



2022 Colorado Clean Truck Strategy



COLORADO
Energy Office



COLORADO
Air Pollution Control Division
Department of Public Health & Environment



COLORADO
Department of Transportation

Letter From State Agency Leadership

To our fellow Coloradans -


Medium- and heavy-duty vehicles include semi trucks, school buses, snow plows, delivery vans, large pick-up trucks, and many different vehicles in between. These vehicles bring our kids to school, deliver food to grocery stores, plow our streets, help repair power lines and roads, transport construction materials, and do hundreds of other critical jobs that power our lives and economy. These vehicles, and the professionals who operate them, are critical to the movement of goods and services across our state, which are brought into sharp view by the current global supply chain crisis. We also know these vehicles have produced much more air pollution and greenhouse gas emissions than their share of vehicles on the road, because they are larger, often drive farther each day and in some cases are lacking the most current pollution controls. In addition, communities living near Colorado's busiest freight routes like I-70, I-25, I-76 and I-270 are exposed to significant air pollution from trucks and buses.

When we developed this draft Colorado Clean Truck Strategy, the primary objective was to transition Colorado's medium- and heavy-duty trucks to low- and zero-pollution alternatives as quickly as possible, especially for those most impacted by the status quo. The opportunities immediately available for Colorado to get older trucks and buses off the roads—including over \$5 billion in funding for clean trucks and buses nationally in the federal Infrastructure Investment and Jobs Act, in Gov. Jared Polis' clean air budget package and in beginning to invest new state funding created by 2021 legislation to support charging infrastructure and incentives for zero-emission trucks and buses—will have the biggest, fastest impact on air quality and public health in the next 12-24 months.

We believe that this actionable and comprehensive strategic plan for Colorado can help jumpstart the market for zero emission trucks and buses by leveraging new opportunities and funding sources, and ensuring our early efforts are focused where they can make the greatest difference. This plan focuses our efforts in the near future on investing in charging infrastructure, creating incentives for truck fleets to start switching to zero emissions vehicles and helping school districts and transit agencies switch to electric buses. Following the development of these foundational programs, this draft plan includes the administration submitting a request to set a rulemaking hearing to the Air Quality Control Commission later in 2022 to consider regulatory standards to both reduce pollution from diesel vehicles and support the transition to zero emission trucks and buses.

We're grateful to the many stakeholders of diverse opinions who have shared their time and ideas with us to inform the development of this plan. Ultimately, a successful transition will require ongoing collaboration and efforts from a wide variety of stakeholders who comprise and are impacted by the medium- and heavy-duty vehicle sector, and we look forward to a continuing partnership.

Many thanks,



Will Toor, executive director
of the Colorado Energy Office



Shoshana Lew, executive
director of the Colorado
Department of Transportation



Shaun McGrath, director of envi-
ronmental health and protection,
Colorado Department of Public
Health and Environment

Executive Summary

Transportation is now the largest source of air pollution and greenhouse gas (GHG) emissions in Colorado. At the same time, our economy is increasingly reliant on freight, as demonstrated during the COVID-19 crisis, so it is critical that the state develop a thoughtful and balanced approach that provides a pathway for emissions reductions from this key sector. Medium- and heavy-duty (M/HD) vehicles are the second-largest source of GHG emissions in the transportation sector, contributing 22% of on-road GHG emissions, despite comprising less than 10% of Colorado vehicles. They are also a significant contributor to ozone precursor emissions like Nitrogen Oxides and Particulate Matter (NO_x and PM) that have serious impacts on air quality and human health. M/HD vehicles are estimated to contribute about 30% of on-road NO_x emissions and 40% of on-road PM emissions.

In July 2020, Gov. Jared Polis signed a [multi-state memorandum of understanding](#) to work collaboratively to advance the market for zero emission trucks and buses. The Colorado Department of Transportation (CDOT), Colorado Department of Public Health and Environment (CDPHE) and Colorado Energy Office (CEO) also announced a public process to work with industry and community stakeholders to develop a broad set of strategies to reduce emissions from M/HD vehicles. Following public meetings in Fall 2020, the state initiated a study to better understand the existing M/HD fleet in Colorado as well as the opportunities and challenges associated with a transition to a zero-emission vehicle (ZEV) fleet. M.J. Bradley & Associates conducted the study on behalf of the state. The [Colorado Medium- and Heavy-Duty Vehicle Study](#) was released in October 2021, and additional public meetings and engagements were held thereafter to present the results and gather input.

The M/HD Study found that if the state of Colorado pursues strategies that support an accelerated transition to M/HD ZEVs – a component of the state’s larger goal of achieving a 100% ZEV transportation sector by 2050 – it could reduce the state’s M/HD emissions of GHGs 45% to 59%, NO_x emissions 54% to 93% and PM emissions 53% to 68% annually by 2050 from a baseline scenario, depending on the level of ZEV adoption. Not only would this have a meaningful impact on the state’s contribution to climate change, but it would also improve air quality and help address the impacts of the transportation sector on disproportionately impacted communities. The M/HD Study also found significant potential cost savings, an estimated \$5.8 billion (2020\$) in cumulative savings by 2050 for Colorado M/HD ZEV owners from reduced vehicle maintenance costs and fuel cost savings.

However, achieving the transition to M/HD ZEVs is not without its challenges. While some M/HD vehicle applications are ready to embrace ZEV technology and have product offerings either on the market or poised to enter the market in the next five years, other sectors may not see viable vehicle alternatives until the end of the decade or longer. In the near term, upfront incremental purchase costs are still significant in most sectors, and support will be needed to afford these higher initial costs. In addition, fueling and charging patterns for M/HD ZEVs will be different than those for the light-duty vehicle sector requiring significant near-term investment in infrastructure along with complementary utility programs that support fleet-friendly rates. There is also a need for workforce development to ensure there are trained technicians for the service and maintenance needs of both vehicles and infrastructure.

Accelerating this transition and achieving the associated benefits will require leveraging a wide range of policies and gaining support from a diverse set of stakeholders. Well-designed, complementary programs that provide vehicle purchase incentives, encourage the retirement of older polluting vehicles, provide technical assistance to fleets, support workforce development and build out a robust charging and fueling network statewide are essential to reduce uncertainty and maximize the benefits of the transition to ZEVs. Both the technical study and the public engagement process have provided input that has refined this Colorado Clean Truck strategy, which seeks to provide a comprehensive roadmap for state agencies and partners to support a successful transition to zero emission M/HD vehicles. The following vision statement, goals and objectives and priority actions are intended to guide this work and are described in more detail in the remainder of the report.

Summary of vision, goals and actions

Vision Statement

Recognizing the critical nature of freight, delivery, passenger transport and other important functions of the medium- and heavy-duty vehicle sector, the vision for this strategy is to support an efficient, affordable and equitable large-scale transition of Colorado's medium- and heavy-duty vehicle sector to zero-emission technologies to achieve the state's greenhouse gas and air pollution emission reduction goals and complementary benefits such as fuel and maintenance cost savings, in a way that prioritizes communities that have historically been most impacted by medium- and heavy-duty vehicle emissions.

Goals and Objectives

Category	Goals and Objectives
Clean truck adoption	<ul style="list-style-type: none">• Zero-Emission Vehicle Sales: Increase adoption of M/HD ZEVs to at least 30% of new sales by 2030, and 100% of sales by 2050.• Zero-Emission Vehicles on the road: Increase adoption of zero-emission M/HD vehicles to 35,000 vehicles on the road by 2030, with a long-term goal of 100% of M/HD vehicles being zero-emissions.• Accelerate Fleet Turnover: For M/HD vehicles that do not have viable near-term ZEV product offerings, state agencies will work with partners to facilitate disposal of the oldest and most polluting vehicles and purchase of replacement vehicles with newer emissions technology. This includes aiming for new trucks sold in the state to produce 90% less NOx emissions than current standards starting in 2027.
Public fleets	<ul style="list-style-type: none">• State fleet: Establish a goal and accompanying transition plan for state-owned fleets to achieve 100% zero-emission M/HD fleet vehicle purchases where technically feasible and able to meet safety and mission critical operations needs by no later than 2040. Interim targets will be set based on the analysis state agencies will complete on the state M/HD fleet needs detailed in the actions below. This builds on Executive Order D 2022 016 Amending and Restating Executive Order D 2019 016 Concerning the Greening of State Government.• Transit fleet: Convert the public transit fleets across the state to 100% zero-emission vehicles no later than 2050, with an interim target of at least 1,000 ZEV transit vehicles by 2030, through implementation of the Transit Zero Emission Vehicle Roadmap.• School buses: Support the adoption of 2,000 electric school buses by 2027 and a longer term goal to achieve 100% zero-emission buses on the road by 2035, with a focus on adoption in school districts in disproportionately impacted communities
Charging and fueling infrastructure	<ul style="list-style-type: none">• State agencies will plan for and support public, utility, public-private partnership and private sector funding for sufficient M/HD charging and hydrogen fueling infrastructure to serve the identified clean truck and bus adoption goals. Additional planning is needed to identify the right quantity and mix of technologies, charging speeds, use cases and locations for this infrastructure.
Equity	<ul style="list-style-type: none">• The state will work with its partners and will leverage CDPHE, CEO, CDOT and CDLE equity resources to prioritize clean truck and bus deployment in ways that provide direct benefits to disproportionately impacted communities and support a just transition for workers in the medium- and heavy-duty vehicle sector.
Support success	<ul style="list-style-type: none">• State agencies and partners will strive to identify sufficient funding, financing and other forms of support to achieve the ZEV adoption goals established, as well as additional anticipated benefits for fleets, workers, disproportionately impacted communities and all Colorado residents such as fuel and maintenance cost savings, job creation and economic development, cleaner air, quieter operations and lower utility rates.

Actions

The M/HD Study along with stakeholder and working group feedback identified many potential actions that Colorado could pursue to support the ZEV transition. Actions have been prioritized to identify the highest impact and most feasible near term actions agencies will pursue in each category in the next two years (2022-2023), as well as medium-term actions that agencies will pursue as capacity allows or after necessary planning has been completed (2024 and beyond). **A full description of each action is included in the main strategy document, including the lead agencies for each.**

Category	Actions	Timing
Procurement policies and programs	1. Analyze the M/HD state fleet to identify the best opportunities for conversion to ZEVs.	Near term
	2. Develop plans for outreach, education, and technical assistance to support public and private fleet transitions to ZEVs.	Near term
	3. Implementation of outreach, education and technical assistance strategies to support public and private fleet transitions to ZEVs.	Medium term
	4. Propose updates to the next Greening of State Government Executive Order that incorporate state fleet goals informed by the analysis of the state M/HD fleet.	Medium term
	5. Evaluate options to streamline procurement and lower costs for public and private fleets.	Medium term
	6. Develop a one-stop shop clean truck website for Colorado fleets.	Medium term
Vehicle incentives and financing	1. Implement an electric school bus grant program and support districts in leveraging federal funds.	Near term
	2. Develop a comprehensive set of program designs for rebates, vouchers and/or grants for zero-emission trucks.	Near term
	3. Explore additional strategies to support the retirement of the oldest, most polluting diesel vehicles on the road, including future legislative action and grant programs.	Near term
	4. Explore options to update and extend tax credits for zero-emission trucks and to consider modifications to the specific ownership tax and sales and use tax.	Medium term
	5. Evaluate options to reduce diesel idling, including incentives for vehicles with high-idling profiles, and for idle-free zones along with other measures.	Medium term
	6. Investigate and recommend financing options for zero-emission M/HD vehicles and fueling infrastructure.	Medium term
	7. Evaluate the level of funding estimated to be needed to support the transition to ZEVs and assess the need for and feasibility of additional funding sources.	Medium term
Infrastructure planning and investments	1. Conduct a planning study for M/HD charging that identifies the quantity, type and locations of charging infrastructure needed to support ZEV truck adoption goals.	Near term
	2. Develop a comprehensive set of incentive offerings for depot and public truck charging, leveraging funding from the federal government and state enterprises.	Near term
	3. Pursue actions in the "Opportunities for Low-Carbon Hydrogen in Colorado:	Near term

	A Roadmap" related to the medium- and heavy-duty transportation sector.	
	4. Work to evaluate and develop case studies for early M/HD charging installations to understand and address barriers to permitting for charging infrastructure.	Near term
	5. Coordinate with neighboring states to share best practices and encourage investments that support an interstate M/HD charging and hydrogen fueling network.	Medium term
	6. Research options to support truck stop electrification, with a focus on electrifying facilities in disproportionately impacted communities.	Medium term
	7. Research options to support loading dock electrification, with a focus on electrifying facilities in disproportionately impacted communities.	Medium term
Utility strategies	1. Engage in development of the next transportation electrification plans (TEPs) to support inclusion of a significant focus on M/HD fleet investments.	Near term
	2. Convene utilities for statewide collaboration on charging planning and implementation for M/HD ZEVs, including in conjunction with roadway projects.	Medium term
	3. Convene a commercial EV rates workshop with utilities and fleets to strive to enable consistent and affordable rates to charge statewide.	Medium term
Workforce development programs	1. Conduct a workforce needs analysis to identify gaps, plan programs and strive to ensure supply of workers matches demand as the ZEV market grows.	Near term
	2. Develop and implement funding partnerships to support ZEV mechanic training programs.	Medium term
	3. Support apprenticeships, internships, scholarships and other strategies to educate and recruit students for future careers in the M/HD ZEV sector.	Medium term
	4. Develop programming alongside existing light-duty dealership efforts to engage and educate M/HD vehicle dealers in the state.	Medium term
Regulatory actions	1. Propose adoption of the Advanced Clean Truck and Low NOx Omnibus rules to the Colorado Air Quality Control Commission (AQCC).	Near term
	2. Establish a working group to collaborate with statewide transit stakeholders regarding potential future adoption of a clean transit rule.	Near term
	3. Investigate options to ensure clean truck adoption by public fleets and large private fleets, in alignment with the Advanced Clean Truck rule where technically feasible.	Near term
Additional opportunities	1. Conduct exploratory work on potential indirect source standards to reduce air pollution from facilities that generate significant M/HD vehicle traffic (any potential regulatory actions would be a medium-term strategy).	Near term
	2. Update the state freight plan including investigation of truck travel strategies that enhance operations, reduce congestion and reduce subsequent greenhouse gas emissions.	Near term
	3. Investigate the potential benefits and feasibility of innovative local programs that reduce emissions from deliveries.	Medium term
	4. Track and report the carbon intensity of transportation fuels used in Colorado.	Medium term
	5. Analyze the relative costs and benefits of different approaches to battery reuse, remanufacturing, recycling and disposal.	Medium term

Introduction

Medium- and heavy-duty (M/HD) vehicles are the second-largest source of GHG emissions in the transportation sector, despite comprising a small portion of vehicles on the road, and are also a significant contributor to ozone precursor emissions (NO_x and PM) that have serious impacts on air quality and human health. Transportation is now the largest source of air pollution and greenhouse gas emissions in Colorado. Increasingly our economy relies on freight and deliveries, so it is critical that the state develop a thoughtful approach that provides a pathway for emissions reductions from this key sector.

A public process, initiated in July 2020 with Gov. Jared Polis signing the [multi-state memorandum of understanding](#) to work collaboratively to advance the market for zero-emission trucks and buses, and which included several public meetings and the development of the [Colorado Medium- and Heavy-Duty Vehicle Study](#), has informed the development of this Clean Truck Strategy. Recognizing the need for a holistic approach to support this transition, the Colorado Clean Truck Strategy is a document that includes a comprehensive set of goals and strategies for state agencies and partners to implement, such as incentives, infrastructure investments, workforce development and regulatory actions, that will be updated over time as the market evolves.

Why the medium- and heavy-duty vehicle sector is critical to Colorado

Medium- and heavy-duty vehicles - including everything from large pick-up trucks and vans to school buses and semi trailers - are critical to our economy and livelihoods in Colorado. Those who operate these vehicles ensure goods are delivered to stores and businesses, transport our kids to school, plow our roads in winter, repair our critical infrastructure and much more. These vehicles are also very diverse, ranging in size, distance traveled per day, variability of daily routes, ownership models and operational requirements. Due to this variability, ZEV models are in various stages of readiness and affordability by weight class and application.

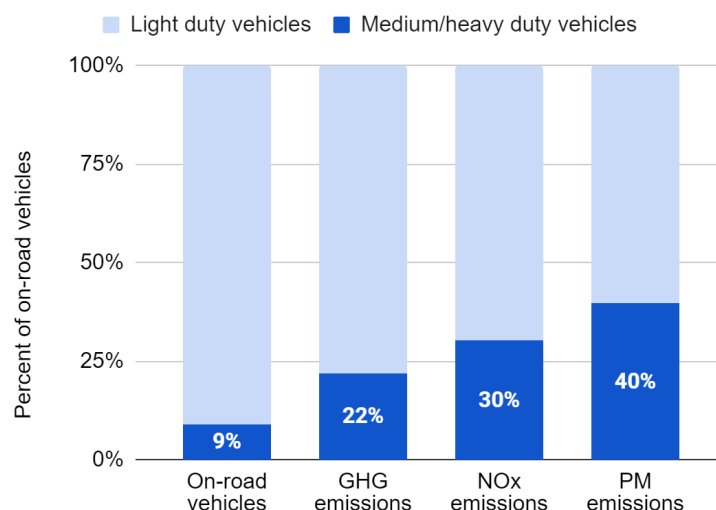
Freight is critical to Colorado's economy, and thus a zero-emission transition must be planned for and managed carefully to ensure continued technological and financial feasibility. As the zero-emission vehicle industry and technology evolve rapidly, several major national fleets have made commitments to transition their vehicles, demonstrating a demand for cleaner trucks and buses; however, most truck fleets are very small and will require technical and financial assistance in order to successfully participate in this transition. Meticulous technical analysis and ongoing, robust stakeholder engagement will be necessary to ensure Colorado can design programs that meet the needs of diverse operators of M/HD vehicles and fleets.

Why clean trucks are important for Colorado's future

M/HD vehicles contribute nearly a quarter of on-road GHG emissions, despite comprising less than 10% of Colorado on-road vehicles, due to their lower fuel economy and higher vehicle miles traveled. They are also a significant contributor to ozone precursor emissions (NO_x and PM) that have serious impacts on air quality and human health.

Figure 1: M/HD vehicles as a percent of total on-road vehicles¹

¹ [FHWA](#), CO vehicle registration data, [CO GHG Pollution Reduction Roadmap](#), and [2017 National Emissions Inventory](#).



In 2019, on-road transportation accounted for 22% of the state’s greenhouse gas emissions. The Greenhouse Gas Pollution Reduction Roadmap established a goal of reducing GHG pollution by 12.7 million metric tons (MMT) from the transportation sector by 2030.² The state’s current Low- and Zero-Emission Vehicle (LEV/ZEV) rules, in addition to utility and public investments in fleet turnover and infrastructure for light-duty zero-emission vehicles, are anticipated to result in an 8 MMT reduction in GHG emissions by 2030. In addition, the state’s recently adopted greenhouse gas transportation planning standard is anticipated to result in 1.5 MMT reduction by 2030. This leaves a 3.2 MMT gap. Accelerating adoption of clean trucks has been identified as one of several strategies to fill this remaining gap.

Figure 2: Clean trucks’ role in reaching the state’s transportation and GHG goals

Reduce GHG pollution ~12.7 million tons by 2030

6 MMT
reduction

Low and Zero Emission Vehicle rules

2 MMT
reduction

Utility and public investment in fleet turnover and infrastructure for light-duty zero emission vehicles (SB19-077, electrification investments from SB21-260)

1.5 MMT
reduction

GHG Transportation Planning Standard

Collectively, the other strategies will target remaining 3.2 million tons

~3.2 MMT
reduction

Incentivize land use to increase housing near jobs and reduce VMT and pollution

HB 21-1271, HB 21-1117; CDOT stakeholder process; interim affordable housing committee



Clean Truck Strategy - infrastructure, fleet incentives, regulatory actions such as Advanced Clean Trucks and fleet rules

Study released October 2021
Stakeholder Engagement - Fall 2021/Winter 2022; fleet investments from SB21-260

Participate in developing post 2025 vehicle standards (state and federal)

Participating in Federal and CARB processes

AQCC evaluation of indirect source rules

Interagency group formed to conduct exploratory analysis

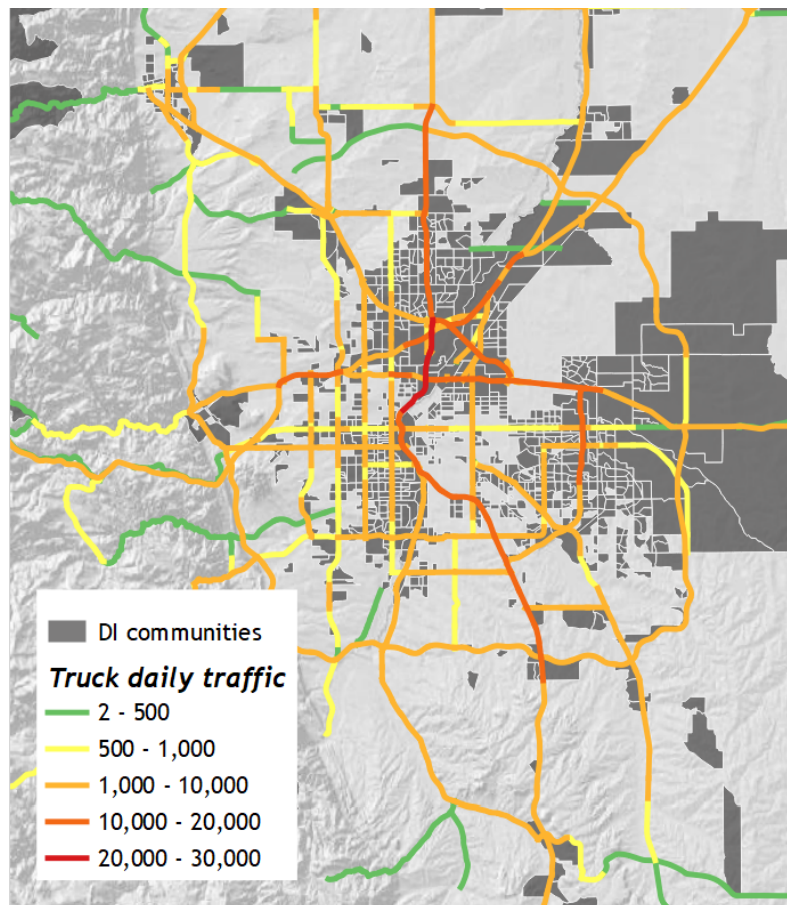
Expansion of public transit, including setting the stage for Front Range Rail

In progress - SB21-238, SB 21-260, Main Streets investments, on-going multimodal emphasis

² [GHG Pollution Reduction Roadmap | Colorado Energy Office](#)

Additionally, disproportionately impacted (DI) communities are more likely to live in close proximity to major freight routes, such as I-70, I-270, I-76 and I-25, where they experience greater exposure to NOx and PM emissions that have significant impacts on human health. Researchers have found that living in areas with high exposure to air pollution has increased risks for morbidity across a range of cardiopulmonary diseases, and there is growing evidence that prolonged exposure to air pollution may also contribute to COVID-19 severity.³

Figure 3: Daily truck traffic and disproportionately impacted (DI) communities



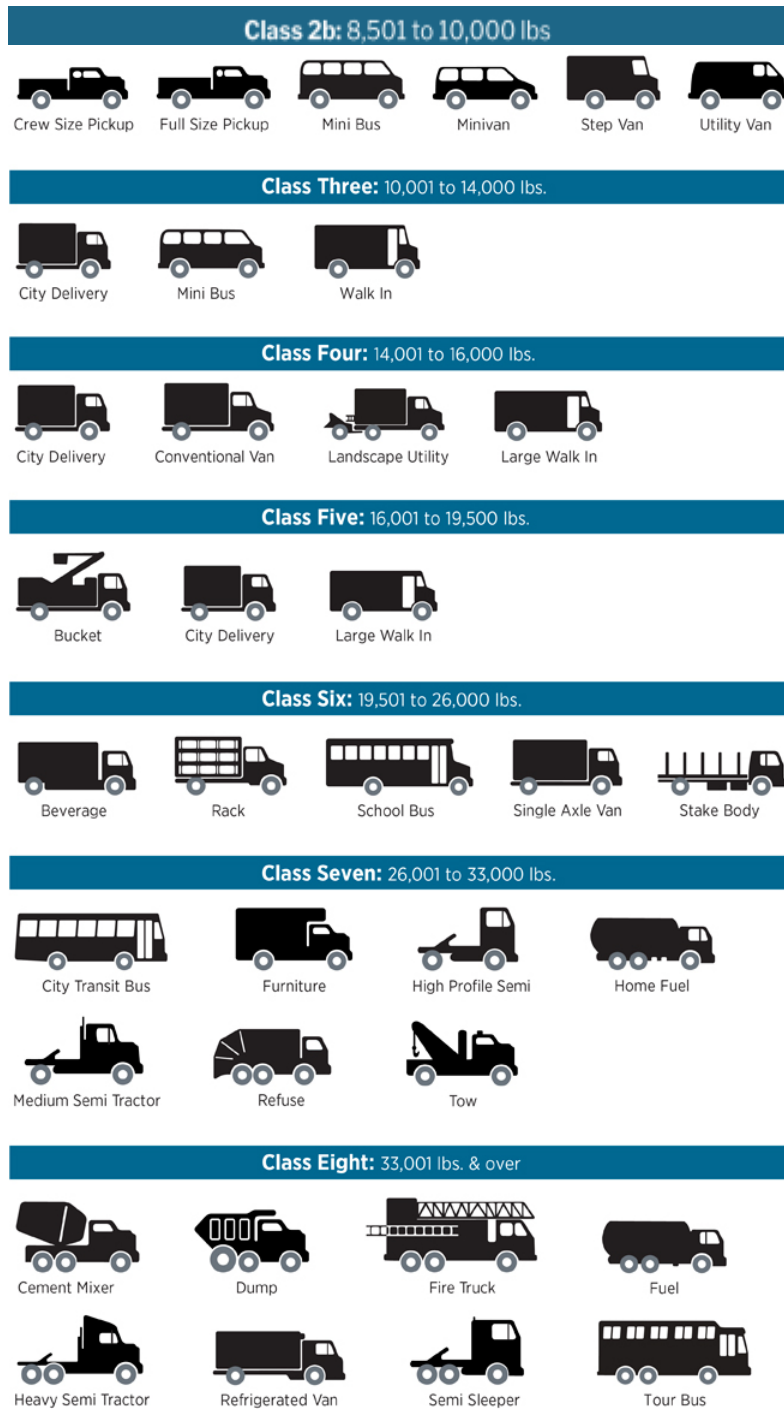
Medium- and Heavy-Duty Vehicle Sector Overview

This section provides a high-level summary of some of the key findings of the [Colorado Medium- and Heavy-Duty Vehicle Study](#), completed by M.J. Bradley & Associates on behalf of the state in October 2021.

Definitions

³ Brandt, E.B., Beck, A.F., & Mersha, T.B. (2020). Air pollution, racial disparities, and COVID-19 mortality. *J Allergy Clin Immunol*, 146(1), 61–63. doi: 10.1016/j.jaci.2020.04.035

What types of vehicles are medium- and heavy-duty (M/HD)?⁴



The Clean Truck Strategy is primarily focused on supporting the transition of on-road medium- and heavy-duty vehicles to cleaner technologies and fuels. Many of these vehicles are commercial vehicles operated by fleets, though a substantial proportion of medium-duty vehicles are also owned by private individuals. The strategy seeks to support the transition of the most ready vehicle segments to zero-emission technologies in the near term, such as buses and delivery vehicles, while vehicles that provide emergency and other critical services are likely to transition later as the technology and charging infrastructure coverage improves.

⁴ <https://afdc.energy.gov/data/10381>

What are zero-emission vehicles (ZEVs)?⁵

Zero-Emission Vehicle: Means a battery electric motor vehicle or a hydrogen fuel cell motor vehicle.

Battery-Electric Vehicles (BEVs): Means a motor vehicle that is powered exclusively by a rechargeable battery pack that can be recharged by being plugged into an external source of electricity and that has no secondary source of propulsion.



Plug-In Hybrid Electric Vehicles (PHEVs): Means a motor vehicle that is powered by both a rechargeable battery pack that can be recharged by being plugged into an external source of electricity and a secondary source of propulsion such as an internal combustion engine. Also sometimes referred to as near zero emission vehicles (NZEVs).



Hydrogen Fuel Cell Electric Vehicles (FCEVs): Means a motor vehicle that is powered by electricity produced from a fuel cell that uses hydrogen gas as fuel.

Other emissions reduction solutions: Other fuels and technologies that can reduce emissions from M/HD vehicles include but are not limited to vehicles that utilize recovered methane or biofuels and hybrid refrigeration units. SB21-260 defines recovered methane as any of the following, if the Air Pollution Control Division determines them to provide a net reduction in greenhouse gas emissions: biomethane; methane derived from municipal solid waste, biomass pyrolysis or enzymatic biomass or wastewater treatment; and coal mine methane. Because there is limited supply and need for recovered methane in hard-to-decarbonize industrial operations, it likely has only a limited and near-term role in transportation, in sectors where EV and hydrogen vehicles are not yet available.



SB21-260 allows the Clean Fleet Enterprise to invest in incentives for vehicles powered by recovered methane in sectors where other ZEV vehicles are not yet available:

- *“It is necessary, appropriate, and in the best interest of the state and all Coloradans to incentivize and support the use of electric motor vehicles and, to the extent temporarily necessitated by the limitations of current electric motor vehicle technology and availability for certain fleet uses, compressed natural gas motor vehicles that are fueled by recovered methane and that produce fewer emissions than gasoline or diesel powered motor vehicles, by businesses and governmental entities that use fleets of motor vehicles”*
- *With respect to the Clean Fleet Enterprise, “through December 31, 2026, to help public and private owners and operators of motor vehicle fleets finance acquisitions of compressed natural gas motor vehicles that are trucks if at least ninety percent of the fuel for the trucks will be recovered methane, and, on or after January 1, 2027, for so long as the Enterprise determines that electric motor vehicles are not yet practically available or do not meet the operational requirements such as cargo carrying capacity and driving range for specific categories of trucks to help public and private owners and operators of motor vehicle fleets finance acquisitions of compressed natural gas motor vehicles that are trucks if at least ninety percent of the fuel for the trucks will be recovered methane”*
- *With respect to the Clean Transit Enterprise: “The Enterprise is authorized to make grants, loans or rebates to fund...the replacement of motor vehicles used by public transit*

⁵ Definitions included are primarily from [SB21-260](#), Sustainability of the Transportation System.

providers that are not electric motor vehicles by electric motor vehicles, or, if electric motor vehicles are not practically available, by compressed natural gas vehicles, if at least ninety-percent of the fuel for the compressed natural gas motor vehicles will be recovered methane.”

National Summary of the Medium- and Heavy-Duty Vehicle Sector

Some of the key takeaways about the national M/HD fleet and industry from the M/HD Vehicle Study include:

- **Vehicle diversity:** Some M/HD vehicles have very specific use cases (e.g., garbage trucks) while others are used for more varied, general purposes.
- **Vehicle lifetime:** M/HD vehicles often remain on the road longer than light-duty vehicles (LDV); average M/HD vehicle life is 30 years, while most vehicles’ “effective life” (90% of total lifetime mileage) is less than 20 years. This suggests the importance of supporting significant uptake of ZEV purchases by 2030 to achieve the state’s long-term transportation emission reduction goals.
- **Ownership models:** Very few fleets own new trucks, and most are the secondary or tertiary owners of M/HD vehicles. Many other fleets lease their vehicles.
- **Fleet size:** Over 80% of truck fleets have six or fewer trucks. Very small fleets like these may have fewer “spare” vehicles, which may affect their risk tolerance to try new technologies.
- **Consolidated industry:** A few major manufacturers make 95% of Class 4-8 vehicles, while Ford, GM and Stellantis (Dodge and Ram) sell the majority of Class 2b and 3 vehicles.
- **Secondary manufacturers:** Many trucks are sold as “incomplete vehicles,” and a secondary manufacturer then adds a vocational body.

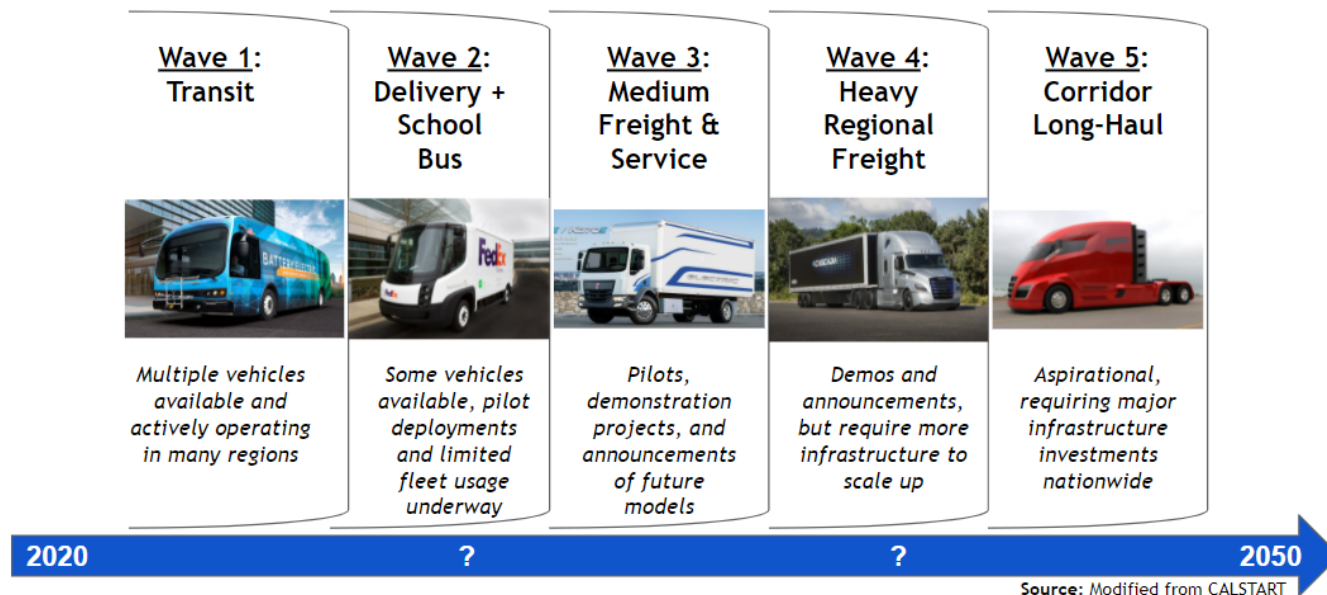
State of the Medium- and Heavy-Duty Zero Emission Vehicle Market

Some of the key takeaways about the M/HD ZEV market from the M/HD Vehicle Study include:

- **Vehicle readiness:** Some vehicle types are more ready to transition to zero-emission vehicles in the near term (such as transit and school buses, delivery vehicles and local and regional haul freight), while others are more challenging and will require more time and support (such as Class 8 tractor trailers).
- **Range and model availability:** Today, few models have more than 150 miles of range, though manufacturers have announced many new ZEV models in the coming years with growing ranges. The Global Commercial Vehicle Drive to Zero campaign’s [Zero-Emission Technology Inventory](#) is a helpful resource to review and track model availability for different vehicle segments.
- **Costs:** Incremental upfront costs are currently higher but are expected to decline in the coming years across a variety of vehicle types, as battery costs continue to decline. Fuel and maintenance cost savings are expected to be substantially lower than conventional vehicles.
- **Charging considerations:** While some vehicles return to the same depot overnight, others travel long distances across the country, and in other cases drivers park their vehicles at home. Each day, some vehicles travel predictable routes and distances (such as buses), while others’ routes are much more variable. Because of these differing duty cycles and parking situations, M/HD vehicles will need a mix of depot and public charging stations, at varying charging speeds.

- **Fleet commitments:** Several large national fleets have made high profile commitments to transition to zero emission vehicles, such as Amazon, Ikea Group, FedEx, Sysco, and more.

Figure 4. Anticipated phase-in of M/HD ZEV technologies (modified from CALSTART)

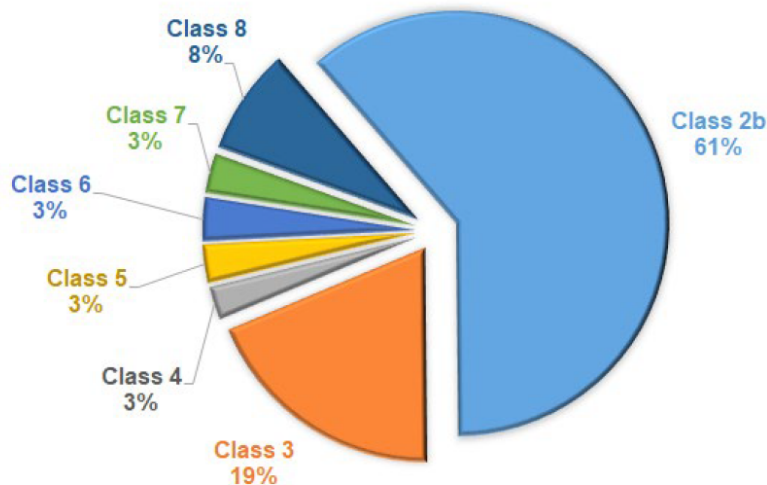


Colorado summary of the Medium- and Heavy-Duty Vehicle Sector

Some of the key takeaways about the Colorado M/HD market from the M/HD Vehicle Study include:

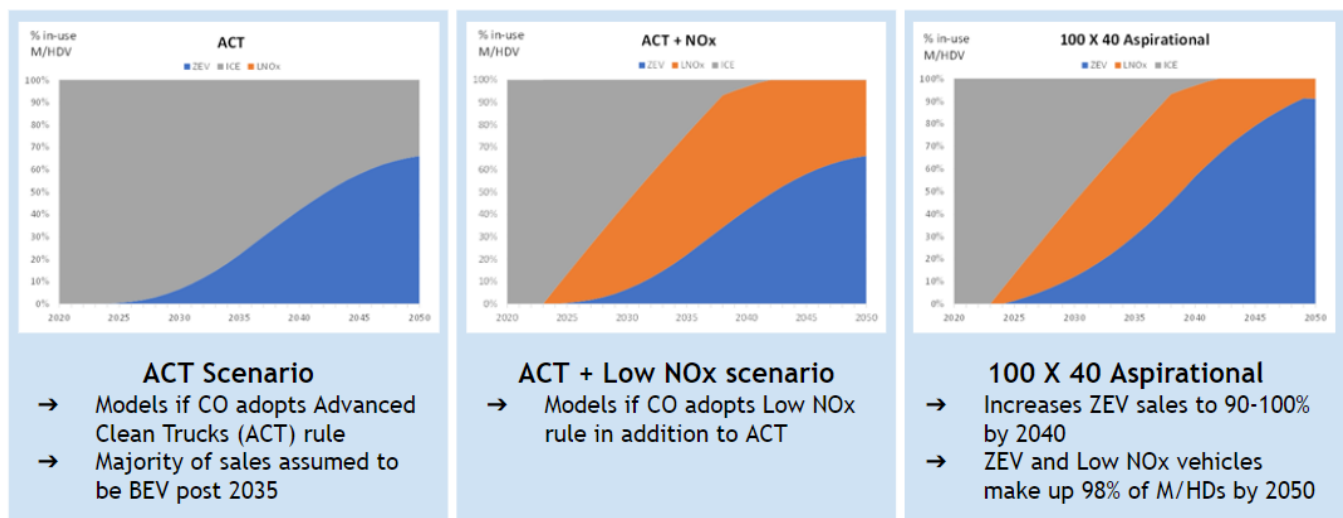
- **Fleet size:** Colorado has nearly half a million M/HD vehicles registered in the state. Over half of these are Class 2b light-trucks (61%), with Class 3 contributing the second largest portion (19%).
- **Fleet ownership:** A very large portion of the Class 2b vehicles are likely either personal vehicles or are owned by very small commercial fleets.
- **Vehicle distribution:** Registrations of Class 2b and 3 vehicles are distributed across the state, while registrations of class 4-8 vehicles are more concentrated along the front range and the I-25 corridor.
- **Vehicle miles traveled:** Class 2b and 3 vehicles, buses and single-unit trucks in Colorado travel on average 30-50 miles per day, while long haul trucks travel on average 235 miles per day.
- **Fleet age:** M/HD vehicles are capital assets and are kept longer than light-duty vehicles. Nearly half of the Colorado M/HD fleet is older than 14 years, and 16% percent of vehicles were built before 2000. Thirty-four percent of Class 7-8 are older than 20 years.
- **Leading by example:** State, county and city governments, including transit authorities and school districts, own nearly half the vehicles in the 100 largest M/HD fleets in Colorado. Fleets of utilities, truck rentals, delivery services and construction also have sizable fleets. Collectively the vehicles in these 100 largest fleets comprise about 6% of all M/HD vehicles.

Figure 5: Colorado M/HD Vehicles by Weight Class



Overview of M/HD Study scenario modeling

Figure 6: Three Scenarios: Comparison by Projected Percent In-Use M/HD Vehicles in Colorado



M.J. Bradley & Associates modeled three scenarios to understand the cost, emissions and societal impacts of different M/HD ZEV adoption trajectories. Some of the key findings include:

- Greenhouse gas emissions:** GHG emissions from all M/HD vehicles on the road in Colorado would decline 6% by 2030 and 45% by 2050 under both the ACT and Low NOx scenarios. An M/HD electric vehicle operating in Colorado today is estimated to emit 48% less than a comparable diesel truck, based on Colorado's electricity mix as of 2021. As more renewable energy is added to the electric grid, M/HD electric vehicles are anticipated to emit 75% less in 2030 and 95% less in 2050, based on modeling completed for the Greenhouse Gas Pollution Reduction Roadmap.⁶

⁶ Estimates developed based on [U.S. Energy Information Administration Electricity Net Generation](#) for Colorado, the [Colorado Greenhouse Gas Pollution Reduction Roadmap](#), and the [Advanced Clean Trucks Initial Statement of Reasons](#).

- **Air pollution emissions:** NOx emissions are expected to fall 54% under the ACT scenario and 90% in the Low NOx scenario, while PM emissions would decrease by 53% in both the ACT scenario and Low NOx scenario by 2050.
- **Costs:** Net financial savings grows for all scenarios over time as upfront costs are projected to decline, resulting in an estimated \$5.8 billion (2020\$) in cumulative savings by 2050 for Colorado M/HD ZEV owners in the ACT + Low NOx scenario. Over the long term, vehicle maintenance and fuel cost savings outweigh upfront incremental costs, though in the early years, support will likely be needed to overcome higher upfront costs.
- **Total societal benefits:** Projected net societal benefits for the ACT + Low NOx scenario are \$20.4 billion (2020\$) by 2050, which takes into account the net financial savings to Colorado M/HD ZEV owners, GHG monetized savings and air quality benefits and utility net revenue from increased M/HD electrification.

Overview of available and potential funding to support clean trucks

SB21-260: In June 2021, Gov. Jared Polis signed SB21-260 into law, which substantially increases funding for Colorado's transportation system and sets up three new state enterprises that will establish programs to support the transition to M/HD ZEVs through vehicle incentives and investments in charging and fueling infrastructure. The enterprises and their focus areas include:

- **Community Access Enterprise (projected \$310 million over the first 10 years):** Support the widespread adoption of electric motor vehicles, equitably invest in transportation infrastructure and incentivize the acquisition and use of electric motor vehicles and electric alternatives to motor vehicles.
- **Clean Fleet Enterprise (projected \$289 million over the first 10 years):** Support fleet replacement (delivery trucks, TNCs, school buses and other light-/medium-/heavy-duty vehicles) with incentives to meet climate and air quality goals.
- **Clean Transit Enterprise (projected \$134 million over the first 10 years):** Support electrification of public transit through electrification planning efforts, fleet replacement, facility upgrades and associated charging infrastructure.
- In addition, SB21-260 builds in an inflation factor for the existing EV registration fee that supports the **Colorado Electric Vehicle Infrastructure Fund**, administered by the Energy Office. This fund is projected to generate **\$115 million over 10 years**.
- The **Innovative Motor Vehicle and Truck Credits**, administered by the Colorado Department of Revenue, offers tax credits for new purchased and leased electric and plug-in hybrid M/HD vehicles through 2026.

Utility Transportation Electrification Plans (TEPs): SB19-077 allowed rate-basing of EV infrastructure and required every investor owned utility to file TEPs supporting widespread electrification every three years. The first TEP was approved by the Public Utilities Commission in January 2021, which included \$105 million in planned investments over three years by Xcel in charging infrastructure, vehicle incentives, fleet advisory services, pilot programs and more. The cost cap in the legislation requiring TEPs grows over time as revenue from electricity sales for EV charging grows, potentially allowing larger investments in future TEPs.

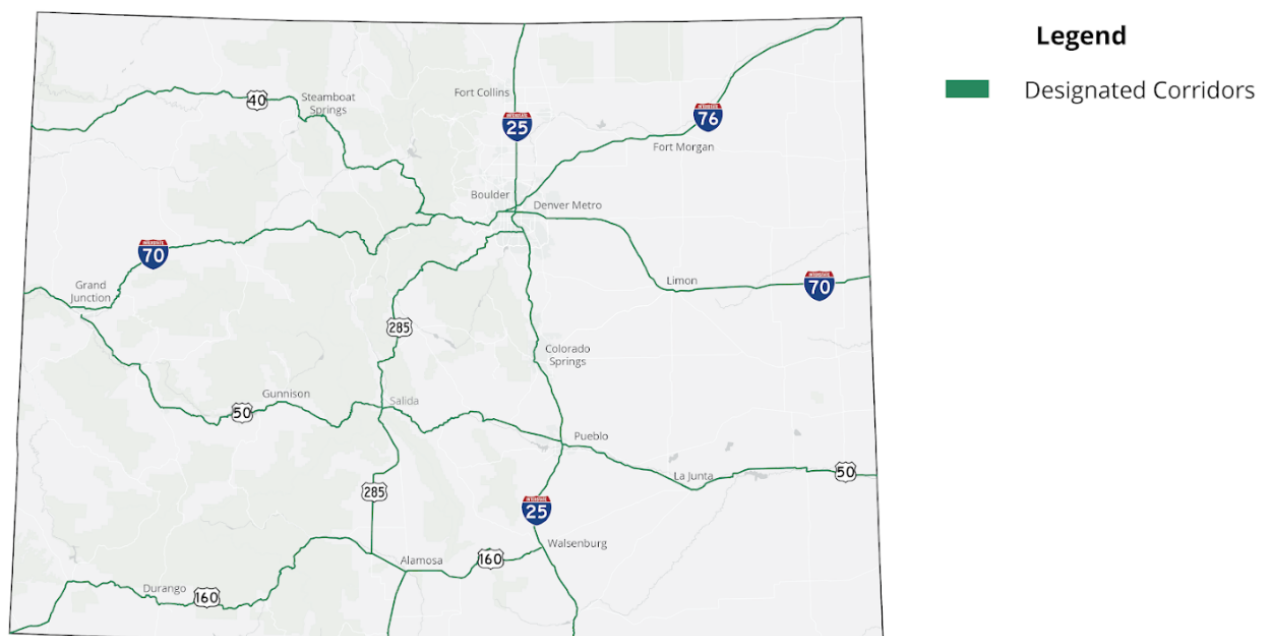
Governor's FY 2022-23 budget: Governor Polis' FY 2022-23 budget included requests for over \$424 million in investments to improve air quality. In response, the legislature approved a \$65 million grant fund to support school districts' purchase of electric school buses, associated infrastructure and accelerated retirement or conversion of diesel buses. The program will also help districts leverage

federal and private financing options for the remaining cost of buses, allowing districts to utilize future fuel and maintenance savings as they are realized.

Infrastructure Investment and Jobs Act (IIJA): The IIJA was signed into law in November 2021 and includes several competitive and formula grant programs relevant to supporting the adoption of clean trucks that state agencies will work to compete for and leverage:

- **Clean school buses:** \$5 billion in competitive grants for clean school buses, including \$2.5 billion specifically for zero-emission school buses.
- **National Electric Vehicle Infrastructure (NEVI) Formula Program:** \$5 billion formula program (including an estimated \$57 million for Colorado) which provides funding to states to “strategically” deploy EV charging, maintenance for the infrastructure and “establish an interconnected network to facilitate data collection, access and reliability.” The primary focus is on charging along designated national alternative fuel corridors.

Figure 7: [*Federally Designated Corridors in Colorado \(Rounds 1-5\)*](#)



- **Grants for charging and fueling infrastructure:** \$2.5 billion competitive grant program for charging and fueling infrastructure, with grants of up to \$15 million each.
- **Regional hydrogen hubs:** \$8 million for competitive grants to create clean hydrogen regional hubs.

Process and Implementation

Process for developing the Clean Truck Strategy: The 2022 Colorado Clean Truck Strategy was developed through a collaboration of state partners including CEO, CDPHE and CDOT with input from stakeholders through public meetings and a stakeholder working group. The figure below outlines the key steps in developing the first iteration of this strategy.

Figure 8: *Clean Truck Strategy development process, 2020-2022*

July 2020: Colorado signs Multi-state M/HD ZEV MOU and Kicks off Clean Truck Strategy

- 3 Public Meetings
- Colorado Motor Carriers Association (CMCA) ZEV Working Group
- M/HD Vehicle Study Kick-off

Fall 2021: M/HD Vehicle Study Completed

- Presentation of M/HD Vehicle Study results
- 3 public meetings
- Formation of stakeholder working group

Winter-Spring 2022: Complete Colorado Clean Truck Strategy

- Issue draft strategy
- Additional public comment and engagement
- Publish final strategy

Summer-Fall 2022: Implementation in progress

- Agencies continue work on early priorities of Clean Truck Strategy implementation, Enterprise program implementation, electric school bus programs
- Enterprise 10 Year Plans completed

Late 2022: AQCC Request for Rulemaking Hearing

- Request for rulemaking hearing in 2022 for potential adoption of the Advanced Clean Trucks (ACT) Rule and Low NOx Omnibus rules, with hearing in 2023
- Public engagement on draft rule in advance

Updates and Reporting: CEO, CDOT and CDPHE, with input from stakeholders, will review and update recommendations from the Colorado Clean Truck Strategy every two years as part of the regular Colorado EV Plan updates, or as needed in response to changing market dynamics and planning requirements. State agencies will report on progress toward the Clean Truck Strategy goals in the annual progress reports to the legislature on the Colorado EV Plan and GHG Pollution Reduction Roadmap required by SB21-260 starting in FY 2022-2023.

Ongoing engagement: State agencies will continue to engage key stakeholders on implementation of the Clean Truck Strategy through regular updates and opportunities for input at the Freight Advisory Council, Colorado Electric Vehicle Coalition and other interested stakeholder groups.

Vision, Goals and Objectives

2022 Clean Truck Strategy Vision

Recognizing the critical nature of freight, delivery, passenger transport and other important functions of the medium- and heavy-duty vehicle sector, the vision for this strategy is to support an efficient, affordable and equitable large-scale transition of Colorado's medium- and heavy-duty vehicle sector to zero-emission technologies to achieve the state's greenhouse gas and air pollution emission reduction goals and complementary benefits such as fuel and maintenance cost savings in a way that prioritizes communities that have historically been most impacted by medium- and heavy-duty vehicle emissions.

Goals and Objectives

Clean Truck Adoption: State agencies will work with partners to achieve the following clean truck and ZEV adoption goals for the M/HD vehicle sector:

- **Zero-Emission Vehicle Sales:** Increase adoption of M/HD ZEVs to at least 30% of new sales by 2030 and 100% of sales by 2050.
- **Zero-Emission Vehicles on the road:** Increase adoption of zero-emission M/HD vehicles to 35,000 vehicles on the road by 2030, with a long-term goal of 100% of M/HD vehicles being zero-emissions.
- **Accelerate Fleet Turnover:** For M/HD vehicles that do not have viable near-term ZEV product offerings, state agencies will work with partners to facilitate disposal of the oldest and most polluting vehicles and purchase of replacement vehicles with newer emissions technology. This includes aiming for new trucks sold in the state to produce 90% less NOx emissions than current standards starting in 2027.

Public fleets: The state and other public fleets, which collectively represent nearly half of the vehicles in the state's 100 largest fleets, will lead by example in deploying zero emission M/HD vehicles in appropriate use cases:

- **State fleet:** Establish a goal and accompanying transition plan for state-owned fleets to achieve 100% zero-emission MHD fleet vehicle purchases where technically feasible and able to meet safety and mission-critical operations needs by no later than 2040. Interim targets will be set based on the analysis state agencies will complete on the state M/HD fleet needs detailed in the actions below. This builds on Executive Order D 2022 016 Amending and Restating Executive Order D 2019 016 Concerning the Greening of State Government, which sets a goal to reduce GHG emissions from state fleet vehicles by at least 15% by the end of FY 2023-2024 from a FY 2014-2015 baseline and directs departments to select M/HD zero-emission vehicles where they are cost-effective, meet operational needs and are available in the marketplace.
- **Transit fleet:** Convert the public transit fleets across the state to 100% zero-emission vehicles no later than 2050, with an interim target of at least 1,000 ZEV transit vehicles by 2030, through implementation of the Transit Zero-Emission Vehicle Roadmap.
- **School buses:** Support the adoption of 2,000 electric school buses by 2027 and a longer-term goal to achieve 100% zero-emission buses on the road by 2035, with a focus on adoption in school districts in disproportionately impacted communities.

Charging and fueling infrastructure: State agencies will plan for and support public, utility, public-private partnership and private sector funding for sufficient M/HD charging and hydrogen fueling infrastructure to serve the identified clean truck and bus adoption goals. Additional planning is needed to identify the right quantity and mix of technologies, charging speeds, use cases and locations for this infrastructure.

Equity: The state will work with its partners and will leverage CDPHE, CEO, CDOT and CDLE equity resources to prioritize clean truck and bus deployment in ways that provide direct benefits to

disproportionately impacted communities and support a just transition for workers in the M/HD vehicle sector.⁷

Support success: State agencies and partners will strive to identify sufficient funding, financing and other forms of support to achieve the ZEV adoption goals established, as well as additional anticipated benefits for fleets, workers, disproportionately impacted communities and all Colorado residents such as fuel and maintenance cost savings, job creation and economic development, cleaner air, quieter operations and lower utility rates.

***A preliminary estimate of greenhouse gas emissions reductions:** Implementation of the actions and goals in the Clean Truck Strategy is estimated to reduce GHG emissions from the M/HD vehicle sector by approximately 0.4 MMT annually by 2030 and 3.3 MMT by 2050, based on modeling completed for the Advanced Clean Truck (ACT) + Low NOx Scenario by MJ Bradley & Associates for the Colorado M/HD Study. This scenario assumed an M/HD ZEV adoption trajectory that would result in 35,000 M/HD ZEVs on the road by 2030, which is the goal the state is setting in this Strategy. The ACT + Low NOx scenario in the M/HD Study assumed Colorado would adopt ACT and the Low NOx rules on the same timeline as California, which is not feasible due to Clean Air Act requirements, and the strategy recommends adopting ACT on a timeline that would come into effect three model years later than California (2027 instead of 2024). Nevertheless, the state anticipates that the incentive programs, infrastructure investments and other actions in the strategy combined can achieve a roughly similar M/HD ZEV adoption trajectory in 2024 through 2026 as programming ramps up to achieve the 35,000 vehicles on the road target. However, this is not a precise estimate and additional analysis will be needed over time to more accurately quantify the GHG emissions reductions associated with all the actions in the strategy. Additionally, the state expects that modeling conducted by the Air Pollution Control Division for the ACT and Low NOx rulemakings is likely to produce differing estimates than those in the Colorado M/HD Study and can help refine the preliminary estimates reported here.*

Actions

The M/HD Study along with stakeholder and working group feedback identified many potential actions that Colorado could pursue to support the ZEV transition. The actions detailed in this section of the strategy are designed to support achieving the vision, goals and targets and include the lead implementers and timing where possible. **Lead agencies for specific actions are highlighted in bold.** Actions have been prioritized to identify the highest impact and most feasible near-term actions agencies will pursue in each category in the next two years (2022-2023), as well as medium-term, lower priority actions that agencies will pursue as capacity allows or after necessary planning has been completed (2024 and beyond). Medium-term actions will be further prioritized in future updates to the strategy. A brief summary of past and ongoing efforts the state will continue is also included in each section for reference.

Procurement policies and programs

Past and ongoing efforts in Colorado

- [Executive Order D 2022 016 Amending and Restating Executive Order D 2019 016 Concerning the Greening of State Government](#), which contains goals and directives for reducing emissions from the

⁷ Relevant equity and disproportionately impacted community resources include [CDPHE's Climate Equity Framework and Data Viewer](#), CEO's EV Equity Study (forthcoming), and CDOT's newly created Environmental Justice and Equity Branch.

state fleet.

- CDOT's [Transit Zero-Emission Vehicle Roadmap](#) has been developed to support planning to reach the state's transit electrification goals.

Near-term, high-priority actions (2022-2023)

1. As the largest state agency operator of M/HD vehicles, **CDOT** will conduct an analysis of the best opportunities for conversion to ZEVs in their M/HD fleet. **CEO**, **CDPHE** and **DPA** will coordinate to conduct an analysis of the best opportunities for conversion to ZEVs with other state agencies who operate M/HD vehicles.
2. **CDPHE**, **CEO** and **CDOT** will engage with the Community Access and Clean Fleet Enterprises, utilities, public and private fleets, disproportionately impacted communities, and other key stakeholders to explore different fleets' needs and develop plans for outreach, education and technical assistance for public and private M/HD fleets to transition to ZEVs, including a focus on fleets located in disproportionately impacted communities, disadvantaged business enterprise fleets, small fleets and local government fleets.

Medium-term strategies (2024 and beyond)

3. **CDPHE**, **CDOT** and **CEO** will collaborate on implementing the outreach, education and technical assistance plans for fleets, including exploring partnerships or potential additional capacity needs to provide technical assistance to public and private fleets to support ZEV transition planning, as well as potentially creating working groups of fleets with similar duty cycles and operating requirements.
4. **CEO**, **CDOT** and **CDPHE** will propose updates to the next Greening of State Government Executive Order that incorporate state fleet goals informed by the analysis of the state M/HD fleet.
5. **CEO**, **CDOT** and **CDPHE** will work with **DPA** to seek ways to leverage cooperative procurement and price agreements to lower costs and streamline procurement of M/HD ZEVs and EVSE for public and private fleets and will explore additional procurement strategies.
6. **CEO**, **CDOT** and **CDPHE** will work together to develop a one-stop-shop website for state-level information on Colorado clean truck policies, programs, technical assistance and educational resources offered across agencies, enterprises and by other key stakeholders. This will include information on available vehicle models, research on in-use operation, total cost of ownership, innovative charging and financing solutions and best practices for vehicle to grid integration.

Vehicle incentives and financing

Past and ongoing efforts in Colorado

- The [Income 69: Innovative Motor Vehicle and Truck Credits for Electric and Plug-in Hybrid Electric Vehicles](#) administered by the Colorado Department of Revenue offers tax credits for new purchased and leased electric and plug-in hybrid, medium- and heavy-duty vehicles through 2026.
- [ALT Fuels Colorado](#), administered by the Regional Air Quality Council (RAQC), is a grant program for

the replacement and retirement of pre-2009 vehicles with battery-electric and recovered methane fleet vehicles.

- The [Diesel Retrofit program](#), administered by the RAQC, is an incentive program designed to help on- and off-road diesel operators voluntarily reduce diesel emissions while saving money.
- [The Volkswagen Settlement](#) funds several programs in Colorado with the \$68.7 million the state received from Volkswagen Group of America, including CDOT's Transit Bus Replacement Program that gives grants to transit agencies to retire and replace older diesel and gasoline buses with battery-electric, hydrogen fuel cell or recovered methane vehicles.
- The [Colorado Clean Diesel Program](#) makes grants to businesses to help offset the cost of replacing certain diesel equipment with all-electric or hybrid-electric equivalents.
- The [Clean Fleet Enterprise](#) was created by SB21-260 for the business purpose of incentivizing and supporting the use of electric motor vehicles and other clean fleet technologies by fleet owners and operators.
- The [Clean Transit Enterprise](#) was created by SB21-260 to support Colorado's transit electrification through planning efforts, transit site upgrades, procurement of electric transit buses and deployment of associated charging infrastructure.
- [Xcel's Electric School Bus Rebate](#) provides public school district customers a rebate for electric school bus projects – up to \$275,000 – depending on project costs.

Near-term, high-priority actions (2022-2023)

1. **CDPHE** and **CEO** will support implementation of the governor's proposed 2022 budget that includes \$65 million for a grant program for school districts to purchase electric school buses and associated infrastructure and that will support school districts in applying for federal funding for zero emission school buses and leveraging other financing approaches.
2. **CDPHE**, **CEO** and **CDOT** will encourage the Clean Fleet Enterprise and Community Access Enterprise to develop a comprehensive set of program designs for rebates, vouchers and/or grants for zero-emission vehicles that consider the following components and principles:
 - Provides a stable and consistent program fleets can plan around.
 - Focuses on bridging the incremental cost gap.
 - Includes electric vehicles, hydrogen vehicles and vehicles that run on recovered methane where there are no other available ZEVs.⁸
 - Maximizes the use of new federal formula funds and competitive grant programs, financing and other sources.
 - Prioritizes the most market-ready electric truck segments in the early years.
 - Prioritizes deployment in disproportionately impacted communities, disadvantaged business enterprises and smaller fleets, such as through increased funding amounts or carve-outs.
 - Requires vehicle retirement where
 - Includes QVM/QSR and OEM-approved vehicle repowers installed by trained and certified technicians utilizing appropriate quality assurance measures.
 - Enables fleets the flexibility to sell vehicles when they need to.
 - Reduces incentive amounts over time based on an evaluation of need.
 - Has sufficient flexibility to accommodate delays in permitting, delivery of vehicles or installation of charging/fueling infrastructure that are beyond the fleet's control.
 - Includes a list and information about current vehicle and equipment eligibility on state websites.
 - Pursues innovative program designs informed by a review of programs nationwide.

⁸ Recovered methane is only eligible through the Clean Fleet Enterprise, not the Community Access Enterprise.

appropriate, particularly for replacing the oldest vehicles on the road.

3. **CDPHE**, with support from the other agencies, will explore additional cost-effective and innovative strategies to support the retirement of the oldest, most-polluting diesel vehicles on the road, including future legislative action and grant programs.

Medium-term strategies (2024 and beyond)

4. **CEO** will work with the Department of Revenue and the legislature to explore options to update and extend tax credits for zero-emission truck purchases and leases beyond when they are set to expire in 2025 and to consider modifications to the specific ownership tax and sales and use tax to ensure that ZEV trucks do not have to pay significantly more than equivalent diesel trucks.
5. **CDPHE** will work with partners to evaluate options to reduce diesel idling, including incentives for vehicles with high-idling profiles, idle-free zones and other measures.
6. **CEO**, **CDOT** and **CDPHE** will work with OEMs, utilities, fleets, dealerships and the Colorado Clean Energy Fund to investigate and recommend financing options for zero-emission M/HD vehicles and fueling infrastructure.
7. **CEO**, **CDOT** and **CDPHE** will evaluate the level of funding estimated to be needed to support the transition to ZEVs based on early lessons learned from implementation of the enterprise programs and other actions in this strategy, and will assess the need for and feasibility of potential additional funding sources and mechanisms.

Infrastructure planning and investments

Past and ongoing efforts in Colorado

Note: Several of the efforts described below have been focused on supporting light-duty electric vehicle charging to date.

- CEO's [EV Fast-Charging Plazas Program](#) is designed to increase access to high-speed charging across the state through large banks of DC fast chargers.
- CEO's [EV Fast-Charging Corridors](#) project comprises high-speed charging stations at 34 locations across the state developed in partnership with ChargePoint and site hosts.
- [Charge Ahead Colorado](#) is a grant program administered by CEO and the RAQC for EVs and community-based Level 2 and DC fast charging stations.
- [REV West](#) Governors from eight western states - Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming - signed an MOU to provide a framework for creating an Intermountain West EV Corridor that will make it possible to drive an EV across major transportation corridors in the west.
- The [Community Access Enterprise](#) was created by SB21-260 to support the widespread adoption of electric motor vehicles, equitably invest in transportation infrastructure and incentivize the acquisition and use of electric motor vehicles and electric alternatives to motor vehicles.
- Support for recovered methane development for transportation and other end uses through the governor's budget request for \$50 million for industrial clean air grants for which recovered methane is an eligible use, and the development of Clean Heat Plans by gas utilities required by SB21-264.
- CDOT is developing implementation guidance through a policy directive for the [GHG Transportation](#)

[Planning Standard](#). One of the potential mitigation actions CDOT and metropolitan planning organizations could take to comply with the standard is investing in M/HD charging infrastructure.

Near-term, high-priority actions (2022-2023)

1. **CEO, CDOT and CDPHE** will work with fleets, utilities, drivers and other key stakeholders to conduct a regional and local corridor planning study for M/HD charging that identifies the quantity, type and public locations of charging infrastructure needed to support the state's clean truck adoption goals.
2. **CEO, CDOT and CDPHE** will coordinate with the Community Access Enterprise and other key stakeholders to develop a comprehensive set of grant offerings for depot and public truck charging and other investments that can support the quantity and range of charging needs for different fleets, leveraging funding from the federal government and new state enterprises. Program designs should consider prioritizing or setting aside funding for deployment in disproportionately impacted communities and to disadvantaged business enterprises – and including funds for facility retrofits. Programs will also need to consider how to best serve fleets who lease their facilities and ensure coordination with utilities and other relevant incentive programs.
3. **CEO** will work with multiple entities to pursue actions in the "Opportunities for Low-Carbon Hydrogen in Colorado: A Roadmap" related to the M/HD transportation sector, including pursuing the development of a regional hydrogen hub as part of the Western Inter-State Hydrogen Hub MOU signed with Wyoming, Utah and New Mexico in February of 2022.⁹
4. **CEO** will work to evaluate and develop case studies for early M/HD charging installations funded by the Community Access Enterprise to understand barriers to permitting for charging infrastructure and develop potential solutions.

Medium-term strategies (2024 and beyond)

5. **CDOT and CEO** will coordinate with neighboring states to share best practices and encourage investments in M/HD charging and hydrogen fueling that support a seamless trucking experience across the West.
6. **CDOT** will research best practices and costs and benefits of developing a program to support truck stop electrification, including the integration of charging infrastructure at newly developed truck parking locations, with a focus on electrifying facilities in disproportionately impacted communities. CDOT will also continue conversations with federal agencies about enabling charging at rest areas.
7. **CDPHE and CEO** will research best practices and costs and benefits of developing a program to support loading dock electrification, with a focus on electrifying facilities in disproportionately impacted communities.

⁹ [Western Inter-States Hydrogen Hub | Colorado Energy Office](#)

Complementary utility strategies

Past and ongoing efforts in Colorado

- [Xcel fleet advisory services, commercial EV rates and charging infrastructure investments](#) in its three-year Transportation Electrification Plan approved in 2021.

Near-term, high-priority actions (2022-2023)

1. **CEO** will work with regulated utilities and market stakeholders to advocate that the next set of transportation electrification plans (TEPs) in 2023 include a significant focus on providing make-ready and other support to develop depot and public charging infrastructure for M/HD vehicles, charging management services, vehicle incentives and financing, fleet advisory services and to explore vehicle to building and grid applications, including for school bus applications.

Medium-term strategies (2024 and beyond)

2. **CEO** and **CDOT** will work with the CEVC Beneficial Electrification subgroup or convene a similar working group for statewide collaboration on charging planning and implementation for M/HD vehicles between fleets, utilities and other key stakeholders. **CDOT** will also work with this group to explore opportunities for integrated corridor planning that includes consideration of utility upgrades that would support M/HD charging in conjunction with roadway projects.
3. **CEO** will convene a commercial EV rates workshop with investor-owned, municipal and rural electric cooperative utilities and fleets, to discuss and develop best practices and strive to enable consistent and affordable rates to charge statewide.

Workforce development programs

Past and ongoing efforts in Colorado

- The ZEV Workforce Development Working Group, led by **CDOT** and **CDLE**, is working with workforce partners to support the development of a standardized curriculum and training offerings for ZEV careers.
- Implementation of [HB21-1149](#), “Energy Sector Career Pathways In Higher Education”.

Near-term, high-priority actions (2022-2023)

1. **CWDC** will work with **CDOT**, **OEMs**, community colleges, independent repair shops, trade unions, dealerships, disproportionately impacted communities, rural communities and other key stakeholders to conduct a workforce needs analysis to identify gaps, plan programs and strive to ensure supply of workers matches demand as the ZEV market grows.

Medium-term strategies (2024 and beyond)

2. **CDLE** and the **CWDC**, in partnership with the Colorado Community College System and workforce stakeholders, and with support from **CDOT**, **CEO** and **CDPHE**, will develop and implement funding partnerships to support ZEV mechanic training programs, with a focus on

recruiting and supporting participants from disproportionately impacted and Just Transition communities, diesel mechanics and others whose work may shift along with the transition to zero-emission vehicles.

3. **CDLE** and the **CWDC**, in partnership with the public workforce system and with support from **CDOT**, **CEO** and **CDPHE**, will support apprenticeships, internships, scholarships and other strategies to educate and recruit students in high schools, community colleges, etc., for future careers in the M/HD ZEV sector.
4. **CEO** will develop additional programming alongside its light-duty dealership efforts to engage and educate M/HD vehicle dealers in the state, including supporting demonstration programs to enable fleets to test vehicles in their operations.

Regulatory actions

Past and ongoing efforts in Colorado

- **CEO**, **CDPHE** and **CDOT** will continue to collaborate to monitor and engage on federal rulemakings to set new emissions standards for M/HD vehicles. Strong national standards are important for reducing air pollution and greenhouse gas emissions nationwide and because many trucks regularly travel between states.

Near-term, high-priority actions (2022-2023)

1. **CDPHE** will propose adoption of the Advanced Clean Truck and Low NO_x Omnibus rules to the Colorado Air Quality Control Commission (AQCC) in order to ensure greenhouse gas and air quality emissions reductions and related benefits, including benefits to disproportionately impacted communities.¹⁰ The notice of proposed rulemaking will be filed by the end of 2022, with a rulemaking hearing in 2023, with the intent that the rules, if adopted by the AQCC, would go into effect for Model Year (MY) 2027 vehicles. Prior to the initiation of the rulemaking, state agencies will work with the Clean Fleet Enterprise, Community Access Enterprise, manufacturers, motor carriers and other key stakeholders to ensure that sufficient complementary policies, programs and investments are in place to support fleets, manufacturers and dealers so they are able to transition successfully, as detailed earlier in this Clean Truck Strategy.
2. By the end of December 2022, **CDOT** will establish a working group of the Transit and Rail Advisory Committee to collaborate with statewide transit stakeholders regarding potential future adoption of a clean transit rule that would require a long-term transition to zero-emission transit buses.
3. By the end of 2023, **CDPHE**, **CEO** and **CDOT** will investigate options to ensure clean truck adoption by state, county, municipal and other public fleets and large private fleets, in alignment with the Advanced Clean Truck rule where technically feasible, and will report findings. This may include fleet rules, MOUs with fleets or other approaches.

¹⁰ The Advanced Clean Truck and Low NO_x Omnibus rules are requirements on bus and truck manufacturers, not fleets or private individuals.

Additional opportunities

Past and ongoing efforts in Colorado

- CDPHE will continue supporting community air monitoring to track progress over time in disproportionately impacted communities.
- CDPHE will continue to evaluate potential improvements to its [diesel inspection and maintenance program](#) to help mitigate air pollution from older on-road vehicles.

Near-term, high-priority actions (2022-2023)

1. **CDPHE, CEO and the RAQC** will conduct exploratory work on potential indirect source standards that seek to reduce localized air pollution emissions from facilities that generate significant medium- and heavy-duty vehicle traffic. After completion of this research, if it is determined that the state should propose an indirect source standard, any potential regulatory actions for indirect sources would be a medium-term strategy.
2. **CDOT** will update the state freight plan, including investigation of truck travel strategies that enhance operations, reduce congestion and reduce subsequent greenhouse gas emissions on Colorado's transportation network.

Medium-term strategies (2024 and beyond)

3. **CDOT, CEO and CDPHE** will collaborate with interested local governments to investigate the potential benefits and feasibility of innovative local programs that reduce emissions from deliveries and support the use of ZEV vehicles and smaller vehicles like e-cargo bikes for last mile delivery.
4. **CEO and CDPHE** will work with CSU to track and report the carbon intensity of transportation fuels used in Colorado.
5. **CEO, CDOT and CDPHE** will work with research partners and OEMs to analyze the relative costs and benefits of different approaches to battery reuse, remanufacturing, recycling and disposal to support consideration of state policies that could accelerate the most promising market opportunities.