

GHG Transportation Planning Standard: Mitigation Policy Overview - DRAFT- As of 10/19/21

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Introduction

Transportation policy must sometimes balance competing priorities; projects that are necessary to move people and goods, improve safety, or achieve another priority may have negative impacts on the environment and the quality of our air. Within the context of the National Environmental Policy Act, mitigations have long been used to offset project impacts. In a similar vein, the Greenhouse Gas Transportation Planning Standard allows for mitigations to help a noncompliant plan achieve target pollution reduction levels.

This Mitigation Policy Overview provides the Department's initial thinking on the process by which CDOT and metropolitan planning organizations (MPOs) may utilize GHG Mitigation Measures and prepare Mitigation Action Plans. This draft includes certain principles for how mitigations can be used within the parameters of a transportation plan. This policy framework also is critical to implementing the enforcement mechanism included in the rule whereby, if an entity does not comply, flexibility for certain capital funds is restricted to use on approved mitigations.

The Department recognizes that this is a dynamic area with ongoing innovations in sustainable transportation and land use mitigation options both expected and welcomed. This proposed framework therefore provides a process to allow for new ideas provided by transportation agencies as well as members of the public to improve this framework over time.

CDOT and the Commission welcome input and alternative suggestions to the ideas presented in this paper and will be seeking to update and better adapt this guidance to Colorado's context before this document is finalized in April 2022. The GHG Mitigation Advisory Group will also be convened in the coming months, and will help provide a sounding board on these key questions and others. Specifically, input is encouraged on the following questions:

- 1. Should mitigation measures be evaluated based on their estimated GHG reduction specifically, through a more generalized scoring/point system, or some other approach?**
- 2. Should a particular method or tool for GHG estimation be specified, or should CDOT and MPOs be able to propose and document their own approach?**
- 3. What other tools and resources would you recommend for consideration?**

Principles

The following core principles, informed by state goals and input from stakeholders, guided the development of this Mitigation Policy Overview:

- **Benefits to Disproportionately Impacted Communities:** Historically, communities have been impacted unequally by transportation project construction. Negative impacts -- both to air quality by virtue of proximity to highways as well as limited non-driving options in neighborhoods proximate to highways -- have often concentrated in disproportionately impacted communities, often minority neighborhoods in urban and industrial areas. To that end, this policy shall include a methodology for crediting projects that achieve greater localized benefit to disproportionately impacted communities.
- **Geographic nexus with impacts:** Where regionally significant projects are projected to increase net greenhouse gas emissions, those emissions should be offset with project-specific mitigation measures that benefit communities that will be impacted by the project. This principle is especially important for ensuring that disproportionately impacted communities that have often, historically, borne a significant share of the negative impacts of highway projects, are able to achieve direct project benefits associated with meeting mitigation requirements.
- **Holistic air quality planning:** CDOT and MPOs should be able to demonstrate how they have supported the GHG Mitigation Measures included in a Mitigation Action Plan, through funding, technical assistance, or other forms of support.
- **Verification:** The mitigations should be able to be tracked and verified to ensure real reductions in greenhouse gas emissions.
- **Reasonable scale:** CDOT and MPOs are expected to strive for a reasonable relationship between the scale of mitigation required and that implemented, but are not expected to achieve a precise match. In some cases it also may not be possible, given current tools and models, to determine an exact ton reduction in GHGs. The Department intends to develop a scoring rubric over the coming months, with input from stakeholders, to provide a way to rate the relative effectiveness of measures and align the scale of mitigation needed with the deficit in MMT needed to achieve the Rule's GHG Reduction Levels.

Mitigation Policy Overview and Update Process

Mitigation Policy Directive and Mitigation Measure Procedural Directive

CDOT anticipates establishing both a Policy Directive and a Procedural Directive for GHG Mitigations. Policy Directives can only be adopted or amended by the Transportation Commission whereas Procedural Directives may be approved and adjusted by the CDOT Executive Director. The Policy Directive would set forth the intent and principles of GHG mitigations as well as the process for establishing, verifying and tracking measures. The Procedural Directive would include the approved list of mitigations, guidance for quantifying

GHG reductions, and/or scoring ranges. This list of measures would be updated regularly both to incorporate new mitigation strategies and to adjust quantification methodologies and/or effectiveness scores as appropriate.

Process for nomination and approval of new measures

CDOT and the Transportation Commission will establish a GHG Mitigation Advisory Group, composed of representatives from CDOT, all five MPOs, the Colorado Energy Office, the Colorado Department of Public Health and Environment, and academic or National Laboratory representation to support ongoing evaluation of new research, mitigation measure nominations, and other updates to the Procedural Directive. With support from CDOT GHG Program staff, this group will establish a regular process of inventorying best practices from around the country to provide input into mitigation measure list updates, with a focus on identifying a range of effective measures for urban, suburban, and rural contexts throughout the state. CDOT is forming a new Environmental Justice branch within the Department; this team will also engage in this process to help ensure that mitigation measures and policy updates are regularly shared with disproportionately impacted communities.

The ability to nominate new GHG Mitigation Measures will be open to all MPOs, local governments, community and advocacy groups, and members of the public as an opportunity to creatively engage in the sustainability of our transportation system. CDOT will have a form available on their website which will allow for nominations of GHG Mitigation Measures that have a nexus with the transportation sector. CDOT GHG Program staff will assess the nominations, determine if there is a way to quantify and/or score the emissions reductions from such a measure, and discuss the new ideas with the GHG Mitigation Advisory Group and CDOT's Executive Management Team at least every 6 months in order to update the formal procedural directive.

Mitigation Action Plan Guidance

Mitigation Action Plan Development Guidelines

As CDOT and MPOs prepare a Mitigation Action Plan, they must adhere to the following guidance:

- CDOT and MPOs should include all measures in the travel demand model that can be modeled, and may only include a measure in either the travel demand modeling to demonstrate compliance OR the Mitigation Action Plan, to avoid double counting impacts.
- CDOT and MPOs must demonstrate how they have partially or fully enabled the implementation of a measure, whether through partial or full funding, technical assistance, or other forms of support. For example, if a municipality implements a zoning change to allow for greater density of housing near transit, CDOT or the MPO should show how their investments meaningfully supported that local innovation prior to claiming mitigation credit.

- CDOT and MPOs may utilize the quantification and/or scoring guidance covered by this document, or if they have an alternative approach to quantifying GHG emission reduction benefits, they must document the methodology, assumptions, and datasets used, as described in “Guidance for alternative quantification methods” below. Any alternative approach must be reviewed by the GHG Mitigation Advisory Group, documented in a format that is available to the public, and approved by CDOT.
- Mitigation Action Plans must include measures that when combined demonstrate compliance for all years in Table 1 of the Greenhouse Gas Transportation Planning Standard for which travel demand modeling indicates a gap in achieving the required GHG reduction levels. Some GHG Mitigation Measures entail infrastructure investments, such as a new protected bike lane or dedicated transit lane, from which long-term GHG reduction benefits can be estimated. Other GHG Mitigation Measures may be more programmatic or one-time investments, such as transportation demand management programs or construction emission reduction projects. Emissions reductions from these measures must only be included for the years in which they are funded and implemented.
- In the event that a specific, significant project included within a plan yields net greenhouse gas emissions, those emissions shall be offset with project-specific mitigation that falls within the geographic project limits as defined in project planning documents. This constraint is especially important for ensuring that disproportionately impacted communities are able to achieve direct project benefits associated with meeting mitigation requirements. The constraint is also important for ensuring a holistic approach to project design that includes multiple choices for travelers, especially when expanding roadway capacity (e.g. adding a functional transit option into a managed lane similar to the current US36 corridor). Requiring high-level modeling of project specific mitigation as part of a transportation plan will accelerate these conversations, ensuring that they happen early in the process such that subsequent environmental reviews and scoping can happen more efficiently. Project specific modeling at the planning stage does not preclude the inclusion of further mitigations later in the process, such as in the completion of requirements under the National Environmental Policy Act (NEPA).

Major categories of currently allowable mitigation measures

This policy outlines the main categories of mitigation that will initially be allowable under the rule— with an ongoing process through which additions to the list may be requested over time:

- Transit improvements
- Pedestrian and bicycle access
- Land use
- Medium/heavy duty ZEV charging and fueling
- Parking Management
- Transportation demand management (TDM)
- Clean construction

Please see “GHG Mitigation Categories and Potential GHG Estimation and Scoring Approach” for additional information on these measures.

Major Categories Excluded from Eligibility for Mitigation

It is important to recognize that not all projects that achieve societal or mobility benefit will be counted as mitigation for the purposes of this rule, which is focused specifically on improving air quality, primarily by expanding mobility options for travelers across Colorado. To that end, traffic improvements that focus on improving traffic flow through either capacity expansion or technology measures that primarily benefit the flow of vehicular traffic without improving alternatives to driving single occupancy vehicles are not allowable for the purposes of approved mitigation. These types of improvements include lane capacity expansion, improvements to highway entrances and exits (e.g. ramp metering), intersection reconstructions for the purposes of improving the flow of traffic (e.g. roundabouts/diverging diamond intersections), signal timing improvements, and similar traffic technologies.

Importantly, these types of improvements are often critically important to improving mobility and the flow of traffic in Colorado, which helps achieve priorities such as safety and level of service on Colorado’s roads. Their exclusion from eligibility for mitigations that achieve reductions in greenhouse gas emissions should not be in any way interpreted as diminishing their importance for traffic management, safety, and other key mobility objectives.

Similarly, it is often the case that these improvements reduce idle time in traffic, which -- particularly for less efficient vehicles -- can reduce per vehicle emissions, though they also allow for the flow of more traffic, which can cause greater total emissions. Therefore, if these types of projects are included in an agency’s transportation plan, they should be included in initial modeling -- accounting for both emissions savings from traffic reduction and induced demand from the allowance of more traffic flow, using the same elasticity as induced demand for other capacity projects.

Mitigation Action Plan Components

This section describes the information the Transportation Commission and Air Pollution Control Division need to evaluate a Mitigation Action Plan, and the information that must be included for each proposed GHG Mitigation Measure.

Each Mitigation Action Plan must include the following components:

- **GHG Emissions Reductions Needed:** Summary of emissions analysis from GHG Transportation Report, including the estimated gap to achieve the GHG Reduction Levels in each horizon year.
- **GHG Mitigation Measure Summary:** A summary table of GHG Mitigation Measures, including measure title, mitigation measure category, estimated GHG reduction or score per year, and any co-benefits.

- **GHG Mitigation Measure Description:** Each measure shall include the following details:
 - **Timing:** Anticipated start date, completion date, and dates of any other key milestones.
 - **GHG Reductions:** Either a score, or where feasible, an estimate of the annual GHG emissions reductions in million metric tons (MMT) of CO₂e achieved by the measure, in each horizon year in Table 1 of the Standard.
 - **Co-benefits:** Quantification, where possible, of specific co-benefits including reduction of co-pollutants (PM_{2.5}, NO_x, etc.) as well as travel impacts (changes to VMT, pedestrian/bike use, transit ridership, etc. as applicable), in which years.
 - **Benefits to Disproportionately Impacted Communities:** Description of benefits to Disproportionately Impacted Communities, particularly those in close proximity to any capacity expansion projects being mitigated, and stakeholder engagement conducted with those communities.
 - **Measure Description:** Description of the measure, including scale, location, and how it would impact travel activities expected to result in GHG reductions.
 - **Measure History:** If new to this plan, or carried over from a previous plan.
 - **Cost:** Any capital and operating cost estimates, including any key assumptions used to inform these estimates.
 - **Funding:** Funding source(s), including if those funds are confirmed.
 - **Implementing agencies and roles:** Partner implementing agencies and roles (if applicable), including letters of support if GHG Mitigation Measure includes implementation support from other entities.
 - **Documentation*:** Documentation of the GHG estimate or score and co-benefits, utilizing the outlined steps in this document, and including all data sources and inputs used.
 - **Implementation tracking:** How success of the strategy will be monitored and verified against the estimated benefits.

*See the Mitigation Measure Documentation Guidance below for further details on how to document some of these elements.

Process for Establishing GHG Effectiveness Scores

For any given mitigation measure, CDOT or an MPO must first determine whether it is possible to quantify the GHG reductions resulting from this measure given the availability of data and estimation tools (a travel demand model or one of the tools listed in Appendix A). If quantification is possible, the reduction in CO₂e shall be calculated and then translated into an effectiveness score. The GHG Mitigation Advisory Group shall establish the scoring framework

which will be included in the policy or procedural directive as appropriate. Table 1 below illustrates how a potential scoring framework will be established.

Table 1: Illustrative GHG reduction scoring framework

Mitigation Measure	Annual GHG Effectiveness Score Range (TBD)	Score metric
Transit improvements		Per estimated increase in annual 1,000 ridership
Bike and pedestrian access		Per incremental mile of bike lane / pedestrian facility
Land use		Per 100 units of compact development planned/enabled
Parking management		Per parking spaces avoided or annual trips avoided
M/HD ZEV charging		Per M/HDV charging ports
Transportation demand management		Per estimated annual trips avoided
Clean construction		Per estimated number and operational hours of equipment EPA Tier IV standards.

Mitigation Action Plan review and approval procedure

If CDOT or an MPO is utilizing mitigation to comply with the Standard for a particular Applicable Planning Document, they must submit their Mitigation Action Plan as part of their GHG Transportation Report:

- To APCD for review at least forty-five (45) days prior to the adoption of any Applicable Planning Document. If APCD has not provided written verification within thirty (30) days, the document shall be considered acceptable.
- To the Commission as part of their GHG Transportation Report at least thirty (30) days prior to adoption of the Applicable Planning Document.

Reporting on compliance

Annually by April 1, CDOT and MPOs must provide a status report to the Commission on an approved form with the following items for each GHG Mitigation Measure identified in their most recent GHG Transportation Report:

- The implementation timeline;
- The current status;
- For measures that are in progress or completed, quantification of the benefit or impact of such measures; and

- For measures that are delayed, cancelled, or substituted, an explanation of why that decision was made, and what mitigation measure(s) they intend to use in its place.

Mitigation Measure Documentation Guidance

This section summarizes the currently approved GHG Mitigation Measures and recommended methods for estimating GHG reductions from specific measures, as well as co-benefits. This guidance has been developed based on several sources and tools that CDOT and MPOs may also use as references in developing their Mitigation Action Plans (see Appendix).

Guidance for estimating benefits to Disproportionately Impacted communities

For each proposed measure, CDOT and MPOs should document:

- Any Disproportionately Impacted (DI) communities (as defined in § 24-38.5-302(3), C.R.S) affected by the measure (i.e. within [½ mile] of the measure or targeted by a specific strategy).¹ CDOT and MPOs should include a map and/or table summarizing which DI Census communities are affected by the measure. It should also be noted if any of these same communities are also affected by any regionally significant capacity projects in the Applicable Planning Document.
- Any public outreach and engagement conducted and its results.

Incorporating DI co-benefits into project scoring: For measures that benefit a DI community, meaning a project crosses through a DI community, is within close proximity (i.e. ½ mile), or targets benefits to specific members of a community, CDOT and MPOs may utilize a multiplier of [TBD] applied to the GHG estimate or score for that measure.

Guidance for estimating criteria pollutant co-benefits

If applicants wish to include estimated criteria pollutant co-benefits, they may utilize MOVES NOx and PM2.5 per mile emission rates to estimate reduced air pollution based on calculated VMT reduction.

Guidance for alternative quantification methods

The guidance for quantifying GHG emissions reductions (TBD) from measures is meant to clarify expectations around the level of detail and types of data sources to be used, and to ensure consistency in approaches. If CDOT or MPOs would like to use their own quantification methods instead of the GHG estimation guidance in the sections below, they may do so, but must document the step-by-step process, input data, sources, and calculations for each measure. They must use appropriate data sources for their area, and indicate how they determined their alternative method (e.g. if adapted from another academic, federal, or other rigorous source). Any alternative approach must be reviewed by the GHG Mitigation Advisory Group and approved by CDOT.

¹ CDOT and MPOs are encouraged to utilize [online tools](#) developed by CDPHE to identify DI communities.

Tracking and monitoring

For each measure, CDOT and MPOs should specify how they intend to track and monitor the success of an implemented measure against the projected benefits. Tracking plans and data sources could include, for example, survey data, regularly updated sources like the American Community Survey, bicycle and pedestrian counts, or transit boardings.

GHG Mitigation Categories and Potential GHG Estimation and Scoring Approach

For each of the identified mitigation measure categories, CDOT has identified resources to base GHG estimation and/or scoring guidance upon, as outlined in Table 2 below, and linked in the Appendix. CDOT welcomes additional suggested resources for review, and will be developing specific guidance for each measure prior to the finalization of this policy.

Table 2: Identified resources to quantify and score GHG reductions from mitigation measures

Resource	Mitigation Measure						
	Transit	Ped./ Bike Access	Land Use	M/HD ZEV	Parking	TDM	Clean Construc tion
CMAQ Emissions Calculator Toolkit (FHWA)		✓		✓			
Infrastructure Carbon Estimator (MnDOT, FHWA)							✓
Appendix C: Greenhouse Gas Monitoring & Evaluation (Boston MPO)		✓		✓			
GASCAP - the Greenhouse-Gas Assessment Spreadsheet for CAPital Projects (Rutgers)							✓
CalEEMod - California Emissions Estimator Model (CAPCOA)							✓
Smart Scale (VDOT)	✓	✓		✓			✓
Quantifying Greenhouse Gas Mitigation Measures (CAPCOA)	✓	✓	✓	✓	✓	✓	
SB 743 Implementation TDM Strategy Assessment (Fehr and Peers)	✓	✓	✓				
Mobility Management Toolbox (SANDAG)	✓	✓	✓		✓	✓	
Appendix E: Quantifying Greenhouse Gas Emission Reductions from Off Model Strategies (CARB)	✓	✓			✓		

Research on Effects of Transportation and Land Use Related Policies (CARB)	✓	✓	✓		✓	✓	
California Climate Investments GHG Quantification Research (CARB)	✓	✓					
Vehicle Miles Traveled Metric (City of San Jose)			✓				
CCI Quantification, Benefits, and Reporting Materials (CARB)	✓	✓	✓	✓			
Quantifying the effect of local government actions on vehicle miles traveled (VMT). (UC Davis)			✓				
Bibliography for Transportation and Buildings Policy Options (Greenlink Group)	✓	✓	✓		✓	✓	

Transit Improvements

Description: Improvements to public transit can be made to decrease VMT from commute and personal trips by increasing transit ridership, including in rural areas where the public may travel to a community for work but live outside that area due to affordability of housing. Transit improvements may include new infrastructure or improvements to operations. Examples of transit improvements include, but are not limited to:

- New or extended transit routes
- Dedicated bus lanes
- Signal priority for buses
- Increases to frequency or service
- Fare reductions

Pedestrian and Bicycle Access

Description: GHG emission reductions from improvements to bicycle and pedestrian access are a result of VMT reductions due to mode shift from vehicle trips to non motorized trips. Examples of pedestrian and bicycle access improvements include, but are not limited to:

- On-road bicycle lanes, including protected lanes
- Off-street bicycling and walking paths
- Bicycle boulevards/neighborhood greenways
- Traffic calming and road diets
- New or widened sidewalks
- Improved first and final mile access to transit stops and stations
- Improved safety and efficiency of road crossings/crosswalks

Land Use

Description: Supporting compact, walkable land use enables fewer, shorter trips by car and more walking, bicycling, and transit use, resulting in lower GHG emissions. Examples of land use strategies include, but are not limited to:

- Transit-oriented developments
- Mixed-use developments
- Zoning or policy changes to support compact land use
- Multi community IGAs that establish urban growth boundaries

Parking Management

Description: Applying changes to parking policies, pricing, and physical configuration that encourage more walking and transit trips. Examples of parking management include, but are not limited to:

- Reducing parking minimums or implementing parking maximums
- Pricing parking
- Parking unbundling
- Parking “cash out” programs

Medium- and heavy-duty zero emission vehicle (ZEV) infrastructure

Description: Incorporating medium/heavy duty vehicle electric charging and hydrogen refueling infrastructure into the design of key freight routes to accelerate zero emission truck deployment. Examples of medium- and heavy-duty ZEV infrastructure include, but are not limited to:

- Electric truck charging stations at truck stops, chain up areas, and other parking areas
- Hydrogen refueling infrastructure
- Truck stop electrification to reduce idling and power transportation refrigeration units

Transportation Demand Management (TDM)

Description: Implementing or encouraging the adoption of transportation demand management policies and programs that reduce VMT. Examples of transportation demand management include, but are not limited to:

- Employer-based trip reduction programs
- Voluntary travel behavior change programs
- Local policies requiring TDM programs for new construction
- Adoption of expansion of school bus or school carpool programs to reduce private vehicle trips

Clean Construction

Description: Establishing policies for clean construction that result in scalable improvements as a result of factors like lower emission materials, recycling of materials, and lower truck emissions during construction.

Appendix - GHG Mitigation Resources

1. [CMAQ Emissions Calculator Toolkit](#). Federal Highway Administration (FHWA).
2. [Infrastructure Carbon Estimator](#). Minnesota Department of Transportation, FHWA.
3. [Handbook for estimating transportation greenhouse gases for integration into the planning process](#). Grant, Michael, et al. FHWA.
4. [Appendix C: Greenhouse Gas Monitoring & Evaluation](#), 2014-2017 TIP and customized CMAQ spreadsheets, Boston MPO.
5. [GASCAP - the Greenhouse-Gas Assessment Spreadsheet for CAPital Projects](#). Alan M. Voorhees Transportation Center (Rutgers).
6. [CalEEMod - California Emissions Estimator Model](#). California Air Pollution Control Officers Association (CAPCOA) and California Air Districts.
7. [Smart Scale](#). Virginia Department of Transportation.
8. [Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures](#). CAPCOA.
9. [SB 743 Implementation TDM Strategy Assessment](#). Fehr and Peers.
10. [Mobility Management Toolbox - Mobility Management Guidebook and VMT Reduction Calculator](#). San Diego Association of Governments (SANDAG).
11. [Sustainable Communities Strategies Evaluation Resources - Appendix E: Quantifying Greenhouse Gas Emission Reductions from Off Model Strategies](#). California Air Resources Board (CARB).
12. [Research on Effects of Transportation and Land Use Related Policies](#). CARB.
13. [Transportation Analysis Under CEQA](#). California Department of Transportation.
14. [California Climate Investments GHG Quantification Research](#). CARB.
15. [Vehicle Miles Traveled Metric: Policy Documents, VMT Evaluation Tool, and Other Links](#). City of San Jose.
16. [CCI Quantification, Benefits, and Reporting Materials](#). CARB.
17. [Quantifying the effect of local government actions on vehicle miles traveled \(VMT\)](#). Salon, Deborah. UC Davis.
18. [Bibliography for Transportation and Buildings Policy Options](#). Greenlink Group, American Cities Climate Challenge.
19. [Transportation Demand Management Point System - Technical Justification Document](#). City of Boston.
20. [Mitigating Vehicle-Miles Traveled \(VMT\) in Rural Development](#). Miller, R., & Ganson, C. Transportation Research Board.