CMAQ Performance Plan

BASELINE PERFORMANCE PERIOD REPORT

Second Performance Period

OCTOBER | 2022

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DENVER REGIONAL COUNCIL OF GOVERNMENTS

Acronyms

The following acronyms are used in this document:

ACS – American Community Survey

CDOT – Colorado Department of Transportation

CFR – Code of Federal Regulations

CMAQ – Congestion Mitigation & Air Quality

CO – Carbon Monoxide

DRCOG – Denver Regional Council of Governments

FHWA – Federal Highway Administration

FTA – Federal Transit Administration

FY – Fiscal Year

MPO – Metropolitan Planning Organization

NAAQS – National Ambient Air Quality Standards

NHS – National Highway System

NOx – Oxides of Nitrogen

NPMRDS – National Performance Management Research Data Set

O3 – Ozone

PBPP – Performance-Based Planning and Programming

PHED – Peak Hour Excessive Delay

PM2.5/PM10 – Particulate Matter 2.5/Particulate Matter 10

SOV – Single Occupancy Vehicle

TMA – Transportation Management Area

TPM – Transportation Performance Management

USC – United States Code

VOC – Volatile Organic Compounds

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Introduction

For the purpose of carrying out the Congestion Mitigation and Air Quality Improvement Program, the Moving Ahead for Progress in the 21st Century Act required USDOT to establish measures for State DOTs to use to assess traffic congestion and on-road mobile source emissions. The subsequent surface transportation legislations have continued and refined these efforts.

To meet this requirement, the Federal Highway Administration finalized three performance measures (two congestion measures and one on-road mobile source emissions measure) in the National Performance Management Measures - Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program Final Rule.

Exhibit 1: Applicable PM3 subparts and measures

Subpart	Measure	Description
Subpart G: Traffic congestion	Peak hour excessive delay	Annual hours of peak hour excessive delay per capita that occurs within an applicable urbanized area
	Percent of non-single occupancy vehicle travel	Percentage of non-SOV travelling within an applicable urbanized area
Subpart H: On-road mobile source emissions	Total emissions reduction	Two-year and four-year cumulative estimated emission reductions, for all CMAQ funded projects, of each applicable criteria pollutant

For **Subpart G: Traffic congestion**, the two performance measures are:

1) peak hour excessive delay measure.
2) percent of non-single occupancy vehicle travel measure.

The PHED measure is the annual hours of peak hour excessive delay per capita that occurs within an applicable urbanized area. The percent of non-SOV travel measure is the percentage of non-SOV vehicles travelling within an applicable urbanized area. The traffic congestion measures only apply in certain urbanized areas that include National Highway System mileage and have a population over 200,000.

For **Subpart H: On-road mobile source emissions**, the performance measure is the total emissions reduction measure. This measure is the two-year and four-year cumulative estimated emission reductions, for all CMAQ funded projects, of each applicable criteria pollutant (Ozone, Carbon Monoxide, and Particulate Patter and their precursors (Volatile Organic Compounds and Oxides of Nitrogen) for which the area is designated nonattainment or maintenance.

In addition to the reporting required by the PM3 regulation, 23 United States Code 149(l) requires that metropolitan planning organization that serve a transportation management area with a population over one million for which the boundaries of that TMA overlap a non-attainment or maintenance area for at least one of the transportation-related criteria pollutants are required to biennially prepare and submit a CMAQ Performance Plan.

This CMAQ Performance Plan is due at the beginning of a four-year performance period and subsequently updated biennially – once at the midpoint and again at the end of the performance period. State DOTs will submit CMAQ Performance Plans to FHWA as part of State Biennial Performance Report.

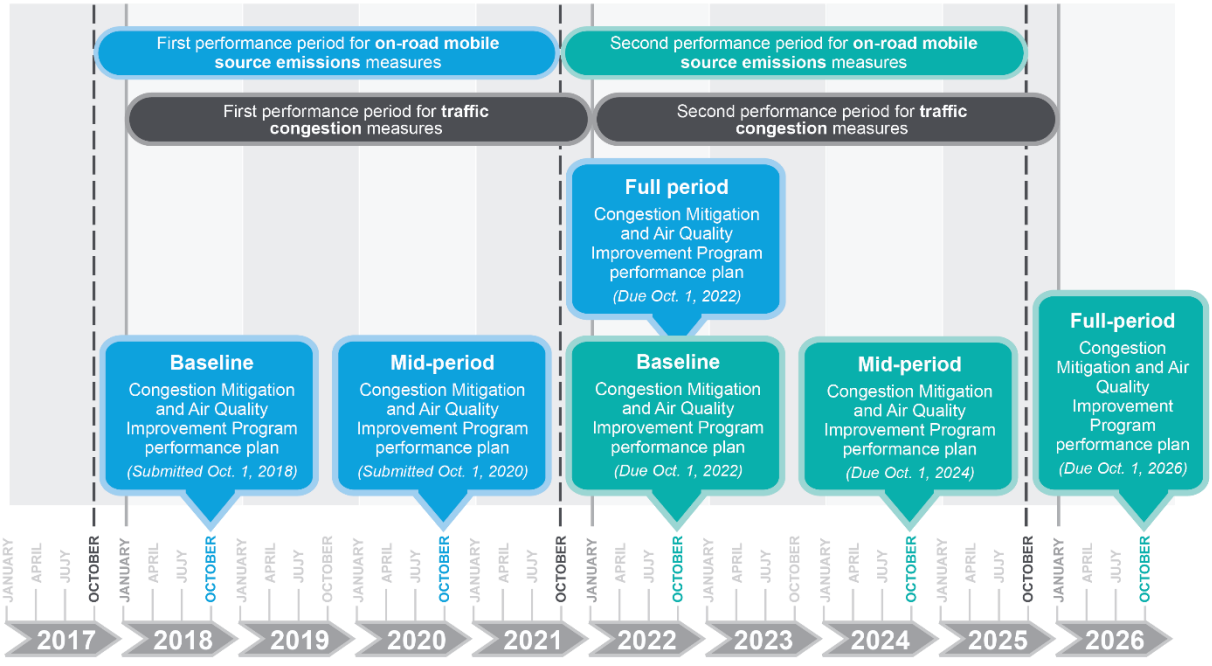
The CMAQ Performance Plan is defined in 23 USC 149(l) with the following requirements:

- **a)** Includes an area baseline level for traffic congestion and on-road mobile source emissions for which the area is in nonattainment or maintenance.
- **b)** Describes progress made in achieving the performance targets described in section 150(d).
- **c)** Includes a description of projects identified for funding under this section and how such projects will contribute to achieving emission and traffic congestion reduction targets.

In the CMAQ Performance Plan and its biennial updates, the MPO reports two- and four-year targets, describes how they plan to meet their targets, and details their progress toward achieving the targets over the course of the performance period.

This CMAQ Performance Plan is an attachment to the Colorado Department of Transportation's Baseline Period Progress Report.

Exhibit 2: Periods for CMAQ measures and reporting timeline



(Courtesy of FHWA's Congestion Mitigation and Air Quality Improvement Program: A Guidebook for Preparing Performance Plans for Metropolitan Planning Organizations)

CMAQ Performance Plan

23 CFR 490.107 requires that CMAQ Performance Plans include the following four key components:

a) Condition/Performance: A baseline level of condition/performance at the beginning of the performance period for each of the CMAQ measures. Throughout the performance period, the CMAQ Performance Plan reports on the actual two-year and four-year condition/performance for each of the applicable CMAQ measures in 23 CFR 490.707 and 490.807.

b) Targets: The targets that the MPOs establish for each of the applicable CMAQ performance measures, including any updates at the midpoint of the performance period, if applicable.

c) Description of Projects: A description of projects scheduled for CMAQ funding that will contribute toward achieving their targets.

d) Assessment of Progress: For the mid and full performance period report, updates to the CMAQ Performance Plan include an assessment of how the CMAQ projects contribute toward achieving the targets.

Exhibit 3: Components of the CMAQ Performance Plan and biennial updates

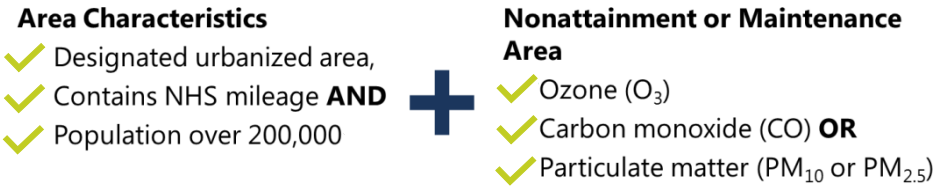
Key component	State DOT baseline performance period report	State DOT mid-performance period progress report	State DOT full performance period progress report
Condition/performance	Baseline condition/ performance	Two-year condition/ performance	Four-year condition/ performance
Targets	Applicable two-year and four-year targets (if available)	Adjusted four-year target (optional)	NA
Description of projects	Description of projects	Updated description of projects	NA
Assessment of progress	NA	Assessment of projects' contribution to achieving two-year target	Assessment of projects' contribution to achieving four-year target
Due dates for 1st performance period	October 1, 2022	October 1, 2024	October 1, 2026

(Courtesy of FHWA's Congestion Mitigation and Air Quality Improvement Program: A Guidebook for Preparing Performance Plans for Metropolitan Planning Organizations)

Applicability determination

As of October 1, 2021, DRCOG is subject to the traffic congestion and on-road mobile source emissions targets, as well as the CMAQ Performance Plan requirements.

Exhibit 4: Applicability determination checklist for DRCOG



As shown in Exhibit 4, DRCOG's planning area includes a designated urbanized area, contains National Highway System mileage, and has a population over 200,000. Additionally, the area includes both maintenance and non-attainment areas for ozone, carbon monoxide, and particulate matter.

The CMAQ Performance Plan is submitted to CDOT and will be included as a separate section of the biennial report submitted to FHWA.

Summary of current adopted PM3 targets

Traffic congestion reduction

The two targets that require joint approval from CDOT and DRCOG are the peak-hour excessive delay and percent of non-single occupancy vehicle travel measures.

Exhibit 5 page shows the adopted targets for PHED and Non-SOV Travel agreed upon by CDOT and DRCOG for the Denver-Aurora, CO Urbanized Area.

Exhibit 5: Traffic congestion reduction performance targets

Traffic Congestion Reduction Performance Measures	Desired Trend	Baseline	2-Year Target (2023)	4-Year Target (2025)
Percent of non-single occupancy vehicle travel	⌃⌃	27.3%	26.7%	27.7%
Annual hours of peak hour excessive delay	⌄⌄	11.7	15.8	17.4

On-road mobile source emissions reduction

The on-road mobile source emissions targets are individual targets for the DRCOG MPO Planning Area.

Exhibit 6 shows the adopted targets for nitrogen oxide, volatile organic compounds, carbon monoxide, and particulate matter for the Denver region.

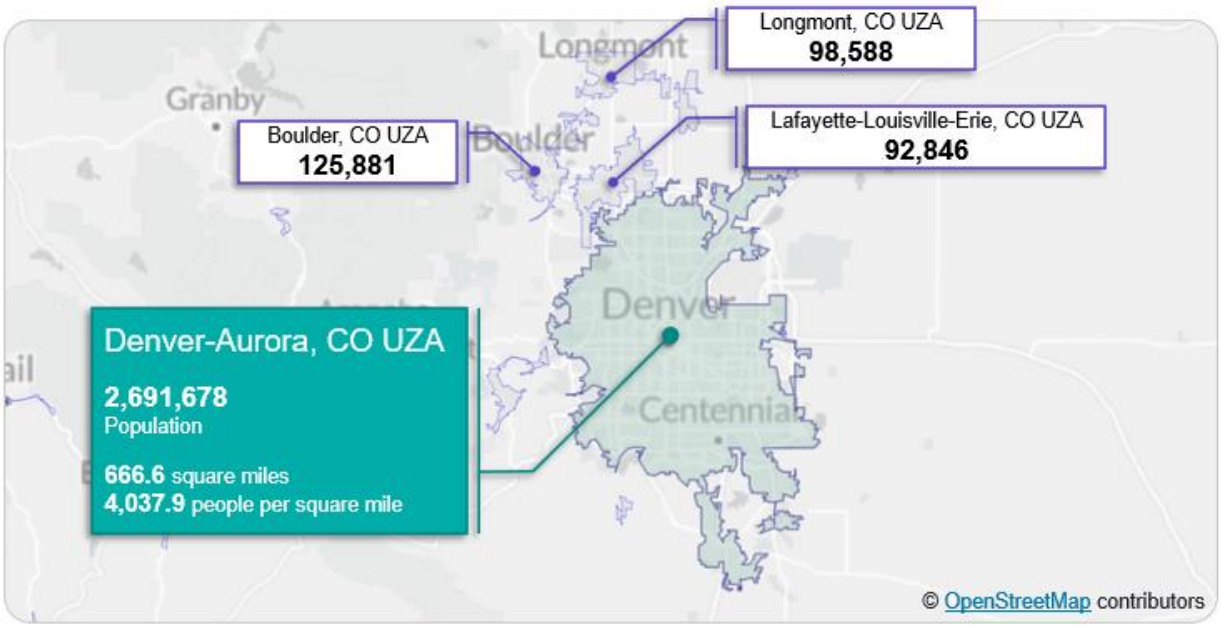
Exhibit 6: Emissions reduction performance targets

On-Road Mobile Source Emissions Reduction Performance Measures	Desired Trend	Baseline (2018-2021)	2-Year Target (2022-2023)	4-Year Target (2022-2025)
Total emissions reduction (**VOC**) kg/day	⌃⌃	388.191	209.971	423.397
Total emissions reduction (**PM10**) kg/day	⌃⌃	41.385	23.900	47.800
Total emissions reduction (**CO**) kg/day	⌃⌃	6,006.652	2,583.027	5,213.589
Total emissions reduction (**NOx**) kg/day	⌃⌃	707.876	397.012	800.557

Baseline conditions for traffic congestion

While the DRCOG planning area includes multiple UZAs, as shown in **Exhibit 7**, only the Denver-Aurora, Colorado UZA meets the population threshold for setting traffic congestion reduction targets. The traffic congestion reduction targets are set jointly by DRCOG and CDOT.

Exhibit 7: Denver-Aurora, Colorado Urbanized Area

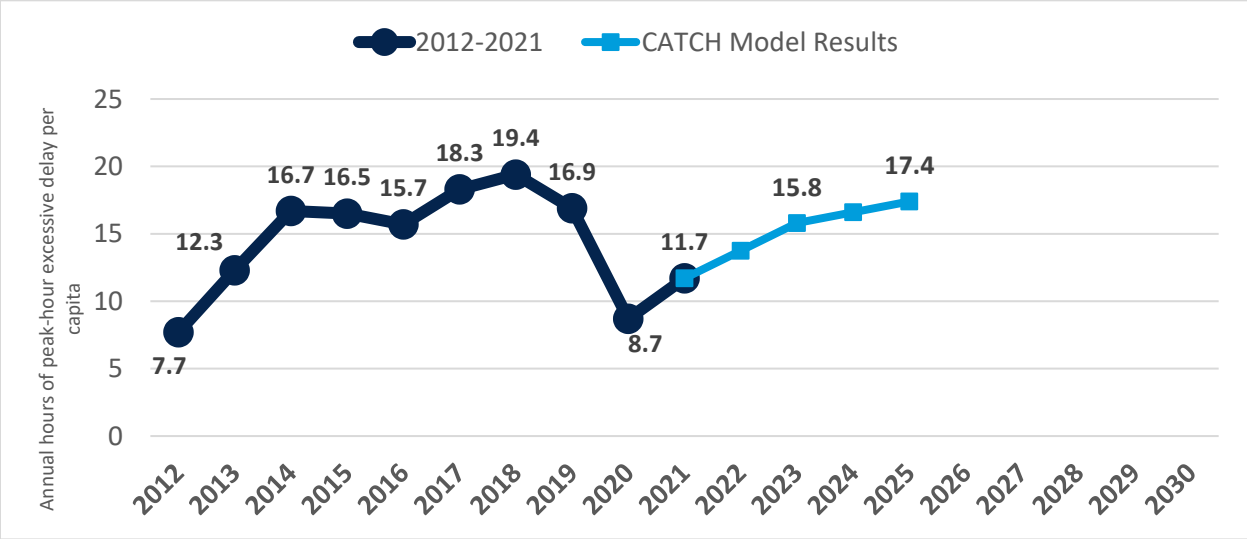


Peak hour excessive delay

The peak hour excessive delay performance measure applies to both traveling directions of the mainline highway segments on the National Highway System. This measure applies to urbanized areas of more than 200,000 people that are also in non-attainment or maintenance areas for ozone, carbon monoxide, or particulate matter.

This measurement uses travel times of all traffic during each 15-minute interval for all applicable reporting segments in the travel time data set occurring for peak periods from January 1 through December 31 of the same year, for the Denver-Aurora, CO UZA, as reported by the NPMRDS.

Exhibit 8: Observed annual hours of peak hour excessive delay and model projections



In Metro Vision, which guides DRCOG's work and establishes a shared regional vision, there is a related performance measure target addressing daily person delay per capita by 2040. However, the two-year and four-year targets were set through modeling work completed by CATCH Intelligence for CDOT and in coordination with DRCOG.

Current PHED levels are below pre-pandemic levels, but modeling suggests that they will slowly rise back. CDOT and DRCOG staff recommended using the higher threshold from the modeling to establish the two-year and four-year targets. This aligns with a potential for travel patterns to return to levels seen before the pandemic and accounts for potential errors in the predictive model. **Exhibit 9** below shows the adopted two-year and four-year targets established by DRCOG and CDOT.

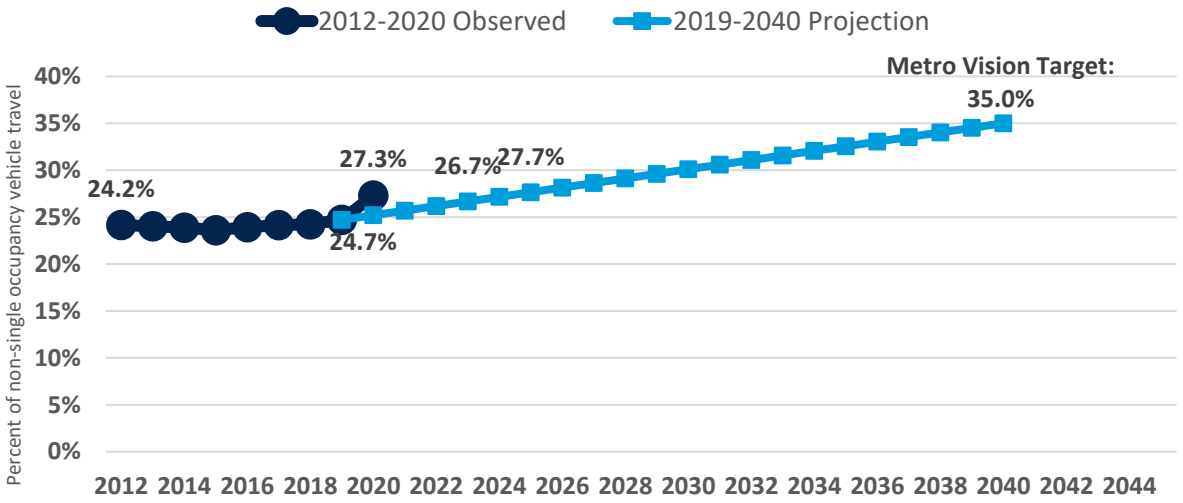
Exhibit 9: Peak hour excessive delay performance targets

Performance Measures	Desired Trend	Baseline	2-Year Target (2023)	4-Year Target (2025)
Annual hours of peak hour excessive delay	⌄⌄	11.7	15.8	17.4

Percent of non-single occupancy vehicle travel

Non-single occupancy vehicle travel is defined as any travel mode other than driving alone in a motorized vehicle, including travel via carpool, van, public transportation, commuter rail, walking, bicycling, or telecommuting. This measure applies to urbanized areas of more than 200,000 people that are also in non-attainment or maintenance areas for ozone, carbon monoxide, or particulate matter. This measurement used the American Community Survey Commuting (Journey to Work) data from the U.S. Census Bureau.

Exhibit 10: Observed single-occupancy vehicle travel and projection



In Metro Vision, DRCOG has established a 2040 performance measure target of 35% non-single occupant vehicle mode share to work. This was used as a basis for setting the two-year and four-year non-SOV target in the first performance period, and DRCOG staff continued this approach for the second performance period.

However, because of the ongoing COVID-19 pandemic's effects on travel, DRCOG staff proposed using 2019 data as the projection baseline until there is greater clarity on whether non-SOV travel will stay elevated or continue to increase. This approach also reflects that despite significant investment in multimodal options in the past few years, the non-SOV rate has hovered around 24%. **Exhibit 11** below shows the adopted two-year and four-year targets established by DRCOG and CDOT.

Exhibit 11: Non-single occupancy vehicle travel performance targets

Performance Measures	Desired Trend	Baseline	2-Year Target (2023)	4-Year Target (2025)
Percent of non-single occupancy vehicle travel	^^	27.3%	26.7%	27.7%

Baseline conditions for on-road mobile source emissions

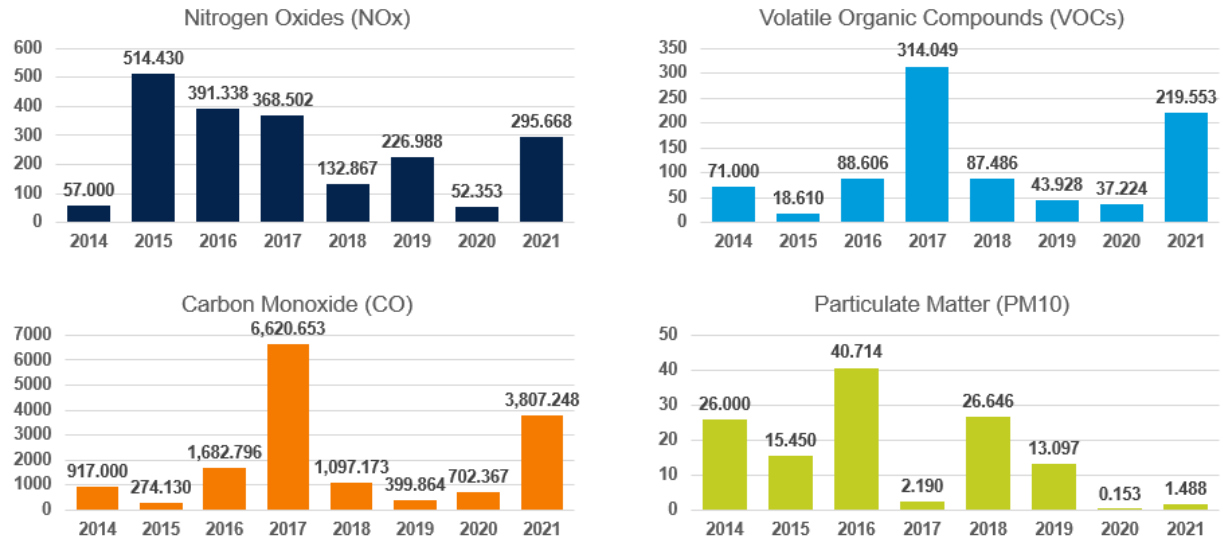
This performance measure is only applicable to areas that include any part of a nonattainment or maintenance area for ozone, carbon monoxide or particulate matter per the National Ambient Air Quality Standards. This measure is limited to these areas to further the CMAQ's program purpose of funding programs and projects that seek to satisfy the NAAQS.

If an MPO has a population of greater than 1 million, and is designated as a nonattainment and maintenance area, then both 2 and four-year targets are required. If the population is less than 1 million, then only a four-year target is required. MPOs are also required to report on progress made toward achieving those targets in their CMAQ Performance Plan every two years.

Unlike other federal performance targets, the on-road mobile source emissions targets are project-based. Specifically, they are based on projects reported in FHWA's CMAQ Public Access System. This project database shows estimated emission reductions at the time of federal funding obligation, not project implementation. It also may have incomplete data by pollutant and/or reporting year.

As the DRCOG MPO Planning Area has a population greater than 1 million and at the time of the applicability determination (Oct. 1, 2021) was designated as nonattainment/ maintenance for ozone, carbon monoxide, and particulate matter, performance targets for this measure for each criteria pollutant had to be established.

Exhibit 12: Historical emissions reduction (FY 2014-2021)



Using historical emissions reduction data from Fiscal Years 2014-2021, DRCOG staff performed multiple analyses to evaluate potential targets. DRCOG staff considered the following points in target-setting:

- Emissions reduction benefits are only recorded from CMAQ funded projects.
    - Does not include projects funded with Transportation Alternatives, Multimodal Transportation and Mitigation Options Fund or Carbon Reduction Program which likely also have emission reduction benefits, or Surface Transportation Block Grant that may have emission reduction benefits.

- Emissions reduction benefits are only reported when the project is first obligated, not at project completion/implementation.
    - Unexpected delays to a project can change anticipated obligation.
    - Emissions reduction benefits for ongoing projects only get recorded with the first obligation.
- DRCOG is currently in the middle of multiple Calls for Projects for the 2022-2025 and 2024-2027 TIPs, so staff are unable to forecast potential emissions reduction benefits.
    - Emission reduction benefits are only one consideration when scoring and evaluating projects.
    - Funding type is assigned to account for funding available and project eligibilities and may be combined with other funding.
- DRCOG's TIP includes set-asides that fund projects staff are not aware of until reporting.
- DRCOG's CO maintenance period has ended and the PM10 maintenance period will end this October, so targets will no longer be required for those pollutants in the future.
- Based on CDOT's findings, DRCOG's projects account for roughly ~74% of the state's CMAQ projects and ~80% of the state's emissions reduction benefits.
- Metro Vision includes a 2040 target of a 60% decrease in surface transportation related GHG emissions per capita from the 2010 baseline.

Ultimately, DRCOG staff proposed basing targets around CDOT's statewide targets that they established using average emissions reduction benefits per dollar and future CMAQ allocations identified in Program Distribution. The proposed methodology reflects DRCOG's historic contributions of each criteria pollutant to the statewide emissions. **Exhibit 13** shows the two-year and four-year targets adopted by the DRCOG Board of Directors.

Exhibit 13: Emissions reduction performance targets

On-Road Mobile Source Emissions Reduction Performance Measures	Desired Trend	Baseline (2018-2021)	2-Year Target (2022-2023)	4-Year Target (2022-2025)
Total emissions reduction (**VOC**) kg/day	⏫	388.191	209.971	423.397
Total emissions reduction (**PM10**) kg/day	⏫	41.385	23.900	47.800
Total emissions reduction (**CO**) kg/day	⏫	6,006.652	2,583.027	5,213.589
Total emissions reduction (**NOx**) kg/day	⏫	707.876	397.012	800.557

Description of projects

This report includes 21 CMAQ funded projects that are anticipated to contribute to achieving the targets for the traffic congestion and on-road mobile source emissions performance measures. The **Appendix** lists the projects identified at the time of this report, the year they are anticipated to be obligated, and their associated emission reduction benefits.

Additional projects that are selected for CMAQ funding in ongoing and future Calls for Projects, will be captured in the subsequent Mid-Performance Period Progress Report and Full Performance Period Progress Report.

Assessment of progress

DRCOG will assess progress in achieving the targets in the Mid-Performance Period and Full Performance Period Progress Reports.

For more information, visit DRCOG's Performance Based Planning and Programming webpage.

Appendix: List of projects

This report includes 21 CMAQ funded projects that are anticipated to contribute to achieving the targets for the traffic congestion and on-road mobile source emissions performance measures. Additional projects that are selected for CMAQ funding in ongoing and future Calls for Projects, will be captured in the subsequent Mid-Performance Period Progress Report and Full Performance Period Progress Report.

#	Project category	Project	Description of project	Anticipated obligation	VOC benefit (kg/day)	CO benefit (kg/day)	NOx benefit (kg/day)	PM10 benefit (kg/day)	PHED benefit	Non-SOV benefit
1	Alternative Fuels and Vehicles	Air Quality Improvements Set-Aside - Advanced Fleet Technology	Develop and implement a large vehicle retrofit, repair, replacement, and zero emissions vehicle program.	2022	TBD	TBD	TBD	TBD	No	No
2	Congestion Reduction and Traffic Flow Improvements	Parker-Quincy-Smoky Hill Intersection Operational Improvements	Reconfigure NB Smoky Hill Rd./Quincy Ave. approach to three exclusive left turn lanes and a shared through-right lane. Reconfigure WB Quincy Ave./NB Parker Rd. for three right turn lanes, shift the crosswalk across Parker Rd., undertake signal improvements, and install/widen sidewalks.	2022	TBD	TBD	TBD	TBD	Yes	No
3	Congestion Reduction and Traffic Flow Improvements	Parker Rd. Operational Improvements: Lincoln Ave. to Pine Ln.	Construct pedestrian and traffic operational improvements, including a new multiuse path.	2022	TBD	TBD	TBD	TBD	Yes	Yes
4	Congestion Reduction and Traffic Flow Improvements	SH-83 Safety Improvements: Bayou Gulch Rd. to El Paso County	Construct safety improvements, possibly including passing lanes, intersection improvements, turn lanes, and others to reduce crashes.	2022	TBD	TBD	TBD	TBD	Yes	No
5	Congestion Reduction and Traffic Flow Improvements	Aurora Signal System Upgrade	Upgrade Aurora's traffic signal system hardware and software.	2022	TBD	TBD	TBD	TBD	Yes	No
6	Congestion Reduction and Traffic Flow Improvements	Aurora Signal Controller Upgrades	Upgrade traffic signal controllers at select intersections.	2023	TBD	TBD	TBD	TBD	Yes	No

#	Project category	Project	Description of project	Anticipated obligation	VOC benefit (kg/day)	CO benefit (kg/day)	NOx benefit (kg/day)	PM10 benefit (kg/day)	PHED benefit	Non-SOV benefit
7	Congestion Reduction and Traffic Flow Improvements	CDOT R4 Advance Detection SH 119	Upgrade/replacement of existing video detection to provide advance detection capability. The primary purpose is to expand ATSPM functionality. The application also suggests adaptive signal control will be deployed.	2022	TBD	TBD	TBD	TBD	Yes	No
8	Congestion Reduction and Traffic Flow Improvements	Denver Bluetooth Expansion	Deploy travel time monitoring devices to expand an existing travel time monitoring system. This includes expansion of the existing data feed to CDOT who will distribute the traveler information.	2023	TBD	TBD	TBD	TBD	Yes	No
9	Congestion Reduction and Traffic Flow Improvements	Denver Adaptive Signal Control & ATSPM System	Deploy adaptive signal control on 56th Ave using data from advance and stop bar detection. Deploy ATSPM 56th Ave using data from advance detection.	2022	TBD	TBD	TBD	TBD	Yes	No
10	Congestion Reduction and Traffic Flow Improvements	Douglas County ATSPM System	Signal controller upgrades and procurement and deployment of ATSPM system.	2022	TBD	TBD	TBD	TBD	Yes	No
11	Congestion Reduction and Traffic Flow Improvements	Lone Tree Adaptive Signal Control	Upgrade signal controllers, deploy advance detection and stop bar detection to expand existing adaptive signal control system. The project also procures the ATSPM module for each intersection.	2022	TBD	TBD	TBD	TBD	Yes	No
12	Transit Improvements	SH-119 and SH-52 Transit Bypass Lanes	Design and construct transit bypass lanes on SH-119 at the northbound and southbound approaches to the SH-52 intersection.	2023	TBD	TBD	TBD	TBD	Yes	Yes
13	Other	Air Quality Improvements Set-Aside -Ozone Aware	A public outreach program to increases awareness of ground-level ozone pollution.	2022	TBD	TBD	TBD	TBD	No	No

#	Project category	Project	Description of project	Anticipated obligation	VOC benefit (kg/day)	CO benefit (kg/day)	NOx benefit (kg/day)	PM10 benefit (kg/day)	PHED benefit	Non-SOV benefit
14	Transportation Demand Management	(Transportation Solutions) Pandemic Recovery and TDM Marketing Campaign	Outreach and education to employers in Cherry Creek and Glendale neighborhoods. Includes assessment of employee commute needs and trip reduction strategies.	2022	TBD	TBD	TBD	TBD	Yes	Yes
15	Transportation Demand Management	(Community Cycles) Ride by e-Bike	Marketing and education on benefits of using e-bikes for longer-distance travel. Targets Boulder commuters with 17-mile or longer commutes.	2022	TBD	TBD	TBD	TBD	Yes	Yes
16	Transportation Demand Management	(West Corridor) Culturally-Sensitive Encouragement and Marketing Campaigns	Multi-lingual marketing initiative targeting Spanish- and Vietnamese-language speakers in Athmar Park, Westwood and Valverde neighborhoods. Provides education on safe and sustainable transportation options	2022	TBD	TBD	TBD	TBD	Yes	Yes
17	Transportation Demand Management	(West Corridor) Colfax Project Safety Outreach	Engages businesses along West Colfax corridor to gain support for safety improvement project by highlighting the benefits of the improvements and sharing insights into commuter behavior.	2022	TBD	TBD	TBD	TBD	Yes	Yes
18	Transportation Demand Management	(Downtown Denver Partnership) Denver Open Streets	Eight events over a two-year period to inform the public about active transportation options in Five Points and Baker neighborhoods. Streets will be closed for “ciclovias” demonstrating the city’s interconnectedness.	2022	TBD	TBD	TBD	TBD	Yes	Yes
19	Transportation Demand Management	(Aurora and NETC) Aurora Aerotropolis/I-70 Corridor TDM Program Development and Implementation	Development of TDM program to service Aerotropolis/I-70 corridor in Aurora, including creation of boundary and target area. Targets industrial, manufacturing and logistics workers.	2022	TBD	TBD	TBD	TBD	Yes	Yes

#	Project category	Project	Description of project	Anticipated obligation	VOC benefit (kg/day)	CO benefit (kg/day)	NOx benefit (kg/day)	PM10 benefit (kg/day)	PHED benefit	Non-SOV benefit
20	Transportation Demand Management	(Commuting Solutions) Expansion of B-Cycle Bikeshare System Feasibility Study	Research to assess viability of launching and operating an electric bikeshare program in the US 36/northwest metro region. Campaign will highlight bikeshare as a critical first and final mile strategy and will expand bikeshare to a region without electric bikeshare.	2022	TBD	TBD	TBD	TBD	Yes	Yes
21	Transportation Demand Management	(DRMAC) Getting There Travel Training	Funding to continue existing travel training program for older adults, people with disabilities, immigrant and refugee populations, low-income residents and high school students with the goal of promoting transportation choices that lead to cleaner air.	2022	TBD	TBD	TBD	TBD	Yes	Yes