

Gaston-Cleveland-Lincoln Metropolitan Planning Organization CMAQ Performance Plan

July 1, 2020

Background

Performance Measures

For the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program, USDOT established three performance measures for State Departments of Transportation (DOT) and Metropolitan Planning Organizations (MPO) to use to assess traffic congestion and on-road mobile source emissions. The measures were established 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 Rule¹, also known as the PM3 rule. The PM3 rule defines the following three CMAQ performance measures:

- Annual hours of peak hour excessive delay per capita (PHED)
- Percent of non-single occupancy vehicle travel (non-SOV)
- Total cumulative on-road emissions reduction from CMAQ projects (on-road emissions reduction)

Baseline CMAQ Performance Plan

Each MPO serving a transportation management area (TMA) with a population over one million that also includes any part of a nonattainment or maintenance area must develop a CMAQ Performance Plan to support implementation of the CMAQ measures.² The MPO must also update the CMAQ Performance Plan biennially.

The contents of the initial, or baseline, CMAQ Performance Plan must:

- Describe the baseline level of condition and performance for the PHED and non-SOV travel measures for calendar year 2017, and the baseline total on-road emissions reductions associated with CMAQ funded projects between Federal fiscal years 2014 and 2017.
- Identify the two-year and four-year performance targets that are established for each CMAQ measure.

¹ 23 CFR Part 490

² 23 CFR 490.107(c)(3)

- Describe the projects identified for CMAQ funding and how the projects will contribute towards achieving the CMAQ targets.

The Gaston-Cleveland-Lincoln Metropolitan Planning Organization (GCLMPO) planning area serves portions of the Charlotte, NC-SC Urbanized Area, which is a TMA with a population over one million. GCLMPO's planning area also includes portions of the Charlotte-Rock Hill, NC-SC ozone maintenance area. As such, GCLMPO is required to prepare and update biennially this CMAQ Performance Plan.

GCLMPO, in coordination with NCDOT, developed the baseline CMAQ Performance Plan in July-August 2018. NCDOT submitted the baseline CMAQ Performance Plan to FHWA prior to October 1, 2018, as required by federal regulations.

Updated CMAQ Performance Plan

MPOs that are required to develop a CMAQ Performance Plan must update the Plan biennially. This updated Plan is due by October 1, 2020 must include the following items:

- A description of the 2-year (2018 and 2019) condition and performance for the PHED, non-SOV travel, and total on-road emissions reduction measures.
- An assessment of the progress of the CMAQ projects identified in the baseline CMAQ Performance Plan toward achieving the 2-year targets.
- If applicable, adjusted 4-year targets and the basis for adjustment.
- Any updates to the description of projects identified for CMAQ funding and how those updates will contribute to achieving 4-year performance targets.

Description of CMAQ Performance Measures

Peak Hour Excessive Delay (PHED): A measurement of traffic congestion, expressed as annual hours of peak hour excessive delay per capita. The threshold for excessive delay is based on travel time at 20 miles per hour or 60% of the posted speed limit travel time, whichever is greater, and is measured in 15-minute intervals on National Highway System (NHS) roads. Peak travel hours are defined as 6:00 to 10:00 a.m. on weekday mornings, and either 3:00 to 7:00 p.m. or 4:00 to 8:00 p.m. on weekday afternoons. The total excessive delay metric is weighted by vehicle volumes and occupancy. Thus, PHED is a measure of person-hours of delay experienced on NHS roads on an annual basis.

Non-Single Occupancy Vehicle (Non-SOV) Travel: Measures the percent of vehicle travel that occurs with more than one occupant in the vehicle.

Total On-Road Emissions Reduction: Measure represents the cumulative two-year and four-year emission reductions of ozone, CO, PM10, or PM2.5, as applicable, in kg/day from CMAQ funded projects within the boundaries of the planning area.

Applicability of CMAQ Performance Measures to GCLMPO

The PHED and non-SOV travel measures apply to urbanized areas (UZA) with a population of more than one million that include NHS roads and are also nonattainment or maintenance areas for ozone, carbon monoxide or particulate matter. States and MPOs within an applicable UZA must coordinate and agree to set a single, unified four-year target for the entire UZA for PHED, and two- and four-year targets for non-SOV travel.

In North Carolina, the PHED and non-SOV travel performance measures apply to the Charlotte, NC-SC UZA. The following agencies have planning area boundaries that overlap with the UZA: Cabarrus-Rowan MPO, Charlotte Regional Transportation Planning Organization, GCLMPO, Rock Hill-Fort Mill Area Transportation Study, NCDOT, and SCDOT. These agencies agreed upon unified PHED and non-SOV travel targets in Spring 2018, and revisited the targets in January 2020.

The on-road emissions reduction measure applies to states and MPOs that contain all or part of a nonattainment or maintenance area for ozone, CO, PM10, or PM2.5. The measure represents emission reductions in kg/day for CMAQ funded projects within the boundaries of the GCLMPO Metropolitan Planning Area.

The applicable pollutants for GCLMPO and the other agencies in the Charlotte, NC-SC UZA are VOC and NOx. At the time the baseline CMAQ Performance Plan was developed in 2018, FHWA guidance incorrectly stated that CO was also applicable in the UZA. However, FHWA has since corrected the guidance to reflect that CO is not applicable. Thus, CO is no longer addressed in this Plan update.

Baseline Condition/Performance

The initial CMAQ Performance Plan prepared for GCLMPO in 2018 documented the baseline performance for the CMAQ measures. This information is presented in Table 1, and a discussion of each measure follows.

Table 1. CMAQ Performance Measures – Baseline Condition/Performance

CMAQ Performance Measure and Geographic Area	Baseline
PHED (Charlotte Urbanized Area)	15.8 hours
Percent non-SOV travel (Charlotte Urbanized Area)	21.7%
On-road emissions reduction (GCLMPO Metropolitan Planning Area)	VOC: 0.460 kg/day NOx: 0.930 kg/day

PHED Baseline Condition/Performance

The PHED baseline shown in Table 1 represents PHED on NHS roads in the Charlotte, NC-SC UZA for 2017. The baseline is obtained from analyzing travel time data in the National Performance Measures Research Dataset (NPMRDS), a federally funded dataset derived from vehicle/passenger GPS data. NPMRDS covers the entire NHS and provides average travel times in five-minute time periods for each travel segment, measured continuously throughout the year.

The primary data elements required to calculate PHED are: travel times on the NHS (in 15-minute segments), vehicle type (car, truck, and bus); average vehicle occupancy (AVO) factors; speed limits; and total UZA population. The Regional Integrated Transportation Information System (RITIS) tool provides the means to analyze historical delay trends for NHS facilities within state, MPO, or UZA boundaries. Default AVO values are assumed within the tool as follows: AVO (car) = 1.7; AVO (truck) = 1.0; AVO (bus) = 8.5. These values were derived from the National Household Transportation Survey (NHTS) and the National Transit Database (NTD). Speed limits are not contained within RITIS. However, NCDOT staff provided posted speed limits for NHS facilities within the Charlotte, NC-SC UZA. The 3:00 to 7:00 pm peak period was used to determine baseline conditions and establish targets.

Non-SOV Travel Baseline Condition/Performance

American Community Survey (ACS) data was used to develop the baseline non-SOV travel data. ACS is Census information based on “commuting to work” survey responses representing a sample of workers age 16 and over. Available survey responses for commuting to work are drove alone, carpooled, took public transportation (excluding taxicabs), walked, used other means, or worked at home.

ACS annual 5-year estimates are used, which represent 60 months of data collected for the most recent five year period, reported on an annual calendar year basis (i.e., the 2017 ACS annual 5-year estimate represents data collected between Jan 1, 2013 and Dec 31, 2017). Note that at the time the Baseline CMAQ Performance Plan was developed, 2017 data was not yet available for the non-SOV travel measures. Thus, 2016 and older values were used to observe trends and analyze possible targets. Table 1 above contains the actual 2017 ACS number for the baseline.

On-Road Emissions Reduction Baseline Condition/Performance

The data source for the emission reductions is the CMAQ Public Access System. States provide project information, including estimated emission reductions, annually to FHWA by March 1 for each CMAQ project funded in the previous Federal fiscal year. FHWA reviews the project information and makes it available in the CMAQ Public Access System prior to July 1 of each year. States can extract the information beginning on July 1 and use it to calculate the emissions reduction measure. The CMAQ Public Access system is accessible at the following link: https://fhwaapps.fhwa.dot.gov/cmaq_pub/

The baseline condition represents the sum of emissions reductions, in kilograms/day for each applicable pollutant, from all CMAQ funded projects between Federal fiscal years 2014 to 2017 in the GCLMPO planning area that were in the CMAQ Public Access System.

When developing the baseline, it was found that some of the projects in the CMAQ System did not have emission reductions entered. For these projects, NCDOT staff reviewed the applicable CMAQ project applications to determine emissions. Emission reduction data for some projects had incorrect units (e.g., grams/day instead of kilograms/day). These were corrected. The baseline also did not include statewide CMAQ projects selected by NCDOT, including ITS projects. Although these statewide CMAQ projects may potentially reduce emissions in the GCLMPO area, the MPO did not select these projects, and has no control over future selections from year to year. NCDOT does not have a policy in place that prioritizes the selection of projects in a particular area, and thus may or may not select projects in that area in the future.

CMAQ Performance Targets

The two-year and four-year targets for each CMAQ measure for the first performance period are provided in Table 2.

Table 2. CMAQ Performance Targets

CMAQ Performance Measure and Geographic Area	2-year Target	4-year Target
PHED (Charlotte Urbanized Area)	2-year target not required	34.0 hours
Percent non-SOV travel (Charlotte Urbanized Area)	21.0%	21.0%
On-road emissions reduction (Statewide)	Kg/day VOC: 0.252 NOx: 2.360	Kg/day VOC: 0.504 NOx: 4.720

The PHED and non-SOV travel targets are set for the entire urbanized area, and state and MPO targets must be unified. Therefore, these targets are identical to the targets set by NCDOT. GCLMPO participated in selecting these targets with other agencies in the UZA in the spring of 2018.

The on-road emissions reduction targets reflect anticipated cumulative 2-year and 4-year emission reductions in the GCLMPO planning area for CMAQ funded projects. The targets were set after taking into consideration recent CMAQ projects authorized for funding and identified in the CMAQ Public Access System. The emission benefits of CMAQ projects are highly dependent on project type and project delivery schedules by local agencies.

GCLMPO agreed to support the 2-year and 4-year unified targets and the NCDOT on-road emissions reduction targets identified in Table 2 on October 25, 2018.

Condition and Performance for 2018-2019

This updated CMAQ Performance Plan is required to discuss the condition and performance for each CMAQ measure at the 2-year point of the current performance period, which is December 31, 2019 for the PHED and non-SOV travel measures, and September 30, 2019 for the on-road emissions reduction measure. This information is provided below.

PHED 2-Year Condition/Performance

Table 3 presents performance for the PHED measure for 2018 and 2019 as well as the 2017 baseline year. PHED for 2018 increased by 1.7 hours over the 2017 baseline (performance decreased). However, in 2019 PHED was 0.9 hours below the baseline (performance was better). The increase in PHED from 2017 to 2018 is similar to the rate of increase seen in 2014 to 2016 data. However, the decrease in PHED from 2018 to 2019 is a positive trend that was not expected. Several factors impact PHED on the Interstate and non-Interstate NHS, including overall VMT, construction zone delays, shifts in travel mode, projects such as the addition of express lanes, and even weather events. As data from 2020 and 2021 becomes available it will become more apparent if the positive trend from 2018 to 2019 continues.

Table 3. PHED 2-Year Condition/Performance

Performance Measure and Geographic Area	2017 Baseline	2018	2019
PHED (Charlotte Urbanized Area)	15.8 hours	17.5 hours	14.9 hours

Non-SOV Travel 2-Year Condition/Performance

Table 4 shows performance for the non-SOV travel measure for 2018 as well as the 2017 baseline year. The percent of non-SOV travel in 2018 remained essentially the same as the 2017 baseline, with a decrease of 0.1 percent. Data for 2019 from the American Community Survey will be available in December 2020.

Table 4. Non-SOV Travel 2-Year Condition/Performance

Performance Measure and Geographic Area	2017 Baseline	2018	2019
Percent non-SOV travel (Charlotte Urbanized Area)	21.7%	21.6%	TBD

On-Road Emissions Reduction 2-Year Condition/Performance

Table 5 shows the VOC and NO_x emission reductions resulting from all CMAQ funded projects that were reported in the CMAQ Public Access System for federal fiscal years 2018

and 2019 in the GCLMPO planning area, as well as from CMAQ projects reported for the baseline years of 2014-2017.

Table 5. On-Road Emissions Reduction Travel 2-Year Condition/Performance

Performance Measure and Geographic Area	2014-2017 GCLMPO Baseline (kg/day)	GCLMPO Reductions 2018-2019 (kg/day)
On-road emissions reduction (GCLMPO Metropolitan Planning Area)	VOC: 0.460 NOx: 0.930	VOC: 0.160 NOx: 0.220

4-Year Target Adjustment

States and MPOs have the option of adjusting 4-year performance targets at the mid-point of the performance period. States must coordinate with MPOs when making any adjustments to 4-year targets, and in the case of the PHED and non-SOV travel targets, the states and MPOs with planning duties within any part of the UZA must collectively agree to adjust and select targets.

The states and MPOs in the Charlotte, NC-SC UZA (NCDOT, SCDOT, GCLMPO, CRMPO, CRTPO, and RFATS) met in January and March of 2020 to review performance for the PHED and non-SOV travel measures and discuss the option of adjusting 4-year targets. Based on the points below, the parties mutually agreed that adjustments to the PHED and non-SOV travel 4-year targets were not necessary or desired.

- PHED for 2018 and 2019 is much better than the 4-year target of 34.0 hours.
- PHED for 2019 is below (better than) the 2017 baseline.
- Non-SOV travel performance for 2018 is better than the 2-year and 4-year target of 21.0 percent and very close to the 2017 baseline.
- The 2-year performance target for non-SOV travel has been achieved. Furthermore, based on 2018 and 2019 trend data, it is anticipated that the 4-year targets for PHED and non-SOV travel will be achieved.
- There is a great deal of uncertainty now resulting from reduced travel due to COVID-19 restrictions and social distancing practices. It is not clear how this will affect travel behavior through the remainder of the performance period and beyond.

In addition, NCDOT and GCLMPO are not electing to adjust the 4-year targets for on-road emissions reductions.

Assessment of Progress

This updated Plan is required to provide an assessment of progress of the CMAQ projects identified in the baseline CMAQ Performance Plan toward achieving the 2-year targets.

As discussed above, the 2-year performance target for non-SOV travel will be achieved, and based on performance results over 2018 and 2019, it is anticipated that the 4-year targets for PHED and non-SOV travel will be achieved.

For the on-road emissions reduction measure, the projects identified for funding in the 2014 through 2017 baseline have been implemented or are underway and the projects anticipated for funding in 2018 and 2019 have been funded, per the CMAQ Public Access System.

There are three additional CMAQ projects identified for funding in the CMAQ Public Access System in 2018 that were not included in the 2018 CMAQ Performance Plan:

- Bus replacement for Gaston Express Mid-Day route.
- Operational assistance for Gaston Express Mid-Day route.
- Gaston County Sidewalks and crosswalks.

In addition, in 2019, GCLMPO worked with NCDOT and local project managers to swap out programmed Transportation Alternative Program (TAP) funds for CMAQ funds in order to save the funds from possible rescission. CMAQ applications were submitted for seven sidewalk projects, five in Gastonia and two in Mount Holly. These seven projects are additional CMAQ projects that were not included in the 2018 baseline CMAQ Plan.

The emission reductions expected from these additional ten projects are included in Table 6. The additional emission reductions will further help the region make progress toward achieving the four-year targets.

Description of CMAQ Projects

The baseline CMAQ Performance Plan included a description of projects identified for CMAQ funding during the performance period and how these projects will contribute to the achievement of the 2-year and 4-year targets for traffic congestion and on-road emissions reduction. This Plan updates the description of projects to include the additional projects listed above.

Table 6 presents the CMAQ projects in the GCLMPO planning area that were funded in 2018 and 2019 and are anticipated for CMAQ funding during 2020 and 2021, based on CMAQ applications received. The additional projects described above that were not included in the 2018 baseline Plan have been added to this table. The projects are grouped by project category for fiscal years 2018-2019 and 2020-2021, with the emission reductions expected from the projects and an indication of whether the projects will benefit the 4-year PHED and non-SOV travel targets. The benefits and emission reductions that are expected to result from these projects will continue to contribute to the achievement of the 4-year CMAQ targets identified in Table 2.

Table 6. Description of CMAQ Projects Identified for CMAQ Funding, GCLMPO Metropolitan Planning Area

Project Category	Description of Projects	Year Antic. for CMAQ Obligation	VOC Benefit (kg/day)	NOx Benefit (kg/day)	PHED Benefit	Non-SOV Benefit
Projects in 2018 Baseline CMAQ Performance Plan						
Bicycle-pedestrian projects	Sidewalk connectors	2019	0.014	0.010	No	Yes
Bicycle-pedestrian projects	Greenway connector	2020	0.019	0.014	Yes	Yes
Projects Added to this CMAQ Plan						
Bicycle-pedestrian projects	Sidewalk connectors	2019	0.472	0.365	No	Yes
Transit Improvements	Bus replacement; operational assistance	2018	0.120	0.200	Yes	Yes