
TRANSPORTATION PERFORMANCE MANAGEMENT

CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT (CMAQ)

THIS NEWSLETTER COVERS THE THREE SYSTEM PERFORMANCE MEASURES RELATED TO THE CMAQ PROGRAM:

1. ON-ROAD MOBILE SOURCE EMISSIONS: TOTAL EMISSION REDUCTIONS (TOTAL EMISSION REDUCTION)
2. TRAFFIC CONGESTION: ANNUAL HOURS OF PEAK HOUR EXCESSIVE DELAY PER CAPITA (PHED MEASURE)
3. TRAFFIC CONGESTION: PERCENT OF NON-SINGLE OCCUPANCY VEHICLE (SOV) TRAVEL (NON-SOV TRAVEL)

CMAQ PROGRAM PURPOSE

Since 1992, the purpose of the Congestion Mitigation and Air Quality (CMAQ) program has been to provide a flexible federal funding source for state and local governments to implement surface transportation projects and other related efforts that help meet the air quality standard and emission reduction requirements of the Clean Air Act (CAA). State and local governments with regions that currently do not or previously did not meet National Ambient Air Quality Standards (NAAQS) can use CMAQ to help fund transportation programs and projects that reduce mobile source emissions for ozone (NO_x and VOC), carbon monoxide (CO), and/or particulate matter (PM 2.5).

A series of federal rules that focus the federal surface transportation program on achieving performance outcomes was initiated under the Moving Ahead for Progress in the 21st Century (MAP-21) Act and continued under the Fixing America's Surface Transportation (FAST) Act. In total, 12 performance measures have been identified for highway systems, including a set of three (3) measures to assess progress toward achieving the goals of the CMAQ Program. The requirements and targets of these measures and tools to calculate them are summarized below.

SUMMARY OF CMAQ PERFORMANCE MEASURES

The TOTAL EMISSION REDUCTION Measure requires significant progress toward reducing mobile source emissions in areas designated as non-attainment or maintenance for ozone (O₃), carbon monoxide (CO), or particulate matter (PM₁₀ and PM_{2.5}). Accordingly, MDOT established 2-year and 4-year targets for the total annual reduction of these emissions and uses data collected from project submittals to identify which projects are most cost-effective in meeting them. MDOT, with coordination from state and local stakeholders, may recommend that these projects take a higher priority in determining which projects will move forward.

The PHED Measure requires significant progress toward reducing delay in travel time caused by traffic congestion on the National Highway System (NHS). MDOT has established targets for the reduction in annual peak hours of excessive delay. MDOT and SEMCOG agreed to use 3:00 p.m. to 7:00 p.m. as Peak Hours for this Measure. Annual hours of delay are calculated by determining the difference between the actual time it takes to get through a travel segment and the baseline time expected to get through the segment.

The NON-SOV TRAVEL Measure requires significant progress toward increasing the percentage of non-single occupancy vehicle (Non-SOV) travel on the National Highway System (NHS). MDOT has established 2-year and 4-year targets of 14.4% for this Measure. These targets reflect a conservative approach and factors in a ten percent decline for unknown factors that could produce volatility in Non-SOV travel. MDOT and SEMCOG selected the U.S. Census Bureau American Community Survey (ACS) Journey to Work data method based on data availability and integrity, as well as meeting the needs of both agencies.

ON-ROAD MOBILE SOURCE EMISSIONS: TOTAL EMISSION REDUCTIONS

A primary focus of the CMAQ program is to fund transportation projects that reduce mobile-source emissions. Each project submitted for CMAQ funding must include an estimated reduction in emissions of primary pollutants.

Description: Measures are intended to assess the CMAQ program by measuring 2- and 4-year cumulative reported emissions reductions for all projects financed by CMAQ program funds. The regulation applies to any DOT and MPO with CMAQ funded projects in areas designated as nonattainment or maintenance for ozone (O₃), carbon monoxide (CO), or particulate matter (PM₁₀ and PM_{2.5}) National Ambient Air Quality Standards (NAAQS). For the first performance period, the measure only applies to the seven counties that are within the SEMCOG boundaries. These counties have been designated nonattainment or maintenance for particulate matter (PM_{2.5}).

Tool Used to Calculate Measure: The baseline information was pulled from the [CMAQ Public Access System](#) for years 2014 through 2017. The emissions benefit information is one of the items reported in the tracking system, and this information was used to develop the cumulative 2- and 4-year mobile emissions targets. A yearly average emissions benefit for PM_{2.5} was calculated based on 2016 and 2017 figures, and then reduced by 10% for unforeseen variables.

Baseline On-Road Mobile Emissions Information	
Year	Particulate Matter (PM _{2.5} kg/day)
2017	190.373
2016	273.416
2015	177.086
2014	12.481
Totals	653.357

Target Calculation Steps:

Particulate Matter	
Calculate average using years 2016 & 2017	$190.373 + 273.416 = 463.789$
Divide by 2 to get yearly average	$463.789 / 2 = 231.894$
Reduce by 10% for unforeseen variables	$231.894 \times .90 = 208.705$
Multiply by two for 2-year target	$208.705 \times 2 = 417.410$
Multiply by four for 4-year target	$208.705 \times 4 = 834.820$

Target Summary:

Measure	Baseline Condition	2-Year Targets FYE 2019	4-Year Targets FYE 2021
On-Road Mobile Source Emissions for Particulate Matter	653.357	417.410	834.820

TRAFFIC CONGESTION: ANNUAL HOURS OF PEAK HOUR EXCESSIVE DELAY (PHED) PER CAPITA

Description: Tracks traffic congestion by measuring the annual hours of peak hour excessive delay per capita on the National Highway System (NHS). This measure applies to Nonattainment or Maintenance Urbanized Areas with NHS mileage, and a population greater than 200,000. However, this regulation has phase-in criteria for the first performance period (2018-2022) and is only applicable for an urbanized area with a population exceeding one million and meeting all other criteria. In Michigan, only the Detroit Urbanized Area meets all criteria for the first performance period.

Excessive delay is calculated for segments of the NHS where travel times show speed at twenty miles per hour or less, or sixty percent of the posted speed limit or less; whichever is greater, during fifteen-minute intervals per vehicle. The regulation applies to weekdays and prescribes a specific time for morning peak travel hours, and two options for the afternoon to provide flexibility to state DOTs and MPOs (3:00 p.m. to 7:00 p.m. or 4:00 p.m. to 8:00 p.m.). MDOT and SEMCOG agreed to use the 3:00 p.m. to 7:00 p.m. option as the data demonstrated had higher levels of delay per capita between 2014 and 2017.

Tool Used to Calculate Measure: The data for the measure comes from the National Performance Measure Research Data Set (NPMRDS), Highway Performance Monitoring System (HPMS), Annual Average Daily Traffic (AADT), Annual Vehicle Occupancy rates (provided by FHWA), and may utilize U.S. decennial census in lieu of HPMS for urbanized area boundaries. The analysis tool is RITIS.

Please note that in late April there were changes made by FHWA that impacted the data outputs in RITIS for the PHED measure. The official average vehicle occupancy values to be used in the PHED per capita metric were released by FHWA and this was updated in RITIS. Also, FHWA provided new guidance on how to address segments that are not entirely on the NHS. A third change was HPMS facility type 6 in addition to facility types 1 and 2 are now included when calculating metrics. The combination of these changes impacted the PHED per capita measure. The target was developed prior to these changes being made in RITIS. The target was set conservatively with a 20% factor for unforeseen variables such as the above.

Target Calculation Steps:

- In RITIS, select the 'MAP-21' widget
- In the MAP-21 widget, under geography select 'UZA' and type 'Detroit'
- Under Select measures choose 'Annual Hours of Peak Hour Excessive Delay Per Capita'
 - Set target to less than desired hours (for this target 22 hours was selected)
 - Choose evening peak period (for this target 3pm-7pm was used)
- Years 2014 through 2018 were selected to help set the target
- Select 'Save Widget'
- The table below is the RITIS output from mid-March when data was collected to set the target

Calculate average using years 2014 – 2017	$19.21 + 18.28 + 21.23 + 14 = 72.72$
Calculate the yearly average	$72.72 / 4 = 18.18$
Increase the yearly average by 20% for unforeseen variables	$18.18 \times 1.2 = 21.81$ *Target was rounded up to 22 hours

Target Summary:

Measure	Baseline Condition (2014 to 2017)	2-Year Targets CYE 12/31/2019	4-Year Targets CYE 12/31/2021
Peak Hour Excessive Delay	18 hours, 30 min	N/A	22 hours

TRAFFIC CONGESTION: PERCENT OF NON-SINGLE OCCUPANCY VEHICLE (SOV) TRAVEL

Description: Measurement of non-SOV travel in specific urbanized areas, including travel via carpool, van, public transportation, commuter rail, walking or bicycling as well as telecommuting. This measure applies to Nonattainment or Maintenance Urbanized Areas with NHS mileage, and a population greater than 200,000. However, this regulation has phase-in criteria for the first performance period (2018-2022) and is only applicable for an urbanized area with a population exceeding one million and meeting all other criteria. In Michigan, only the Detroit Urbanized Area meets all criteria for the first performance period.

Tool Used to Calculate Measure: American Community Survey (ACS) Commuting (Journey to Work) data from the U.S. Census Bureau.

Target Calculation Steps:

- <https://data.census.gov/cedsci/>
- Search: 'S0801: COMMUTING CHARACTERISTICS BY SEX'
- Select '*Desired Year*: ACS 5-Year Estimates Subject Tables' from the Product drop down menu
- Select 'Urban Area' and under Geographies
- Select subset 'Detroit, MI Urbanized Area (2010)' under Geographies

	Total	
	Estimate	Margin of Error
Workers 16 years and over	1,637,063	+/-4,835
▼ MEANS OF TRANSPORT...		
▼ Car, truck, or van	92.5%	+/-0.1
Drove alone	84.0%	+/-0.2

- % SOV Travel = Workers who drove alone / Total Workers
- % SOV Travel = 84.0%
- % Non-SOV Travel = 100% - 84% = 16%
- A conservative approach to setting the target was taken and a 10% decline for unanticipated factors was used. Therefore the Non-SOV Travel Measure target was calculated as follows:
 - 16% of Non-SOV travel – 10% = 14.4%
- 14.4% Non-SOV travel was used as the 2- and 4-year target based on the historic trend of non-SOV travel remaining consistent per the 2012 through 2016 data.

Target Summary:

Measure	Baseline Condition	2-Year Targets CYE 12/31/2019	4-Year Targets CYE 12/31/2021
Non-Single Occupancy Vehicle (SOV) Travel	16.0%	14.4%	14.4%