South Jersey Transportation Planning Organization

Congestion Mitigation & Air Quality

Baseline Report and Performance Plan

2022 - 2025

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Congestion Mitigation and Air Quality Performance Plan, 2022 - 2025

South Jersey Transportation Planning Organization, Vineland, New Jersey (NJ)
Part of Philadelphia, PA—NJ—DE—MD Urbanized Area (UZA) and Atlantic City, NJ UZA

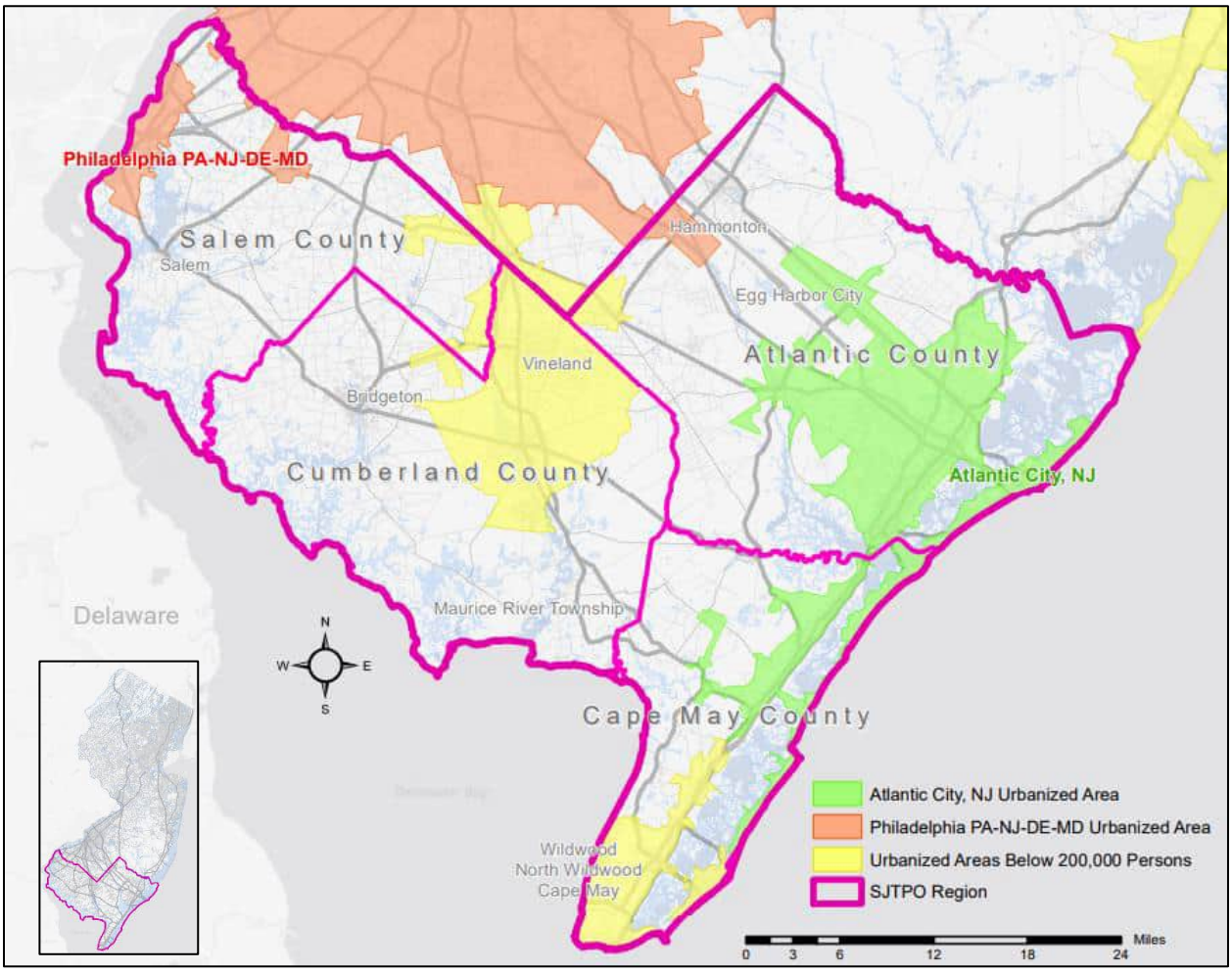
Introduction

The Congestion Mitigation Air Quality (CMAQ) Performance Plan is required to be completed per the System Performance Rules;[1] if any part of a designated nonattainment and maintenance area within the metropolitan planning area overlaps the boundary of an urbanized area with a population of more than 1 million in population, that a Metropolitan Planning Organization (MPO) shall establish both 2-year and 4-year targets for their metropolitan planning area and prepare a CMAQ Performance Plan.[2] The South Jersey Transportation Planning Organization (SJTPO) region, Figure 1, falls within the Philadelphia-Wilmington-Atlantic City, PA—NJ-MD-DE 8-Hour Ozone Nonattainment Area under the 2015 standard of 0.070 parts per million (ppm) (75 parts per billion (ppb)) as depicted in Figure 2.[3] In the 8-hour Ozone Standards from 1997, 2008, and 2015 the SJTPO region is classified as a "marginal" 8- Hour Ozone Nonattainment area. Since a portion of the 8-Hour Ozone Nonattainment Area within the SJTPO metropolitan planning boundary overlaps with the Philadelphia, PA-NJ-DE-MD Urbanized Area with a population of approximately 5.4 million, it is subject to this requirement. The SJTPO region also includes the Atlantic City, NJ Urbanized Area (AC UZA); it is now required to set targets for congestion measures as a result of new guidance and regulations for the second performance period. New guidance states that urbanized areas (UZA) of between 200,000 and 1 million persons, as well as those exceeding 1 million persons, require congestion measure targets.[4] Since the AC UZA has a population of 274,966 people, it is required to complete traffic congestion performance targets and is being included in this CMAQ Performance Plan.

As with many MPOs in non-attainment areas, the SJTPO has a competitive process to solicit projects to be funded under the CMAQ program. Projects are eligible for CMAQ funding if they are intended to reduce emissions in the region through direct means such as converting to low-emission vehicles, or through indirect means such as traffic signal improvements that improve vehicle flow and reduce congestion. Government, non-profit and private entities are eligible to apply. Applicants must include specific information as part of their application, including: a detailed description of the project, the amount of CMAQ funding being requested, a project cost estimate, a project schedule, certification of the project sponsor's familiarity with the New Jersey Department of Transportation (NJDOT) Local Aid process, and an overview of any preliminary work that has been done such as prior planning studies or data collection activities.

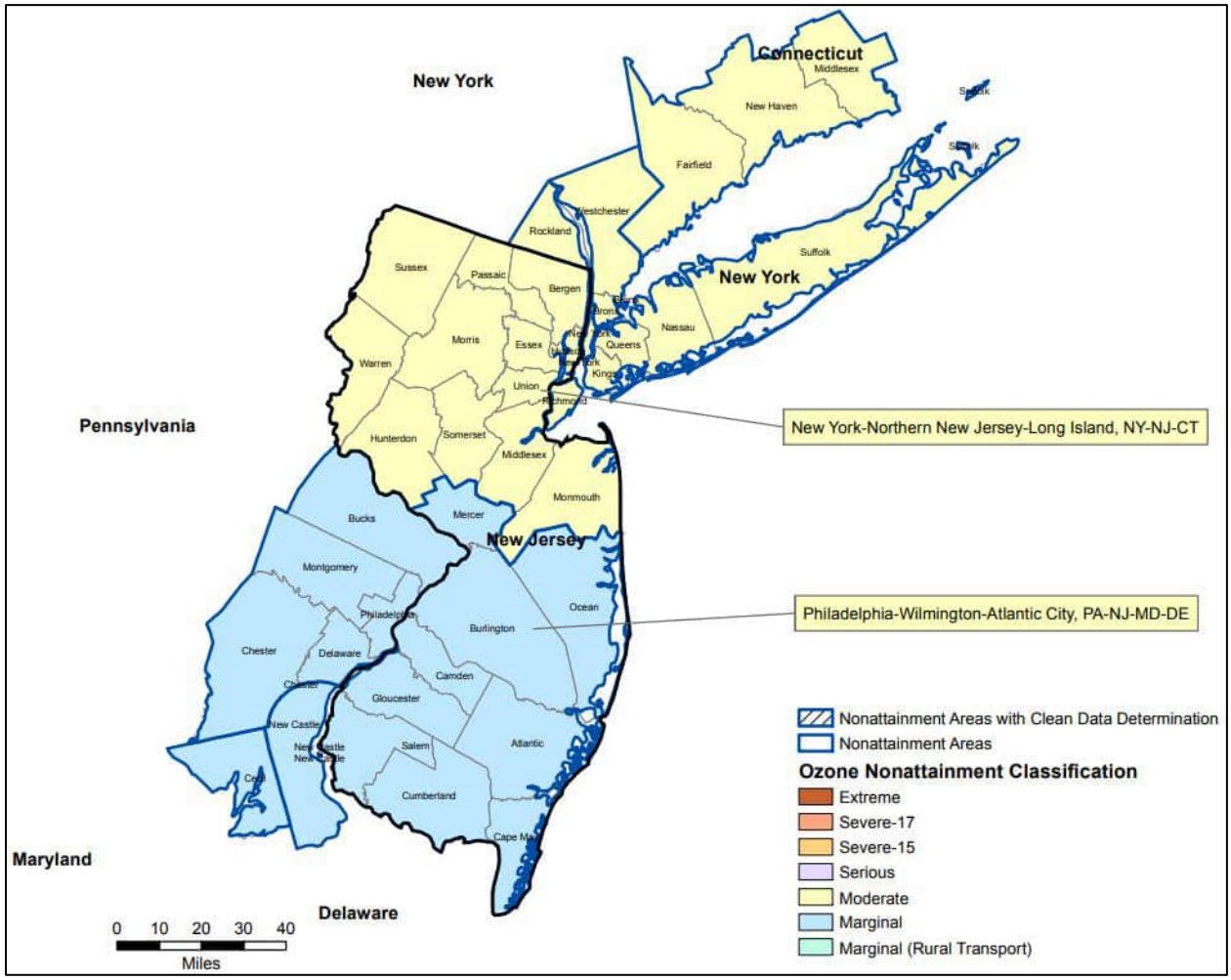
[1] As specified in 23 CFR 490.105(f)(6)(iii).
[2] As specified in 23 CFR 490.107(c)(3).
[3] Environmental Protection Agency, EPA.
[4] As specified in 23 CFR 490 & 23 CFR 450.

Figure 1: Urbanized Areas in the SJTPO Region



The CMAQ applications are scored by a CMAQ Selection Committee, which is designated by the SJTPO Technical Advisory Committee (TAC). The CMAQ Selection Committee is comprised of SJTPO staff, SJTPO Technical Advisory Committee members, and representatives from NJDOT's Transportation and Air Quality unit. Applications are scored in accordance with federal CMAQ guidance, with the main scoring criterion being the cost-effectiveness of the expected emissions benefit. SJTPO continues to work with all project sponsors throughout the project authorization process. Additional information and guidance on SJTPO's CMAQ process is available at: http://www.sjtpo.org/cmaq/.

Figure 2: 8 Hour Ozone Non-Attainment Area



Source: https://www3.epa.gov/airquality/greenbook/nj8_2015.html

Baseline Condition, Performance & Targets

The CMAQ Program assesses traffic congestion and on-road mobile source emissions. The promulgation of performance measures and targets covering the national goals for the Federal-Aid Highway System is in accordance with the Fixing America's Surface Transportation Act (FAST Act), Moving Ahead for Progress in the 21st Century (MAP-21), and the Infrastructure Investment and Jobs Act (IIJA).[5] The Federal Highway Administration (FHWA) enacted the System Performance Measure Final Rule, which establishes national performance measures for assessing performance for carrying out the CMAQ program.[6] Traffic congestion and on-road mobile source emissions are performance measures that establish targets to be approved by the NJDOT.

Additionally, through correspondence with local and state Department of Transportation (DOT) Organizations, coordinated emissions reductions are implicated to the maximum extent possible through

[5] As specified in 23 USC 150.
[6] As specified in 23 CFR 490.

awareness and education. An assessment of the project's expected emission reduction benefits is completed including the reduction in ozone precursors of Nitrogen Oxides (NO_x) and Volatile Organic Compounds (VOC), in kilograms (kg) per day or per year, along with the expected lifespan of the emissions reduction. SJTPO frequently assists project applicants in completing emissions estimates using FHWA Office of Environment's series of spreadsheet-based tools to facilitate the calculation of representative air quality benefit data, congestion management data, and other tools developed for use in NJDOT's CMAQ program. NJDOT provides reports on current conditions and frequently updates emission rates and emission estimation methodologies.

The CMAQ performance plan includes two major performance areas: Traffic Congestion and Emissions. As such, federal regulation calls for MPOs and State DOTs to report both a baseline conditions assessment as well as a 2-year (except for the Peak Hour Excessive Delay (PHED) measure) and 4-year targets. These targets were set at conservative levels to ensure a realistic chance of attainment. In developing these baseline measures and targets, the SJTPO coordinated extensively with NJDOT as well as the other New Jersey MPO's to ensure consistency to the maximum extent possible.

Traffic Congestion Measures

Two performance measures are required for the Traffic Congestion performance area: Peak Hour Excessive Delay (PHED) and Percent of Non-Single-Occupancy Vehicle Travel. A single target is required for the urbanized areas for these measures. This includes the Philadelphia, PA-NJ-DE-MD Urbanized Area and the Atlantic City, NJ Urbanized Area (AC UZA). Projections for each of the two baseline measures were based on projected reductions for FFY 2018-19 for the 2-year target, and FFY 2018-21 for the 4-year target. On July 25, 2022, the SJTPO Policy Board approved the urbanized area targets for the following CMAQ Traffic Congestion measures.

Peak-Hour Excessive Delay

The Peak Hour Excessive Delay (PHED) measure indicates the extra time spent traveling due to congestion, expressed as the number of hours per year on a per capita basis. The threshold for excessive delay is based on the travel time at 20 miles per hour or 60% of the posted speed limit travel time; the greater value measured in 15-minute intervals.[7] The established targets are based on historical trends while utilizing the Regional Integrated Transportation Information Systems (RITIS) tool which is maintained by the University of Maryland's Center for Advanced Transportation Technology (CATT) lab.[8] The metric used to calculate the target measures is Annual Hours of PHED per capita on the National Highway System (NHS).

Atlantic City, NJ Urbanized Area

From 2017 to the onset of the pandemic in March 2020, PHED per capita in the AC UZA has been declining. From July 2020, as the lockdown was lifted, PHED per capita, has started to increase gradually. In addition to the numbers reported by RITIS, SJTPO staff compiled a list of major projects in SJTPO's current capital program, the CMAQ list, as well as a list of projects provided by the City of Atlantic City that were likely to impact PHED

[7] As specified in 23 CFR 490.707a.

[8] An information portal that computes various travel-time related performance measures using the federally approved National Performance Research Dataset (NPMRDS). The NPMRDS is archived travel time data collected in 15-minute intervals. It covers most of the NHS roadways, on which many of these performance measures apply.

per capita in the AC UZA. These consisted primarily of signal synchronization projects as well as road diets. While in the short-term (which SJTPO defined as one year or less), these projects may cause a slight uptick in PHED, in the long-term, which SJTPO is defining as longer than one year, members of the AC UZA Coordination Group anticipate some mitigation of congestion. For the AC UZA, the 2-year target is **6.3 person hours/ capita**, and the **4-year target is 6.2 person-hours/ capita**. This decision was concurred by the members of the AC UZA Coordination Group at their June 14, 2022 meeting.

Philadelphia, PA-NJ-DE-MD Urbanized Area

In preparation of the 2-year and 4-year performance plan targets, various potential scenarios were proposed. The conservative target scenarios showed higher PHED indicating more SOV; however, the aggressive target scenarios showed lower PHED indicating more telework, transit commuting, and carpooling. These scenarios were sent out to the coordination group for feedback. The coordination group discussed trends including the continuation of telework, decreased use of transit due to health risks, increased safety projects, and increased population or employment. For the Philadelphia UZA, the agreed upon targets are as follows: 2-year target is **15.2 person hours/ capita**, and the 4-year target is **15.1 person-hours/ capita**. This decision was concurred by the members of the Philadelphia UZA Coordination Group at their June 9, 2022 meeting.

Due to the long-term impacts of construction projects, the increasing number of people working from home, and the impact of the pandemic, a "conservative or flat-line" scenario was considered the most realistic. The SJTPO Policy Board formally approved the 2-year and 4-year PHED targets for the Atlantic City, NJ Urbanized Area and the Philadelphia, PA-NJ-DE-MD Urbanized Areas, respectively, on July 25, 2022.

Percent of Non-Single-Occupancy Vehicle Travel

The Non-Single-Occupancy Vehicle (SOV) Travel measure indicates the number of persons using a travel mode that includes walking, bus, carpool, train, bicycle, taxi, rideshare, and work at home, and excluding those using single-occupancy vehicles.[9] The metric utilized is Percent of Non-SOV Travel in the urbanized area.

Atlantic City, NJ Urbanized Area

As with the PHED per capita targets, SJTPO relied largely on extrapolation of past historical trends to establish the non-SOV targets for the Atlantic City, NJ, Urbanized Area. In establishing the 2-year and 4-year % non-SOV targets for the AC UZA region, SJTPO looked at several different datasets. Results from both the 5-year ACS as well as the 1-year ACS from 2010 to 2020 were analyzed. Looking at non-overlapping 5-year ACS datasets, there was a slight decline in %non-SOV from the 2006-2010 ACS to the 2016 to 2020 ACS, from 26.10% to 25.40%. While there were some fluctuations in the values reported from the 1-year ACS compared to the 5-year ACS, there was still a very slight decline between 2010 and 2019. A 5-year rolling average based on the 1-year ACS data back to 2013 was also drawn to delineate the overall historical trends more clearly in this measure. In addition

[9] As specified in 23 CFR 490.707b.

to reviewing ACS data, past trends of other indicators were examined to get an overall sense of the context. These "related" indicators included population, both in the SJTPO region as well as the AC UZA, employment, vehicle-miles traveled (VMT), transit ridership within the region, as well as percentage of people working from home. Apart from employment, which has been flat since 2010, all these indicators have been trending downward. In addition to the trends shown by past indicators, future population and VMT projections were analyzed. Both indicators depicted very small increases, with annual growth rates of 0.11% and 0.08%. Based on this analysis and feedback from the coordination group, targets were set are as follows: for the AC UZA, the 2-year % non-SOV target is **24.1% non-SOV travel**, and the 4-year % non-SOV target is **23.7% non-SOV travel**. This decision was concurred by the members of the AC UZA Coordination Group at their June 14, 2022 meeting.

Philadelphia, PA-NJ-DE-MD Urbanized Area

For the Non-SOV travel measure, overlapping and non-overlapping 5-year ACS and 1-year ACS were trended to identify potential targets. The conservative target scenarios showed lower percent non-SOV travel indicating more SOV; however, the aggressive target scenarios showed higher percent non-SOV travel indicating more telework, transit commuting, and carpooling. These scenarios were sent out to the coordination group for feedback and the. The result of the analysis along with feedback from the coordination group resulted in the following targets for the Philadelphia UZA: the 2-year % non-SOV target is **30.0% non-SOV travel,** and the 4-year % non-SOV target is **30.0% non-SOV travel**. This decision was concurred by the members of the Philadelphia UZA Coordination Group at their June 9, 2022 meeting.

As with the PHED per capita measure, due to the long-term impacts of construction projects, the increasing number of people working from home, and the impact from the pandemic, a "conservative or flat-line" scenario was considered most realistic. The SJTPO Policy Board formally approved the 2-year and 4-year % non-SOV targets for the Atlantic City, NJ Urbanized Area and the Philadelphia, PA-NJ-DE-MD Urbanized Area on July 25, 2022.

On-Road Mobile Source Emissions Measures

The On-Road Mobile Source Emissions measure requires reduction benefits by pollutant from all investments made through the CMAQ Program. As SJTPO falls within the Philadelphia-Wilmington-Atlantic City PA-NJ-MD-DE 8-Hour Ozone Non-Attainment Area, it must report this measure. The Atlantic City, NJ Urbanized Area is not required to report this measure. The specific metrics are kilograms/day of Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NOx), both ozone precursors. As SJTPO meets the National Ambient Air Quality Standards (NAAQS) for CO or $PM_{2.5}$, these measures are not required to be reported. The target values are based on cumulative emissions reduction benefits recorded in the FHWA CMAQ Public Access System (PAS) database for fiscal years 2018-21. Table 1 contains a more detailed breakdown of the emissions benefits used in calculating the baseline. For the 2-year target, SJTPO reported a baseline of 8.38 kg/ day of VOC, and a baseline of 79.51 kg/ day of NOx. For the 4-year target, SJTPO reported a baseline of 9.68 kg/ day of VOC, and a baseline of 84.53 kg/ day of NOx. The targets

assume a declining return in emissions reduction benefits with the implementation of tighter fuel and vehicle emission standards, combined with fleet turnover and new energy-efficient cars.[10] The SJTPO Policy Board approved the CMAQ mobile source emissions reduction targets on September 26, 2022.

Federal Fiscal Year (FFY)	Total Emissions Reduction Benefits (kg/ day)			
	VOC	CO*	NO_X	$PM_{2.5}$*
2018	8.14		79.03	
2019	0.24		0.48	
2020	0.58		3.20	
2021	0.73		1.82	
2-Year Baseline	**8.38**		**79.51**	
4-Year Baseline	**9.68**		**84.53**	

Table 1: Emissions Reduction Benefits used in Calculating Baseline

The methodology for forecasting these targets is agreed upon by the New Jersey Department of Environmental Protection (NJDEP), New Jersey Transit (NJT), NJDOT, and the three MPO's in New Jersey including SJTPO. These concepts are as follows: reduced fleet emissions, prior CMAQ PAS benefits, high impact outlier projects, and miscellaneous miscalculations. The average fleet emissions are reported as reduced on a downward trend over time due to strict fuel and emissions standards, or older vehicles retired in preparation for new clean vehicles added to the fleet. The benefits from the last four year reporting period for CMAQ is considered and projected for future forecasted projections. Aside from calculated impacts upon forecasting, there are also outliers formed as high yield or impact projects that disproportionally bias the reporting, and general miscalculations during the CMAQ PAS revision process that have been eliminated. The forecasted targets were construed through a conservative approach much like the congestion target measures. The total emission reduction projections are from the projected programmed projects for FFY 2022-23 for the 2-year target, and FFY 2022-25 for the 4-year target. The SJTPO emission reduction projections are in Table 2. For the 2-year target, SJTPO is reporting the projections to be **0.73 kg/ day** of VOC, and **2.33 kg/ day** of NOx. For the 4-year target, SJTPO is reporting the projections to be **1.39 kg/ day** of VOC, and **4.30 kg/ day** of NOx. As SJTPO is in attainment for both CO and $PM_{2.5}$, emissions reductions are not included for these pollutants. Further details on the methodology utilized in calculating the baseline and targets are included in the separate technical memorandum that is included as part of Appendix I.

[10] In 2018, a statewide project was completed which increased the yield of NO_x and VOC exponentially; this was an unusual one-off project and the SJTPO region met and exceeded the set targets without the addition of the project.

Federal Fiscal Year (FFY)	Total Emissions Benefits Projections (kg/day)			
	VOC	CO*	NO_X	$PM_{2.5}$*
2022	0.37		1.22	
2023	0.36		1.12	
2024	0.34		1.03	
2025	0.32		0.94	
2-Year Target	**0.73**		**2.33**	
4-Year Target	**1.39**		**4.30**	

Table 2: SJTPO Total Emissions Reductions Projections including 8 percent of benefits from statewide projects[11]
*No CO or $PM_{2.5}$ is reported as SJTPO meets the NAAQS for these pollutants.

Description of Projects

Future planned projects are identified in Table 3; these projects are anticipated to help the SJTPO region meet its CMAQ congestion and mobile source emissions targets as specified above. These projects will be programmed into the CMAQ PAS database upon completion of authorization and reported in the mid-performance plan. For the local CMAQ Program, SJTPO currently solicits projects to be funded on a three-year basis as opposed to annually or several years in advance. The most recent solicitation period was for FFY 2022-24; the next solicitation period will be for FFY 2025-27. The SJTPO Policy Board approved the CMAQ congestion targets on July 25, 2022, and the CMAQ mobile source emissions reduction targets on September 26, 2022. Throughout the ensuing 2-year and 4-year performance periods, in addition to monitoring those projects listed below, SJTPO will continue to program new projects and programs that will help contribute towards attainment of these targets. SJTPO will have the opportunity to adjust these targets in the biennial update to the CMAQ Performance Plan, to be submitted with the Mid-Performance Period Progress Report, due to the FHWA and DOT by October 1, 2024.

[11] Per the Highway Performance Monitoring System (HPMS), 2020.

Table 3: Current Local & State Projects

STATE PROJECT ID	TIP PROGRAM YEAR	PROJECT CATEGORY	PROJECT TITLE	COUNTY	ADDITIONAL PROJECT DESCRIPTION	EMISSIONS BENEFIT	PHED TRAFFIC CONGESTION BENEFIT	NON-SOV TRAFFIC CONGESTION BENEFIT	STATUS
I. Local CMAQ Projects									
X065	FFY 2022-24	Congestion Reduction and Traffic Flow Improvements	Pacific Avenue Signal Optimization	Atlantic City	Installation of traffic signal system for synchronization: Pacific Ave from Hartford Ave to Massachusetts Ave; Tennessee Ave to Atlantic City – City Hall to Pacific Ave; and Iowa Ave Atlantic City Public Safety Building to Pacific Ave .	Yes, improved operations, less idling.	Yes, improved operations.	No.	DES Authorized FFY 2022.
X065	FFY 2022-24	Bicycle and Pedestrian Facilities and Programs	Somers Point Bike Path Enhancements	Atlantic County	Installation of amenities along the Somers Point Bike Path, including flashing beacons at crosswalks; 4 pedestrian and bicycle counters; 6 bicycle repair stands; 20 wayfinding signs; 10 bike racks; and 10 benches .	Yes, encourage alternative methods of transportation.	Yes, reduced vehicles on the road.	Yes.	Authorized FFY 2022.
X065	FFY 2022-24	Congestion Reduction and Traffic Flow Improvements	Ventnor Avenue Signal Synchronization Project	Atlantic County	Installation of traffic signal system for synchronization; Ventnor Ave between Oxford Ave and Baton Rouge Ave.	Yes, improved operations, less idling.	Yes, improved operations.	No.	To be Authorized FFY 2023.
X065	FFY 2022-24	Transit improvement project	Cumberland County Department of Workforce Development "To-Work" Transportation Vehicle Replacement	Cumberland County	Procurement of 5 low-emission, unleaded fuel, body on chassis minibuses, to replace older models that will reach the end of their useful life by the end of 2023.	Yes, improved operations.	Yes, reduced vehicles on the road.	No.	To be Authorized FFY 2023.
X065	FFY 2022-24	Transit improvement project	Purchase of Eight (8) Replacement Paratransit Passenger Buses (flex to NJ Transit)	Various	Replacement of older vehicles with cleaner diesel powered buses and low emission unleaded fueled minibuses.	Yes, cleaner vehicles and fuels.	Yes, will remove SOV.	Yes.	To be authorized FFY 2023.

STATE PROJECT ID	TIP PROGRAM YEAR	PROJECT CATEGORY	PROJECT TITLE	COUNTY	ADDITIONAL PROJECT DESCRIPTION	EMISSIONS BENEFIT	PHED TRAFFIC CONGESTION BENEFIT	NON-SOV TRAFFIC CONGESTION BENEFIT	STATUS
X065	FFY 2022-24	Transit improvement project	Procurement of 7 low emission, unleaded fuel, body on chassis minibuses (flex to NJ Transit)	Various	This project consists of the procurement of 7 low emission, unleaded fueled, body on chassis minibuses with a fourteen passenger seating capacity and two wheelchair securement locations. These newly purchased vehicles would replace older models of a similar nature which have reached or will reach the end of their useful life.	Yes, cleaner vehicles.	Yes, will remove SOV.	Yes.	To be authorized FFY 2023.
X065	FFY 2022-24	Congestion Reduction and Traffic Flow Improvements	Roosevelt Boulevard/34th Street Advanced Traffic Signal Project	Cape May County	Construction of interconnection of advanced system equipment at 7 signalized intersections along Cape May County CR 623 (Roosevelt Blvd and 34th St).	Yes, improved operations, less idling.	Yes, improved operations.	No.	To be authorized FFY 2024.

II. Statewide CMAQ Projects

STATE PROJECT ID	TIP PROGRAM YEAR	PROJECT CATEGORY	PROJECT TITLE	ADDITIONAL PROJECT DESCRIPTION	EMISSIONS BENEFIT	PHED TRAFFIC CONGESTION BENEFIT	NON-SOV TRAFFIC CONGESTION BENEFIT	STATUS
22352	FFY 2022-25	Congestion Reduction and Traffic Flow Improvements	Carbon Reduction Program	Established pursuant to Section 11403 of the Infrastructure Investment and Jobs Act (IIJA), the Carbon Reduction Program provides funds for projects to reduce transportation emissions or the development of carbon reduction strategies. Funding is broken down as between 50-200k, between 5-50k, less than 5k, and Flex.	Yes, improved operations.	Yes, improved operations.	Yes.	Ongoing; New Program.
22350	FFY 2022-25	Transit improvement project	Electric Vehicle Infrastructure Program	Establishes an Electric Vehicle Infrastructure Program to provide funding to strategically deploy electric vehicle (EV) charging infrastructure and to establish an interconnected network to facilitate data collection, access, and reliability. This is a federal-aid funding category established under the Infrastructure Investment and Jobs Act (IIJA).	Yes, improved operations.	Yes, improved operations.	Yes.	Ongoing; New Program.

STATE PROJECT ID	TIP PROGRAM YEAR	PROJECT CATEGORY	PROJECT TITLE	ADDITIONAL PROJECT DESCRIPTION	EMISSIONS BENEFIT	PHED TRAFFIC CONGESTION BENEFIT	NON-SOV TRAFFIC CONGESTION BENEFIT	STATUS
13303	FFY 2022-25	Congestion Reduction and Traffic Flow Improvements	Active Traffic Management System	This program will provide funding for the deployment program for the first Active Traffic Management System (ATMS) in the State including all phases of design. This program will include funding for the complete delivery of the Final Design document for Active Traffic Management System (ATMS) for a candidate highway (I-80, I-295 or I-78). The design document will be used to deploy and carry out the actual construction of this technology for automatic operation and handling of traffic.	Yes, improved operations, less idling.	Yes, improved operations.	No.	Ongoing; Continued Program.
X185	FFY 2022-25	Bicycle and Pedestrian Facilities and Programs	Bicycle & Pedestrian Facilities/ Accommodations	This is a comprehensive program to ensure the broad implementation of the Statewide Bicycle and Pedestrian Mast Plan, Complete Streets Policy, and the implementation of federal and state policies and procedures pertaining to bicycle, pedestrian, transit, and ADA access and safety. This program includes addressing bicycle, pedestrian, transit, and ADA travel needs through the development of improvements on state, county, and local systems either by independent capital projects or through grants to counties and municipalities. Projects must make full consideration for the needs of all users.	Yes.	Yes, reduced vehicles on the road.	Yes.	Ongoing; Continued Program.
15343	FFY 2022-25	Congestion Reduction and Traffic Flow Improvements	Intelligent Traffic Signal Systems	This program will seek to improve mobility on New Jersey's arterial highways. Arterials contribute almost 70% of the total congestion that occurs in New Jersey. This program will focus on dynamically managing NJ's arterials from NJDOT's Arterial Management Center. Existing traffic signals will be strategically, systematically, and programmatically upgraded from standalone signals to highly sophisticated, coordinated, real-time traffic response traffic signals. This upgrade will consist of installing new controllers, intelligent software and algorithms, robust detection, and communication. This is a plan to upgrade most of the signals on NJDOT owned highways only.	Yes, improved operations, less idling.	Yes, improved operations.	No.	Ongoing; Continued Program.

Appendix I: Methodology and Forecasting Considerations behind SJTPO's baseline and targets for the On-Road Mobile Source Emissions Performance Measure

TECHNICAL MEMORANDUM

Michael Baker INTERNATIONAL

DATE: September 21, 2022

TO: Jamie Derose, NJDOT

CC: Chuck Grill, NJDOT
Sean Green, DVRPC
Keith Miller, NJTPA
Liz DeRuchie, NJTPA
Richard Cippoletti, NJTPA
Jason Simmons, SJTPO
David Heller, SJTPO

FROM: Robert d'Abadie - Michael Baker International

SUBJECT: Methodology and Resulting Targets for the Congestion Mitigation and Air Quality Emissions Performance Planning Measure for 2022 - 2025 Planning Period

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Introduction

Transportation Performance Management (TPM) provisions of MAP-21 and FAST Act require that state DOTs and Municipal Planning Organizations (MPOs) incorporate performance measures and target setting into the planning and programming process, providing accountability and transparency in how federal funding is spent on transportation projects. As part of this effort, NJDOT, NJDEP, NJ Transit (NJT) and the three (3) New Jersey MPO's engaged in a process to establish targets for the Congestion Mitigation and Air Quality (CMAQ) emissions measure, one of three performance measures specific to the CMAQ program. Specifically, emissions reductions reported in the CMAQ Public Access System (PAS) from the last four years were used to inform the setting of two-year (2023) and four-year (2025) targets. For this second performance reporting period, the CMAQ emissions targets were developed using a slightly updated process as compared to the first performance period, using reported data from 2018-2021 as the basis for forecasting. This update was developed for NJDOT with direct input from the MPOs, NJT and NJDEP. The following is a brief overview of the methodology used for forecasting targets and summarizes the underpinnings of the spreadsheet process. The spreadsheet itself can be made available on request.

Considerations in the Development of CMAQ Emissions Performance Targets.

The purpose of the CMAQ program is to fund transportation projects or programs that will contribute to attaining or maintaining national ambient air quality standards (NAAQS). This measure helps assess progress toward that purpose.

For projects funded with CMAQ funds, states enter estimated emissions reductions of applicable criteria pollutants (ozone, carbon monoxide, and particulate matter) and precursors that aid in the formation of those pollutants into a national database. States estimate emissions reductions in kilograms per day for all projects funded with CMAQ program funds.

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To keep this measure simple and consistent with current CMAQ annual reporting requirements, a project's estimated emissions reductions are only estimated for the first year of full operation. The emission estimate is entered in the CMAQ Project Tracking System for the first year of funding. For projects that carry-over to future funding years, emissions are only entered for the first year to avoid double counting. The FHWA understands this approach may result in taking credit for a project in a performance period before it becomes operational but believes the simplicity of this process is appropriate. The total emissions reduction measure was then calculated by adding together the total emissions projections, across all funded projects, for the 2- and 4-year reporting periods.

Assumptions and Calculations

The development of a methodology to forecast targets for the reporting periods was conceived and agreed to by NJDEP, NJT, NJDOT and the NJ MPOs. The targets were forecasted using a few basic concepts and considerations:

1. The process recognizes that on average fleet emissions are going down over time. This is due to stricter fuel and emissions standards and the turnover in the fleet with older more polluting vehicles being retired and newer cleaner-running vehicles entering the fleet.
2. Reported benefits from the last four-years in the FHWA CMAQ PAS were added and projected forward to develop targets, taking into account the cleaner fleet over time.
3. Outliers, particularly one-time high-impact projects that are unlikely to be repeated, were not used to develop targets as they disproportionally skew the forecasts/targets.
4. Projects containing oversights or miscalculations entered into the CMAQ PAS were reviewed and possibly eliminated when identified.

It should be noted that in addition to the above adjustments, for the last few reporting periods, NJDOT has been entering project data into the CMAQ PAS differently than in the past to better reflect FHWA guidance. In addition to properly coding multi-year projects, NJ Transit projects are now consistently coded in the FHWA CMS PAS database as statewide projects.

Decreasing Average Fleet Emissions

Many of the projects seeking CMAQ funding either improve traffic flow or aim to decrease Light Duty Vehicle (LDV) travel usually associated with commuting. As newer, cleaner vehicles enter the fleet, and as older vehicles are retired, the fleet as a whole becomes cleaner. This means that many project types have declining benefits over time. As an example, a Travel Demand Management (TDM) project encourages telecommuting has an estimated reduction in Vehicle Miles of Travel (VMT) of 1,000 vehicle miles per day. If the project was in Fiscal Year (FY) 2018 the benefits would be higher as the average emission rates per vehicle were also higher. The same project in 2025, eliminating the same 1,000 vehicles per day, would have emissions benefits decrease by approximately 35% to 50% depending on the pollutant and the location simply due to fleet turnover.

To account for this reduction in average fleet emissions rates, 2018-2025 fleet average emission rates for each of the criteria pollutants were developed for each of the three NJ MPOs as summarized in **Table 1** below. These rates are for a representative county in each of the MPOs and were developed using the EPA Motor Vehicle Emissions Simulator (MOVES) and data assembled for the latest air quality conformity demonstration

for each MPO. The rates were used to factor and project the annual average project benefits reported in the CMS PAS as follows:

- Existing projects found in the CMS PAS are factored to a 2021 baseline. Emissions benefits are multiplied by a factor of the average emissions rate/pollutant in the year of the project is reported and divided by the average emissions rate in 2021.
- Benefits for projects in 2021 occur in the baseline year and were not factored according.
- The adjusted benefits for all years were added together (by pollutant) and an average of the adjusted emissions calculated.
- Benefits reported are then averaged over the 4-year reporting period to yield the emission benefits in a typical year in 2021 equivalent values.
- The 2021 average is then projected forward year-by-year (2022-2025) by factoring the average emissions rate for the future year (by pollutant) dividing by the emissions rate for the year of the project by the 2021 fleet average emission rates.
- The above is done for all future years (to 2025) and the 2022-2025 and 2022-2025 values were summed together to create the targets.
- In the past, diesel projects such as vehicle emissions retrofits were not factored over time. For these projects the year and model of the vehicles were generally known so the benefit calculated is more precise and factoring was not appropriate. However, in the years 2018-2021 there were no diesel retrofit projects seeking CMAQ funds, so this approach was not needed. The lack of diesel projects can be attributed to a number of factors, the most significant being delays and denials of waivers to the federal "Buy America" requirements.

Table 1: Representative County Average Fleet Emissions Rates By MPO, Pollutant and Year

DVRPC Representative County

Year	General Fleet Running Emission Rates (grams/mile)			
	VOC	CO	NO_x	$PM_{2.5}$
2018	0.348	4.877	0.836	0.02481
2019	0.323	4.549	0.751	0.02277
2020	0.298	4.220	0.667	0.02073
2021	0.272	3.891	0.582	0.01869
2022	0.260	3.699	0.537	0.01755
2023	0.247	3.508	0.491	0.01640
2024	0.235	3.331	0.452	0.01560
2025	0.222	3.154	0.412	0.01479

Table 1 Continued: Representative County Average Fleet Emissions Rates By MPO, Pollutant and Year

NJTPA Representative County

Year	General Fleet Running Emission Rates (grams/mile)			
	VOC	CO	NOX	$PM_{2.5}$
2018	0.351	4.883	0.809	0.02376
2019	0.326	4.554	0.727	0.02183
2020	0.300	4.224	0.644	0.01990
2021	0.275	3.895	0.562	0.01797
2022	0.263	3.703	0.517	0.01690
2023	0.250	3.511	0.473	0.01582
2024	0.237	3.334	0.435	0.01506
2025	0.225	3.157	0.396	0.01430

SJTPO Representative County

Year	General Fleet Running Emission Rates (grams/mile)			
	VOC	CO	NO_X	$PM_{2.5}$
2018	0.339	4.829	0.845	0.02552
2019	0.314	4.504	0.760	0.02340
2020	0.289	4.178	0.675	0.02127
2021	0.264	3.852	0.591	0.01915
2022	0.251	3.662	0.544	0.01795
2023	0.239	3.472	0.498	0.01674
2024	0.227	3.296	0.459	0.01591
2025	0.214	3.120	0.419	0.01507

Distribution of Benefits from Statewide projects

Projects identified as "No MPO Identified/State Sponsored" (generally NJDOT and NJT efforts) were not assigned to a single MPO. Project examples falling into this category include NJ Transit rail car purchases that may travel through multiple MPO's, and NJDOT sponsored signal improvement programs which could be undertaken at any congested or failing intersection anywhere in the state. With no clear documentation where these projects would have an impact, the benefits of these projects were distributed to each of the MPOs based of the fraction of total statewide Vehicle Miles of Travel (VMT) occurring within the boundaries of each of the three MPOs as reported in the 2020 Highway Performance Monitoring System (HPMS). This was deemed appropriate as the NJ MPOs completely cover the entire state. **Table 2** below shows the share of "No MPO Identified/State Sponsored" projects assigned to each of the MPOs.

Table 2: Share of Statewide VMT by MPO

MPO	2020 HPMS AADT	Percent of Statewide Total
DVRPC	37,334,262	20.6%
NJTPA	129,483,903	71.4%
SJTPO	14,441,813	8.0%
Statewide	181,259,978	

Outlier Projects and Target Development

In some cases, a single project may have such a high reported benefit, unreasonably skewing the target calculations. These outliers can occur for a number of reasons.

- Particular beneficial projects that are unliked to replicated in the future, sometimes referred to as "one-time Heavy-hitters."
- Recorded benefit that seemed unusually high given the project description and is likely an error.
- A recurring project with its benefit recoded in years other than the first year of the project.
- A particularly large continuing project where the benefit is only calculated in the first year then will be a continuing project for years to come. This is an indication the project should be broken up over multiple years to spread out the benefit.

In cases like those described above, the interagency group was consulted before a project was eliminated from consideration to avoid unachievable 2 and 4-year targets. In the current target setting effort, only two projects were eliminated:

- A 2018 statewide project NJ20180003. This project reduces congestion and improves air quality by optimizing progression for 217 intersections in various counties. It is likely this project should be broken apart and the project should not be considered a continuing project in future years. The project benefits were eliminated from consideration in the target setting process.
- A similar project in the DVRPC Region NJ20190008 also seeks to improve air quality through improvements in traffic signal equipment and coordination. This project also likely needs to be broken out into multiple smaller projects over time. This project was also eliminated from the target setting process.

Special consideration of CO Emissions in the NJTPA region.

At the time of this effort, NJTPA includes CO in its air quality conformity analysis while all other MPOs are in full attainment for this NAAQS. There is no reasonable way to estimate impact of the projects just within the CO maintenance area, so as a substitute the percentage of total MPO VMT within the CO Maintenance area was used: 39.26%. In all likelihood the NJTPA region will reclassified as full attainment of the CO standard during this reporting period and this pollutant will no longer need to be reported.

Results

Table 3 below shows the 2023 and 2025 targets for the MPOs and statewide. The calculation spreadsheet was updated, and the two projects listed above were not used in the final calculation of targets. It should be noted that there are numerous continuing projects which are, by necessity, coded as qualitative and do not contribute to the estimation of targets, resulting in lower overall targets. For each MPO, only the pollutants that the regions are classified as non-attainment or maintenance of the NAAQS are shown.

The target setting does not attempt to reflect the COVID-19 pandemic's immediate and ongoing impacts. At this time there is little clarity on the longer-term impacts of the pandemic on overall travel including changes to mode choice, changes to time of day travel patterns, the frequency with which individuals' travel, the impact on project funding as well as other factors. It is suggested that when revisiting the targets at the midterm reporting period there may be an opportunity to revisit the pandemic impacts and adjust the targets accordingly.

Table 3: Summary of Agreed to CMAQ Performance Planning Emission Targets for the 2023 Midterm and 2025 Four-Year Full Reporting Period

Summary of 2023 Two-Year Midterm Targets

Location	Total Emissions Benefits Projections (kg/day)			
	VOC	CO	NO_x	$PM_{2.5}$
DVRPC	2.844		9.506	24.252
NJTPA	8.384	60.422	22.528	4.659
SJTPO	0.730		2.334	
Statewide Total	11.958	60.422	34.367	28.911

Summary of 2025 Four-Year Targets

Location	Total Emissions Benefits Projections (kg/day)			
	VOC	CO	NO_x	$PM_{2.5}$
DVRPC	5.406		17.495	45.963
NJTPA	15.948	114.796	41.425	8.841
SJTPO	1.386		4.298	
Statewide Total	22.740	114.796	63.218	54.805