Prehearing Clean Air Act Section 110(l) Noninterference Demonstration for the Removal of Transportation Control Measures from the Georgia State Implementation Plan

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Air Protection Branch

June 28, 2019

Prehearing CAA Section 110(l) Noninterference Demonstration for the Removal of Transportation Control Measures from the Georgia SIP

Executive Summary

This document contains Georgia's demonstration of noninterference and its request to revise the Georgia State Implementation Plan (SIP) to remove Transportation Control Measures (TCMs) from the Georgia SIP.

A TCM is any measure in a State Implementation Plan directed toward reducing emissions of air pollutants by improving traffic flow, reducing congestion, or reducing vehicle use. These measures are included in a region's transportation plan and program, which the U.S. Department of Transportation (DOT) Federal Highway Administration or the U.S. DOT Federal Transit Administration must find to be in conformity with the purpose of the SIP. TCMs are included in Georgia's SIP through the process established in the Clean Air Act (CAA) section 176(c)(8). SIPs can be revised to remove any TCMs which are outdated and no longer appropriate.

In this document, the Georgia Environmental Protection Division (EPD) is requesting that the Environmental Protection Agency (EPA) remove TCMs from the Georgia SIP. This document also contains Georgia EPD's demonstration that this request to remove TCMs from the Georgia SIP will not interfere with the maintenance or attainment of the National Ambient Air Quality Standards (NAAQS) or with reasonable further progress toward attainment. This state implementation plan (SIP) submittal focuses on ozone, the NAAQS most likely to be impacted by the removal of TCMs. The removal of TCMs from the Georgia SIP will not interfere with the maintenance of the 1997 and 2008 8-hour ozone NAAQS or the attainment of the 2015 8-hour ozone NAAQS. Although the Atlanta area has been designated nonattainment for the 2015 ozone standard, this plan secures an equivalent emissions reduction; therefore, this change will not hinder Georgia's ability to attain the standard.

As part of this request, Georgia EPD is submitting a supporting 110(l) demonstration. The 110(l) demonstration secures reproducible, enforceable, surplus, quantifiable, and permanent offsets so that the removal of TCMs from the Georgia SIP will not interfere with the continued maintenance of the 1997 and 2008 8-hour ozone NAAQS or attainment of the 2015 8-hour ozone NAAQS.

Georgia is currently in attainment for particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). The removal of TCMs from the Georgia SIP will have little to no impact on emissions of these pollutants or their related precursors. There is no concern that removal of TCMs from the Georgia SIP will interfere with compliance with the NAAQS in these attainment areas. Georgia EPD demonstrates in this SIP revision that this revision to Georgia's SIP is consistent with section 110(l) of the Clean Air Act and will not interfere with the corresponding attainment and maintenance of the NAAQS.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST of APPENDICES

LIST of ACRONYMS

Acronym	Meaning
ABM	Activity Based (Travel Demand) Model
ARC	Atlanta Regional Commission
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CFR	Code of Federal Regulations
CMAQ	Community Multi-scale Air Quality
CO	Carbon monoxide
DOT	Department of Transportation
EPA	Environmental Protection Agency
EPD	Environmental Protection Division
FR	Federal Register
GP	General Purpose
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
MOVES	Motor Vehicle Emission Simulator
MVEB	Motor Vehicle Emissions Budget
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NPRM	Notice of Proposed Rulemaking
Pb	Lead
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 micrometers
ppb	Parts per billion
ppm	Parts per million
PSI	Pounds per square inch
RFP	Reasonable Further Progress
RVP	Reid Vapor Pressure
SEMAP	Southeastern Modeling Analysis and Planning
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
TCM	Transportation Control Measures
TPD	Tons per day
TPY	Tons per year
VOC	Volatile organic compound

1.0 Introduction and Background

The Georgia Environmental Protection Division (EPD) requests to modify the Georgia State Implementation Plan (SIP) by removing Transportation Control Measures (TCMs) from the Georgia SIP. This technical analysis demonstrates that the removal of TCMs from the Georgia SIP will not interfere with the attainment or maintenance of any National Ambient Air Quality Standards (NAAQS) or any other CAA requirement as prescribed in section 110(l) of the Clean Air Act (CAA).

The noninterference demonstration contained in this document focuses on the impact of the removal of TCMs from the SIP in the 15-county Atlanta 2008 ozone NAAQS maintenance area (Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Newton, Paulding, and Rockdale), which includes the new 7-county 2015 ozone NAAQS nonattainment area. This is demonstrated by securing reproducible, enforceable, surplus, quantifiable, and permanent offsets so that the removal of TCMs from the SIP will not interfere with continued maintenance of the 1997 and 2008 8-hour ozone NAAQS or attainment of the 2015 8-hour ozone NAAQS. For the 2015 ozone standard, a 7-county Atlanta area has been designated nonattainment. This plan secures an equivalent emissions reduction; therefore, the removal of TCMs from the SIP will not hinder Georgia's ability to attain the standard. Furthermore, removing TCMs from the SIP will not interfere with the attainment or maintenance of the particulate matter (PM), which includes particulate matter with an aerodynamic diameter less than 10 micrometers and 2.5 micrometers (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), or lead (Pb) NAAQS. There are no nonattainment or maintenance areas in Georgia for PM, SO_2, NO_2, CO, or Pb. All of the PM, SO_2, NO_2, CO, and Pb monitors in the affected area are currently measuring levels well below the NAAQS and these revisions will result in little or no increase in emissions of these pollutants or their precursors.

Many TCMs were included in the Georgia SIP during the mid-1990s to help achieve attainment in the 1-hour ozone nonattainment area. In these cases, the State took off-travel model credit for their implementation in the SIP directly. In the late 1990s and early 2000s, during the conformity lapse, several TCMs were added to allow for the continued advancement of certain key infrastructure projects in a period when all non-exempt projects were frozen. Outside of these periods, no TCMs have been added to the Atlanta nonattainment area's transportation program. None of the TCMs were credited in future SIPs beyond any impacts TCMs had within the travel demand models.

TCMs inserted in the State's SIP do not have a sunset, unless specifically mentioned. Many are outdated, with new technologies or programs being implemented. In some cases, TCMs have affected land use decisions and can prevent the implementation of newer best practices in travel demand management or transit operations. TCMs are included in Georgia's SIP through the process established in the Clean Air Act (CAA) section 176(c)(8). SIPs can be revised to remove any TCMs which are outdated and no longer appropriate.

Section 1.1 will give the history of Atlanta's Nonattainment Area, Section 1.2 will explain the Clean Air Act provisions, and Section 1.3 will request the removal of TCMs from the SIP.

1.1 The Atlanta Nonattainment/Maintenance Area

This section provides a brief overview of the Atlanta area ozone nonattainment history. Table 1-1 summarizes the designation, classification, and attainment history of each ozone NAAQS for the Atlanta region. Each subsection below discusses specifics to individual standards and their current status.

1.1.1 1979 1-Hour Ozone Standard

Pursuant to the Clean Air Act Amendments of 1990 (CAAA), the Atlanta area was designated as serious nonattainment for the 1979 1-hour ozone NAAQS (0.12 parts per million (ppm)) by U.S. EPA on November 16, 1991. The area was comprised of 13 Georgia counties (Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale). When Atlanta failed to attain the 1-hour ozone NAAQS by the attainment deadline (November 15, 1999), EPA issued a final rulemaking on September 26, 2003 that the Atlanta area was being reclassified as a "severe" ozone nonattainment area effective January 1, 2004 (68 FR 55469). On June 15, 2005, EPA approved Georgia EPD's request to redesignate the Atlanta area from nonattainment to attainment with respect to the 1-hour ozone NAAQS (70 FR 34660).

1.1.2 1997 8-Hour Ozone Standard

Under the 1997 8-hour ozone standard (0.08 ppm), EPA designated 20 Atlanta counties on April 30, 2004 as a "marginal" nonattainment area. The 8-hour ozone nonattainment area encompassed the 13-counties (Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale) from the former 1-hour ozone nonattainment area plus seven (Barrow, Bartow, Carroll, Hall, Newton, Spalding, and Walton) additional "ring" counties. On March 6, 2008, EPA determined that the Atlanta Area did not attain the 1997 8-hour ozone NAAQS by June 15, 2007, as required, and reclassified the area to "moderate" nonattainment (73 FR 12013).

Georgia EPD submitted a request for a one-year extension of the attainment date in accordance with 40 CFR 51.907 on June 9, 2010, and EPA published a final rule granting that extension on November 30, 2010 (75 FR 73969). On June 23, 2011, EPA promulgated its determination (76 FR 36873) that the Atlanta nonattainment area had attaining data to meet the 1997 8-hour ozone NAAQS. EPA published a final rule confirming that the Atlanta nonattainment area had attained the 1997 8-hour ozone NAAQS by its applicable attainment date on March 7, 2012 (77 FR 13491).

Table 1-1. Atlanta Ozone NAAQS Designations.

NAAQS Designation Year	Averaging Time; Form	Level (ppm)	Attainment Classification (Federal Register (FR) citation, FR date)	Nonattainment Area	Attainment Date (FR citation, FR date)
1979	1-hour Number of days per calendar year, with maximum hourly average concentration greater than 0.12 ppm, is equal to or less than 1	0.12	Serious (56 FR 56694, November 6, 1991) Severe (68 FR 55469, September 26, 2003)	Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale	Met attainment deadline of November 15, 2005 (70 FR 34660, June 15, 2005)
1997	8-hour Annual 4th-highest daily maximum 8-hr average concentration, averaged over 3 years	0.08	Marginal (69 FR 23858, April 30, 2004) Moderate (73 FR 12013, March 6, 2008) Moderate (75 FR 73969, November 30, 2010) Granted one year extension	Barrow, Bartow, Carroll, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Hall, Henry, Newton, Paulding, Rockdale, Spalding, and Walton	Met attainment deadline of June 15, 2011 (78 FR 72040, December 2, 2013)
2008	8-hour Annual 4th-highest daily maximum 8-hr average concentration, averaged over 3 years	0.075	Marginal (77 FR 30088, May 21, 2012) Moderate (81 FR 26697, May 4, 2016)	Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Newton, Paulding, and Rockdale	Met attainment deadline of July 20, 2018 (82 FR 25523, June 2, 2017)
2015	8-hour Annual 4th-highest daily maximum 8-hr average concentration, averaged over 3 years	0.070	Marginal (83 FR 25776, June 4, 2018)	Bartow, Clayton, Cobb, DeKalb, Fulton, Gwinnett, and Henry	N/A

In order to be formally redesignated attainment, Georgia EPD was required to submit a maintenance plan. On April 4, 2012, Georgia EPD submitted a maintenance plan under the CAAA of 1990 requesting that the Atlanta area be redesignated from nonattainment to attainment based on 2008-2010 ambient monitoring data. EPA approved the plan and redesignation request and promulgated a proposed rule on February 4, 2013 (78 FR 7705), that was published in the Federal Register as a final rule on December 2, 2013 (78 FR 72040). The removal of TCMs will not interfere with the maintenance of the 1997 8-hour ozone NAAQS.

1.1.3 2008 8-Hour Ozone Standard

On May 21, 2012 (77 FR 30088), EPA published a final rule in the Federal Register designating a new 15-county (Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Newton, Paulding, and Rockdale) Atlanta area as "marginal" nonattainment for the 2008 8-hour ozone NAAQS (0.075 ppm). The Atlanta area was reclassified as "moderate" on May 4, 2016 (81 FR 26697). On July 14, 2016, the Atlanta area attained the 2008 standard and EPA issued a clean data determination (81 FR 45419). EPD subsequently requested that EPA redesignate the Atlanta Area to attainment for the 2008 8-hour ozone NAAQS and submitted a maintenance plan for the 2008 8-hour Atlanta nonattainment area (2008 Ozone NAAQS Maintenance Plan). In a notice of proposed rulemaking (NPRM) published on December 23, 2016 (81 FR 94283), EPA proposed to approve the maintenance plan, including the 2014 and 2030 Motor Vehicle Emissions Budgets (MVEBs) for nitrogen oxides (NO_X) and volatile organic compounds (VOCs), and to redesignate the area to attainment for the 2008 8-hour ozone NAAQS. The 2008 8-hour Atlanta nonattainment area was officially designated attainment on June 2, 2017 (82 FR 25523), with the 2008 8-hour ozone maintenance plan set in place. The plan (hereafter referred to as the "revised 2008 ozone maintenance plan") was updated as part of the Non-Interference Demonstration and Maintenance Plan Revision for Federal Low-Reid Vapor Pressure (RVP) Requirement in the Atlanta Area (84 FR 3358), although the MVEBs remained unchanged. The non-interference demonstration for the federal low-RVP was submitted to relax the gasoline volatility requirement for the 13-county area. Summer gasoline (June 1-September 15) is currently required to have a Reid Vapor Pressure (measure of volatility in pounds per square inch (psi)) of 7.8 (plus a waiver of 1.0 psi for 9-10% ethanol gasoline). The relaxation would increase the requirement to 9.0 (plus a waiver of 1.0 psi for 9-10% ethanol gasoline). For the purposes of this demonstration, it is assumed that the RVP requirement has been relaxed and the revised 2008 ozone maintenance plan has been approved. Using the revised 2008 ozone maintenance plan as the baseline, the removal of TCMs will not interfere with the maintenance of the 2008 8-hour ozone NAAQS.

1.1.4 2015 8-Hour Ozone Standard

On October 1, 2015, EPA announced its decision to lower the 8-hour ozone standard from 0.075 ppm to 0.070 ppm. The new standard became effective December 28, 2015 (80 FR

65292). On September 23, 2016, EPD recommended[1] an 8-county (Bartow, Clayton, Cobb, DeKalb, Fulton, Gwinnett, Henry and Rockdale) nonattainment area for the 2015 ozone NAAQS. This recommendation was based on 2013-2015 certified data. On December 20, 2017, EPD received a 120-day letter from EPA matching EPD's recommendation and allowing EPD to provide additional input regarding designations if 2015-2017 data was early certified. On February 9, 2018, EPD recommended that Rockdale County be designated attainment based on the 2015-2017 monitoring data, leaving a 7-county area. EPA designated 7 counties (Bartow, Clayton, Cobb, DeKalb, Fulton, Gwinnett, and Henry) as nonattainment for the 2015 ozone NAAQS on April 30, 2018[2] (83 FR 25776). The removal of TCMs will not interfere with achieving attainment of the 2015 8-hour ozone NAAQS.

1.2 Clean Air Act Provisions

In order to support Georgia's request to remove TCMs from its SIP, Georgia EPD must demonstrate that the change will satisfy section 110(l) of the CAA. Therefore, this section consists of a detailed description of those requirements.

1.2.1 Section 110(l) Requirement

Section 110(l) of the CAA governs EPA's ability to approve all SIP revisions. Specifically, section 110(l) states:

> *Each revision to an implementation plan submitted by a State under this chapter shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171 of this title), or any other applicable requirement of this chapter.*

Because of this, the removal of TCMs from the SIP should be evaluated to determine the potential to impact attainment or maintenance of National Ambient Air Quality Standards (NAAQS) and reasonable further progress (as defined in section 171) or any other CAA requirement as prescribed in section 110(l) of the CAA.

1.2.2 Attainment and Maintenance

Designations for the 1997 8-hour ozone standard were assigned on April 30, 2004 to the Atlanta 20-county area (69 FR 23858), but applicable requirements of the 1979 1-hour ozone had to be followed until attainment was reached for the 13-county 1979 1-hour ozone nonattainment area. The Atlanta area 1-hour ozone standard was attained and revoked

[1]Georgia EPD 2015 Ozone NAAQS Designation Recommendation Letter: https://www.epa.gov/sites/production/files/2016-11/documents/ga-rec.pdf
[2]Letter from EPA Administrator Scott Pruitt to Governor Nathan Deal on April 30, 2018.

effective June 15, 2005 (40 CFR 81.311) (70 FR 44470, August 3, 2005). Attainment for the 1997 8-hour ozone NAAQS was reached on June 23, 2011. Along with redesignation to attainment, Atlanta's maintenance plan for the 1997 8-hour ozone NAAQS was officially approved in December 2013. The 2008 8-hour Atlanta nonattainment area was officially designated attainment in June 2017, with the 2008 ozone maintenance plan set in place. The plan (hereafter referred to as the "revised 2008 ozone maintenance plan") was updated as part of the Non-Interference Demonstration and Maintenance Plan Revision for Federal Low-Reid Vapor Pressure Requirement in the Atlanta Area, although the MVEBs remained unchanged. As mentioned in Section 1.1.4, designations for the 2015 8-hour ozone standard were completed on April 30, 2018. The non-interference demonstration for the federal low-RVP was submitted to relax the gasoline volatility requirement for the 13-county area. Summer gasoline (June 1-September 15) is currently required to have a Reid Vapor Pressure (measure of volatility in pounds per square inch (psi)) of 7.8 (plus a waiver of 1.0 psi for 9-10% ethanol gasoline). The relaxation would increase the requirement to 9.0 (plus a waiver of 1.0 psi for 9-10% ethanol gasoline). For the purposes of this demonstration, it is assumed that the RVP requirement has been relaxed. The revised 2008 ozone maintenance plan was approved on April 23, 2019.

1.3 Removal Request

With the submission of this plan revision, Georgia EPD is requesting the removal of all TCMs, except the Intersection Upgrade TCM, from Georgia's SIP. The removal of TCMs will be implemented in 2020. This document was prepared using the requirements of 110(l), which demonstrate this revision will not interfere with attainment and reasonable further progress, as a basis for the removal of these measures.

The analysis contained in this document will focus on the impact of TCM removal on ozone maintenance and nonattainment areas, specifically maintenance of the 1997 and 2008 ozone standard and attainment of the 2015 ozone standard. Although the Atlanta area has been designated nonattainment for the 2015 ozone standard, this plan secures an equivalent emissions reduction and therefore, this change will not hinder Georgia's ability to attain the standard.

Furthermore, these revisions will not interfere with attainment or maintenance of PM, SO_2, NO_2, CO, or Pb NAAQS since the TCM removal will have little to no impact on emissions of these criteria air pollutants or their related precursors. There is no concern that the TCM removal will interfere with compliance with the NAAQS in their corresponding attainment areas. Since each of the monitors in the affected area is currently measuring levels well below the NAAQS, Georgia EPD can demonstrate in this SIP submittal that the TCM removal is consistent with section 110(l) of the Clean Air Act and will not interfere with the maintenance of these standards or attainment of the 2015 ozone standard.

The 110(l) demonstration will be included in Section 2.0 and will cover the following:

- NO_X and VOC Emissions Analysis
- Emissions Compared to MVEBs
- Attainment/Maintenance Inventory Comparison
- NO_X and VOC Sensitivity

To demonstrate that maintaining attainment of the 2008 ozone NAAQS is not interfered with by removing TCMs from the SIP, the NO_X and VOC emissions analysis will evaluate the impact of the removal of all TCMs from the SIP on the 15-county Atlanta 2008 ozone NAAQS maintenance area, which includes the new 2015 ozone NAAQS nonattainment area. By comparing emissions with TCMs and without TCMs, EPD can show the impact of the removal of TCMs from the SIP on NO_X and VOC emissions. The MVEB emissions comparison will demonstrate that the removal of TCMs from the SIP does not require any changes to the MVEBs, nor interfere with transportation planning and the Atlanta Regional Commission's (ARC's) ability to continue to demonstrate conformity with SIP budgets. The revised 2008 ozone maintenance plan with TCMs in place will be compared with the emissions that result from the removal of TCMs from the SIP. Emissions from the removal of TCMs from the SIP must remain below those in the attainment/maintenance inventory and MVEBs. Although this demonstration evaluates the impact of the removing all TCMs from the SIP, Georgia EPD will not be requesting the removal of all TCMs. Intersection Upgrade will remain as a TCM in the Georgia SIP. Therefore, this demonstration showing the impact of removing all TCMs is a conservative approach to showing emission impacts since the actual impacts will be smaller than those presented in this document.

Additional evidence that the removal of TCMs from the SIP will not interfere with the requirements of 110(l) can be found in Section 3.0 of this document. The state of Georgia is a NO_X limited area and Section 3 describes the sensitivity of ozone formation in the Atlanta area to reductions of NO_X and VOC emissions. The sensitivity analysis in Section 3 is based on photochemical grid modeling performed by Georgia Tech as part of the Southeastern Modeling, Analysis, and Planning (SEMAP) project.

When a state's 110(l) demonstration indicates that VOC or NO_X emissions have increased due to the relaxation or removal of a rule or a program in a nonattainment area, emissions offsets may be considered as long as the offset is reproducible, enforceable, surplus, quantifiable, and permanent. Section 4 demonstrates secured emissions offsets to ensure that the removal of TCMs from the SIP will not interfere with maintenance of the 1997 and 2008 8-hour ozone NAAQS or attainment of the 2015 8-hour ozone NAAQS. By offsetting the projected increases in VOC and NO_X emissions, the emissions offsets will ensure that the removal of TCMs from the SIP will not interfere with the attainment of the Atlanta 2015 ozone nonattainment area.

2.0 Transportation Control Measures

A Transportation Control Measure (TCM) is any measure in a State Implementation Plan directed toward reducing emissions of air pollutants by improving traffic flow, reducing congestion, encouraging clean fuel fleets, or reducing vehicle use. These measures are included in a region's transportation plan and program, which the U.S. Department of Transportation (DOT) Federal Highway Administration or the U.S. DOT Federal Transit Administration must find to be in conformity with the purpose of the SIP. TCMs are included in Georgia's SIP through the process established in the Clean Air Act (CAA) section 176(c)(8). SIPs may be revised to remove any TCMs which are outdated and no longer appropriate.

Many TCMs were included in the SIP during the period of the mid-1990s to help achieve attainment in the 1-hour ozone nonattainment area. In these cases, the State took off-model credit (i.e., did not use travel demand models) for their implementation in the SIP directly. In the late 1990s and early 2000s, during the conformity lapse, several TCMs were added to allow for the continued advancement of certain key infrastructure projects in a period when all non-exempt projects were frozen. Outside of these periods, no TCMs have been added to the Atlanta nonattainment area's transportation program. None of the TCMs were credited in future SIPs beyond any impacts TCMs had within the travel demand models. A complete list of current TCMs is included as Table 1, Appendix A.

TCMs inserted in the State's SIP do not have a sunset, unless specifically mentioned. Many are outdated, with new technologies or programs being implemented. In some cases, TCMs have affected land use decisions and can prevent the implementation of newer best practices in travel demand management or transit operations. Many TCMs have outlived their useful life and are due to be retired.

The methodologies and tools used to prepare the original TCM emissions reports from the 1990s were reviewed and the following methods in Tables 2-1 and 2-2 were selected to assess the emissions impacts that removing each TCM would have on the region's air quality. The TCM calculations will fall in two broad methodological categories: (1) Activity-Based Model (ABM) projects which use the travel demand model employed by the ARC (Table 2-1) and (2) off-model projects (Table 2-2). Those projects evaluated through the ABM will be coded and run through in one system-wide regional travel demand model run. The resulting travel networks and MOVES model inputs (considering both cases, with and without TCMs) will be carried through full MOVES emissions runs, similar to a conformity determination analysis run, to determine emissions impacts. The magnitude of impacts (combined with off-model calculations from the other TCMs) will determine offsets required against any emissions increases. Offsets help fulfill the non-interference demonstration regarding the 2015 ozone standard in which the Atlanta area is in nonattainment. Further discussion of offsets and the 2015 ozone NAAQS is found in Section 4. The ABM method is preferred, and all eligible projects will be evaluated using this methodology.

Projects evaluated using off-model methods cannot be run through the ABM. These projects will rely on updated methodologies based off those used in the 1990s. The inputs and assumptions will be updated, as applicable, to apply to current (2018) and future projections (out to 2040). The methodologies will focus on vehicle mile traveled (VMT) calculations to apply set MOVES-based emission factors to determine emissions impacts. Further discussion of offsets and the 2015 ozone NAAQS is found in Section 4. Individual off-model detailed methodologies are outlined in Appendix B.

Table 2-1. ABM-Based TCM Emissions Offset Methodology.

TCM Name	County	TCM Description	Federal Register	Brief Methodology Description
High Occupancy Vehicle (HOV) Lanes	Clayton, Cobb, DeKalb, Fulton	I-75 & I-85 ITP HOV lanes	63 FR 23387 (April 29, 1998) 64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Convert the HOV lanes to General Purpose (GP) lanes in the model
High Occupancy Toll (HOT) Lanes	DeKalb, Gwinnett	I-85 HOT lanes	77 FR 24397 (April 24, 2012)	Convert the HOT lanes to GP lanes in the model
Atlantic Station	Fulton	17th St bridge & ramps 17th St bridge over rail	65 FR 52028 (August 28, 2000)	Remove the bridges, ramps, and transit
Express Bus Routes	DeKalb, Fulton	#5, #6, #36, #125, XPRESS #428 & #426	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Remove the transit routes from the model
Improve/Expand Bus Service	DeKalb, Fulton	#15, #114, #111	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Remove the transit routes from the model
Park & Ride Lots	Douglas, Rockdale	West Douglas P&R Sigman Rd @I-20	63 FR 34300 (June 24, 1998)	Remove the transit stops & associated routes from the model
Transit Signal Preemption	DeKalb	MARTA Routes #15 and #39	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Remove the benefit of TSP from the model

Table 2-2. Off-Model-Based TCM Emissions Offset Methodologies.

TCM Name	County	TCM Description	Federal Register	Brief Methodology Description
Clean Fuel Buses	Cobb, DeKalb, Fulton	200 CNG buses for MARTA & CCT	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Prepare emissions comparison for 200 CNG & diesel buses
Clean Fuels Revolving Loan Program	Not restricted to any specific county within the 13-county area when initially implemented	1,800 vehicle revolving clean fuel program	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	The emissions benefits of this TCM have phased out as Tier II and Tier III emissions standards and fuels have replaced Tier I and clean fuel fleet (CFFV) standards*
Intersection Upgrade, Coordination & Computerization	Clayton, Cobb, DeKalb, Forsyth, Fulton, Gwinnett	Upgrades to 1,708 signals in Clayton, Cobb, DeKalb, Fulton and Gwinnett counties	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Copy method used in 1990s with updates to planning assumptions
ATMS/Incident Management	Clayton, Cobb, DeKalb, Fulton	I-75 & I-85 ITP & I-285 northern perimeter	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Copy method used in 1990s with updates to planning assumptions
Regional Commute Options & HOV Marketing	Not restricted to any specific county within the 13-county area when initially implemented	Marketing and incentives to carpool & use transit	64 FR 13348 (March 18, 1999) 64 FR 20186 (April 26, 1999)	Copy method used in 1990s with updates to planning assumptions
Transportation Management Associations (TMAs)	Clayton, DeKalb, Fulton	Formation and programs run by TMAs to encourage mode split	63 FR 23387 (April 29, 1998)	Copy method used in 1990s with updates to planning assumptions
Transit Incentives	DeKalb, Fulton	Transit subsidies to employees in TMAs	63 FR 23387 (April 29, 1998)	Copy method used in 1990s with updates to planning assumptions
University Rideshare Program	Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry, Rockdale	Carpooling and transit incentives program for university students/staff	63 FR 23387 (April 29, 1998)	Copy method used in 1990s with updates to planning assumptions

*The clean fuels revolving loan program TCM is producing no emissions benefit today since the implementation of Tier II and Tier III emission controls and fuels. Tier II and Tier III fuels and emission controls are inherently cleaner than the fuels and emission controls required by the clean fuels revolving loan program.

2.1 Impact of Removing TCMs – Emissions Increase and Trends

2.1.1 NO_X Emissions Analysis

NO_x emissions were analyzed using Motor Vehicle Emission Simulator (MOVES) 2014a to show the change in on-road emissions from removal of TCMs within the 15-county Atlanta 2008 ozone NAAQS maintenance area, which incorporates the new 7-county 2015 ozone NAAQS nonattainment area. Modeling assumptions, inputs, outputs and other related files are found in Appendix C. Emissions increases from TCM removal are minimal and continue to decrease into the future. Figure 2-1 shows the annual trend for NO_x emissions increases. For the purposes of this demonstration, "removal of TCMs" will be defined as the physical removal of the project and/or emission controls where they no longer exist in any capacity. In reality, the TCM projects will only be removed from the Georgia SIP, but will remain as is, continuing to function, and will stay that way unless transportation planners and local jurisdictions decide to remove them at a later date.

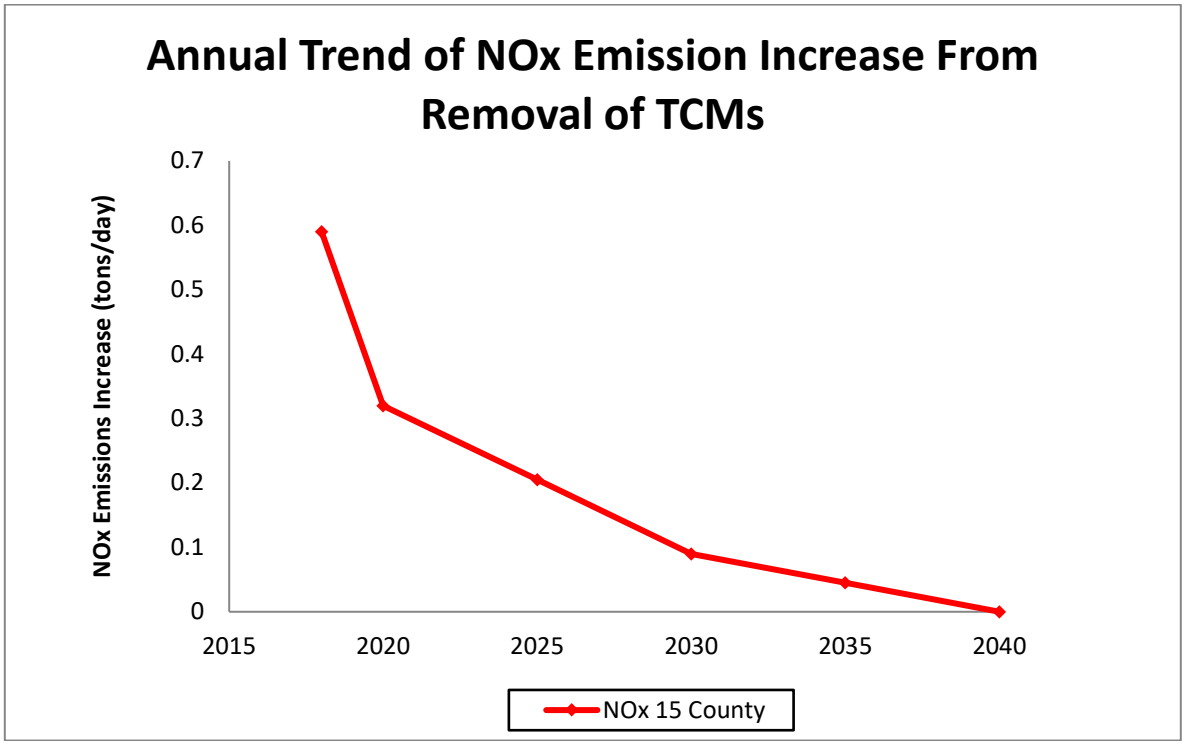

Figure 2-1: Annual Trend of NO_X Emissions Increase from Removal of TCMs.

The overall breakdown of TCM impacts is shown in Table 2-3 with impacts of individual TCMs and methodology listed in Table 2-4, with the exception of all TCMs covered by the ABM which are grouped together since the ABM runs them as one regional system. Further details on off-model and ABM based TCM calculations and methodologies are provided in

Appendices B and C. Any further calculations in this narrative will use the total impacts combining both the ABM and off-model impacts. Years 2025 and 2035 are interpolated.

Table 2-3. Comparison of On-Road NOx Emissions Before and After Removal of TCMs: Model (ABM) and Off-Model Calculations.

Model Year	NOx (TPD)		
	Off-model	ABM	Total
2018	0.589	0.004	0.59
2020	0.378	-0.055	0.32
2025	0.246	-0.041	0.21
2030	0.114	-0.027	0.09
2035	0.062	-0.019	0.05
2040	0.009	-0.010	0.00

Tables 2-4. NOx Impacts of each TCM or group of TCMs.*

TCM	NO_x (TPD)					
	2018	2020	2025	2030	2035	2040
Covered by Travel Demand Model**	0.004	-0.055	-0.041	-0.027	-0.019	-0.010
Clean Fuel Buses	0.054	0.032	0.012	-0.008	-0.008	-0.008
Clean Fuels Revolving Loan Program	0.000	0.000	0.000	0.000	0.000	0.000
Intersection Upgrade, Coordination &	0.255	0.196	0.137	0.062	0.036	0.010
ATMS/Incident Management	0.022	-0.088	-0.054	-0.019	-0.018	-0.018
Regional Commute Options & HOV Marketing	0.137	0.125	0.087	0.049	0.033	0.017
Transit Incentives	0.073	0.059	0.039	0.019	0.012	0.005
Transportation Management Associations (TMAs)	0.041	0.034	0.023	0.011	0.007	0.003
University Rideshare Program	0.0073	0.0060	0.0040	0.0019	0.0011	0.0005
Total (rounded to nearest hundredths of a ton)	0.59	0.32	0.21	0.09	0.05	0.00
Total (if keep Reg Com& Intersection Upgrade)	0.20	-0.01	-0.01	-0.02	-0.02	-0.03
Total (if keep Intersection Upgrade)	0.34	0.12	0.08	0.03	0.01	-0.01

* Groups of TCMs covered by the travel demand model are grouped together since that is how it was handled in the model
**HOV Lanes, HOT Lanes, Atlantic Station, Express Bus Routes, Improve/Expand Bus Service, Park & Ride Lots, Transit Signal Preemption

Prehearing CAA Section 110(l) Noninterference Demonstration for the Removal of Transportation Control Measures from the Georgia SIP

The impact of removal of TCMs in the 15-county Atlanta 2008 ozone NAAQS maintenance area, which incorporates the new 2015 ozone NAAQS nonattainment area, is that any NO_x emissions increase associated with the removal decreases steadily from 0.32 tons per day (TPD) in 2020 to near zero by 2040.

Table 2-5 shows the comparison of the NO_x emissions with and without TCMs for the 13, 2, and 15-county Atlanta areas over a variety of years. The data below is split to demonstrate the impacts of TCMs on the original former 13-county nonattainment area that were part of the 1979 1-hour ozone NAAQS, and the 2-county area (out of a total of 7) that was both later added with the 1997 8-hour ozone NAAQS, and then retained with the 2008 ozone NAAQS. The year 2014 is used as the first year of the analysis as it is both a base year and MVEB year for the Georgia maintenance SIP for the 2008 ozone NAAQS. The 2014 emissions values are from the maintenance SIP. 2018 is the first year where new emissions estimates and impacts are calculated. Additional years include those used in ARC's transportation conformity determination reports (2020, 2030, and 2040) and the MVEB year (2030) in the revised 2008 ozone maintenance plan. Additional modeling details can be found in Appendix C.

Table 2-5. Comparison of On-Road NO_X Emissions Before and After Removal of TCMs.*

Pollutant and Region	Year	With TCMs	Without TCMs	Emissions Increase with TCM Removal	Emissions Increase with TCM Removal
NO_x		**TPD**	**TPD**	**TPD**	**%**
13-county area	2018	94.49	95.10	0.61	0.64
	2020	76.70	77.01	0.31	0.41
	2025	55.74	55.94	0.20	0.35
	2030	34.78	34.86	0.08	0.23
	2035	29.10	29.14	0.04	0.14
	2040	23.42	23.42	0.00	0.00
2-county area	2018	11.45	11.43	-0.02	-0.18
	2020	9.49	9.50	0.01	0.11
	2025	7.16	7.17	0.01	0.14
	2030	4.82	4.83	0.01	0.21
	2035	4.36	4.37	0.01	0.12
	2040	3.90	3.90	0.00	0.00
15-county NAA	2018	105.94	106.53	0.59	0.56
	2020	86.19	86.51	0.32	0.37
	2025	62.89	63.10	0.21	0.33
	2030	39.46	39.51	0.09	0.23
	2035	33.46	33.51	0.05	0.13
	2040	27.32	27.32	0.00	0.00

*In the final calculations for the NAA, an additional 0.03 TPD added to these values to account for a Senior Exemption (is applied to any graphical comparisons)

2.1.2 VOC Emissions Analysis

VOC emissions were also analyzed using MOVES 2014a to show the change in on-road emissions from removal of TCMs. Modeling assumptions, inputs, outputs, and other related files for VOC emissions can be found in Appendix C. Figure 2-2 shows a trend similar to that of the NO_x emissions where emission increases from removal of TCMs are minimal and continue to decrease into the future. As more aged vehicles are replaced with newer cleaner vehicles that have improved controls, the increase in VOC emissions after TCM removal likely decreases over time (see Figure 2-2 and Table 2-5). The basis for the years illustrated in Table 2-6 is described in Section 2.1.1.

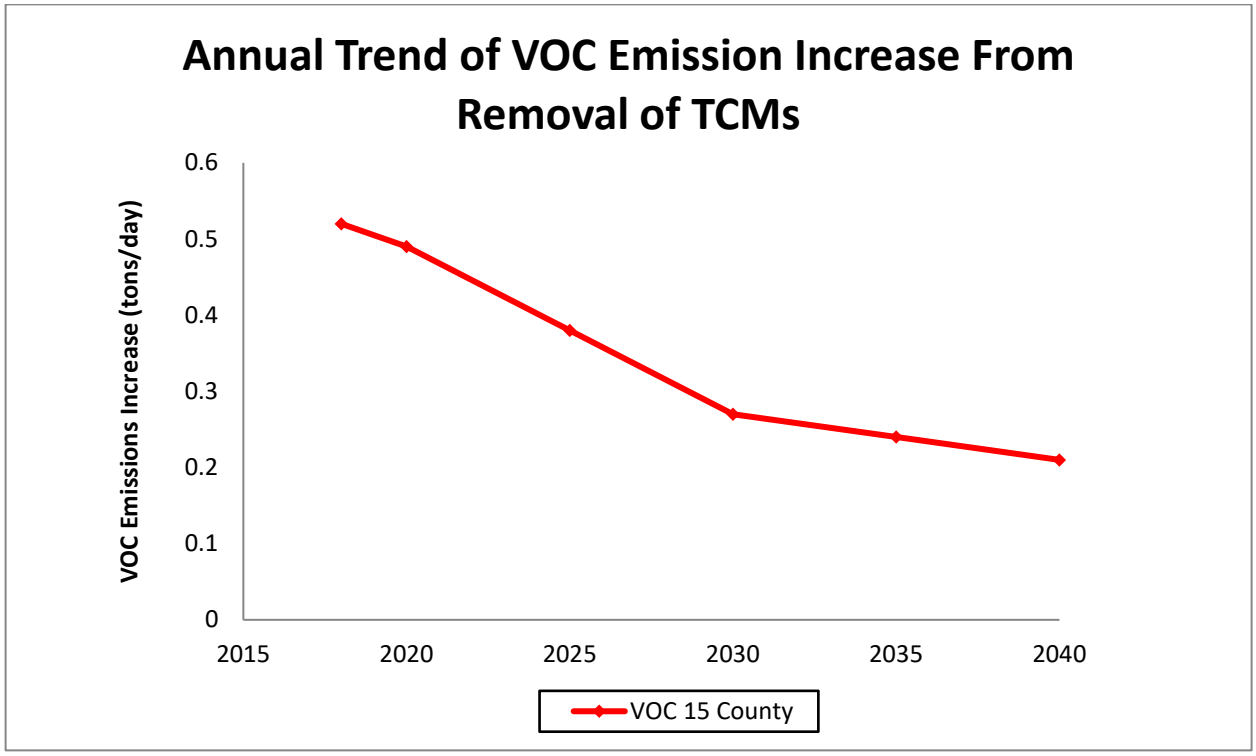

Figure 2-2: Annual Trend of VOC Emissions Increase from Removal of TCMs.

The overall breakdown of TCM impacts is shown in Table 2-6 with impacts of individual TCMs and methodology listed in Table 2-7, with the exception of all TCMs covered by the ABM which are grouped together since the ABM runs them as one regional system. Further details on off-model and ABM based TCM calculations and methodologies are provided in documentation in Appendices B and C. Any further calculations in this narrative will use the total impacts combining both the ABM and off-model impacts. Years 2025 and 2035 are interpolated.

Table 2-6. Comparison of On-Road VOC Emissions Before and After Removal of TCMs: Model (ABM) and Off-Model Calculations.

Model Year	VOC (TPD)		
	Off-model	ABM	Total
2018	0.544	-0.023	0.52
2020	0.491	0.003	0.49
2025	0.374	0.006	0.38
2030	0.257	0.008	0.27
2035	0.233	0.006	0.24
2040	0.209	0.003	0.21

Tables 2-7. VOC Impacts of each TCM or group of TCMs.*

TCM	VOC (TPD)					
	2018	2020	2025	2030	2035	2040
Covered by Travel Demand Model**	-0.023	0.003	0.006	0.008	0.006	0.003
Clean Fuel Buses	-0.003	-0.001	-0.003	-0.005	-0.005	-0.005
Clean Fuels Revolving Loan Program	0.000	0.000	0.000	0.000	0.000	0.000
Intersection Upgrade, Coordination & Computerization	0.220	0.183	0.146	0.108	0.099	0.090
ATMS/Incident Management	0.098	0.099	0.070	0.041	0.038	0.035
Regional Commute Options & HOV Marketing	0.119	0.111	0.089	0.066	0.062	0.058
Transit Incentives	0.064	0.053	0.040	0.026	0.022	0.018
Transportation Management Associations (TMAs)	0.040	0.033	0.025	0.016	0.014	0.011
University Rideshare Program	0.0071	0.0058	0.0043	0.0028	0.0024	0.0020
Total (rounded to nearest hundredths of a ton)	0.52	0.49	0.38	0.27	0.24	0.21
Total (if keep Reg Com& Intersection Upgrade)	0.18	0.19	0.14	0.09	0.08	0.06
Total (if keep Intersection Upgrade)	0.30	0.30	0.23	0.16	0.14	0.12

* Groups of TCMs covered by the travel demand model are grouped together since that is how it was handled in the model
**HOV Lanes, HOT Lanes, Atlantic Station, Express Bus Routes, Improve/Expand Bus Service, Park & Ride Lots, Transit Signal Preemption

VOC emissions increases associated with removal of TCMs in the 15-county maintenance area decrease from 0.49 TPD in 2020 to approximately 0.21 TPD in 2040 for on-road vehicles emissions as shown in Table 2-8 below. Also, Table 2-8 shows the impact of removal of TCMs in the 13, 2, and 15-county Atlanta areas. The data below is split in such a manner to demonstrate the impacts of TCMs on the original former 13-county nonattainment area that were part of the 1979 1-hour ozone NAAQS where there are additional restrictions currently in place due to this history (and where the TCMs impact was intended) and the 2-county area (out of a total of 7) that was both later added with the 1997 8-hour ozone NAAQS, and then retained with the 2008 ozone NAAQS. Additional modeling details can be found in Appendix C. For further illustration of impacts over time, 2025 and 2035 years were interpolated and added to the analysis.

Table 2-8. Comparison of On-Road VOC Emissions Before & After Removal of TCMs.*

Pollutant and Region	Year	With TCMs	Without TCMs	Emissions Increase with TCM Removal	Emissions Increase with TCM Removal
VOC		**TPD**	**TPD**	**TPD**	**%**
13-county area	2018	62.14	62.67	0.53	0.85
	2020	54.14	54.63	0.49	0.90
	2025	43.59	43.96	0.37	0.86
	2030	33.03	33.30	0.27	0.81
	2035	28.69	28.93	0.24	0.83
	2040	24.36	24.56	0.20	0.86
2-county area	2018	5.46	5.46	-0.01	-0.18
	2020	4.72	4.73	0.01	0.21
	2025	3.83	3.83	0.01	0.08
	2030	2.93	2.93	0.00	0.00
	2035	2.59	2.59	0.00	0.00
	2040	2.26	2.26	0.00	0.00
15-county area NAA*	2018	67.60	68.12	0.52	0.77
	2020	58.86	59.35	0.49	0.83
	2025	47.41	47.79	0.38	0.80
	2030	35.96	36.23	0.27	0.75
	2035	31.29	31.53	0.24	0.77
	2040	26.62	26.83	0.21	0.79

*In the final calculations for the NAA, an additional 0.05 TPD added to these values to account for a Senior Exemption (is applied to any graphical comparisons)

2.2 Emissions Compared to Motor Vehicle Emissions Budgets

Motor vehicle emissions budgets provide limitations of on-road mobile emissions, so that future emissions from mobile sources will not interfere with the region's ability to attain or maintain a NAAQS standard (2008 and 2015 ozone NAAQS specifically in this case). This section explains how removal of TCMs does not require any changes to the motor vehicle emissions budgets (MVEBs) nor interferes with transportation planning's ability to continue to demonstrate conformity with the SIP budgets in place.

2.2.1 NO_X and VOC Emissions Analysis

Figure 2-3 shows the NO_x emissions with and without TCM removal and how the emissions relate to the 2014 and 2030 MVEBs in Georgia's revised 2008 ozone maintenance plan. The difference in the two lines is nearly indistinguishable showing how TCM removal will not significantly affect these trends or the magnitude of emissions. This includes the impact of this removal on on-road mobile emissions.

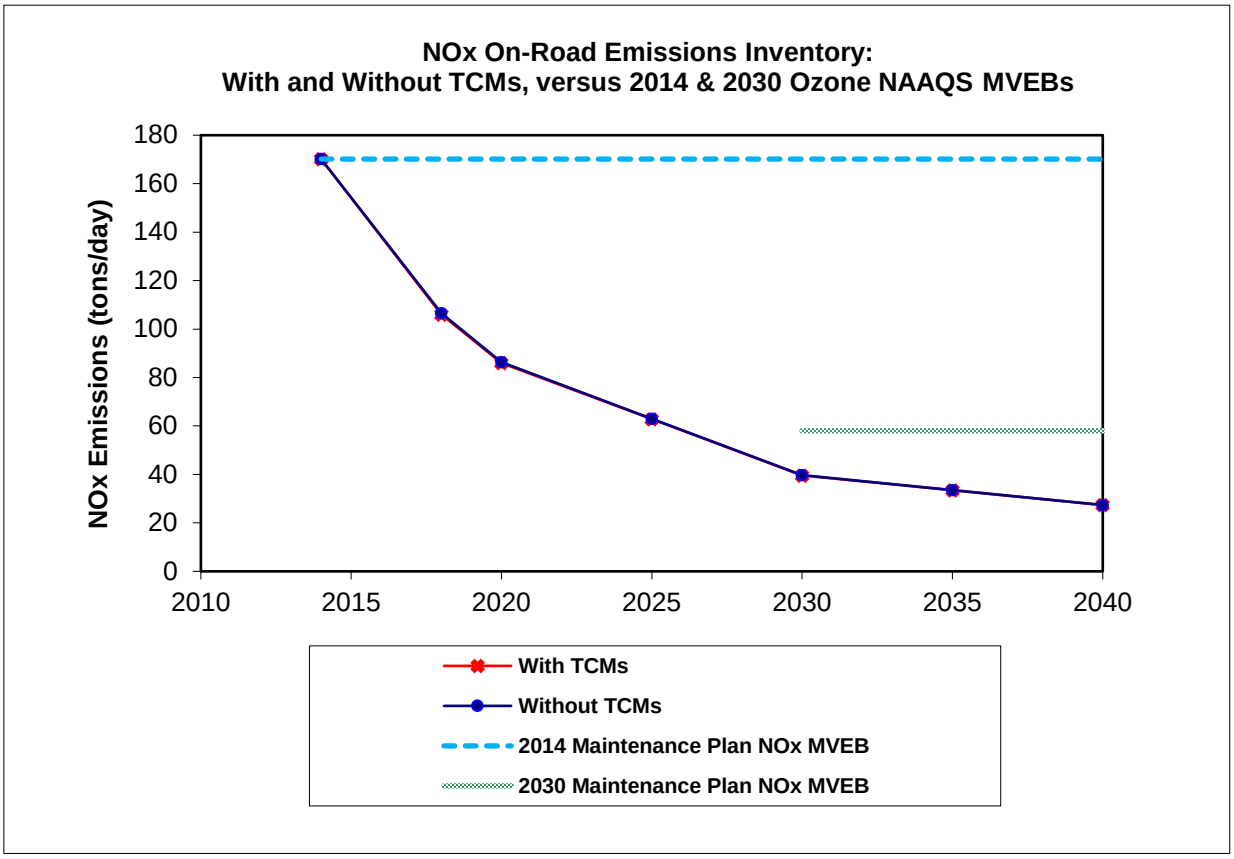

Figure 2-3: NOx Emissions: Comparison of Emissions, With and Without TCMs to Budgets for the 2008 Ozone Maintenance Plan NAAQS.

The dashed line represents the 2014 NOx MVEB and the green line describes the 2030 NO_X MVEB from Tables 4-1 and 4-2 in the revised 2008 ozone maintenance plan. The green line begins at 2030 because this budget only applies from 2030 onward in the revised 2008 ozone maintenance plan. The emissions where TCMs are in place and if they are removed are compared in this graph to the MVEBs to show that the removal of TCMs clearly does not impact Atlanta's ability to keep NO_X emissions below the MVEBs.

In both cases, with and without TCMs, the NO_X emissions after 2014 are well below the 2014 MVEB while emissions from 2030-2040 never exceed the 2030 MVEB. Table 2-9 shows the NO_X emissions for both cases in comparison to the two MVEBs.

Table 2-9. Comparison of NO_X On-Road Emissions with TCM Removal Versus 2008 Ozone NAAQS Maintenance Plan MVEBs.

Year	2014 MVEB (TPD)	2030 MVEB (TPD)	With TCM Removal Emissions (TPD)
2018	170.15	N/A	106.26
2020	170.15	N/A	86.54
2025	170.15	N/A	63.13
2030	170.15	58	39.72
2035	N/A	58	33.54
2040	N/A	58	27.35

A similar comparison can be made for VOC emissions. Figure 2-4 shows emissions from keeping TCMs in the SIP versus removing them and how the emissions compare to the 2014 and 2030 MVEBs.

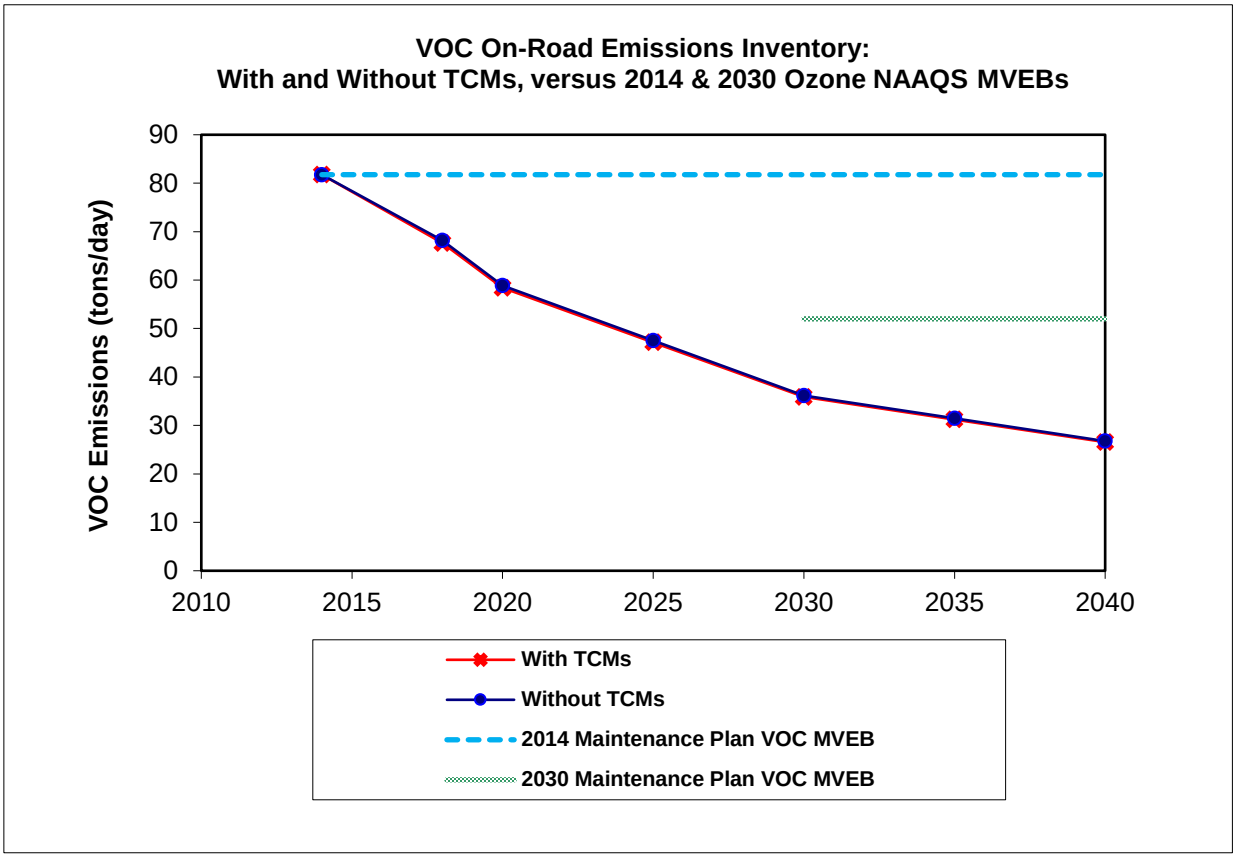

Figure 2-4: VOC Emissions: Comparison of Emissions With and Without TCMs to Budgets for the 2008 Ozone Maintenance Plan NAAQS.

Similar to NO_X, the difference in the two lines for VOCs is also extremely small showing how the removal of TCMs will not significantly affect these trends or the magnitude of emissions.

The dashed line represents the 2014 VOC MVEB and the green line describes the 2030 VOC MVEB from Tables 4-1 and 4-2 in the revised 2008 ozone maintenance plan. The green line begins at 2030 because this budget only applies from 2030 onward in the maintenance plan. The emissions where TCMs are in place and if they are removed are compared in this graph to the MVEBs to show that the removal of TCMs clearly does not impact Atlanta's ability to keep VOC emissions below the MVEBs.

In both cases, with TCMs and without TCMs, the VOC emissions after 2014 are well below the 2014 MVEB while emissions from 2030-2040 never exceed the 2030 MVEB. Table 2-10 shows the VOC emissions with TCM removal in comparison to the two MVEBs.

Table 2-10. Comparison of VOC On-Road Emissions with TCM Removal Versus 2008 Ozone NAAQS Maintenance Plan MVEBs.

Year	2014 MVEB (TPD)	2024 MVEB (TPD)	With TCM Removal Emissions (TPD)
2018	81.76	N/A	68.17
2020	81.76	N/A	59.40
2025	81.76	N/A	47.84
2030	81.76	52	36.28
2035	N/A	52	31.58
2040	N/A	52	26.88

2.3 Attainment Inventory Comparison

Table 3-13 in Georgia's revised 2008 ozone maintenance plan, shows the consolidated emissions projections of all metro Atlanta sources from 2014 to 2030. This plan demonstrated that future NO_X and VOC emissions through 2030, or the maintenance inventory, remained well below the emissions levels calculated in 2014, the attainment inventory year.

A maintenance plan modification is not needed because in the revised 2008 ozone maintenance plan demonstration, the only TCMs that were addressed in the demonstration were those run using the Activity Based (Travel Demand Model) Model, also called "ABM-Based TCMs". Removing these TCMs resulted in a slight decrease in NOx emissions so the safety margin could be increased. Since it is more conservative to keep the NOx safety margin unchanged, EPD will not pursue a change to the NOx safety margin in the revised 2008 ozone maintenance plan. For VOCs, removing these TCMs resulted in a negligible increase in VOC emissions. Based on the number of significant figures used in the revised 2008 ozone maintenance plan, the negligible increase in VOC emissions resulted in no change to the VOC safety margin.

A comparison of the attainment inventory with the emissions that result from removal of all TCMs from the SIP remain below those in the attainment inventory just as in the case with TCMs in place. If current and future emissions of precursors to NAAQS pollutants such as

NOx and VOCs are shown to be below the emissions levels determined for a year making up part of the first attaining 3-year design value, then it is assumed that the Atlanta region will continue to have ozone concentration levels below the 2008 ozone standards.

2.3.1 Total NO_X Emissions and the 2014 Attainment Inventory

Figure 2-5 shows that there is no discernable difference in the total NO_X emissions inventory between retaining and removing all TCMs; and both are well below the 2014 attainment inventory.

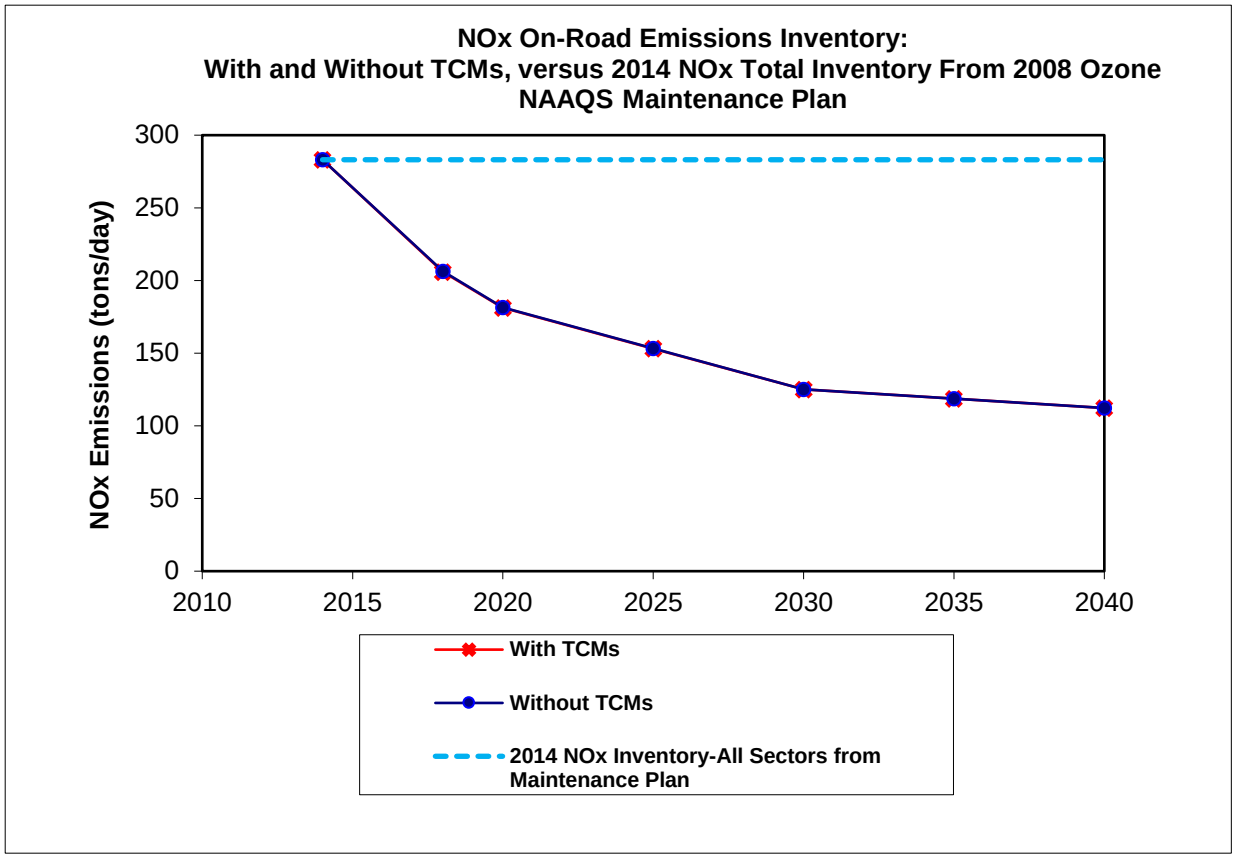

Figure 2-5: Comparison of Total NOx Emissions Inventory: With and Without TCMs vs. 2014 Attainment Inventory.

Table 2-11 shows the difference between the total NO_X emissions inventory for both the case of with and without TCMs as well as the total 2014 NOx attainment inventory. This table also determines the margin between the quantified emissions for both TCM scenarios and the total 2014 NOx attainment inventory, which represents the maximum allowable emissions before continued attainment of the 2008 8-hour ozone standard may be jeopardized. A large margin as seen here for both with and without TCMs indicates that emissions are well below a level where there would be any concern. The 2014 value for "Total NOx Emissions Inventory with

TCMs" is taken straight from the revised 2008 ozone maintenance plan so it exactly matches the attainment inventory value, with a beginning margin of zero.

Table 2-11. 2014 NO_X Attainment Inventory Comparison to Current Margin with TCMs and Margin Without TCMs.

Year	Total 2014 NO_x Attainment Inventory	Total NO_x Emissions Inventory with TCMs	Total NO_x Emissions Inventory with TCM Removal	Current Margin With TCMs (NO_x)	Margin Without TCMs (NO_x)
	TPD	TPD	TPD	TPD	TPD
2014	283.09	283.09	283.09	0	N/A
2018	283.09	205.86	206.45	77.23	76.64
2020	283.09	181.44	181.76	101.65	101.33
2025	283.09	153.29	153.49	129.80	129.60
2030	283.09	125.14	125.23	157.95	157.86
2035	283.09	118.69	118.74	164.40	164.35
2040	283.09	112.24	112.24	170.85	170.85

A comparison of the attainment inventory with the emissions that result from the removal of TCMs from the SIP confirms that emissions from the removal of TCMs remain below those in the attainment inventory. After calculating the margin both with and without TCMs, it is important to evaluate the amount of the margin allotted to the removal of TCMs. In Table 2-12, the increase in NO_X emissions with TCM removal is 0.09 TPD or just 0.06% of the margin in 2030.

Table 2-12. NO_X Margin Allotted to TCM Removal

Year	Current Margin (NO_x)	Margin with TCMs Removal (NO_x)	Amount of Margin Allotted to TCMs Removal	% of Margin Allotted to TCMs Removal
	TPD	TPD	TPD	%
2018	77.23	76.64	0.59	0.76
2020	101.65	101.33	0.32	0.31
2025	129.80	129.60	0.21	0.16
2030	157.95	157.86	0.09	0.06
2035	164.40	164.35	0.05	0.03
2040	170.85	170.85	0.00	0.00

2.3.2 Total VOC Emissions and the 2014 Attainment Inventory

Figure 2-6 shows a slight difference in the total VOC emissions inventory between retaining TCMs in the SIP and removing them. However, just as in the case of total NO_X emissions inventory, both stay well below the 2014 attainment inventory.

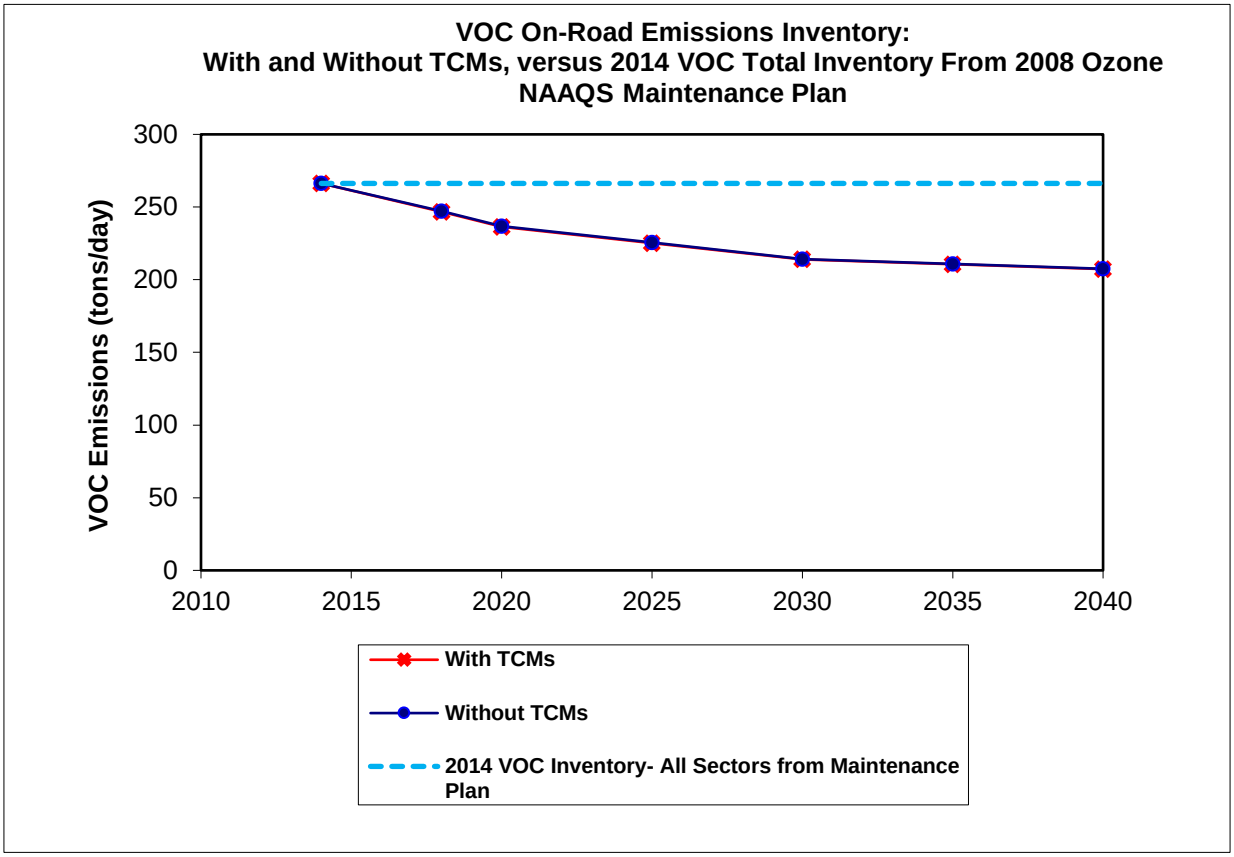

Figure 2-6: Comparison of Total VOC Emissions Inventory: With and Without TCMs vs. 2014 Attainment Inventory.

Table 2-13 shows the difference between the total VOC emissions inventory for cases with and without TCMs and the calculation results used to determine the margin for both of them. In both cases, the margins increase beginning in 2014 through to the year 2040. The 2014 value for "Total VOC Emissions Inventory with TCMs" is taken straight from the revised 2008 ozone maintenance plan so it exactly matches the attainment inventory value, with a beginning margin of zero.

Table 2-13. 2014 VOC Attainment Inventory Comparison to Current Margin with TCMs and Margin Without TCMs.

Year	Total 2014 VOC Attainment Inventory	Total VOC Emissions Inventory with TCMs	Total VOC Emissions Inventory with TCM Removal	Current Margin With TCMs (VOC)	Margin Without TCMs (VOC)
	TPD	TPD	TPD	TPD	TPD
2014	266.25	266.25	N/A	0	N/A
2018	266.25	246.71	247.23	19.54	19.02
2020	266.25	237.67	238.16	28.58	28.09
2025	266.25	226.36	226.74	39.89	39.51
2030	266.25	215.06	215.33	51.19	50.92
2035	266.25	211.77	212.01	54.48	54.24
2040	266.25	208.48	208.69	57.77	57.56

A comparison of the attainment inventory with the emissions that result from the removal of TCMs from the SIP confirms that emissions from the removal of TCMs remain below those in the attainment inventory. After calculating the margin both with and without TCMs, it is important to evaluate the amount of the margin allotted to the removal of TCMs. In Table 2-14, the increase in VOC emissions from the removal of TCMs is 0.27 tons/day or just 0.53% of the margin in 2030.

Table 2-14. VOC Margin Allotted to TCM Removal.

Year	Current Margin (NO_x)	Margin with TCMs Removal (NO_x)	Amount of Margin Allotted to TCMs Removal	% of Margin Allotted to TCMs Removal
	TPD	TPD	TPD	%
2018	19.54	19.02	0.52	2.66
2020	28.58	28.09	0.49	1.71
2025	39.89	39.51	0.38	0.95
2030	51.19	50.92	0.27	0.53
2035	54.48	54.24	0.24	0.44
2040	57.77	57.56	0.21	0.36

3.0 NO_X and VOC Sensitivity

As stated in Section 1.0, 110(l) of the CAA requires that a SIP revision not interfere with any applicable requirement concerning attainment, and reasonable further progress (as defined in section 171 and 182 of the CAA). This section will demonstrate that the emissions increases resulting from the removal of TCMs will have insignificant to no impact on ozone concentrations in the Atlanta area.

3.1 Sensitivity of Ozone in Atlanta to NO_X and VOC Emissions

Control of NO_X and VOCs are generally considered the most important components of an ozone control strategy, and NO_X and VOCs make up the largest controllable contribution to ambient ozone formation. However, the metro Atlanta nonattainment/maintenance area has shown a greater sensitivity of ground-level ozone to NO_X controls rather than VOC controls. This is due to high biogenic VOC emissions compared to anthropogenic VOC emissions in Georgia. Therefore, implemented control measures have focused on the control of NO_X emissions. The Atlanta nonattainment/maintenance area is NO_X limited in such a way that changes in anthropogenic VOC emissions have little effect on ozone formation.

3.1.1 Sensitivity Modeling NO_X and VOC Emissions

As part of the Southeastern Modeling Analysis and Planning (SEMAP) project, Georgia Tech performed an analysis of the sensitivity of ozone concentrations in the Eastern U.S. to reductions in emissions of both NO_X and VOCs. This analysis was based off the 2007 and 2018 SEMAP modeling which used the Community Multi-scale Air Quality (CMAQ) model, version 5.01 with updates to the vertical mixing coefficients and land-water interface. May 1st through September 30th was modeled using a 12-km modeling grid that covered the Eastern U.S. Details of the modeling platform set-up can be found in Appendix D.

3.1.2 Modeling Scenarios

Sensitivities were modeled relative to 2018 emissions to evaluate the impact of NO_X and VOC reductions on daily 8-hour maximum ozone concentrations. Each emission sensitivity run reduced the 2018 anthropogenic NO_X or VOC emissions (point, area, on-road and non-road mobile, marine/aircraft/rail) within a specific geographic region by 30%.

Georgia EPD examined the normalized sensitivities of NO_X and VOC emissions on 8-hour daily maximum ozone concentrations (ppb ozone/TPD) at 9 ozone monitors in Atlanta. For further details on the approach used to calculate the normalized sensitivities of NO_X and VOC emissions, please see Appendix E.

3.1.3 Modeling Results

Table 3-1. Normalized NO_X and VOC Sensitivity at 9 Atlanta Ozone Monitors.

AIRS ID	Site Name	NO_X (ppb/TPD)	VOC (ppb/TPD)
13-067-0003	Kennesaw	-0.0741	-0.0049
13-077-0002	Newnan	-0.0806	-0.0018
13-085-0001	Dawsonville	-0.0513	-0.0001
13-089-0002	South DeKalb	-0.0874	-0.0069
13-097-0004	Douglasville	-0.0797	-0.0042
13-121-0055	Confederate Ave.	-0.0643	-0.0105
13-135-0002	Gwinnett	-0.0763	-0.0026
13-151-0002	McDonough	-0.0869	-0.0034
13-247-0001	Conyers	-0.0906	-0.0033
	AVERAGE	**-0.0768**	**-0.0042**

The results in Table 3-1 show that NO_X emissions reductions are generally 15-25 times more effective than VOC emissions reductions at reducing ozone concentrations. In order to look at the impact of removing NO_X or VOC controls on the 2008 ozone NAAQS, the site-specific normalized sensitivities are multiplied by the increase in NO_X and/or VOC emissions.

The site-specific normalized NO_X and VOC sensitivities were applied to the expected emissions increases due to the removal of TCMs from the SIP. The emissions increases are based on 2020 values and represent the largest impact as the emissions increase will decrease each successive year. The removal of the TCMs from the SIP results in an increase of VOC emissions of 0.32 TPD in 2020 for the 15-county area decreasing over time to 0.21 TPD by 2040. The removal of the TCMs results in an increase of 0.49 TPD of NO_X in 2020 in the 15-county area decreasing over time to near zero by 2040. The corresponding ozone increases at each monitor are found in Table 3-2 and demonstrate insignificant increases in ozone concentrations. The calculated changes in ozone levels are well below the level of precision of the ambient ozone monitors (1 ppb). In addition, ozone concentrations are reported to EPA in ppm and to three decimal places (e.g., 0.070 ppm) and any additional decimal places are truncated. Since the corresponding ozone increase at all 9 monitors would only be seen at the fifth decimal place (in units of ppm), these small increases could not impact maintenance or attainment of any ozone NAAQS.

Table 3-2. Emissions Increases Due to Removal of TCMs and Effects on Ozone Formation.

Monitor	Removal of TCMs				Combined
	2020 NO_X Emissions Increase (TPD)	Corresponding Ozone Increase at Monitor due to NOx Increase (ppb)	2020 VOC Emissions Increase (TPD)	Corresponding Ozone Increase at Monitor due to VOC Increase (ppb)	Corresponding Ozone Increase at Monitor (ppb)
Kennesaw	0.32	0.02378	0.49	0.00221	**0.0260**
Newnan	0.32	0.02579	0.49	0.00089	**0.0267**
Dawsonville	0.32	0.01991	0.49	0.00034	**0.0203**
South DeKalb	0.32	0.02467	0.49	0.00285	**0.0275**
Douglasville	0.32	0.02550	0.49	0.00205	**0.0276**
Confederate Ave.	0.32	0.01959	0.49	0.00377	**0.0234**
Gwinnett	0.32	0.02442	0.49	0.00127	**0.0257**
McDonough	0.32	0.02781	0.49	0.00167	**0.0295**
Dallas /Yorkville	0.32	0.02218	0.49	0.00054	**0.0227**
Conyers	0.32	0.02873	0.49	0.00152	**0.0303**

4.0 Emissions Offsets

Offset measures may be considered in a state's 110(l) demonstration where VOC or NO_X emissions have increased due to the relaxation or removal of a rule or a program in a nonattainment area. If an offset measure is used, it must be reproducible, enforceable, surplus, quantifiable, and a permanent measure. Surplus is defined in 40 CFR 51.491 as "at a minimum, emissions reductions in excess of an established program baseline which are not required by SIP requirements or State regulations, relied upon in any applicable attainment plan or demonstration, or credited in any reasonable further progress (RFP) or milestone demonstration, so as to prevent the double-counting of emissions reductions."

4.1 Emissions Increase

2020 – All TCMs Removed

As indicated in sections 2.1.1 and 2.1.2, the removal of TCMs results in an increase of 2020 NO_X emissions of 0.32 TPD (an equivalent ozone season emissions increase of 79.06 tons) and VOC emissions of 0.49 TPD (an equivalent ozone season emissions increase of 121.01 tons). The ozone season for the 15-county area is 245 days per calendar year.

0.32 tons/day NOx * 245 days/year = **79.06 tons/year** of NO_X

0.49 tons/day VOC * 245 days/year = **121.01 tons/year** of VOC

Section 3 addresses ozone formation in the Atlanta area and the sensitivity to reductions of NO_X and VOC emissions. The Atlanta area is a NO_X limited area; therefore, the control of NO_X emissions result in greater reductions of ozone compared to VOC emissions. The maximum VOC emissions increase resulting from the TCM Removal is 0.49 TPD (121.01 tons/year). This increase in VOC emissions can be converted to an equivalent increase in NO_X emissions based on the ratio of normalized ozone sensitivities found in Section 3 as follows:

121.01 tons/year VOC * (-0.0042 ppb/TPD VOC)/(-0.0768 ppb/TPD NO_X)
= **6.62 tons/year NO_X**

By adding the actual NO_X emissions increase to the equivalent NO_X emissions increase from VOC emissions using the sensitivity calculation, the resulting offset NO_X emissions is:

79.06 tons/year of NO_X + 6.62 tons/year of NO_X (VOC equivalent reduction)
= **85.68 tons/year** of NO_X offsets needed.

2020 – All TCMs Removed Except Intersection Upgrade TCM

By using the same calculation methods as above except subtracting out the emissions impact of the Intersection Upgrade TCM (see Tables 2-4 and 2-7 for this impact), the resulting 2020 offset NOx emissions needed for removal of all TCMs except Intersection Upgrade is calculated below.

0.11 tons/day NOx * 245 days/year = **27.93 tons/year** of NO_X

0.30 tons/day VOC * 245 days/year = **74.30 tons/year** of VOC

74.30 tons/year VOC * (-0.0042 ppb/TPD VOC)/(-0.0768 ppb/TPD NO_X)
= **4.06 tons/year NO_X**

27.93 tons/year of NO_X + 4.06 tons/year of NO_X (VOC equivalent reduction)
= **31.99 tons/year** of NO_X offsets needed.

Table 4-1 summarizes the total offsets needed from removing TCMs from the SIP.

Table 4-1. Emissions Offsets Needed from TCM Removal from the Georgia SIP.

Offset Method	NOx Offsets Needed (TPY)	VOC Offsets Needed (TPY)	NOx Emissions Equivalent of VOC Emissions (based on the ratio of normalized ozone sensitivities)	Total NOx Offsets Needed (TPY)
2020 Total – All TCMs removed	79.06	121.01	6.62	**85.68**
2020 Total – All TCMs Removed Except Intersection Upgrade TCM	27.93	74.30	4.06	**31.99**

4.2 Emissions Offsets

Georgia EPD is securing NO_X emissions offsets to ensure that the removal of TCMs from the SIP in the 15-county 2008 8-hour ozone maintenance area will not interfere with attainment of the 2015 ozone NAAQS for the 7-county Atlanta nonattainment area. Georgia proposes to demonstrate noninterference by substituting quantifiable, permanent, surplus, enforceable, and contemporaneous measures described herein to achieve equivalent emissions reductions to offset the potential emissions increases. The following is an analysis with supporting calculations to determine the offsets needed to address the removal of TCMs from the SIP that will take place in the 15-county 2008 8-hour ozone maintenance area. As described more fully in this submission, a minimum of 25.99 tons/year NOx emissions reductions have been achieved through implementation of the Locomotive Conversion Program, and a minimum of 12.86 tons/year of NOx emissions reductions have been achieved through 85 school bus replacements. As such, these measures will fully offset the expected emissions increases associated with removing all TCMs, except for the Intersection Upgrade TCM, from the Georgia SIP.

As previously discussed, the Atlanta Area is NO_X-limited; therefore, the impact on ozone formation of reducing NO_X emissions is greater than it is for reducing emissions of VOCs. Accordingly, for purposes of calculating the emissions reductions necessary to offset the

removal of TCMs from the SIP, Georgia is relying on NO_X emissions reductions. As described in this SIP revision, Georgia performed a sensitivity analysis to calculate the NO_X equivalent emissions reductions necessary to offset the expected emissions increase in NO_X and VOCs associated with removal of TCMs from the SIP.

4.2.1 Locomotive Conversion Offsets

Georgia EPD has worked with the railroad industry to replace higher-emitting, existing diesel locomotive engines with lower emitting locomotive engines. As such, the Georgia Department of Natural Resources has entered into a contract with the Norfolk Southern Railway Company (see attached contract dated July 20, 2016 in Appendix F) to complete locomotive engine modifications that will reduce NO_X emissions in the nonattainment area. In total, these locomotive conversions will reduce NO_X emissions by 25.99 tons per year for 10 years or longer. The project is funded through the U.S. DOT Federal Highway Administration's Congestion Mitigation and Air Quality (CMAQ) Program through a memorandum of understanding between the Georgia Department of Transportation and Georgia EPD.

The majority of switcher locomotives in use across the country today are old (TIER 0 or Unregulated) with high emissions of PM, NO_X, and VOCs. These older, switcher locomotives will typically remain in service for an extensive time (in excess of 50 years) because of the high capital cost of new locomotives. While the contract only requires a ten-year commitment, this project should have long-lasting air quality benefits for the region. This particular CMAQ project involves Norfolk Southern Railway. Norfolk Southern Railway, Inc. converted five older TIER 0 or lower original locomotives to five clean "mother" locomotives meeting the EPA TIER 3 Line Haul Duty Standard and EPA TIER 2 Switcher Duty Cycle Standard or better.

As shown in Table 4-2 below, NO_X emissions reductions occurred in December 2018, within the contemporaneous period. NO_X emissions reductions from these locomotive conversions will yield 25.99 tons/year in Atlanta. Further details regarding the locomotive reductions can be found in Appendix F.

4.2.2 School Bus Replacement Offsets

Georgia EPD has a strong school bus early replacement program. School bus replacement projects completed in 2018 using DERA funding have resulted in NO_X emission reductions of 12.86 tons per year in the Atlanta metro nonattainment area. Specifically, eighty-five old (model year 1999-2005) school buses in Fulton County were replaced with 2018 school buses. Calculations of NO_X emissions reduction are in Appendix F.

4.3 Offset Equivalency Demonstration

Based on the available offsets from the locomotive conversion projects and school bus replacement projects, Georgia EPD has offsets available to remove all TCMs, except the Intersection Upgrade TCM, from the Georgia SIP with residual offsets remaining. Tables 4-2 and 4-3 summarize the emission increases and the available offsets for comparison.

Table 4-2. Emissions Decrease Due to Locomotive Conversions and School Bus Replacements.

Month and Year of Reductions	Areas	Source*	Annual NOx Emissions Reduction (TPY)
December 2018	Atlanta-General	Railroad (NS - 5 Mothers)	25.99
September 2018	Atlanta-Fulton	School Bus Replacement	12.86
		Total Offsets Available	**38.85**

The offsets available from both bus replacements and locomotive conversions total 38.85 tons per year NO_X. As shown in Table 4-3, the annual NO_X decrease from the locomotive conversions and school bus replacements are more than adequate to offset the maximum NO_X and VOC emissions increases (33.29 tons per year of equivalent NO_X) associated with removing all TCMs, except the Intersection Upgrade TCM, from the Georgia SIP. There is a 5.56 ton per year residual NO_X emissions offset that will remain available.

Table 4-3. Emissions Increases Compared to Available Emissions Offsets.

Emissions Increase Due to Removing all TCMs from the Georgia SIP except for the Intersection Upgrade TCM (TPY)	Total Offsets Available (TPY)	Residual Offsets (TPY)
31.99	38.85	6.86

Georgia has demonstrated noninterference by substituting quantifiable, permanent, surplus, enforceable, and contemporaneous measures described above to achieve equivalent emissions reductions to offset the potential emissions increases related to the removal of TCMs, except for the Intersection Upgrade TCM, from the Georgia SIP. The locomotive conversions and school bus replacements occurring in late 2018 are surplus since they have not been relied upon by any attainment plan or demonstration or credited in any RFP demonstration. The old locomotive diesel engines have been destroyed; therefore, the emissions reductions are permanent. The emissions reductions have been quantified in Appendix F. Enforceability of the emissions reductions from locomotive conversions and school bus replacements are addressed in the contract commitments that are included in Appendix F. The locomotive and school bus replacements are contemporaneous since they occurred within twelve months of this submittal and within eighteen months of the effective date of the TCM removal.

5.0 Conclusion

Georgia EPD is requesting the removal of TCMs from the Georgia SIP. This request includes a 110(l) noninterference demonstration. The noninterference demonstration shows that the removal of TCMs from the Georgia SIP in 2020 will not interfere with the attainment or maintenance of any NAAQS or any other CAA requirement as prescribed in section 110(l) of the CAA. Although this plan focuses on ozone, the removal of TCMs from the Georgia SIP will have little to no impact on emissions of PM, SO_2, NO_2, CO, or Pb, or their related precursors.

Removing TCMs from the SIP results in a NO_X emissions increase of 0.32 TPD in 2020 that decreases to near zero by 2040. VOC emissions increase 0.49 TPD in 2020 and decrease to 0.21 TPD in 2040.

Furthermore, analysis shows that in both cases, with TCM and without TCMs, the NO_X and VOC emissions after 2014 are well below the 2014 MVEB while emissions from 2030-2040 never exceed the 2030 MVEB. A comparison of the NO_X and VOC attainment inventories with the NO_X and VOC emissions that result from removing TCMs from the SIP confirm that emissions resulting from removing TCMs remain below those in both attainment inventories.

With the State of Georgia being a NO_X limited area, the sensitivity of ozone formation in the Atlanta area to reductions of NO_X is greater than the sensitivity to reductions in VOC emissions. Site-specific normalized NO_X and VOC sensitivities were applied to the expected peak emissions increases in 2020 due to removal of TCMs from the SIP. The corresponding ozone increases at the 9 ozone monitors in Atlanta were well below the level of monitoring precision (1 ppb). In addition, ozone concentrations (in ppm) are reported to EPA to three decimal places (e.g., 0.070 ppm) and any additional decimal places are truncated. Since the corresponding ozone increase at all 9 monitors would only be seen at the fifth decimal place, this small increase could not impact maintenance or attainment of any ozone NAAQS.

Offsetting emissions are available from the locomotive conversion and school bus replacements that more than cover the increase in NO_X and VOC emissions resulting from the removal of all TCMs, except the Intersection Upgrade TCM. These offsets are demonstrated to be contemporaneous, reproducible, enforceable, surplus, quantifiable, and permanent as required by 40 CFR 51 Appendix S. This plan secures an equivalent emissions reduction and the TCMs removal will not hinder Georgia's ability to attain the 2015 ozone standard and will not interfere with continued maintenance of the 1997 and 2008 8-hour ozone standards.

For these reasons, the removal of TCMs from the Georgia SIP meets the requirements of 110(l).

6.0 References

Georgia EPD 2015 Ozone NAAQS Designation Recommendation Letter, submitted to EPA on September 23, 2016.

EPA Region 4 Intended Area Designation for the 2015 Ozone NAAQS, received by Georgia EPD on December 20, 2017.

Georgia's Revised Designation Recommendations for the 2015 Ozone NAAQS, submitted to EPA on February 9, 2018.

Revision to the Georgia State Implementation Plan for the Removal of Georgia Rules for Consumer and Commercial Products and for Gasoline Marketing, and for the Revision of the Georgia Rule for NOx Emissions from Stationary Gas Turbines and Stationary Engines used to Generate Electricity, December 22, 2014, submitted to EPA on February 5, 2015.

USEPA "Approval and Promulgation of Implementation Plans; Georgia: Changes to Georgia Fuel Rule and Other Miscellaneous Rules", 80 FR 52627 through 80 FR 52630, Final Rule, September 1, 2015.

Atlanta 1997 8-Hour Ozone Maintenance Plan, March 21, 2012, submitted to EPA on April 4, 2012.

Atlanta 2008 8-Hour Ozone Maintenance Plan, May 25, 2016, submitted to EPA on July 18, 2016.

Atlanta 2008 8-Hour Ozone Maintenance Plan, revised August 15, 2018, submitted to EPA on August 15, 2018 (as part of the Non-Interference Demonstration and Maintenance Plan Revision for Federal Low-Reid Vapor Pressure Requirement in the Atlanta Area)

USEPA, National Emissions Inventory: Inventory year 2014.