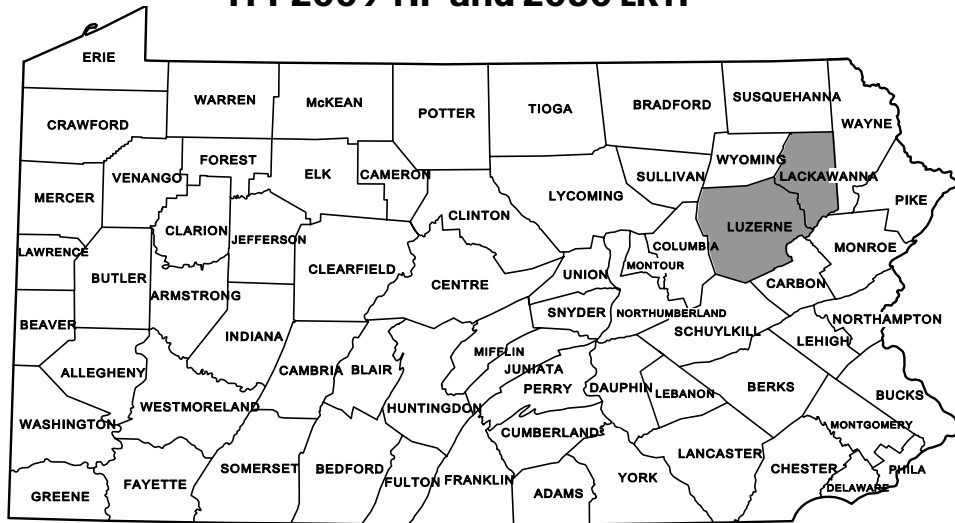


**AIR QUALITY  
CONFORMITY ANALYSIS REPORT  
FOR THE LACKAWANNA/LUZERNE MPO PORTION OF THE  
SCRANTON-WILKES-BARRE OZONE MAINTENANCE AREA  
FOR THE 8-HOUR OZONE NAAQS**

**VOLUME I - EXECUTIVE SUMMARY**

**FFY 2009 TIP and 2030 LRTP**



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PUBLIC REVIEW:

PLANNING PARTNER APPROVAL:

# TABLE OF CONTENTS

1.	INTRODUCTION .....	1
1.1	Purpose.....	1
1.2	Coverage .....	2
1.3	Analysis Overview.....	2
1.4	Limitations .....	2
1.5	Document Contents.....	3
2.	SUMMARY .....	3
3.	ANALYSIS.....	3
3.1	Overview.....	3
3.2	Background.....	4
3.3	Long Range Plan/Transportation Improvement Program.....	5
3.4	Traffic Parameters.....	6
3.5	Other Parameters.....	8
3.6	Transportation Control Measures .....	8
3.7	Emissions .....	8
3.8	Discussion.....	9
4.	FINANCIAL CONSTRAINT.....	9
5.	PUBLIC PARTICIPATION .....	9
6.	CONFORMITY STATEMENT .....	9

## MAPS

Figure 1 – Scranton-Wilkes-Barre Ozone Maintenance Area.....	12
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## TABLES

1	Summary of Total Daily Highway VMT .....	14
2	Summary of Total Daily Highway VOC Emissions .....	14
3	Summary of Total Daily Highway NO <sub>x</sub> Emissions .....	14

## CHARTS

1	VOC & NO <sub>x</sub> Graph.....	16
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## 1. INTRODUCTION

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This document provides an analysis of the air quality implications of the Lackawanna/Luzerne Metropolitan Planning Organization (MPO) FFY 2009-2012 Transportation Improvement Program (TIP) and 2030 Regional Transportation Plan (LRTP). The analysis demonstrates transportation conformity to the 8-hour ozone National Ambient Air Quality Standards (NAAQS).

This document replaces the previous approved conformity demonstration of the TIP and LRTP and ensures that the findings meet all current ozone criteria established by the U.S. Environmental Protection Agency (EPA).

Since vehicular emissions contribute to ozone violations, the Act requires transportation planners in nonattainment and maintenance areas to consider the air quality impacts of their proposed plans, programs, and projects. These activities, if subject to federal involvement, must be shown to conform based on the requirements for each pollutant.

Lackawanna and Luzerne Counties are included in the Scranton-Wilkes-Barre 8-hour ozone maintenance area. Both counties must make a conformity determination for ozone precursors. The conformity determination must include the results from all counties in the Scranton-Wilkes-Barre maintenance area, which thereby allows the TIP/LRTPs in each region to be approved by U.S. DOT.

In an attempt to reduce harmful emissions nationwide, the Clean Air Act Amendments (CAAA) of 1990 classified certain metropolitan areas as nonattainment if they did not comply with federal air quality standards under the 1-hour ozone standard. Lackawanna and Luzerne counties were originally designated as part of a marginal nonattainment area under the 1-hour ozone NAAQS.

Effective June 15, 2004, the United States Environmental Protection Agency (US EPA) finalized ground-level ozone designations under the 8-hour ozone NAAQS. The standard replaced the pre-existing 1-hour ozone NAAQS that was withdrawn on June 15, 2005. The Scranton-Wilkes-Barre area was originally designated as *Basic ozone* nonattainment area under the 8-hour standard.

On November 19, 2007, EPA approved a State Implementation Plan (SIP) revision requesting that

the Scranton-Wilkes-Barre ozone nonattainment area be redesignated as *attainment* for the 8-hour ozone standard. In conjunction with its redesignation request, the Pennsylvania Department of Environmental Protection (DEP) submitted a SIP revision consisting of a maintenance plan for the region that provides for continued attainment of the 8-hour ozone NAAQS for at least 10 years after the redesignation. EPA approved the adequacy determination for motor vehicle emission budgets (MVEBs) that are identified in the maintenance plan for purposes of transportation conformity. Separate emission budgets have not yet been provided for the Lackawanna/Luzerne MPO, NEPA RPO and the Northern Tier RPO. Instead one emission budget is provided for the total 4-county region for the 2009 and 2018 analysis years. Based on the approved maintenance plan MVEBs, transportation conformity for the 8-hour ozone standard must demonstrate that future year emissions (of all four counties combined) are no greater than the established 2009 and 2018 emission budgets.

Pollutants subject to conformity determination in ozone nonattainment and maintenance areas include Volatile Organic Compounds (VOC) and Nitrogen Oxides (NO<sub>x</sub>).

### 1.1 Purpose

The CAAA directs the EPA to implement regulations providing for reductions in pollutant emissions. This conformity demonstration is based on the current final conformity guidance, 40 CFR Parts 51 and 93 as revised, and adheres to all requirements in the 8-hour ozone NAAQS. Pollutants addressed include volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>).

Transportation conformity for ozone includes a demonstration that emission forecasts do not exceed the emission budgets established in the maintenance plan. Ozone analyses are for emissions during a *summer day*

This report evaluates the Highway and Transit Transportation Improvement Program (TIP) and the Long Range Regional Transportation Plan (LRTP) for Lackawanna and Luzerne counties. It presents the most recent estimates of highway mobile source emissions for the region, including consideration of significant projects on the TIP and LRTP. It provides the basis for determining if the conformity criteria have been satisfied for both ozone and fine particulates.

## 1.2 Coverage

This report considers the impact of emissions within the Lackawanna and Luzerne county portion of the Scranton-Wilkes-Barre ozone maintenance area. Wyoming and Monroe counties are covered under separate reports although their emission results are included in this report in order to demonstrate the conformity test.

Ozone is a secondary pollutant; it is not directly discharged into the atmosphere. Instead, it is produced by the reaction of several precursor chemical compounds in the presence of sunlight. Volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>) are primary reactants. VOCs are alternately classified as non-methane hydrocarbons (NMHC), since methane is less reactive and therefore not considered. Under the EPA conformity regulations, both VOC and NO<sub>x</sub> must be analyzed for regional transportation conformity.

## 1.3 Analysis Overview

Emissions from highway vehicles within the area have been analyzed using EPA's MOBILE6.2, the agency's currently approved computer model. The modeling procedures are described in more detail later in this report.

Certain projects were excluded if it was determined that they would not impact regional emissions (e.g., reconstructing bridges, resurfacing projects, etc.) in accordance with 40 CFR Parts 51 and 93. These projects are noted as "Exempt" (X) in Volume II, Appendices A and B. Other projects are noted as "Not Significant" (NS), and include those projects which are not exempt by definition, but whose air quality impacts are too small to quantify through current modeling practice. All decisions on project significance were made using the guidelines in the report, "PENNDOT Project Review & Classification Guidelines for Regional Air Quality Conformity", dated March of 2008.

This conformity test was conducted under the requirements of 40 CFR Parts 51 and 93. For ozone, forecast emissions are demonstrated to be no greater than the 2009 and 2018 emission budgets in the applicable maintenance plan. For the Scranton-Wilkes-Barre maintenance area, the Lackawanna and Luzerne county emission results have been combined with the emission estimates for Wyoming and Monroe counties as needed to perform the emission

budget test. Ozone emissions are analyzed for a summer weekday.

Analysis years are for 2009, 2018, 2025, and 2030. The 2009 and 2018 years are emission budget years established in the ozone maintenance plan. The 2030 year is the last year of the LRTP, and 2025 is an interim year to ensure there is not more than 10 years between any two analysis years.

## 1.4 Analysis Limitations

The Final Conformity Rule asserts that the conformity process must include an evaluation of proposed capital facility investments. This is required to assure that such expenditures, which are typically irreversible, are not made without consideration of air quality consequences and that CAAA requirements are being implemented.

In order to proceed with its planned projects, each MPO must adopt a conformity resolution. This study has proceeded with reasonable assumptions and the best available data to provide a valid comparison within these limitations, applying the same assumptions to each of the milestone scenarios within any given year. A reasonable effort has been extended to provide an evaluation of future year emissions.

The planning assumptions used for this conformity submission have been updated as compared to past submissions. Many of the traffic related assumptions are updated on a "triennial" basis to satisfy EPA's latest planning assumption requirements. The last update was based on 2005 data and future efforts will be required in the preparation of 2008 related data. Examples of key tools and input data are presented below:

- MOBILE6.2 is used to determine emission factors for the region.
- Roadway Traffic Data – Uses PENNDOT's 2005 Roadway Management System (RMS) data.
- VMT growth rates based on PENNDOT's VMT forecasting system. Growth rates based on historic HPMS VMT through 2005 and socioeconomic forecasts by county.
- HPMS Adjustments – Missing local roadway VMT is reconciled to the 2005 HPMS to ensure consistency. These adjustments are carried forward to future years.
- Vehicle Mix Patterns – Vehicle mix patterns have been developed for the county based on 2005 PENNDOT RMS truck percentages.

- Vehicle Fleet Ages – Updated 2005 vehicle fleet age data was prepared from the state motor vehicle registration database.

## 1.5 Document Contents

The conformity analysis for the Lackawanna/Luzerne MPO is divided into two volumes. Volume I is the executive summary of the analysis. It consists of six sub-sections:

Section one provides introductory material and defines the purpose of the report. Further, it describes the scope of the study: its geographical coverage, the time frame considered, and the pollutant emissions analyzed. The limitations of the study, primarily related to constraints affecting the analysis, are also presented here.

Section two provides a summary of the analysis. This information is also presented in graphic form in Tables 1 through 6 at the end of this report.

A more detailed discussion of the analysis is presented in section three. It provides an overview of the study process and background information on the relation between vehicular emissions and ozone. The Long Range Plan and Transportation Improvement Programs are discussed, with a focus on projects that might significantly affect emissions. Traffic and other parameters used in the modeling process are presented and discussed. This section also includes a discussion of the emission tables (Tables 2, 3, 5, 6) developed during the analysis, and presenting the implications of these results.

The fourth section of this report discusses the "financial constraints" of the Long Range Plan and Transportation Improvement Programs.

Section five discusses the public participation process of the conformity analysis. This process includes the advertisements of availability of the LRTP/TIP and accompanying conformity documents, as well as any comments received and associated responses.

The sixth section concludes this report by summarizing the results of the analysis and stating a conclusion regarding the conformity of the Long Range Plan and Transportation Improvement Programs to the applicable State Implementation Plan, and the Clean Air Act, as amended.

Volume II of this report contains the technical data used to conduct the conformity determination. Key variables, such as vehicle miles traveled (VMT), vehicle hours traveled (VHT), average speed, and daily VOC and NO<sub>x</sub> emissions (ozone) are shown. In addition, the LRTP/TIP for the region, MOBILE6.2 set-up files, and other variables are shown. Copies of Volume II are available from PENNDOT's Air Quality Section upon request.

## 2. SUMMARY

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As required by the Clean Air Act Amendments of 1990 (CAAA), a study of vehicle emissions was performed for Lackawanna and Luzerne portion of the Scranton-Wilkes-Barre ozone maintenance area. State and federal emissions control measures are included in the analyses for the relevant analysis year.

The study compared the ozone emission forecasts for VOC and NO<sub>x</sub> to the 2009 and 2018 mobile emission budgets established in the maintenance plans. The future emission projections include the implementation of the TIP and LRTP. These projects are listed in section 3.3. The regional evaluation of the projects indicates an overall increase in mobility and a decrease in VOC and NO<sub>x</sub> emissions.

For the ozone analysis year of 2009, the VOC and NO<sub>x</sub> emissions are less than the 2009 budget (for each respective pollutant). For the 2018, 2025, and 2030 analysis years, the VOC and NO<sub>x</sub> emissions are less than the 2018 budgets.

To further address VOC and NO<sub>x</sub> reductions in the later years after the TIP (LRTP years), strategies such as reduction in VMT, speed changes, smoothness of traffic flows, use of alternative fuels, and other factors will be key to further reducing air pollution levels. Some of these have been mandated by the CAAA, and the state has committed to executing others.

## 3. ANALYSIS

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This section of the report presents the premises for the analysis, background information supporting the modeling, and the results of the analyses.

### 3.1 Overview

This study used a set of computer programs and databases to estimate vehicle miles of travel and operating speeds, and to subsequently calculate emission factors and total emissions. The programs

rely on a variety of input factors, which are discussed in more detail below. A travel demand model does not exist in this region.

Key traffic parameters include daily vehicle miles of travel (DVMT), average speeds, and vehicle type mix. These input factors are calculated by the PPSUITE Post Processor for Air Quality computer program from highway databases containing traffic volumes and descriptions of physical characteristics. In addition, roads are categorized into six functional classifications (Interstate, Other Principal Arterials, Minor Arterials, Major Collectors, Minor Collectors and Local Roads) in three settings: urbanized area, small urban area, and rural area.

The existing DVMT was determined for each roadway class/setting by multiplying the length of road by the number of vehicles using the road per day. Additional adjustments to VMT included:

- Seasonal adjustments to reflect summer weekday conditions.
- Adjustments of daily VMT to align with 2005 HPMS.

The 2005 VMT was then projected to the future years by applying local growth factors derived from both historic traffic volume growth trends and trip-end growth, as related to past and future projected population and employment growth. Using the latest planning assumptions, population growth, employment growth, and land use trends have been considered in the analyses to as great an extent possible.

Speed data was calculated, using the post processing software, for each highway segment and hour of the day, based on the roadway's capacity and traffic volume. Thus, average speeds reflect physical highway conditions, the effects of traffic signals, and congestion caused by traffic volume. For future conditions, congestion (and thereby speed) is affected by traffic growth and other changes in physical conditions due to LRTP and/or TIP improvement projects.

Other input parameters include information regarding vehicle types using the roads and environmental factors. Since local data provides a useful distinction for this comparative analysis, county-specific data was used to describe the vehicle fleet on the highway. The environmental factors used in this analysis (e.g., ambient temperatures) were

established based on historic records for peak ozone events within the county (ozone).

This conformity analysis, performed according to the Final Conformity Rules for ozone, indicates that future year emission estimates, including the impacts of planned TIP and LRTP projects, are less than emissions provided in the maintenance plan

### 3.2 Background

National Ambient Air Quality Standards (NAAQS) have been established by EPA for a number of pollutants considered harmful to public health and the environment. Lackawanna and Luzerne counties are in maintenance for ozone.

Ozone is a strong irritant to the eyes and upper respiratory system. It hampers breathing and damages crops and rubberized materials. It is the main component of smog. A region is in nonattainment of the 8 hour ozone standard if the 3 year average of the individual fourth highest air quality monitor readings, averaged over 8 hours throughout the day, exceeds the NAAQS of 0.08 parts per million (ppm).

Ozone is formed by chemical reactions occurring under specific atmospheric conditions. Two of the important classes of compounds in these reactions are hydrocarbons (including VOC) and oxides of nitrogen. Both of these are components of vehicular exhaust. Additionally, the hydrocarbons may be produced by evaporation from vehicle fuel system components, and by displacement of vapors in the gas tank during refueling. By controlling these emissions, ozone formation can be controlled.

The actual reactions occurring in the atmosphere are complex and the subject of ongoing research. However, it is known that the formation of ground level ozone is a photochemical oxidation process activated by sunlight. Higher ozone concentrations are associated with warm temperatures, and high pressure systems involving temperature inversions and low wind speeds. Under these stagnant conditions, emissions and ozone tend to accumulate rather than disperse.

The role that each component plays in formation of ozone is also complex. Increases in NO<sub>x</sub> could lead to an increase in ozone, depending on the time of suspension in the atmosphere and its transport to other polluted areas. Reductions in NO<sub>x</sub> emissions may achieve regional ozone reductions. On the other

hand, reductions in VOC are often most important for local ozone reduction.

Transportation accounts for significant portions of man-made emissions. On average, mobile sources contribute approximately 36% of the hydrocarbons, 45% of the oxides of nitrogen, and 78% of the carbon monoxide emissions from man-made sources. For VOCs, the rate of emissions (expressed in grams per mile for motor vehicles) generally decreases with an increase of vehicle speed. This trend is most dramatic for VOC and CO at low speeds. However, both VOC and CO exhibit a slight increase in emission rates as vehicles travel above 40 miles per hour.

For NO<sub>x</sub>, however, the emissions rate is a more gradual decline with increasing speed up to approximately 25 miles per hour. Above that speed, vehicle NO<sub>x</sub> emissions increase gradually. At 40 mph, the NO<sub>x</sub> emissions begin to increase rapidly, due, in part, to the higher engine temperatures associated with higher speeds. Thus, while increasing speeds generally reduces VOC emissions, increasing speeds may cause NO<sub>x</sub> emissions increases (see Chart 1). There is no simple way to solve both issues without producing an overall LRTP and TIP with a mix of strategies that reduce the NO<sub>x</sub> increases.

#### Emission Control Strategies:

Recognizing the contribution of transportation sources to air pollution, the federal government initiated an emission control program in 1968. These requirements are periodically revised, based on the effectiveness of existing controls in meeting pollution challenges. In addition, cleaner burning fuels have decreased emissions rates of gasoline powered cars, and to some extent, diesel vehicles. Additional new federal vehicle and fuel control programs are planned for the period 2004-2010. Increasing VMT, however, tends to counteract a portion of reductions from cleaner vehicles and fuels.

In order to assure that emission controls are working properly, vehicle inspection and maintenance (I/M) programs have been adopted in some nonattainment areas. These programs have the added benefit of improving the fuel efficiency of vehicles on the road. The Pennsylvania inspection and maintenance (I/M) program was upgraded and expanded throughout the state with a phase-in period starting in September 2003 and fully implemented by June 2004.

The program requirements vary by region and include on-board diagnostics (OBD) technology that uses the vehicle's computer for model years 1996 and newer to identify potential engine and exhaust system problems that could effect emissions. The program, named PAOBDII, is implemented by Region, as follows:

- Philadelphia Region - Bucks, Chester, Delaware, Montgomery and Philadelphia Counties,
- Pittsburgh Region - Allegheny, Beaver, Washington and Westmoreland Counties,
- South Central and Lehigh Valley Region - Berks, Cumberland, Dauphin, Lancaster, Lebanon, Lehigh, Northampton and York Counties.

Other elements of the Pennsylvania I/M program include a gas cap test and visual inspections of subject vehicles in the North Region (Blair, Cambria, Centre, Erie, Lackawanna, Luzerne, Lycoming, and Mercer Counties), and a visual inspection as part of the annual safety inspection in the other 42 counties.

The Pennsylvania Clean Vehicles Program adopted in 1998 incorporated the California Low Emission Vehicle Program (CA LEV II) by reference although it allowed automakers to comply with the NLEV program as an alternative to this Pennsylvania program until MY 2006. A rulemaking was approved in December 2006 postponing compliance with the Pennsylvania Clean Vehicles program until model year 2008. The impacts of this program are modeled for all analysis years beyond 2008.

### **3.3 Long Range Plan/Transportation Improvement Program**

The complete Transportation Improvement Program and Long Range Plan for the Lackawanna/Luzerne MPO are included in Volume II, Appendix A, for highways and transit service projects.

Detailed assessments were only performed for those projects on the LRTP and TIP which may have a significant effect on emissions in accordance with 40 CFR Parts 51 and 93. Essentially, only those projects which would increase capacity or significantly impact vehicular speeds were considered. Projects such as bridge replacements and roadway restoration projects, which constitute the majority of the LRTP/TIP list, have been excluded from consideration since they are not expected to significantly alter the volume or speed of traffic.

The following LRTP/TIP AQ significant highway projects are included in this analysis.

**Lackawanna:**

1. Scranton CBD Network: This project involves updating and interconnecting 47 traffic signals in the City of Scranton Central Business District.
2. Widen I-81 Scranton–Davis: This project involves widening existing four-lane Interstate to six lanes and improvements to Central Scranton Expressway, Moosic Street and River Street interchanges.
3. Dunmore Signal Network: This project involves updating and interconnecting 10 traffic signals on SR 347 in Dunmore and Throop Boroughs.
4. Keyser Avenue SAMI: This 3.7 mile corridor safety improvement project involves traffic signals at 5 intersections on Keyser Avenue (SR 3011). The project extends from Continental to Keyser RR Bridge in Taylor Borough and the City of Scranton.
5. Main St. Corridor # 2: Project focuses on congestion reduction, signal upgrades, and signal timings.
6. Greenridge Corridor: Project focuses on congestion reduction, signal upgrades, and signal timings.
7. Valley View Business Park

**Luzerne:**

8. Airport Access Road: New 2-lane access road from SR 0315 around the airport runway over the Turnpike connecting with Commerce Boulevard.
9. Coal Street Realignment: This project involves widening from two lanes to five lanes, realigning the lower portion of the existing Coal Street (approximately 1,200 feet) and approximately 800 feet of new construction.
10. Hazleton Signals: This 4.5 mile project involves updating and interconnecting traffic signals at 12 intersections in the City of Hazleton and Hazleton Borough.
11. Connect Exit 168 and Route 115: Construct a new two lane roadway (1.75 miles) to connect East Mountain Road to Exit 46 in Plains, Wilkes-Barre and Laurel Run Townships.

12. Butler Twp. Park & Ride: Construct a park and ride lot at the intersection of US Route 80 and PA Route 309.
13. Dallas Int. 5 leg: Intersection Improvement
14. Extension of SR 424 to SR 924 – This 0.47 mile project involves the extension of SR 424 from the Hazleton South Beltway to the Humbolt Industrial Park.
15. PA 924 Barletta to Scotch: Widen and restoration of existing two lane road to 5 lanes with a center turn lane.
16. White Haven Park & Ride: Construct Park and Ride Lot along SR 1-80 in White Haven.
17. Nuangola Park & Ride: Construct Park-n-Ride lot at Exit 159 of Interstate Route 81.
18. Tomhicken Rd. Park & Ride: Construct Park & Ride lot along SR 3020 (Tomhicken Rd.), adjacent to I-81 SB on-ramp at Exit 145.
19. Widen Hazleton Airport Road: This 2.8 mile project involves widening the existing Hazleton Airport Beltway (SR 3026) to five lanes.
20. South Valley Parkway: A new 2-lane arterial including new interchange and road widening. New roadway on new alignment in Hanover Township to alleviate congestion on Middle Road

The following LRTP/TIP AQ significant transit projects are included in this analysis.

**Lackawanna:**

1. Hybrid buses: County of Lackawanna Transit System intends to replace its existing fleet of buses and replace with 35 Hybrid buses beginning in 2011.

**Luzerne:**

2. Intermodal Center: Hazleton Public Transit intends to construct an Intermodal Center/downtown bus terminal within the City of Hazleton.
3. Purchase – Replace Service Vehicle: Hazleton Public Transit will replace a service vehicle in 2009
4. Heavy Duty Buses: The purchase of 5 new buses in 2009 will replace older model buses.

**3.4 Traffic Parameters**

Traffic parameters within the emissions modeling provide the basis for the conformity emission test comparisons. For ozone, data is

compiled for an average summer day. The following summarizes the data sources, compilation and processing to produce VMT, speeds and emissions by pollutant / precursor. There is no travel demand model for this area; instead, state traffic databases are used to calculate regional VMT and speeds.

Emission factors vary with average speed and vehicle type mix. Daily emissions are calculated by multiplying the emission factor (expressed in grams per vehicle mile) and traffic volumes (expressed in daily vehicle miles of travel for ozone).

Annual Average Daily Traffic (AADT) volumes on individual roadway segments were generated from 2005 PENNDOT HPMS and Roadway Management System (RMS) databases. Actual traffic counts are completed at thousands of sites around the state at least once every three years. Separate from the HPMS, there are 60 permanent counting stations, which provide data on growth trends and periodic fluctuations in traffic volumes (e.g., seasonal variations). Adjustment factors developed from these permanent station records are applied to the HPMS data.

Individual roadway segments are designated within RMS to one of the six (6) functional classifications and to one of the three settings. RMS also records the length of roadway for each segment, the number of lanes, and the traffic volume. A computerized tabulation of daily vehicle miles of travel (DVMT) for each roadway class and setting is generated by multiplying the ADT and the length for each segment, and summing the products. In addition, PENNDOT has developed temporal variation data, which describe both the hourly variation of traffic volumes within a day, the daily variation within a week, and the monthly variation over the year. The AADT volumes were adjusted to reflect average summer weekday conditions in the peak ozone season, and were also disaggregated to hourly volumes within the day to support detailed speed estimation.

VMT forecast growth rates are based on PENNDOT's VMT forecasting system as documented in the report "Statistical Evaluation of Projected Traffic Growth, Traffic Growth Forecasting System: Final Report, March 14, 2005". The resulting forecasting system includes the development of VMT forecasts and growth rates for four functional classifications in each Pennsylvania county: urban interstate, urban non-interstate, rural interstate, and rural non-interstate. The forecasts use

statistical relationships based on historic HPMS VMT trends and future county socioeconomic projections from Woods and Poole Economics, Inc. The statistical models incorporate historical VMT trends, socio and economic data (households, mean household income), and a relative measure of transportation capacity (lane miles per capita). The results of the study have been shared between PENNDOT, DEP, and other Interagency Consultation Group members, including the PA Conformity Work Group (which includes EPA, FHWA, FTA and representatives from larger MPOs within the state).

Speeds were calculated for 2005 and future years by the PPSUITE post processor computer system, and were validated against data from PENNDOT's ongoing speed monitoring program. The PPSUITE software contains procedures to calculate the capacity of each highway segment, giving consideration to the physical attributes of the highway (functional class, number of lanes, geographic setting), the effects of traffic congestion are then accounted for by comparing traffic volumes to this capacity for each hour of the day, and calculating the speeds which will result.

Speeds are forecast by adjusting the link attributes to reflect future physical improvements, changing the traffic volumes to reflect growth or other actions, and recalculating capacities and speeds. This approach has proven to be appropriately sensitive to the variety of factors, which affect congestion and speed.

The traffic data was developed using the projection process described above. Conditions were evaluated for the years 2002, 2009, 2018, 2025 and 2030 for ozone precursors. The roadways affected by the LRTP/TIP projects listed were further analyzed to determine operational changes, which may result from implementation of the LRTP/TIPs. In this way, emission characteristics were developed for the region.

The traffic data serves as the regional population, employment, travel, and congestion estimates required by the CAAA, and uses the area's latest planning assumptions. Travel, represented by DVMT, reflects population and employment trends. The speed estimation procedure serves as a measure of congestion, and is consistent with on-going, established monitoring programs. The estimates were coordinated with other data resources, such as the local planning departments. The RMS and HPMS data are available in published formats.

With supplemental analysis performed by PPSUITE, both speed and vehicle type mix data were used in application of the MOBILE6.2 computer model. The emission factors (expressed in grams per vehicle mile) derived by the model were then multiplied by the appropriate VMT for each functional class / setting / time period to calculate the total emissions (in kilograms per day). Off-system adjustments were made using the Congestion Mitigation and Air Quality (CMAQ) methodologies and the PAQONE emissions model developed by the consulting firm of Michael Baker Jr., Inc. for PENNDOT.

### 3.5 Other Parameters

MOBILE6.2 includes a variety of input parameters which characterize the environmental setting, the vehicle fleet, the condition of emission controls, and the volatility of gasoline. A set of sample input files has been provided in Volume II, Appendix C, of this document. Separate runs of the program were performed for each year and improvement scenario, as described in Section 3.7, to produce summer weekday VOC and NOx.

The sample input file shows a number of the parameters indicate use of MOBILE6.2 default or uncorrected values. A combination of default assumptions and site-specific data were determined through the interagency consultation process. For all data, assumptions were applied uniformly to the baseline, TIP and LRTP cases, providing an unbiased comparison.

MOBILE6.2 allows a calculation for refueling losses. This analysis is used for estimating the effectiveness of vapor recovery systems at fueling stations, where such equipment exists. The PA Department of Environmental Protection (DEP) includes these sources as area sources, not as part of the mobile source category. Therefore the emissions from refueling have not been calculated for this conformity analysis.

Emissions from fuel evaporation from vehicles depend on the age of the vehicle, fuel used, length of time the vehicle was operating, and whether the engine was cold or hot when it was started. The effect of the start condition also varies with the emissions control system on the particular vehicle. This study used national average percentages for fuel evaporation from highway motor vehicles.

Minimum and maximum temperature and humidity data in the local area parameter and scenario records have been developed from historic temperature records in 14 regions across the state (see Volume II, Appendix C3). These temperatures represent conditions consistent with the development of the region's maintenance plan.

An in-use Reid vapor pressure (RVP) of 8.7 pounds per square inch (see Volume II, Appendix C4) has been used for all analysis summer weekday analysis scenarios.

### 3.6 Transportation Control Measures

No Transportation Control Measures (TCMs) have been adopted for the Lackawanna/Luzerne MPO area because existing and planned emissions controls are sufficient for attainment and maintenance purposes.

### 3.7 Emissions

The results of the computer modeling are used to demonstrate conformity for ozone. For ozone, emission forecasts are compared against 2009 and 2018 emission budgets established in the Scranton-Wilkes-Barre maintenance plan. Emissions are produced for the following analysis scenarios:

- 1- Budget Year 1 - 2009 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by 2009. This year is an emission budget year established in the maintenance plan and satisfies the requirements for the inclusion of a year within the TIP timeframe.
- 2- Budget Year 2 - 2018 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by 2018. This year is an emission budget year established in the maintenance plan.
- 3- Interim Year - 2025 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by 2025. This year is included to ensure that no analysis year is more than 10 years apart.
- 4- Long-Range Plan End Years –2030 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by end of Plan. The end of the LRTP is a required ozone analysis year.

Based on this analysis and the summary emission tables provided at the end of this report, the conformity results for the 8-hour ozone standard are described below.

#### Ozone Conformity Test Results:

Results for the Scranton-Wilkes-Barre nonattainment area (includes Lackawanna and Luzerne counties) indicate that forecasted 2009 VOC and NO<sub>x</sub> emission estimates (including TIP & LRTP) are lower than the regional 2009 emission budgets established in the area maintenance plan. Forecasted 2018, 2025, and 2030 emissions are lower than the 2018 VOC and NO<sub>x</sub> emission budgets.

The decreases reflected in the historic trend may change in future years beyond the study horizon. These issues must be addressed in the state's air quality implementation planning, considering all sources, stationary and mobile. The TIP and LRTP are expected to provide a favorable increase in travel speeds, which reduces the VOC emission rates. The favorable mix of projects contributes to a reduction in NO<sub>x</sub> emissions.

### **3.8 Discussion**

This analysis demonstrates that the forecast summer day VOC and NO<sub>x</sub> satisfy the applicable conformity tests for the ozone standards. Therefore, implementation of the TIP and LRTP as defined in the study will not adversely affect air quality goals.

Further measures directed at reducing vehicle trips may become increasingly important in future transportation plans and programs. Transit and intermodal alternatives may serve as a means for achieving these reductions. The current plan and program present several appropriate means of achieving this. Additionally, transit and intermodal alternatives can be incorporated into preliminary engineering for highway projects.

## **4. FINANCIAL CONSTRAINT**

The Planning Regulations, Sections 450.322 (b) (11) and 450.324 (e) require the LRTP and the TIP to be financially constrained while the existing transportation system is being adequately operated and maintained. Only projects for which construction and operating funds are reasonably expected to be available are included. The Lackawanna/Luzerne MPO, in conjunction with PENNDOT, has developed an estimate of the cost to maintain and operate the existing roads and bridges in Lackawanna and

Luzerne counties and have compared that with the estimated revenues and maintenance needs of the new roads.

## **5. PUBLIC PARTICIPATION**

This LRTP and TIP have undergone the public participation requirements and the comment and response requirements set forth in the Final Conformity Rule, the Final Statewide/Metropolitan Planning Rule, and Pennsylvania's Conformity SIP. A public meeting was held, pursuant to public notice, on (date). The documentation of the public notice for the hearings, comments, and the responses to comments can be found in Volume II, Appendix C.

## **6. CONFORMITY STATEMENT**

The Clean Air Act Amendments of 1990 (CAAA) require that a Metropolitan Planning Organization (MPO) determine that a Long Range Plan (LRTP) and Transportation Improvement Program (TIP) conform with the applicable State Implementation Plan (SIP), or other tests as defined in the EPA's Conformity Rule, before the LRTP and TIP are adopted. No Federal agency may approve, accept, or fund a LRTP/TIP or its component projects unless the LRTP/TIP have been found to conform to the SIP. Under the Act, conformity is determined by applying three criteria; that "the transportation plans and programs--

- (i) Are consistent with the most recent estimates of mobile source emissions;
- (ii) Provide for the expeditious implementation of transportation control measures in the applicable implementation plan; and
- (iii) With respect to ozone and carbon monoxide non-attainment areas, contribute to annual emissions reductions consistent with sections 182(b)(1) and 187(a)(7)"

Each new transportation plan and TIP must be found to conform before the transportation plan/TIP are approved by the MPO/ RPO or accepted by DOT.

As specified under the first item, the most recent estimates of highway emissions for Lackawanna and Luzerne counties have been developed as a part of this study. The results, when combined with the other counties in the Scranton-Wilkes-Barre nonattainment area (under a separate report), indicate that the forecast ozone precursors, VOC and NO<sub>x</sub>, are

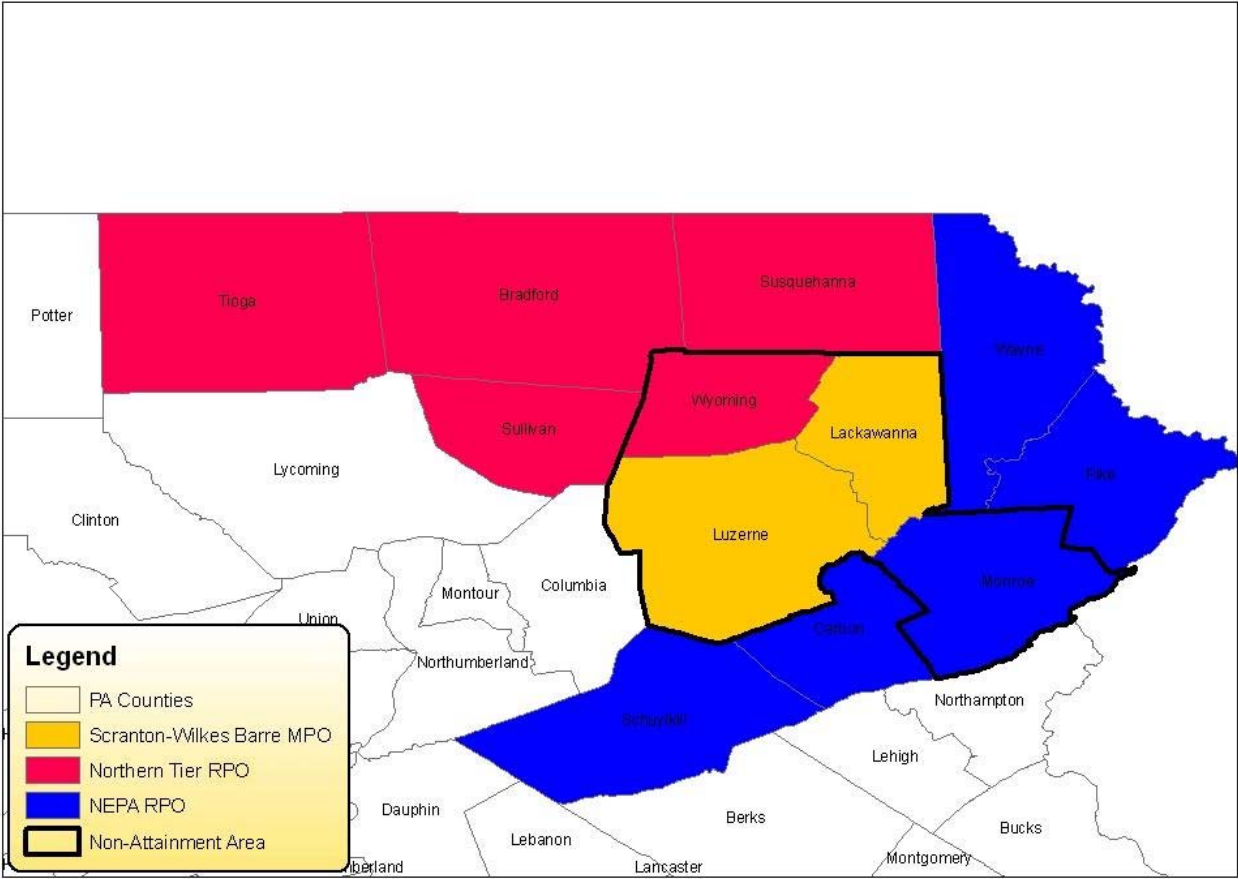
lower than the 2009 and 2018 regional emission budgets established in the Scranton-Wilkes-Barre area maintenance plan for the 8-hour ozone standard.

Lackawanna and Luzerne counties were not considered to be nonattainment for ozone (prior to the CAAA of 1990) and have not submitted a SIP including TCMs under the 1990 CAA Amendments. No transportation control measures for this area exist in a state implementation plan. Consequently, the second criterion (above) is not applicable.

Therefore, the Long Range Plan and Transportation Improvement Programs for the Lackawanna/Luzerne MPO area are found to satisfy the regional transportation conformity requirements for the 8 hour ozone standard for the Scranton-Wilkes-Barre 8-hour ozone maintenance area under the U.S. Clean Air Act.

**MAPS**

# Scranton - Wilkes Barre Ozone Maintenance Area and MPO/RPO Boundaries



# TABLES

**TABLE 1**  
**OZONE Conformity**  
**Summary of Total Highway Vehicle Miles Traveled (VMT)**  
Average Summer Weekday  
Scranton-Wilkes-Barre Ozone Maintenance Area

<b>County</b>	<b>2009</b>	<b>2018</b>	<b>2025</b>	<b>2030</b>
Lackawanna	6,193,296	6,828,418	7,287,185	7,630,374
Luzerne	9,144,962	9,176,214	9,583,751	9,950,345

**TABLE 2**  
**OZONE Conformity**  
**Summary of Total Highway VOC Emissions**  
Average Summer Weekday (kg/day)  
Scranton-Wilkes-Barre Ozone Maintenance Area

<b>County</b>	<b>2009</b>	<b>2018</b>	<b>2025</b>	<b>2030</b>
Lackawanna	4,905	2,895	2,538	2,620
Luzerne	7,558	3,947	3,285	3,360
Wyoming *	785	404	321	311
Monroe**	4,516	3,125	3,304	3,938
Area Total	17,764 kg/day <b>(19.6 tons/day)</b>	10,371 kg/day <b>(11.4 tons/day)</b>	9,448 kg/day <b>(10.4 tons/day)</b>	10,229 kg/day <b>(11.3 tons/day)</b>
Emission Budget***	<b>25.2 tons/day</b>	<b>16.9 tons/day</b>	<i>Same as 2018</i>	<i>Same as 2018</i>

**TABLE 3**  
**OZONE Conformity**  
**Summary of Total Highway NO<sub>x</sub> Emissions**  
Average Summer Weekday (kg/day)  
Scranton-Wilkes-Barre Ozone Maintenance Area

<b>County</b>	<b>2009</b>	<b>2018</b>	<b>2025</b>	<b>2030</b>
Lackawanna	10,543	4,506	3,130	2,856
Luzerne	16,391	6,504	4,315	3,846
Wyoming *	1,272	506	337	297
Monroe**	9,931	4,680	3,540	3,454
Area Total	38,137 kg/day <b>(42.0 tons/day)</b>	16,196 kg/day <b>(17.9 tons/day)</b>	11,322 kg/day <b>(12.5 tons/day)</b>	10,452 kg/day <b>(11.5 tons/day)</b>
Emission Budget***	<b>48.3 tons/day</b>	<b>23.7 tons/day</b>	<i>Same as 2018</i>	<i>Same as 2018</i>

\* Wyoming emission numbers based on analyses contained in separate conformity report for Northern Tier RPO.  
\*\* Monroe County emission numbers based on analyses contained in separate conformity report for the NEPA RPO.  
\*\*\* Emission budgets based on total nonattainment area budgets provided in the Scranton-Wilkes-Barre (11/19/07) maintenance plan. Sub-County/MPO/RPO budgets are not provided in the maintenance plan.

# CHARTS

# MOBILE6 VOC and NOx Speed vs. Emissions

