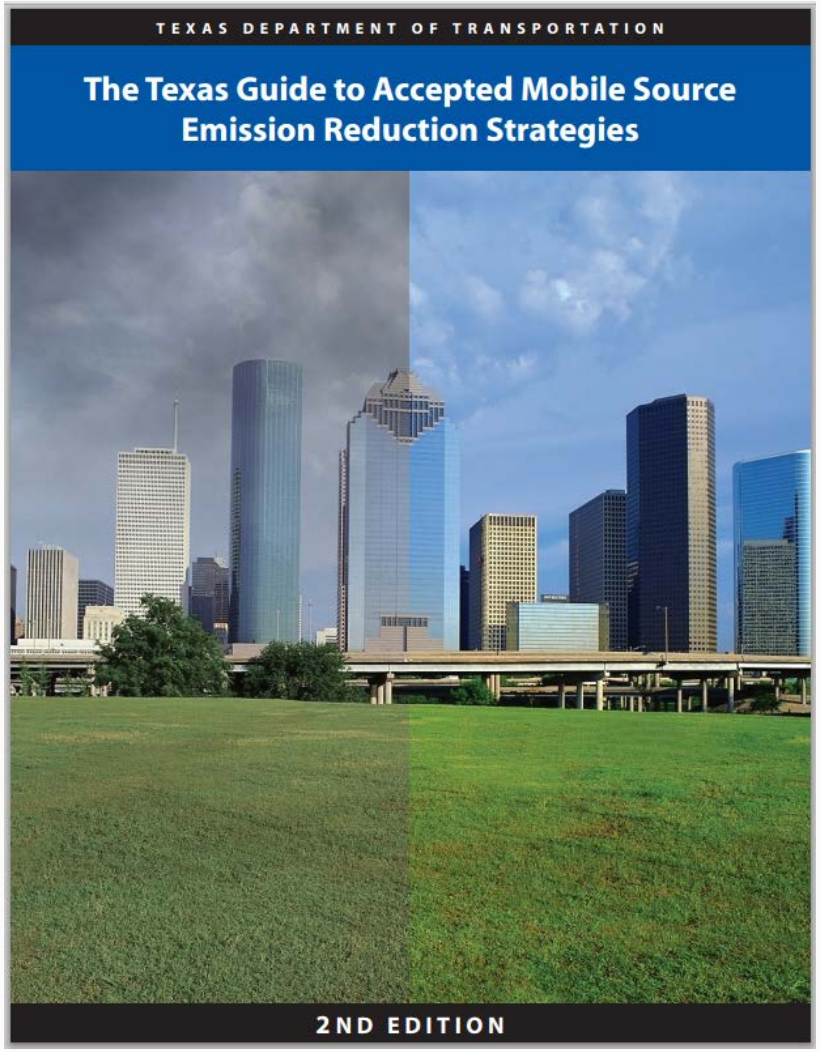
Updating the Texas Guide to Accepted Mobile Source Emission Reduction Strategies (MOSERS)

Presentation to the Technical Working Group for Mobile Source Emissions

April 2nd, 2015

Background

- Current MOSERS (2nd Edition – 2007)
  - Module A: Introduction and Background
  - Module B: Strategies and Equations
- http://moser.tamu.edu/



Updates(1)

- Improved user-friendliness
  - Potential for streamlining
  - Ease of navigation
  - More visual
- Target Audience/Users:
  - MPO staff working on air quality tasks
  - Consultants supporting MPOs and TxDOT

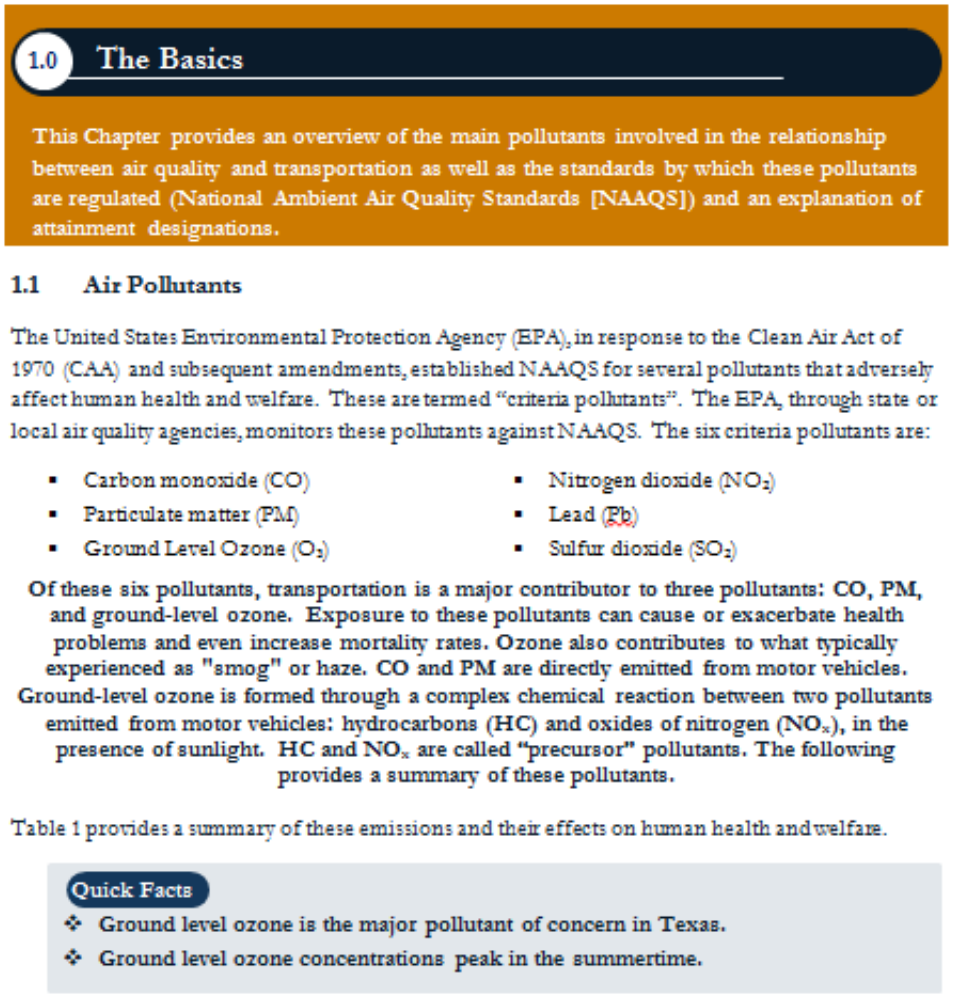
Updates(2)

- Restructure and new content for MOSERS
  - **Module 1:** Overview of Transportation AQ – corresponds to existing **Module A**
  - **Module 2:** Methodologies – corresponds to existing **Module B**
  - **Module 3:** Activity Analysis – for most commonly used strategies

Module 1 – Overview of Transportation Air Quality

Concept

- Deliver key items for practitioners
- User-friendly and visual – Updated look and feel



1.0 The Basics

This Chapter provides an overview of the main pollutants involved in the relationship between air quality and transportation as well as the standards by which these pollutants are regulated (National Ambient Air Quality Standards [NAAQS]) and an explanation of attainment designations.

1.1 Air Pollutants

The United States Environmental Protection Agency (EPA), in response to the Clean Air Act of 1970 (CAA) and subsequent amendments, established NAAQS for several pollutants that adversely affect human health and welfare. These are termed "criteria pollutants". The EPA, through state or local air quality agencies, monitors these pollutants against NAAQS. The six criteria pollutants are:

- Carbon monoxide (CO)
- Particulate matter (PM)
- Ground Level Ozone (O_3)
- Nitrogen dioxide (NO_2)
- Lead (Pb)
- Sulfur dioxide (SO_2)

Of these six pollutants, transportation is a major contributor to three pollutants: CO, PM, and ground-level ozone. Exposure to these pollutants can cause or exacerbate health problems and even increase mortality rates. Ozone also contributes to what typically experienced as "smog" or haze. CO and PM are directly emitted from motor vehicles. Ground-level ozone is formed through a complex chemical reaction between two pollutants emitted from motor vehicles: hydrocarbons (HC) and oxides of nitrogen (NO_x), in the presence of sunlight. HC and NO_x are called "precursor" pollutants. The following provides a summary of these pollutants.

Table 1 provides a summary of these emissions and their effects on human health and welfare.

Quick Facts

- Ground level ozone is the major pollutant of concern in Texas.
- Ground level ozone concentrations peak in the summertime.

Content

- Based on the previous edition as the starting point

- Most recent information on
  - MOVES and other modeling tools
  - NAAQS
  - Other relevant items

- Rewritten and restructured to
  - Serve as an overview guide

Structure

1. The Basics
2. Overview of Transportation Conformity
3. Air Quality Modeling
4. Mobile Source Emission Reduction Strategies
5. Utilization of MOSERS
6. Methodologies and Information Sources
7. Analytical Approaches and Tools

Module 2 – Methodologies

- More visual, user-friendlier
  - A new style and design
  - Improved readability

3.1 System/Service Expansion

Increase ridership by providing new rail system services and/or expanding bus services.

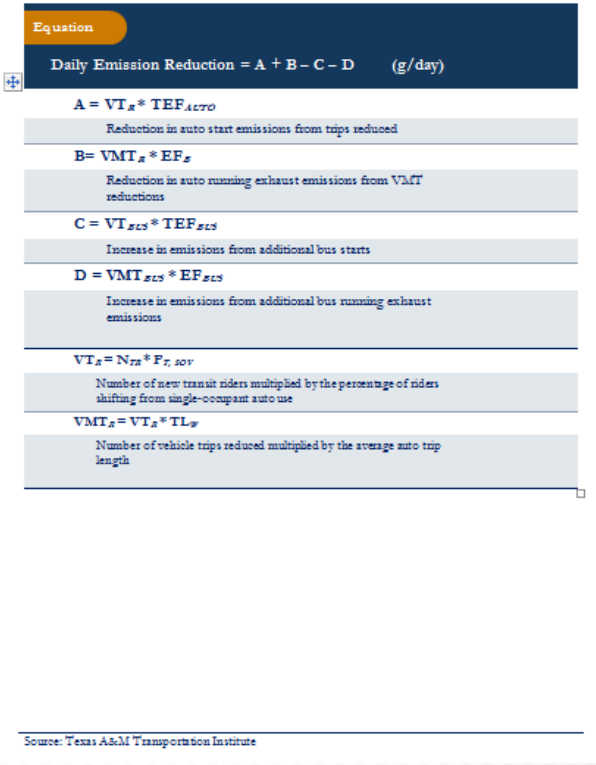
Description

Expansion of a transit system or service can include the addition of rail services through increased frequency or route extension. Bus or paratransit services can be expanded with new vehicles and/or route extensions.

Application

Large cities or communities with enough population density to support reasonably frequent transit service.

Variables	(unit)	Definitions
EF_B	(g/mi)	Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO)
EF_{BUS}	(g/mi)	Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO)
$F_{T,\,SOV}$	(%)	Percentage of people using a transit vehicle that previously were vehicle driven
N_{TR}		New transit ridership
TEF_{AUTO}	(g/mi)	Auto trip-end emission factor (NO_x, VOC, and CO)
TEF_{BUS}	(g/trip)	Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO)
TL_W	(mi)	Average auto trip length
VMT_{BUS}		Vehicle miles traveled (VMT) by transit vehicle
VMT_R		Reduction in daily automobile VMT
VT_{BUS}		Daily vehicle trips by bus or other transit vehicle



Equation

Daily Emission Reduction = A + B – C – D (g/day)

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

$C = VT_{BUS} * TEF_{BUS}$

Increase in emissions from additional bus starts

$D = VMT_{BUS} * EF_{BUS}$

Increase in emissions from additional bus running exhaust emissions

$VT_R = N_{TR} * F_{T,\,SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Source: Texas A&M Transportation Institute

Modules 1 and 2 Progress Update

- The draft **content** complete and going through an internal technical review

- D**esign** refinements and finalized by TTI Communications

Concept

- Practitioners currently use a variety of methods to calculate the changes in vehicle activity parameters; i.e. VMT, VHT, Speed

- Provide detailed estimation methods for these parameters – for most common strategies

- Implement them in an Excel-based tool

Progress

- Reviewed TCM State of Practice
- Focused on identifying the most common CMAQ projects
  - Intersection improvement and signal timing
- Studied available tools and methodologies for MOSERS type projects
  - Collecting information on MOSERS strategies being used in Texas

Next Steps

- Module 1 and 2
  - Review and approval process
- Module 3
  - Survey of TWG members – Most commonly used MOSERS
  - Finalize list of strategies
  - Develop the methodologies
  - Implement in a user-friendly spreadsheet tool