CMAQ Emission Reduction Methodology Overview

Presentation Topics

- Need for Emissions Reduction Calculations
- MOSERS Manual
- FHWA CMAQ Emissions Calculator Toolkit
- Cost Effectiveness Calculations

CMAQ Project Requirements

- Congestion Mitigation and Air Quality program funded projects must show that they can do one of two things:
  - Improve Air Quality
  - Decrease Congestion
- No specific federal requirements for amount of improvement by a project, just that they do result in and show improvement
- Project emission reductions are calculated by project sponsors or H-GAC staff and reported to FHWA when the project is programmed

MOSERS Manual

- MObile Source Emissions Reduction Strategies (MOSERS)
- Developed by the Texas A&M Transportation Institute (TTI) in 2003 with TxDOT, TCEQ, and MPOs
- "Standardize and facilitate the calculation of emission reduction benefits from transportation emission reduction strategies in Texas."
- Currently in its third edition

https://txaqportal.org/mosers/

MOSERS Manual

- Contents
  - Module 1: Overview of Transportation Air Quality
  - Module 2: Methodologies
  - MOSERS Toolkit (3rd Edition)
  - MOSERS Emission Rate Tables (3rd Edition)
- Topics
  - Transit
  - Bicycle & Pedestrian
  - Infrastructure & Traffic Operations
  - Vehicle Activity & Technology
  - Travel Demand Management

6.4 Shared-Use Parking

Enhance park-and-ride services and subsequent reduced VMT and vehicle trips.

Description

In some urban locations, it may be more cost-efficient for a city to establish park-and-ride service at an existing parking facility. Joint use of parking facilities at shopping malls, theaters, churches, or stadiums can be negotiated with property owners or management companies.

Application

Cities with transit service.

Equation

$$\text{Daily Emission Reduction (grams/day)} = N_{PK} * U_P * (TL_W - TL_{PR}) * EF_B * 2 \text{ trips/day}$$

Reduction in running exhaust emissions from reduced VMT resulting from park-and-ride facility use

Variables	(Unit)	Definitions
EF_B	(grams/mile)	Speed-based running exhaust emission factor before implementation (NO_X, VOC, PM, or CO)
N_{PK}		Number of parking spaces
TL_{PR}	(mile)	Average auto trip length from home to parking facility
TL_W	(mile)	Average auto work trip length
U_P		Parking facility utilization rate (estimate)

Source: Texas A&M Transportation Institute

MOSERS

MObile Source Emission Reduction Strategies

Texas A&M Transportation Institute

Strategy 6.1 - Park-and-Ride New Facilities

Main Menu | Save Report as PDF | View Report | Project Information | Open Strategy Documentation

Input Data		Press here to clear input values	Variable	Value	Units
Region		Metropolitan area	*Select* ▼		-
Year		Analysis year	*Select* ▼		-
Road Type		Urban or rural with restricted or unrestricted access	*Select* ▼		-
Trip Section Information	Home to Work Place	Average auto trip length from home to work place	TL_W		mile
		Average trip average speed from home to work place	v		mph
	Home to Park-and-Ride	Average auto trip length from home to park-and-ride facility	TL_{PR}		mile
Park-and-Ride Facility		Number of parking spaces	N_{PK}		parking space
		Expected peak hour parking facility utilization rate	U_P		percent

Daily Emissions Reduction

Press Here to Load Emission Factors

Description	Variable	Pollutant					Units
		NO_X	VOC	PM_{10}	CO	CO_2	
Daily Emissions Reduction	A	-	-	-	-	-	kg / day
		-	-	-	-	-	lbs / day

Load Emission Factors

Emission Factors (Currently Loaded: Austin)

Description	Variable	Pollutant					Units
		NO_X	VOC	PM_{10}	CO	CO_2	
Speed-based running exhaust emission factor before implementation	EF_B	-	-	-	-	-	grams / mile

Emission Calculations

	Variable	Pollutant					Units
		NO_X	VOC	PM_{10}	CO	CO_2	
Reduction in running emissions from reduced vehicle trips of SOV vehicles	$A = N_{PK} * U_P * (TL_W - TL_{PR}) * EF_B * 2$ trips/day	-	-	-	-	-	grams / day

CMAQ Emissions Calculator Toolkit

- FHWA's Answer to MOSERS
- A national perspective on this type of toolkit
- Includes methodologies/calculators for many of the same types of projects with some additions
- No studies comparing the methodologies and outputs from both tools

https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/

Cost Effectiveness Calculations

- For projects that have historical performance data
- We use verified past performance to determine an average project cost effectiveness
- Use that cost effectiveness to estimate emission reductions for future project allocations
- Projects that have used this methodology include:
  - Clean Vehicles
  - Vanpool
  - Commute Solutions

Questions?