



Air Quality and Congestion Mitigation Measure Outcomes Assessment Study

CMAQ PROGRAM BACKGROUND

The Congestion Mitigation and Air Quality (CMAQ) Improvement Program is a Title 23 federal-aid highway funding program. It provides funding for transportation projects and programs that contribute to attainment or maintenance of the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, and particulate matter. Congestion relief projects are also eligible for CMAQ funding when they can demonstrate an emissions reduction. Since 1992, nearly \$30 billion has been invested in over 38,000 projects.

ELEMENTS OF CMAQ

Transportation Project



Emissions Reduction



Nonattainment or Maintenance Area



STUDY BACKGROUND

Section 1113 (c) of Moving Ahead for Progress in the 21st Century Act (MAP-21) directs examination of the outcomes of projects funded under the CMAQ program between 2006 and 2012.

The Air Quality and Congestion Mitigation Measure Outcomes Assessment Study was funded by the Federal Highway Administration and conducted under a research grant by the research study team of Battelle and the Texas A&M Transportation Institute (TTI). An independent committee provided oversight on the study methodology and study findings. Case study teams were competitively selected to conduct reviews of case study projects.

TYPES OF ELIGIBLE PROJECTS

- Diesel retrofits and engine replacements
- Anti-idling facilities, APUs
- Traffic flow improvements
- Freight and intermodal operations
- Transit improvements
- Bicycle and pedestrian projects
- Demand management
- Shared ride services
- Carsharing
- Alternative fuels
- Inspection and maintenance programs
- Experimental pilots

STUDY DETAILS

Projects funded under the CMAQ program were assessed by project type to understand the impacts on emissions, air quality, and human health. The study approach included three main components.

CMAQ PROGRAM ANALYSIS

- Database analysis to select case studies
- Case study project selection and data collection
- Assessment of 72 case studies

ANALYSIS OF MODELING TECHNIQUES

- Literature review
- Model Selection
- Analysis of 10 models

ASSESSMENT OF HUMAN HEALTH FACTORS

- Literature review
- Summary of findings by CMAQ project types





STUDY FINDINGS

- Seventy-two percent of Case Study projects reported estimates of traffic or congestion mitigation impacts; of the subcategories in the case study, Improved Public Transit projects most frequently reported traffic mitigation impacts.
- Estimated emissions impacts of Case Study projects were reported most frequently for volatile organic compounds and nitrogen oxides—precursor pollutants to the smog-forming pollutant ozone and particle pollution.
- Traffic congestion mitigated through promotion of alternative transportation options such as public transit, walking, and bicycling can lead to positive health benefits in the areas of physical and mental health.
- Improved traffic flow and system efficiency can also lower vehicle crash and injury risk while also reducing traveler stress levels. Bus replacements can provide enhanced benefits due to new technologies such as collision warning and avoidance systems, providing a safer riding experience.

STUDY RECOMMENDATIONS

The research team made the following recommendations for further development and improvement of emissions estimation models:

- Maintain vigilant quality control/quality assurance and focus on the dimensional analysis of equations. Ensure that input data matches the units in the equation.
- Use the best available local inputs when generating emission factors used in the emissions analysis.
- Strive to compute and report all emissions equation results in kilograms/day to follow CMAQ program guidance.
- Develop new equations and methodologies through using or expanding on estimation techniques developed by other agencies. Often, logic or components in equations can be transferred to another project type and used with little or no modification.

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For more information on the CMAQ Program and the study visit:

http://www.fhwa.dot.gov/environment/air_quality/cmaq/research/outcomes_assessment/