

One MPO's Approach to Air Quality Impact Evaluation

Presented at the
National Association of Regional Councils 36th Annual
Conference & Exhibition
Integrating Transportation and Air Quality Planning
Workshop #4

Tuesday, June 25 2002



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Overview of CATS

- Transportation MPO for Chicago region
- Founded in 1955
- Governed by a Policy Committee consisting of 20 policy-level representatives of local governments and transportation and planning agencies in the region
- Staff of 70



Overview of CMAQ Program

- Approximately \$60 million per year in federal dollars to distribute
- CATS is responsible for selecting and monitoring projects
- IDOT is responsible for administering funds
- Annual solicitation for projects



Overview of CMAQ Program (continued)

- Evaluation and ranking is primarily based on cost per ton of VOC removed with NOx reductions, VMT reductions and trips eliminated as secondary criteria
 - › Cost is total project cost
 - › Emissions benefits are measured over the project's life expectancy



Overview of CMAQ Program (continued)

- Selection Committee chooses among ranked projects for a program to recommend
 - › Committee is composed of representatives from CDOT, IDOT, IEPA, RTA, counties, and local governments with CATS as non-voting (except in case of a tie) Chair
 - › After a public comment period, the projects are recommended to CATS' Work Program Committee and then to the Policy Committee, which adopts a final program
 - › FHWA makes the eligibility determination after Policy Committee adoption



Overview of CMAQ Program (continued)

- Staff time required is approximately 2 full-time equivalents
 - › One full-time senior analyst
 - › An entry-level analyst at $\frac{3}{4}$ time
 - › Management tasks at $\frac{1}{4}$ time



Evaluation Process

- Each type of project is ranked against its' peers
- The Selection Committee, following staff recommendation, determines the method for each type of project
 - › Methods do not change much once agreed upon
 - › Projects that do not lend themselves to uniform methods (e.g., transit improvements) are evaluated individually
 - › Demonstration projects are not evaluated for air quality impacts



Evaluation Process

(continued)

- CATS staff performs the analysis for most projects
 - › Information is taken from the application.
 - › A spreadsheet is used for the actual analysis
 - › All project types use a life expectancy to determine total emissions eliminated
 - › All project types use a table of VOC reductions based on speed and the year – greater speeds produce greater emissions, and emission rates decline in the future. The table was derived from a MOBILE5 analysis



Evaluation Process

(continued)

- › The primary items estimated are speed improvements (for traffic flow improvements and signal interconnects) or trips eliminated/diverted (for bicycle, pedestrian, and transit improvements)
 - Trips eliminated are taken wholly by the new mode
 - Diverted trips are partially on the previous mode, partly on the new mode (e.g., park-and-ride trips)



Individual Evaluation Methods

- Traffic Flow Improvements
- Bicycle/Pedestrian Facilities
- Signal Interconnects
- Transit Improvements



Traffic Flow Improvements

- Intersection Improvements
- Existing and proposed intersection geometry is given on HCM Input Module Worksheets
- Intersection data is modeled in CORSIM traffic simulation software
- Average speeds for pre-project and post-project geometry are obtained to calculate emission reduction



Bicycle/Pedestrian Facilities

- Using GIS software, create 1 mile buffer zones around the projects to help in calculating the general population, working population, and university workers for each zone
- Census data is used to generate the population demographics needed



Bicycle/Pedestrian Facilities

(continued)

- Compute the population density, to determine the diversion rates and usage factors. This method follows a model developed by the Pennsylvania DOT
- Estimate VMT eliminated using the diversion rates and use factors
- Use the VMT eliminated to calculate the VOC reductions for the life of the project



Signal Interconnects

- Locate all townships that have a project or part of a project within its boundaries
- Traffic growth factors are established for the areas affected by the signal interconnect based on township growth factors
 - › The growth factors are based on expected VMT growth in each township from 1999 to 2020 (the current plan year)
 - › Projects that extend across townships use a growth factor averaged from the townships involved



Signal Interconnects

(continued)

- The traffic growth factor is then used to forecast future traffic volumes for the interconnect
- The future traffic volumes and traffic speeds are used to calculate the VOC reduced for the life of the project base on the VOC per mile chart



Transit Improvements

- New or expanded services are evaluated based on trips eliminated or diverted from autos
 - › Estimate ridership increase
 - Based on survey data if available
 - Ridership on comparable services can also be used
 - Journey to work data can be applied to new services



Transit Improvements (continued)

- › Estimate percentage of trips eliminated/diverted
- › Estimate auto occupancy factor (typically the regional average)
- › Estimate the length of the eliminated/diverted trips
 - Preferably based on the length of the auto trip if known (typically the case for park-and-ride facilities)
 - Use the average trip length of the replacement mode (average bus, train bicycle or pedestrian trip length)



Transit Improvements

(continued)

- Park-and-ride facility rankings are based on projected use
 - › The number of spaces is requested in the application
 - › Occupancy rates are based on actual use for an existing location, or standard rates for new projects
 - › The trip length is determined by the expected line-haul length of the trip – typically the distance from the location to downtown Chicago



All Projects

- Outreach assistance - putting agencies in touch
- Cost reviews by implementers
- Project reviews by interest groups



Project Monitoring

- Projects are reevaluated when cost increases are requested
 - › Emissions reductions remain the same in most cases
 - › The increased cost is divided by the emissions reduction to obtain a revised project ranking, compared to other projects approved in the same year
- If the project ranking falls below other projects not approved in that year, the cost increase is not approved



Project Monitoring

(continued)

- Projects not making satisfactory progress are contacted
 - › Progress is defined by progress in awarding engineering/construction contracts.
 - › The Selection Committee reviews the projects, and sets deadlines if necessary.



Project Monitoring

(continued)

- The Selection Committee reprograms funds that become available
 - › Some funds are held in reserve from each year's mark
 - › Some funds become available when projects are withdrawn
 - › Funds that are likely to become available are noted and applied to small-scale increases. These are funds from projects whose final contract has been awarded and are under budget



Summary

- MPO programs
- MPO staff evaluates and monitors
- Ideas for improvements are welcome