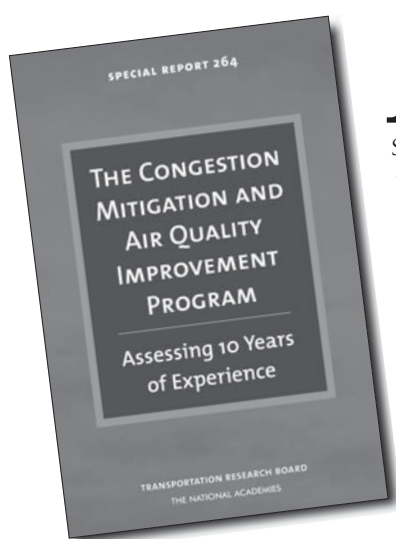


# Assessing the Congestion Mitigation and Air Quality Improvement Program

## TRB Study Committee Recommends Reauthorization, Retooling

NANCY P. HUMPHREY



*Special Report 264: The Congestion Mitigation and Air Quality Improvement Program: Assessing 10 Years of Experience* is available from TRB (to order, visit the TRB Bookstore on the web: [www.TRB.org/trb/bookstore/](http://www.TRB.org/trb/bookstore/)).

A committee of 16 experts appointed by the Transportation Research Board and chaired by Martin Wachs, Director of the Institute of Transportation Studies at the University of California, Berkeley, recently concluded a congressionally requested evaluation of the Congestion Mitigation and Air Quality Improvement (CMAQ) program (see sidebar, page 39). The committee found that the benefits warrant continuation of the 10-year old program and recommended modifications to strengthen and improve the evaluation of projects. The Board on Environmental Studies and Toxicology of the National Research Council's Division on Earth and Life Studies also contributed to the study.

### Background and Study Charge

Enacted under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, the CMAQ program assists regions in meeting the deadlines imposed by the Clean Air Act Amendments (CAAA) of 1990. In 1998, the Transportation Equity Act for the 21st Century reauthorized the program for another six years, with funding increased to \$8.1 billion.

During the reauthorization hearings, however, the efficacy of the CMAQ program was questioned, leading to the study request. Congressional sponsors wanted to know whether the CMAQ program has been effective and whether the projects are cost-effective compared with other strategies for reducing pollution and congestion. TRB's *Special Report 264: The Congestion Mitigation and Air Quality Improvement Program: Assessing 10 Years of Experience* presents the study committee's response.

### Program Operation

The CMAQ program is targeted to states through a formula that takes into account the severity of air quality problems and the size of the populations affected.

The states must spend the funds in nonattainment areas—which have not achieved compliance with air quality standards—and in maintenance areas, which have achieved compliance. The primary focus has been on areas designated as nonattainment because of ozone and carbon monoxide levels—the pollutants that were of greatest concern when the CAAA and ISTEA were passed.

CMAQ focuses funds on the transportation control measures (TCMs) described in the CAAA—except for vehicle scrappage programs, which are not eligible (see sidebar, page 40). TCMs are strategies to lessen the pollutants emitted by motor vehicles by decreasing highway travel—for example, with bicycle, pedestrian, and rail transit projects—and by encouraging more efficient facility use—for example, through ridesharing and traffic-flow improvements.

In addition, CMAQ funds may support projects that reduce vehicle emissions directly through vehicle inspection and maintenance programs and through fleet conversions to less polluting alternative-fuel vehicles. The funds are intended for new facilities, equipment, and services, generating new sources of emission reductions.

Operating funds that support these projects are generally awarded only for a three-year period. The CMAQ enabling legislation prohibits funding the construction of new capacity for single-occupant vehicle travel, such as the addition of general-purpose lanes to a highway or building a new highway in a new location.

In the spirit of ISTEA, CMAQ project planning and decision making are decentralized. The program sponsors—the Federal Highway Administration (FHWA) and the Federal Transit Administration, in cooperation with the U.S. Environmental Protection Agency (EPA)—provide policy guidance and define eligibility criteria, but projects are initiated locally. Metropolitan planning organizations—the agencies responsible for transportation planning and conformity determination at the regional level—typically develop consensus lists

of CMAQ projects for funding and programming in nonattainment and maintenance areas.

An analysis of program obligations for the first eight program years, drawn from an FHWA national database of all CMAQ projects, reveals that funding has concentrated on two areas—transit and traffic flow improvements (Figure 1). This pattern holds for both numbers of projects and dollar values of projects.

Nevertheless, the two categories include a range of projects, from infrastructure to operational improvements, and from more traditional measures—such as park-and-ride facilities and high-occupancy vehicle lanes—to strategies considered nontraditional and innovative, such as traffic monitoring and incident management centers, special freeway service patrols, on-demand shuttle bus services on major corridors, bus traffic signal preemption systems, and commuter ferry service.

### Context of Evaluation

Any evaluation of the CMAQ program must comprehend the magnitude of the air quality problem in the United States and have realistic expectations about the influence one small program can have on reducing pollution generated by transportation, which is only one source of emissions. The resources provided by the CMAQ program are modest by federal transportation program standards—typically 2 to 3 percent of a region's total transportation budget. Moreover, the funds are often disbursed to a wide range of eligible activities. Compared with new-vehicle emission and fuel standards that apply to large segments of the vehicle fleet, most CMAQ-funded TCMs are local in scale—for example, an intersection improvement or a bicycle path—and affect a small segment of a large regional transportation system.

### Committee for the Evaluation of the Congestion Mitigation and Air Quality Improvement Program

- Martin Wachs**, University of California, Berkeley, *Chair*
- Carla J. Berroyer**, Wilbur Smith Associates
- David S. Cordray**, Vanderbilt University
- Henry E. Dittmar**, Great American Station Foundation
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- Robert F. Sawyer**, University of California, Berkeley
- Kenneth A. Small**, University of California, Irvine
- Katherine F. Turnbull**, Texas Transportation Institute
- Kathleen C. Weathers**, Institute of Ecosystem Studies
- Arthur M. Winer**, University of California, Los Angeles

### Findings

The committee found strong support for the CMAQ program among regional transportation planners, operating agency staff, air quality officials, and interest groups. However, a credible, scientific, quantitative evaluation of the cost-effectiveness of the CMAQ program at the national level was not possible. The issues of scale, the limited methods for measuring project effects, and the localized character of the program preclude efforts to aggregate local results into a national total.

Nevertheless, with its diverse and often innovative project mix, the CMAQ program offers a valu-

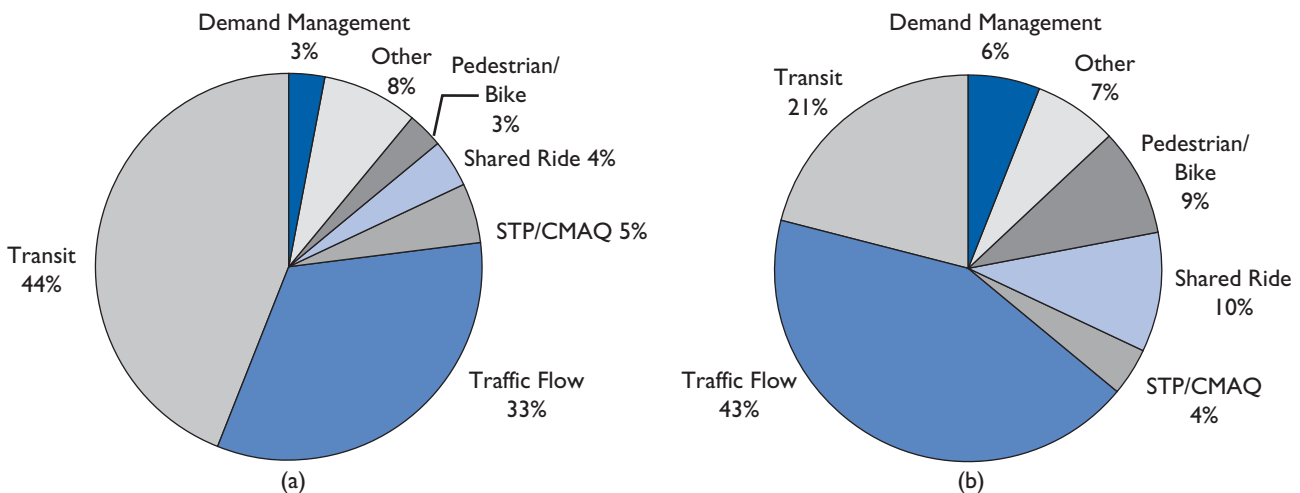


FIGURE 1 CMAQ spending priorities, Fiscal Years 1992–1999: (a) by CMAQ obligation levels; (b) by number of projects. (STP = Surface Transportation Program. SOURCE: FHWA CMAQ Database.)

## Transportation Control Measures Included in the Clean Air Act Amendment of 1990, Eligible for CMAQ Funding

- ◆ Programs for improved public transit;
- ◆ Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or HOV;
- ◆ Employer-based transportation management plans, including incentives;
- ◆ Trip-reduction ordinances;
- ◆ Traffic flow improvement programs that achieve emission reductions;
- ◆ Fringe and transportation corridor parking facilities serving multiple-occupancy vehicle programs or transit service;
- ◆ Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use;
- ◆ Programs for the provision of all forms of high-occupancy, shared-ride services;
- ◆ Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of nonmotorized vehicles or pedestrian use, both as to time and place;
- ◆ Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas.
- ◆ Programs to control extended idling of vehicles;
- ◆ Reducing emissions from extreme cold-start conditions [newly eligible under TEA-21];
- ◆ Employer-sponsored programs to permit flexible work schedules;
- ◆ Programs and ordinances to facilitate nonautomobile travel, provision and utilization of mass transit, and to generally reduce the need for SOV travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;
- ◆ Programs for new construction and major reconstruction of paths, tracks, or areas solely for the use by pedestrian or other nonmotorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior; and
- ◆ Programs to encourage removal of pre-1980 vehicles [excluded from eligibility under ISTEA and TEA-21].

NOTE: HOV = high-occupancy vehicle; SOV = single-occupancy vehicle. SOURCE: FHWA, 1999.

able laboratory for measuring the cost-effectiveness of individual projects or groups of projects at the local level. With more attention to evaluation procedures, the ability to track project effectiveness can be greatly improved.

### Cost-Effectiveness Results

The limited evidence suggests that, when compared on the criterion of emissions reduced per dollar spent, strategies aimed directly at emission reductions (e.g., new-vehicle emission and fuel standards, well-structured inspection and maintenance programs, and vehicle scrappage programs) generally have been more successful than most CMAQ strategies aimed at changing travel behavior. Nonetheless, the cost-effectiveness of some CMAQ-eligible TCMs—involv-

ing regional ridesharing, regional transportation demand management, and some pricing strategies—compares favorably with that of non-CMAQ-eligible control strategies.

There is uncertainty about these conclusions, however.

- ◆ The comparisons are based on estimates of emission reductions for ozone precursors only.
- ◆ The range of results for cost-effectiveness—even for the same type of CMAQ strategy—suggests that performance depends largely on context.
- ◆ Many TCMs may offer benefits in addition to pollution reduction, such as congestion relief.
- ◆ The estimates for nearly all strategies are affected by modeling uncertainties.

Furthermore, project cost-effectiveness is a moving target—the pollution baseline against which effectiveness is measured is changing as vehicles and fuels become cleaner. The historical performance of CMAQ projects therefore does not provide a basis for confident projections of cost-effectiveness.

### Qualitative Evidence

The strongest evidence in favor of the program is qualitative. First, CMAQ is the only federally funded transportation program explicitly targeting air quality improvement. Arguably the most important benefits of the CMAQ program are the incentives and resources provided to local agencies to think seriously about strategies for improving air quality and reducing congestion.

Second, the funds are restricted to these purposes, offering an opportunity for local nonattainment areas to experiment with nontraditional transportation approaches to pollution control and to forge new partnerships and greater interagency cooperation. Third—although the data are uncertain—some of the most promising TCMs in terms of cost-effectiveness receive limited or no support from traditional transportation funding sources and therefore depend on the CMAQ program.

Fourth, the program helps nonattainment and maintenance areas fund the mandates and pollution control schedules of the CAAA. Finally, the CMAQ program provides a flexible source of funds for a range of activities tailored to alleviating local pollution and congestion problems.

### Recommendations

After reviewing the available qualitative and quantitative evidence on the program's effectiveness, the committee reached consensus on the following recommendations.

### Program Continuation and Focus

1. The CMAQ program has value and should be reauthorized with modifications noted below.

2. Air quality improvement should continue to receive high priority in the CMAQ program. The program should continue to support congestion relief projects that contribute to vehicle emission reduction but should maintain restrictions on projects involving construction of new highway capacity.

3. State and local air quality agencies should be involved more directly in evaluating proposals for CMAQ funding.

### Program Scope

4. The CMAQ program should address all pollutants regulated under the CAAA. At a minimum, the program funding formula and eligibility criteria should include particulates—now believed to pose a greater health hazard than any other criteria pollutants—as well as sulfur dioxide and air toxics.

5. Any local project that can demonstrate the potential to reduce mobile source emissions should be eligible for CMAQ funds.

6. Restrictions on the use of CMAQ funds for operating assistance should be relaxed if cost-effectiveness can be demonstrated.

7. CMAQ funds should be considered for land use actions that establish conditions for long-term reductions in mobile source emissions.

### Program Operation

8. The agency selecting CMAQ projects in each nonattainment area should develop a process for identifying, selecting, and evaluating projects in the context of specific regional air quality and congestion problems. In exchange, the federal CMAQ project approval process should be streamlined.

### Program Evaluation

9. Recipients of CMAQ funds should be given incentives to conduct more evaluations of funded projects, and federal program sponsors should provide guidance on best practices.

10. A more targeted program of evaluation should be undertaken at the national level, to include in-depth evaluation studies, synthesis and dissemination of results, research on appropriate analysis methods, and monitoring. FHWA, in consultation with EPA, should take the lead in initiating the evaluation program, financed in part by CMAQ funds.

Nancy P. Humphrey is Senior Program Officer, TRB, and served as study director for this project.

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