

**November 1992**

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**TRAFFIC  
CONGESTION****Activities to Reduce  
Travel Demand and Air  
Pollution Are Not  
Widely Implemented**

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**555861**

**Program Evaluation and  
Methodology Division**

B-249546

November 6, 1992

The Honorable Daniel Patrick Moynihan, Chairman  
The Honorable John H. Chafee, Ranking Minority Member  
Committee on Environment and Public Works  
United States Senate

The Honorable Steve Symms, Ranking Minority Member  
Subcommittee on Water Resources, Transportation and  
Infrastructure  
Committee on Environment and Public Works  
United States Senate

Increasing congestion on America's highways and local urban streets continues to damage the nation's economic vitality. Traffic congestion curtails the movement of people and goods, diminishes air quality, and wastes valuable energy resources. The role of mobile sources in expanding air pollution has received new attention in recent years. In 1990 and again in 1991, the Congress undertook major efforts to improve the air quality of the nation by mitigating congestion problems.

The 1990 Clean Air Act Amendments encouraged the use of transportation systems management (TSM) techniques (a variety of low-cost approaches designed to maximize the efficiency of existing roadways or to lower the demand on them) to meet air quality goals. To demonstrate the importance of these techniques, the Congress authorized the Environmental Protection Agency (EPA) to require the imposition of a certain proportionate number of these techniques in areas that fail to meet federal air quality regulations.

In its 1991 reauthorization of surface transportation legislation, the Congress reiterated its advocacy of these techniques by establishing a \$6 billion federal-aid program for congestion mitigation and air quality improvement activities. The Intermodal Surface Transportation Efficiency Act of 1991 additionally mandated the creation of a congestion management system in areas with an urban population greater than 200,000. In both the Clean Air Act Amendments and the Intermodal Surface Transportation Efficiency Act, the Congress clearly indicated its

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belief that the implementation of TSM strategies contributes to congestion reduction and, as a consequence, to air quality improvement.<sup>1</sup>

At your request, we reviewed federal efforts to promote more efficient management of America's roadway systems through TSM actions. In an earlier report, which documented the briefing we provided your staff in March 1991, we assessed the strengths and shortcomings of the Department of Transportation's (DOT's) TSM efforts with respect to funding, planning, and technical assistance.<sup>2</sup> The present report provides a more detailed explanation of our findings about the role of federally required urban transportation planning agencies in TSM efforts and the extent to which air quality concerns affected the inclusion of TSM activities in the local transportation planning process. In this study, we did not independently evaluate the effectiveness of any TSM activity for either congestion or air pollution reduction. It was also not our purpose in this report to evaluate DOT's programmatic activities in this area. Our analyses were guided by the 1990 Clean Air Act Amendments and the 1991 Intermodal Surface Transportation Efficiency Act, both of which address TSM activities for congestion reduction and clean air purposes.

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## Objectives, Scope, and Methodology

We investigated the strengths and weaknesses of federal TSM planning efforts by conducting a nationwide survey of 119 metropolitan planning organizations (MPOs), using a stratified random sample of metropolitan statistical areas. The survey was conducted between December 1990 and March 1991 (before the Intermodal Surface Transportation Efficiency Act was passed). Our response rate was 100 percent. Additionally, we conducted site visits in three major metropolitan areas—Minneapolis, San Francisco, and Tampa—and interviewed key decisionmakers involved in TSM implementation and local air quality planning.<sup>3</sup> We performed our work in accordance with generally accepted government auditing standards between December 1990 and August 1991.

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<sup>1</sup>Section 179 of the Clean Air Act Amendments exempts most TSM activities (which are also discussed in section 108) from any sanctions placed on federal-aid highway funds in areas failing to meet air quality requirements. The new surface transportation legislation targets these same activities in its funding program for congestion mitigation and air quality improvement.

<sup>2</sup>See Traffic Management: Federal Policies to Encourage Low-Cost Approaches Need to Be Strengthened, GAO/PEMD-91-26BR (August 1991), pp. 30-31.

<sup>3</sup>Implementors included officials or representatives of agencies such as state departments of transportation, transit agencies, commuter rideshare organizations, transportation management organizations, and environmental agencies. The site visits took place in December 1990 and February and April 1991. All data were collected before the Intermodal Surface Transportation Efficiency Act of 1991 was passed and consequently do not reflect the results of this legislation.

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Our study was designed to determine

1. To what extent have MPOs, as federally mandated local planning agencies, included TSM activities in their short-range transportation plans?
2. To what extent have locally planned TSM activities been implemented by state and local transportation decisionmakers?
3. To what extent has air quality planning been integrated into the local transportation planning process?

Although our study addressed both supply management and demand management TSM activities, this report focuses, wherever possible, on demand management activities for two reasons: (1) demand management activities were not emphasized as much as supply management in both planning and implementation and (2) apart from their congestion-reduction purposes, demand management activities have greater implications for air quality improvement than supply management ones.<sup>4</sup> (See appendix II.)

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## Background

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### Metropolitan Planning Organizations and TSM

To receive federal highway and mass transit funds, urban areas are required by the federal government to conduct local transportation planning. Although transportation planning normally occurs on a variety of governmental levels, federal regulations particularly target urban areas; in effect, they mandate that any urban area with a population over 50,000 must have a designated MPO to conduct local transportation planning. These planning agencies are expected to facilitate intergovernmental coordination in transportation. Their staff are selected by the governor in cooperation with local jurisdictions, and they vary widely in structure and in the number of jurisdictions represented. Before 1975, many planning activities of the MPOs tended to have a long-range focus (20 years or more). In 1975, federal law required MPOs to incorporate TSM elements into short-range planning and to produce long-range regional plans for urban areas. (See appendix I, Federal Interest in TSM.)

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<sup>4</sup>Supply management and demand management strategies are described below.

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These TSM elements can be classified as either supply or demand management activities. Supply management TSM, intended to increase roadway supply, includes activities that improve roadway efficiency by minimizing obstacles to free flow; for example, through coordinated traffic signals or through a highway surveillance system.<sup>5</sup> Demand management TSM, intended to reduce roadway demand, consists of strategies to decrease vehicle travel on roadways; for example, through ridesharing or parking management programs.<sup>6</sup> On the supply management side, evaluations of traffic signal coordination systems show positive cost-benefit outcomes from their implementation. On the demand management side, recent evaluations suggest that techniques such as ridesharing and vanpooling have significant effects on congestion reduction where they are implemented.

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## Clean Air Legislation and TSM

The 1977 Clean Air Act Amendments required states and local governments to revise state air quality implementation plans for all areas in which national air quality standards were not attained. If these plans were not revised, EPA was expected to request sanctions that entailed the withholding of federal-aid highway funds for those states. As urban transportation planning agencies, MPOs were made responsible for preparing the transportation portions of these plans. Consequently, the 1977 amendments increased the planning responsibilities of MPOs. Additionally, MPOs were expected to play a role in developing demand management TSM activities, which were to be given implementation priority over road construction projects when areas continued to have air quality problems.

However, it was EPA's practice to restrict sanctions to inspection and maintenance programs and to apply these only infrequently. Since MPOs were not formally required to plan demand management or related activities for clean air purposes in the 1977 amendments, MPO planning of these activities occurred in some regions and not in others. During the 1980s, concerns that federal air quality legislation had been less than fully effective in reducing air pollution led some states to take action on their

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<sup>5</sup>The supply management activities included in this study were traffic signal improvement systems, re-striping and widening without major construction, incident management and motorist aid programs, and real-time highway surveillance and control systems.

<sup>6</sup>The demand management activities included in this study were ridesharing programs, park-and-ride lots, designation of high-occupancy-vehicle (HOV) lanes, ramp meters or toll bypass lanes, transit or truck incentive programs, auto-use restrictions, parking management programs, trip reduction ordinances, peak period fees and congestion pricing, promotion of alternative work weeks, flexitime, provisions to reduce nonwork trips, telecommuting, and transportation management associations.

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own. In 1988, California passed its own clean air legislation, which required MPOs in the state to develop plans by which local emission standards could be met. Under the law, California MPOs must develop demand management measures to reduce auto emissions, including measures that lower vehicle miles traveled. These planning agencies now face stricter air quality planning regulations than MPOs in other parts of the country, which are subject only to federal regulations.

In 1990, the Congress passed new clean air legislation, which not only expanded the air quality planning responsibilities of MPOs but also required the implementation of demand management or related activities for clean air purposes.<sup>7</sup> It also set specific goals for reducing air pollution from mobile sources. The 1990 Clean Air Act Amendments exempted TSM activities from any federal transportation funding sanctions that EPA might recommend for areas failing to meet air quality standards. In doing so, the Congress indicated its belief in the importance of these activities for improving air quality.

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### The Intermodal Surface Transportation Efficiency Act of 1991 and TSM

The recently passed surface transportation legislation included several provisions designed to strengthen the MPO planning process. The legislation increased the control MPOs will have over what occurs between planning transportation projects and programming federal-aid funds for them. Provisions in this act also enhanced the role of TSM in the MPO planning process by (1) clearly identifying TSM as an important consideration in the regional transportation planning process, (2) mandating that MPOs in population areas of more than 200,000 develop congestion management systems for their regions, (3) requiring states to develop traffic management systems for all areas within their borders, (4) establishing a congestion mitigation and air quality funding program (section 1008) with a \$6 billion authorization to support projects that achieve both of these goals, and (5) assigning considerable programming authority for federal-aid funding to MPOs in areas of more than 200,000. (See table 1 for selected historical events.)

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<sup>7</sup>In the legislative language, these are called "transportation control measures." For the sake of clarity in this report, we use the expression "demand management or related activities for clean air purposes" in lieu of transportation control measures.

**Table 1: Calendar of Key Events for TSM Planning by MPOs and for Joint Air Quality and Transportation Planning**

<b>Year</b>	<b>Event</b>
1962	Federal-Aid Highway Act mandates urban transportation planning process for highway projects and starts MPO process.
1964	Urban Mass Transportation Act provides first federal assistance for urban mass transit development.
1968	Federal-Aid Highway Act creates Traffic Operations Program to Improve Capacity and Safety (TOPICS) to foster traffic engineering techniques (supply management TSM).
1970	Clean Air Act Amendments create EPA; specify emissions standards; require national ambient air quality standards, state implementation plans, and transportation control plans; and focus on traffic congestion management. EPA to devise federal implementation plan when states fail to develop their own.
1973	Federal-Aid Highway Act authorizes separate funding available to MPOs for urban transportation planning.
1974	The Services and Methods Demonstration Program established by the Urban Mass Transportation Administration (UMTA) promotes innovative TSM, including demand management.
1975	Regulations issued jointly by UMTA and the Federal Highway Administration (FHWA) require local transportation planning by MPOs, short-range Transportation Improvement Program, and TSM planning by MPOs.
1977	Clean Air Act Amendments require revised state implementation plans by 1982 for areas with poor air quality, encourage MPOs to develop transportation portion of state implementation plans, and authorize EPA to recommend the withholding of funds by DOT for areas having no plans. Sanctions restricted by EPA to inspection and maintenance programs only and applied to a few locations.
1981	DOT issues regulations requiring that all transportation plans and projects conform to state implementation plans.
1983	DOT issues regulations that no longer require MPOs to include a formal TSM element in their Transportation Improvement Program.
1990	Clean Air Act Amendments increase the role of MPOs in the joint air quality and transportation planning process, set specific pollution reduction targets, and exempt TSM activities from any funding sanctions imposed on federal-aid funds.
1991	The Intermodal Surface Transportation Efficiency Act strengthens programming authority of MPOs, requires development of a congestion management system for population areas of more than 200,000, and creates a funding program for congestion mitigation and air quality improvement.

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## Results in Brief

Most MPOs included TSM activities in their plans, generally placing greater emphasis on supply than on demand management TSM activities. Ninety-six percent of all MPOs planned at least some TSM activities for their regions. Forty-nine percent emphasized supply management activities, but only 17 percent emphasized demand management ones. When MPOs did plan demand management activities, the greatest emphasis on almost every type of activity came from MPOs in areas with a population of 1 million or more. Ridesharing programs received greater planning emphasis than any other demand management activity from MPOs in areas of 125,000 or more.

Planning alone failed to ensure the implementation of demand management activities, according to our survey respondents. Almost every type of demand management activity received higher emphasis in planning than in implementation except in areas with a population less than 125,000. Of those who indicated that demand management activities were not used enough in their regions (79 percent of all MPOs), 71 percent listed the lack of available funding and 64 percent cited the low priority given to congestion reduction by local officials because of unwillingness to discourage single-occupancy ridership. According to MPOs in areas of 500,000 or more, other most important reasons were (1) a lack of consensus among implementors about using demand management activities and (2) the absence of a link between planning and funding. But for MPOs in areas of less than 500,000, the other most important reasons were (1) a lack of reliable information on demand management effectiveness and (2) an emphasis on demand management conflicting with an emphasis on seeking construction funding.

In the survey responses and site interviews, we found evidence of only limited integration of air quality and local transportation planning processes, even in many areas with poor air quality. Only 26 percent of all MPOs indicated that their short-term plans included at least some demand management or related activities for clean air purposes. According to survey respondents, a different agency had lead responsibility for almost every stage in the joint planning and implementation process. This means that the planning and implementation of demand management or related activities for clean air purposes requires the involvement of many agencies. Coordination problems, implementor perceptions of unpopularity with the public, scarcity of evaluation data, and general doubts about local relevance inhibited the implementation of demand management for congestion reduction and air quality improvement purposes.



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## Principal Findings

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### TSM Planning

Even though MPOs were not required after 1983 to include a formal TSM element in their short-range plans, 96 percent planned at least some TSM activities. As already noted, supply management planning was emphasized much more than demand management planning. When MPOs did focus on demand management activities, they emphasized traditional strategies such as ridesharing (38 percent) more frequently than innovative techniques such as trip reduction ordinances (6 percent). Every type of demand management activity received greater planning emphasis from MPO survey respondents in areas of 1 million or more than in smaller areas. However, ridesharing, park-and-ride lots, HOV lanes, and transit incentives (all traditional demand management) were the only demand management activities that more than half of the MPO survey respondents in these largest population areas emphasized. Except in areas of less than 125,000, MPOs emphasized ridesharing activities more than other demand management activities. Less than 34 percent of MPOs in areas of less than 1 million emphasized any demand management activities, according to the survey. (See appendix III, TSM Planning.)

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### TSM Implementation

Planning alone failed to guarantee the implementation of demand management activities. Only 13 percent of all MPOs reported in the survey at least moderate implementation emphasis on demand management activities in their regions, whereas 54 percent indicated the same level of implementation emphasis on supply management ones. Some implementors we interviewed reported that demand management activities are difficult to market "politically" because they require changing commuter behavior, whereas supply management projects focus mostly on engineering changes. Demand management activities received consistently less emphasis in implementation than in planning. Survey respondents in areas of 1 million or more reported a lower emphasis on implementing than on planning almost every type of demand management, even though more MPOs in these areas (74 percent) than in smaller areas (only 19 percent) reported at least some implementation of demand management activities. (See appendix III, TSM Implementation.)

In the survey, 79 percent of MPOs indicated that demand management activities were not utilized enough in their regions; of these, 71 percent mentioned the lack of available funding for demand management activities

as an important reason why they were not used enough in their regions.<sup>8</sup> Sixty-four percent cited as another important reason for low usage the low priority local officials gave to congestion reduction because they were unwilling to discourage single-occupancy ridership. (See appendix III, TSM Implementation.)

Beyond these, however, MPOs differed by population size in what they considered as other important reasons for underuse. Seventy-three percent of MPOs in areas of 500,000 or more reported a lack of consensus among implementors for demand management activities, and 72 percent cited the absence of a planning and funding link as important reasons for inadequate use. In contrast, less than 50 percent of MPOs in areas of less than 500,000 considered these reasons to be important. Fifty-six percent of MPOs in areas of less than 500,000 reported a lack of reliable information about demand management effectiveness, and 53 percent cited a demand management emphasis in conflict with an emphasis on seeking construction funding as other important reasons for insufficient use. In contrast, 61 percent of MPOs in areas of 500,000 or more mentioned the absence of reliable information about effectiveness, and 54 percent reported the conflict with a construction funding emphasis. (See appendix III, TSM Implementation.)

## Integration of Air Quality and Transportation Planning

Seventy percent of all MPOs reported in the survey that air quality concerns were not integrated into the transportation planning process. Only 15 percent of MPOs in areas with severe or serious ozone pollution indicated that air quality concerns played a major or critical role in transportation planning and implementation decisions. However, 67 percent of MPO survey respondents in areas of 1 million or more reported that at least some demand management activities were being planned to improve air quality.<sup>9</sup> Sixty-one percent of all MPOs viewed their own agency as being in the lead role for integrating air quality concerns into transportation planning. However, the survey results indicated that for almost each individual stage of the joint planning and implementation process, a

<sup>8</sup>“Not utilized enough” in this context was self-defined by each survey respondent. (See question 34 in appendix IV.) Our previous reports, *Traffic Congestion: Federal Efforts to Improve Mobility*, GAO/PEMD-90-2 (December 1990) and *Traffic Management: Federal Policies to Encourage Low-Cost Approaches Need to Be Strengthened*, GAO/PEMD-91-26BR (August 1991), present analyses of federal-aid funding of both supply and demand management TSM. The funding program flexibility established under the new surface transportation legislation may well provide a vehicle for overcoming funding obstacles for TSM activities.

<sup>9</sup>Eighty percent (32) of the areas with a population of 1 million or more failed to meet national air quality standards for ozone. Seventy-five percent (18) of the areas between 500,000 and 999,999 included in our survey also did not meet those standards.

different agency was likely to have the lead responsibility. (See appendix III, Integration of Air Quality and Transportation Planning.)

## Obstacles to Adequate TSM for Congestion and Air Pollution Reduction

Both the 1990 Clean Air Act Amendments and the Intermodal Surface Transportation Efficiency Act of 1991 addressed the importance of traffic congestion reduction and air quality improvement, and both incorporated demand management activities as important tools for achieving these goals. However, we found a number of common obstacles that inhibit demand management planning and implementation, whether for congestion reduction or air quality improvement purposes.

## Coordination Problems

The planning and implementation of TSM activities generally require that MPOs coordinate a wide variety of organizations, agencies, or jurisdictions with an interest in TSM activities. In our site visits, we learned that in the San Francisco area, for example, there are 14 public transit operators and 97 private ones to coordinate in many regional demand management projects. As one implementor observed, while MPOs are responsible for coordinating many agencies, they have had no corresponding authority to require that the long-range transportation plan and the short-range Transportation Improvement Program have a broad, regional orientation. In his view, demand management solutions tend to be regionally oriented, since congestion rarely ends at a jurisdictional line.<sup>10</sup> According to another implementor, what is generally perceived to benefit a whole region may not necessarily be perceived by individual local officials as helpful for their jurisdictions. (See appendixes III, Obstacles to Adequate TSM for Congestion and Air Pollution Reduction, and V, Experience With TSM Planning by MPOs and Implementor Views on Local MPO Promotion of Demand Management.)

An even greater number of agencies have to be coordinated by MPOs for demand management or related activities that are targeted for clean air purposes, since local and state air quality agencies have to be included as well. Diffusion of lead responsibility to several different agencies in the joint air quality and transportation planning process increases MPO coordination burdens. For example, we learned in our visit to Tampa that the air quality shed covers an area under the jurisdiction of at least three

<sup>10</sup>The Intermodal Surface Transportation Efficiency Act permits the governor and the MPO to determine the boundaries of a metropolitan area, but specifies that this area includes, at a minimum, the existing urbanized area and the surrounding areas that are expected to become urbanized in the 20-year forecast. In some cases, this covers one entire metropolitan area; in others, it does not. The boundaries must also include any areas that fail to meet national air quality standards for ozone and carbon monoxide.

MPOs, an equal number of county air quality agencies, and a regional council of governments, as well as state transportation and air quality agencies, all of which must be involved in planning any demand management or related activities for clean air purposes. (See appendix III, Obstacles.)

### Perceptions of Unpopularity and Private Sector Disinterest

Some implementors perceived that many demand management activities are not favored by the general public. In our site visits, state implementors noted that demand management activities were difficult to market politically in their states. For example, one state transportation department promoted flexitime to reduce congestion, but the state government itself had not yet adopted it. Elected officials are reluctant, according to demand management advocates whom we interviewed in our site visits, to impose tolls to reduce traffic (congestion pricing), raise gas taxes, and reduce parking (parking management) for fear of voter reaction. Even implementors who have promoted demand management use expressed concerns about obtaining public approval for individual demand management activities. (See appendixes III, Obstacles, and V, Experience With TSM Planning.)

In our site visits, implementors also indicated that demand management projects have had to compete with more expensive capital projects when funding decisions were made, even though demand management projects cost much less. According to these implementors, highway and mass transit projects have had greater visibility and popularity with the public. In their view, unlike higher cost freeway and mass transit development, low-cost demand management has had neither a natural constituency of its own nor vested interests. For example, one state transportation department that has implemented a number of demand management activities indicated that most of that state's private sector transportation community—contractors, businesses, trucking firms, and highway consultants—had shown little interest in demand management activities. An orientation toward construction projects still remains the dominant trend in the transportation field, according to implementors. (See appendixes III, Obstacles, and V, Experience With TSM Planning.)

### Scarcity of Evaluation Data

Only 11 percent of all MPOs stated in the survey that they conducted frequent or routine evaluation of TSM projects. Twenty-three percent of all MPOs in areas of 500,000 or more (the areas most likely to have severe or serious traffic congestion) indicated that there was no lead agency for evaluation in their regions. Even when MPOs identified a lead agency for TSM evaluation in the survey, there was considerably less consensus than

## Doubts About the Local Relevance of Demand Management

on TSM forecasting, planning, prioritizing, coordinating, programming, funding, and implementation. Less than 41 percent of all MPOs agreed that any particular agency routinely had lead responsibility for monitoring and evaluating TSM efforts. (See appendix III, Obstacles.)

The unavailability or insufficiency of evaluation evidence may reflect concerns about the effectiveness of demand management activities or their relevance to local problems. In our site visits, some implementors (and planners, too) did not regard demand management activities as the solution to congestion problems in their regions. For example, one state implementor we interviewed commented that demand management activities address only the symptoms of congestion problems. Another state's implementors indicated that demand management activities would be ineffective in their largest city because there is no defined central business district and a wide availability of free parking spaces. As for planners, some have questioned the relevance of demand management for resolving their local congestion problems. For example, the San Francisco MPO has in the past asserted that demand management activities can play only a minor role in reducing congestion for that region compared with building roads and mass transit because the cost of driving remains low. (See appendixes III, Obstacles, and V, Experience With TSM Planning and Implementor Views on Local Promotion.)

Our site visits also suggested that implementors have established little connection between demand management activities and air quality improvement. The implementors we interviewed in Minneapolis and Tampa indicated that local air pollution was not severe enough for air quality concerns to play an important role in whether or not demand management activities were implemented.<sup>11</sup> Even when TSM activities were being planned and implemented, 47 percent of MPOs stated in the survey that implementors gave at best only informal consideration to whether or not the activity to be implemented would also reduce air pollution. Forty-two percent reported that no consideration at all had been given. (See appendixes III, Obstacles, and V, Joint Air Quality and Transportation Planning.)

## Conclusions

From our survey and site visit findings, we conclude that demand management activities, particularly innovative ones, have been given relatively little emphasis in both local transportation planning and

<sup>11</sup>In the San Francisco area, demand management or related activities for clean air purposes have been mandated by statute and court action.

implementation, but particularly in implementation. We also conclude that until the 1990 clean air legislation was passed, there was little joint air quality and transportation planning, except in a number of very large metropolitan areas. Additionally, we conclude that:

1. coordinating various interest groups for demand management activities poses particular problems that do not appear to be present in highway and transit planning and implementation;
2. implementors, especially in larger, more congested regions, perceive that demand management activities do not have the support of the general public or local elected officials;
3. local evaluation of demand management activities is not taking place routinely, and evaluation data on specific demand management activities are not available, difficult to gather, or insufficient to convince implementors; and
4. demand management activities are not viewed by implementors as locally relevant solutions for their traffic congestion problems, and air quality concerns have not been linked to transportation planning in such a way that they influence the implementation of demand management activities.

The 1990 Clean Air Act Amendments and the 1991 Intermodal Surface Transportation Efficiency Act both contain several provisions that may help to mitigate these obstacles. The new clean air legislation strengthens the links between TSM congestion reduction and air quality improvement decisions by mandating implementation of demand management or related activities for clean air purposes in areas that fail to meet national air quality standards. For example, long-range transportation plans and short-range transportation improvement programs cannot be approved now unless they include some form of these activities. Additionally, this new legislation provides for sanctions if demand management and related projects are not implemented in areas failing to meet national air quality standards. This contrasts with the situation before 1990 in which highway funds could be lost only if air quality plans were not developed or were inadequate.

Furthermore, under the Intermodal Surface Transportation Efficiency Act, states and MPOs must now explicitly consider, in preparing long- and short-range plans, 15 factors, two of which address the more efficient use

of existing transportation facilities, the need to alleviate present congestion and to prevent future congestion in currently noncongested areas. Moreover, this legislation provides MPOs with greater control over local projects funded with federal aid. In particular, MPOs in population areas with more than 200,000 can now select projects for implementation in consultation with the state (excluding projects on the National Highway System or the bridge or interstate maintenance programs), whereas previously, the states selected all highway projects (in consultation with the MPO).

The combination of increased funding for traffic congestion management, an increased voice in project selection for MPOs, and greater flexibility in the use of federal highway funds offers significant promise that TSM planning will receive greater emphasis and, more importantly, that planned activities will be implemented. Nevertheless, to ensure more efficient use of existing transportation facilities through TSM planning and implementation, the obstacles we identified in this report must be overcome.

## Recommendations

The new surface transportation legislation identifies the need to reduce traffic congestion and air pollution as important considerations and gives demand management activities a prominent role in doing so. To illustrate this role, we recommend that the Secretary of Transportation report to the Congress during fiscal year 1995, midway during the reauthorization period, about the extent to which any policies, regulations, practices, and programs the Department may institute in response to the 1991 act are functioning to effectively overcome these obstacles. Such an evaluation could be provided either separately or as a section of the annual report on the congestion management system, which the new legislation requires DOT to submit. The Department should

- address, specifically, the funding expended and the projects begun for congestion mitigation and air quality improvement as required under section 1008 of the Intermodal Surface Transportation Efficiency Act, and
- demonstrate how both funding and project decisions relevant to section 1008 have served to improve regional coordination of TSM—and particularly demand management—activities and to encourage public and private sector support for and involvement in these efforts.

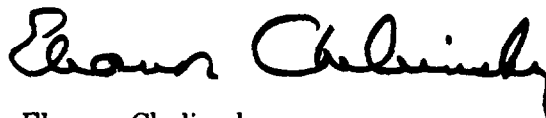
Additionally, federal policy and practices need to foster local planning and implementation of these activities. In our August 1991 report, we noted

DOT's current efforts to provide information about demand management activities. Yet questions about their effectiveness in reducing congestion and improving air quality remain among some planners and implementors across the country, particularly in fast-growing, smaller metropolitan areas. In view of this, we recommend that the Secretary of Transportation act to provide information about demand management activities by (1) promoting routine evaluations of these activities on the local level; (2) furnishing documentation—as it becomes available—of how relevant these activities, particularly innovative ones, are to local congestion and air pollution problems; and (3) disseminating widely the existing evaluations of the effectiveness of demand management activities.

## Agency Comments

We received oral, informal comments on this report from officials at the Department of Transportation. Where appropriate, we have incorporated their suggestions into the report.

As we agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 30 days from its date of issue. We will then send copies to the Secretary of Transportation and to others who are interested. If you have any questions or would like additional information, please call me at (202) 275-1854 or Kwai-Cheung Chan, Director of Program Evaluation in Physical Systems Areas, at (202) 275-3902. Other major contributors to this report are listed in appendix VI.



Eleanor Chelimsky  
Assistant Comptroller General



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**Abbreviations**

DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GAO	General Accounting Office
HOV	High occupancy vehicle
MPO	Metropolitan planning organization
MSA	Metropolitan statistical area
TIP	Transportation Improvement Program
TOPICS	Traffic Operations Program to Improve Capacity and Safety
TSM	Transportation systems management
UMTA	Urban Mass Transit Administration

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# Background

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America's system of highways and streets is a key component in the nation's economic infrastructure. However, in recent years, roadway travel has increased, creating high levels of traffic congestion in metropolitan areas. This congestion leads to reduced personal mobility, lower job productivity, increased air pollution, and wasted fuel consumption. In previous reports, we have addressed the problems of traffic congestion and examined ways of improving mobility.<sup>1</sup> In a period of limited federal expenditures on the transportation infrastructure, new attention is being given to low-cost ways to improve mobility and contribute to the nation's air quality and energy needs. These low-cost improvements have been called transportation systems management (TSM).

TSM encompasses a variety of low-cost techniques and strategies that improve the efficiency of the surface transportation system by reducing congestion, particularly in urban areas. The two types of TSM, supply management and demand management, utilize different strategies to reduce traffic congestion. Supply management entails low-cost strategies, such as traffic signal coordination, for maximizing the capacity of roadways for traffic. Demand management techniques, such as ridesharing programs, focus on reducing travel demand or lowering the number of vehicle trips.

The application of TSM strategies began in congested metropolitan areas, since traffic congestion tends to be more pronounced there. In 1975, federal regulation mandated that metropolitan planning organizations (MPOs) conduct urban transportation planning, and thus, MPOs were involved almost from their formal beginning in local planning of TSM activities. Federal efforts to incorporate air quality concerns into local transportation planning have a direct relationship to the TSM planning process, since certain TSM activities also function to improve air quality.

Below we summarize, from a legislative and regulatory perspective, federal involvement in local TSM planning through MPOs as well as federal efforts to integrate air quality concerns into the local transportation planning process over the last 30 years. We describe the history of legislation and regulations on MPOs, TSM programs, and federal efforts to incorporate air quality concerns into the local transportation planning process, with a special emphasis on the federal role in developing MPOs, federal interest in TSM, and finally, federal efforts to integrate air quality and transportation planning on a local level. (See also table 1 in the letter.)

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<sup>1</sup>Traffic Congestion: Trends, Measures, and Effects, GAO/PEMD-90-1 (December 1989), and Traffic Congestion: Federal Efforts to Improve Mobility, GAO/PEMD-90-2 (December 1989).

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## Federal Role in MPOs

The Federal-Aid Highway Act of 1962 was the first federal legislation to require urban transportation planning as a prerequisite for obtaining federal-aid highway funds in urban areas. The Federal Bureau of Public Roads mandated the creation of new agencies or the designation of existing organizations to carry out the required planning process because many urban areas did not have agencies qualified to undertake such a planning process. This marked the inception of the urban transportation planning process, which eventually led to the creation of MPOs.<sup>2</sup> The organizational variability of MPOs makes it difficult to generalize about how they work or about the exact organizational position of any individual MPO in a local system of transportation decision-making.<sup>3</sup>

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## MPO Coordination Role

From the very beginning, MPOs had a key responsibility to promote interagency coordination. In response to the 1968 Intergovernmental Cooperation Act, the Bureau of the Budget established a requirement that governors designate clearinghouses to review and comment on the compatibility of proposed federal-aid projects with overall transportation plans. As local clearinghouses, local transportation policy boards were given responsibility for coordinating this review with all agencies that had plans and programs that might be affected by these projects.<sup>4</sup>

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## Local Transportation Planning by MPOs

Separate federal-aid funding for urban transportation planning was made available to MPOs for the first time through the 1973 Federal-Aid Highway Act. From 1975 until 1983, each MPO, regardless of regional size, population, or traffic congestion level, needed to include a TSM element in its short-range plan before any federal-aid highway or mass transit funds for the area the MPO represented were released. Transportation planning in the late 1960s had focused mostly on broad time periods (20 years or more), and the original planning activities of MPOs had been directed more to long-range than to short-range planning. In 1975, the Federal Highway Administration (FHWA) and the Urban Mass Transportation Administration

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<sup>2</sup>Although the term "metropolitan planning organization" was not used until the early 1970s, local transportation policy boards established in response to the 1962 act conducted urban transportation planning. Many of these local boards were designated as MPOs in 1973.

<sup>3</sup>The Surface Transportation Assistance Act of 1978 stated that MPOs were to be designated by agreement among the general purpose units of local government in cooperation with the governor. In general, local elected officials served on the boards of most MPOs. In the 1980s, the governor and the local governments were authorized to determine the nature of the MPO without any federal prescription.

<sup>4</sup>These clearinghouses were originally called A-95 agencies (because the requirement was established in Bureau of the Budget Circular A-95). When MPOs formally came into existence, they became responsible for interagency coordination.

(UMTA) issued regulations providing for the joint designation of MPOS to conduct all local transportation planning, including transit planning. This planning process was required to produce not only a long-range plan but also a shorter range “transportation systems management element” for improving the operation of the existing transportation network without creating new roadways.

As part of this effort, a Transportation Improvement Program (TIP) containing all highway and transit projects to be implemented with federal funds for a 5-year period was to be developed for each urban area. This short-term plan was required to contain an “annual element” to serve as the basis for federal funding decisions for that year. Thus, the regulations helped shift the focus from long-range planning to shorter range TSM.

## Federal Interest in TSM

The Federal-Aid Highway Act of 1968 established the Traffic Operations Program to Improve Capacity and Safety (TOPICS). Continuing a long effort by the Bureau of Public Roads to broaden use of traffic engineering techniques, this TSM program was designed to reduce traffic congestion in urban areas. By 1969, 150 cities had become involved in the program and another 96 had opened preliminary consideration of TOPICS projects. Many of the projects under TOPICS were types of supply management TSM.<sup>6</sup>

The federal government also assumed a direct role (beyond mandating local TSM planning) in promoting travel demand management activities during the 1970s. The Emergency Highway Energy Conservation Act of 1974 permitted the use of federal-aid highway funds for ridesharing demonstration projects. In 1974, UMTA established the Services and Methods Demonstrations Program to promote the development, demonstration, evaluation, and widespread adoption of innovative TSM techniques, such as the National Ridesharing Demonstration Program. This program was to foster the use of transit services around the country. By 1978, 59 ongoing demonstrations, 31 special case study projects, and 17 National Ridesharing Demonstration Program projects were underway. According to a senior UMTA official, there was a shift by UMTA during the 1980s away from the research approach in the Services and Methods Demonstration Program toward more involvement with policy and program implementation.

<sup>6</sup>The Federal-Aid Highway Act of 1973 ended separate funding for TOPICS, merging the program into the federal-aid urban system established in 1970. Federal-aid funding was available and was used for TSM activities in the following years. For further information, see Traffic Management: Federal Policies to Encourage Low-Cost Approaches Need to Be Strengthened, GAO/PEMD-91-26BR, pp. 13-20.

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## Changes in TSM Planning Requirements

The 1975 planning regulations remained the key federal guidance on TSM planning until the early 1980s, when changes were introduced to reduce the overall federal role in urban transportation planning. In 1983, DOT issued new regulations that, while retaining requirements for a long-range transportation plan and for a shorter range TIP with an annual or biennial element, dropped the requirement to specify a TSM element in short-range plans.<sup>6</sup> Federal guidance afterward “encouraged” the inclusion of TSM activities but no longer mandated the formal TSM element in the TIP.

Additionally, after a period of extensive federal interest in TSM planning by MPOs, federal authorities gave state and local governments increased flexibility in determining what role TSM played in the local planning efforts of MPOs. Under new regulations, states and local governments were allowed greater discretion for determining the actual process of urban transportation planning. Thus, MPOs became more dependent on the state transportation planning process, especially since, with reduced federal planning funds overall, they became more reliant on state, local, and private funding.<sup>7</sup>

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## The Intermodal Surface Transportation Efficiency Act of 1991

The reauthorization of the surface transportation act in 1991 included a number of provisions designed to strengthen the local transportation planning process and the part that TSM activities play in that process. In general, the new legislation provided MPOs with greater control over the programming of transportation projects with federal-aid funding. The new law strengthened links between planning and implementation by increasing the programming authority of MPOs on noninterstate roads. Additionally, the act highlighted the need to make the existing transportation system function more efficiently. The legislation required MPOs in urban areas of more than 200,000 to develop a congestion management system for their regions and mandated that the congestion management plan for that system include a financial analysis that shows how congestion mitigation projects would be funded. The reauthorization also created a separate congestion mitigation and clean air funding

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<sup>6</sup>Since the 1983 change in regulations regarding a TSM element in short-range planning, a number of MPOs no longer viewed the planning and identification of specific TSM activities as a federal requirement.

<sup>7</sup>This refers not just to transportation planning funds but also to the termination of the section 701 comprehensive planning program of the U.S. Department of Housing and Urban Development. Although 0.5 percent of total federal-aid system funds goes for planning, much of the additional funds authorized by the Congress were absorbed during the 1980s by the 70 new MPOs created after the 1980 census.



program to ensure that congestion reduction projects are actually implemented.

## Federal Efforts to Integrate Air Quality and Transportation Planning

Federal concerns about the effect of transportation decisions on the environment led to increasing federal interest in integrating the two planning processes. The National Environmental Policy Act of 1969 set the stage for more federal involvement in local transportation decisions by requiring an environmental impact statement for all legislation and federal actions that affected the environment in any major way. The Environmental Quality Improvement Act and Clean Air Act Amendments, both enacted in 1970, shifted decision-making on environmental impact away from states and local governments to the federal government, thereby creating a wholly new planning process for transportation projects.

The increasing involvement of EPA in transportation planning further augmented a shift in emphasis toward short-range transportation planning in urban areas. EPA issued the first national ambient air quality standards in 1971. The states were required to formulate state implementation plans describing how they would achieve and maintain these standards in areas failing to meet them. When an urban area failed to meet air quality standards, EPA required a transportation control plan, encompassing changes in urban transportation systems for auto emissions reduction. This entire planning process occurred outside the traditional transportation planning process and, in some cases, did not involve those agencies that were developing transportation plans. This made joint efforts difficult for urban areas that had not achieved what EPA considered sufficient mitigation of local air quality problems. Since deadlines for achieving attainment status tended to be relatively short term, a new emphasis had to be placed on short-range actions.

When a state failed to produce or enact its plan, a federal implementation plan devised by EPA was supposed to go into effect. However, the 1977 amendments considerably restricted the demand management measures that EPA could use in federal implementation plans. This legislation empowered the states to suspend any state or federal implementation plans that rationed gas, required older vehicle retrofits, or reduced on-street parking, as long as the states adopted revised plans to implement the overall legislative requirements.

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## The 1977 Clean Air Act Amendments

The 1977 Clean Air Act Amendments required state and local governments to develop revised state implementation plans for all urban areas in nonattainment status. These plans had to provide for attainment by 1982 or, if there were severe air quality problems in an area, by 1987. The amendments also encouraged MPOs to develop the transportation portions of the state implementation plan for their areas. In the process of developing these transportation portions, MPOs assumed responsibility for planning travel demand management or related activities for clean air purposes, although federal regulations never mandated that MPOs plan specific demand management measures for clean air.

Additionally, the amendments authorized EPA to recommend that any federal-aid funds for transportation be withheld from any area in which the local transportation plan or program failed to conform to the state implementation plan or in which there was no state implementation plan. In 1981, DOT issued regulations mandating that transportation plans, programs, and projects conform to approved state implementation plans in those areas that failed to meet national air quality standards. Funding priority in those areas was to be given to demand management or related activities for clean air purposes, with funding withheld for failure to conform.<sup>8</sup>

However, the transportation portions of state implementation plans were not updated in many regions after 1982. Additionally, some states failed to complete their state implementation plans for their nonattainment areas after 1982.<sup>9</sup> Nevertheless, EPA generally limited application of funding sanctions only to the failure of states to develop inspection and maintenance programs for vehicle emissions. By publishing sanction proposals for California and Colorado, EPA succeeded in getting those states to adopt inspection and maintenance programs, but EPA did not propose sanctions for other violations of the Clean Air Act Amendments.<sup>10</sup> Sanctions were imposed in only a few locations and affected just a small percentage of the planned transportation projects in those areas. The

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<sup>8</sup>From the perspective of a total region, all demand management activities function to improve air quality by reducing traffic congestion; however, demand management activities such as congestion pricing (backups at toll plazas where they exist) and auto-use restrictions (increased traffic on nonrestricted roads) can create individual sites of increased carbon monoxide pollution.

<sup>9</sup>Chicago, Denver, Los Angeles, and Phoenix are examples of areas for which no state implementation plans were revised.

<sup>10</sup>California passed its own Clean Air Act in 1988, requiring MPOs to develop plans to meet local emission standards. These MPOs must currently plan demand management measures to reduce auto emissions, including measures lowering vehicle miles traveled. With this legislation, California is now considered by some DOT officials to be far ahead of federal requirements in managing congestion for air quality purposes.

sanctions were designed to stop transportation project implementation until state and local governments developed state implementation plans and programs, but many projects were implemented despite the sanctions.

For example, according to one EPA official, sanctions on one metropolitan area were focused on only 10 percent of the transportation projects in the 3- to 5-year state implementation plan. After 2 years, every single project had been funded because the state had provided full funding on its own for the most controversial of these projects.

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## The 1990 Clean Air Act Amendments

The 1990 amendments to the Clean Air Act were designed to improve on the earlier legislation in achieving effective coordination between regional transportation and air quality improvement efforts. Transportation planning agencies, particularly MPOs, were given major responsibility for reducing vehicle use in order to decrease emissions from mobile sources. The 1990 legislation linked federal transportation funding to the adoption of regional transportation plans that must conform to specific targets in the state implementation plan, thereby broadening the local transportation planning process.

The amendments also greatly strengthened the authority of federal air quality regulators to request sanctions on the allocation of federal-aid transportation funds for both planning and implementation failures.<sup>11</sup> The Congress specifically exempted demand management and related projects from any EPA sanctions that would otherwise prevent the use of federal transportation funds in any area with poor air quality for which a state implementation plan was not prepared or was found to be inadequate. This means that, if sanctions are imposed on an area with poor air quality for the reasons mentioned above, federal transportation funds can be used in that area only for certain activities, almost all of which are the demand management activities described in this study.

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## Summary

Traffic congestion is a major problem affecting many areas around the country. Low-cost methods of addressing this problem include both supply and demand management TSM. Supply management aims to maximize capacity while demand management endeavors to reduce demand. Federal involvement in TSM began with the TOPICS projects, which focused on

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<sup>11</sup>In the past, highway funds could be lost only if air quality plans were not developed or were inadequate. The new clean air legislation provides for sanctions if demand management and related projects are not implemented in areas failing to meet national air quality standards.

supply management activities. A later interest in demand management arose with the Services and Methods Demonstration Program.

Prior federal interest in local urban transportation planning led to the formation of MPOs, which have responsibility for coordinating different transportation interests on the local level. Federal policy originally required that a TSM element be included in the short-range transportation plans of MPOs but later dropped that requirement. During the 1980s, MPOs lost some control over the local transportation planning process, including TSM. The Intermodal Surface Transportation Efficiency Act of 1991 strengthened the MPO planning process and gave important programming authority to MPOs in population areas of more than 200,000. The legislation also required a congestion management system for those areas, establishing a new program for congestion mitigation and air quality improvement.

Federal interest in clean air issues increased the role played by federal environmental officials in transportation planning by establishing a separate air quality planning process. The states were originally required to have an implementation plan in place by 1982, but EPA did not enforce this deadline. Responsibility for developing transportation sections of state plans was assumed by MPOs. Funding sanctions available to EPA were used only on a limited basis. The 1990 Clean Air Act Amendments, which increased the responsibility of MPOs, were designed to strengthen the relationship between transportation and air quality planning.

# Objectives, Scope, and Methodology

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## Objectives

This report examines the quality of federal efforts to encourage local transportation systems management (TSM) activities through the planning process and to promote incorporation of air quality concerns into the local urban transportation planning process. Our August 1991 report focused primarily on Department of Transportation (DOT) policies for funding TSM, federal technical assistance efforts for TSM, and innovative TSM efforts by local governments and the private sector. (See GAO/PEMD-91-26BR.) In this report, we assess the extent to which federal requirements for local transportation planning have affected TSM actions and the degree to which the federal goal of incorporating air quality concerns into the local transportation planning process has been accomplished.

We asked three questions in this study:

1. To what extent have metropolitan planning organizations (MPOs), as federally mandated local planning agencies, included TSM activities in their short-range transportation plans?
2. To what extent have locally planned TSM activities been implemented by state and local transportation decisionmakers?
3. To what extent has air quality planning been integrated into the local transportation planning process?

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## Scope

We addressed both the supply and demand management types of TSM, although wherever possible, we focused on demand management activities because of their prominent role in improving air quality. The supply management activities included in this study were

- traffic signal improvement systems,
- re-striping and widening without major construction,
- incident management and motorist aid programs, and
- real-time highway surveillance and control systems.

Demand management TSM activities included

- ridesharing programs;
- park-and-ride lots;
- the designation of high-occupancy-vehicle lanes, ramp meters, or toll bypass lanes;

- transit and truck incentive programs;<sup>1</sup>
- auto-use restrictions;
- parking management programs;
- trip reduction ordinances;
- peak period fees and congestion pricing;
- promotion of alternative work weeks, flexitime, provisions to reduce nonwork trips, and telecommuting; and
- transportation management associations.<sup>2</sup>

We did not include any analysis of public transit (other than in terms of transit incentives) in this study.

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## Methodology

To answer the three evaluation questions, we conducted a nationwide mail survey of MPOs, using a stratified random sample of these organizations. These federally mandated agencies have been involved in local TSM planning over the years and were assigned specific roles in joint air quality and transportation planning efforts by federal legislation.

Since individual MPOs can represent relatively small areas, such as a city of 50,000 and its immediate suburbs, or huge areas covering several metropolitan statistical areas (MSAs), we decided to use the Census Bureau's MSAs to establish our sampling frame. The boundaries of an MSA always encompass whole jurisdictions, while an "urbanized area" does not necessarily incorporate all portions of a jurisdiction.<sup>3</sup> (Some MPOs represent only urbanized areas, rather than an entire MSA.)

We used five strata, based on a range of MSA population sizes, for the survey. The first stratum included all MSAs with populations of more than 1 million; we used random samples of MSAs based on different ratios for the other strata. Once we had selected an individual MSA for a stratum, we included all MPOs within that area in the survey. In a few cases, one MPO represented more than one MSA and one MSA was represented by more than one MPO, which explains the slight variation in the corresponding numbers

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<sup>1</sup>This refers to incentives to have trucks travel through central business districts and certain major arterials during off-peak hours.

<sup>2</sup>The list of activities is not meant to be exhaustive, but it does represent almost all the TSM activities included in both the 1990 Clean Air Act Amendments and the 1991 Intermodal Surface Transportation Efficiency Act.

<sup>3</sup>An urbanized area is defined as a city of 50,000 or more (or twin cities meeting the same criterion) and surrounding, closely settled areas, including incorporated places and unincorporated territory.

of MSAs and MPOs. (See table II.1.) A total of 119 MPOs participated in the survey.

**Table II.1. MSA Sampling and MPO Survey Selection Plan<sup>a</sup>**

Population range	Selection ratio	Number of MSAs	Number of MPOs
1,000,000 and up	1:1	43	40
500,000-999,999	1:2	21	24
250,000-499,999	1:3	23	21
125,000-249,999	1:5	26	24
50,000-124,999	1:7	10	10
<b>Total</b>		<b>123</b>	<b>119</b>

<sup>a</sup>The population figures are estimates as of July 1, 1988, from Bureau of the Census, *Statistical Abstract of the United States—1990: The National Data Book*, 110th ed. (Washington, D.C.: Bureau of the Census, 1990).

The questionnaire in appendix IV was organized to provide information about the following:

1. demographics, including MPO organizational structure and arrangement, population growth, traffic congestion levels, staffing levels, and work time allotment;
2. TSM planning and implementation, including lead and supportive roles for various stages of TSM development, degrees of emphasis placed on specific types of TSM in planning and implementation, effects of federal policy on local TSM planning and implementation, TSM activities other than planning by MPOs, and some funding mechanisms for TSM;
3. demand management planning and implementation, including impediments to increased demand management actions;
4. air quality issues, including the level of incorporation into the transportation planning process and identification of agencies responsible for each stage of the air quality and transportation planning and implementation process; and
5. recommendations for an appropriate federal role in promoting TSM planning and implementation and in fostering the integration of air quality and transportation planning processes.

Every MPO in our sample returned our questionnaire. Survey participants also enclosed copies of their most recent short-range plans. We reviewed these for evidence of TSM planning.

This nationwide survey was supplemented by visits to Minneapolis, San Francisco, and Tampa. The purpose of these visits was to learn, through structured interviews, about problems in the TSM planning and implementation process from the perspective of implementors or potential implementors. We interviewed these implementors, including state and local government officials, private and public transportation providers, and TSM advocates, about their experiences with the TSM planning process of the local MPO, about the attractiveness or lack thereof of certain types of TSM, and about the links between air quality and transportation planning within their areas. We also met with MPO officials in these locations. Additionally, we reviewed planning documents, studies, annual reports, and other documentation related to demand management planning by the MPOs in these areas. Finally, we examined state and local documentation related to the programming and implementation of demand management activities.

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### **Strengths of Our Study**

Since this study was based primarily on a nationwide survey that included randomly sampled MPOs of all sizes, our results can be generalized across all MPOs. The survey questions were designed after extensive scoping and interviews with experts on the federal, state, and local levels. Content matter was reviewed by several transportation consultants and question structure was analyzed by a GAO survey research expert. While the results of the implementor interviews are more site-specific, they reflected the views of other transportation officials in at least some large metropolitan areas in various parts of the country.

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### **Study Limitations**

The questionnaire items involved self-reporting from planning agency officials. We compensated for the limitations of self-reports by requesting objective verification of their planning efforts in their latest short-range plans. Most of the respondents provided documentary evidence.

Additionally, we did not gather information from all metropolitan areas in the country on traffic congestion levels, on air quality levels, or on the level of emphasis given to TSM activities. Consequently, other metropolitan areas not included in our sample may be as congested (or uncongested) as those in the sample. Statements and conclusions about metropolitan areas



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**Appendix II**  
**Objectives, Scope, and Methodology**

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within the individual strata of different population sizes refer to the metropolitan areas of each size as a group, not necessarily to each metropolitan area individually. Ratings of congestion and of the degree of emphasis given to TSM activities represent the views of local transportation planning agencies only and may not be identical with the views of local and state transportation implementors in those regions.

# Analyses of Survey and Site Visit Results

The weighted results of our survey analyses in appendix IV do not reflect the full extent of our analysis. We examined certain responses for differences across metropolitan area size, traffic congestion level, and nonattainment status for ozone.<sup>1</sup> Here we highlight the results of some of these supplemental analyses. The strong interest of the Congress in greater transportation systems management and in improved air quality as expressed in the request letter from the Senate Committee on Environment and Public Works (and later in the 1991 Intermodal Surface Transportation Efficiency Act) established the direction for our analyses.

## Demographic Information

Sixty percent of all MPOs are housed in some type of regional agency, whether in a council of governments, an association, or a separate agency. Only about 23 percent are organized within a county or city planning department. Sixty-four percent of MPOs in areas of 125,000 or more were organized as or in a regional agency. Forty percent of MPOs in areas of 50,000-124,999 were housed in a county or city planning department, while another 40 percent were organized regionally.

Eighty percent of all MPOs reported no higher than moderate congestion in their areas. In metropolitan areas of 1 million or more, 55 percent of the MPOs rated local congestion as severe or serious. (See table III.1.)

**Table III.1: MPOs Reporting Severe or Serious Congestion**

MSA size	Reported congestion level <sup>a</sup>	
	Severe	Serious
1 million or more	Houston, Los Angeles, Newark, New York City	Atlanta, Boston, Chicago, Clearwater, <sup>b</sup> Dallas, Denver, Detroit, Fort Lauderdale, Hampton Roads, <sup>b</sup> Miami, Milwaukee, New Orleans, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington, D.C.
500,000-999,999	Baton Rouge	Honolulu, Las Vegas, Nashville, New Haven, Orlando
250,000-499,999	None	Evansville, Pensacola, Sarasota
125,000-249,999	Fort Walton Beach	Burlington, Vt., Nashua, New Britain, Vancouver

<sup>a</sup>Congestion levels refer only to MSAs in this study; other MSAs not included may be equally congested. No MPOs in MSAs of 50,000-124,999 reported severe or serious congestion levels.

<sup>b</sup>By itself, Clearwater is not a very large metropolitan area; however, the Tampa-Clearwater-St. Petersburg MSA of which it is a part contained over 1 million inhabitants in 1988. The same is true of Hampton Roads, which is part of the Newport News-Norfolk-Virginia Beach MSA.

<sup>1</sup>We used responses to certain questions in further analyses because of the importance of those questions. In the Demographics section, questions 3-7 were used; in the Principal Findings section, questions 7, 12, 14-16, 19-20, 22-27, 33-35, and 37-49.

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While the average population growth rate reported from 1980 to 1990 for all areas covered in the study was 17 percent, there were wide variations in average growth rate reported by metropolitan area size.<sup>2</sup> In areas of 1 million or more, MPOs reported a 14-percent average growth rate, while in areas of 500,000-999,999, the reported rate was 11 percent. In areas of 250,000-499,999, the average growth rate reported was the highest, 55 percent. Average growth rates reported were 28 percent in areas of 125,000-249,999 and 9 percent in areas of 50,000-124,999. Of the metropolitan areas included in the study, the only regions outside the South and the West with reported growth rates greater than 20 percent were sections of northern New England (Vermont and New Hampshire). We found only a very limited relationship between reported growth rate and traffic congestion levels in our analyses of areas of 125,000 or more, except for a moderate correlation (0.53) in metropolitan areas of 500,000-999,999.

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## Principal Analyses

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### TSM Planning

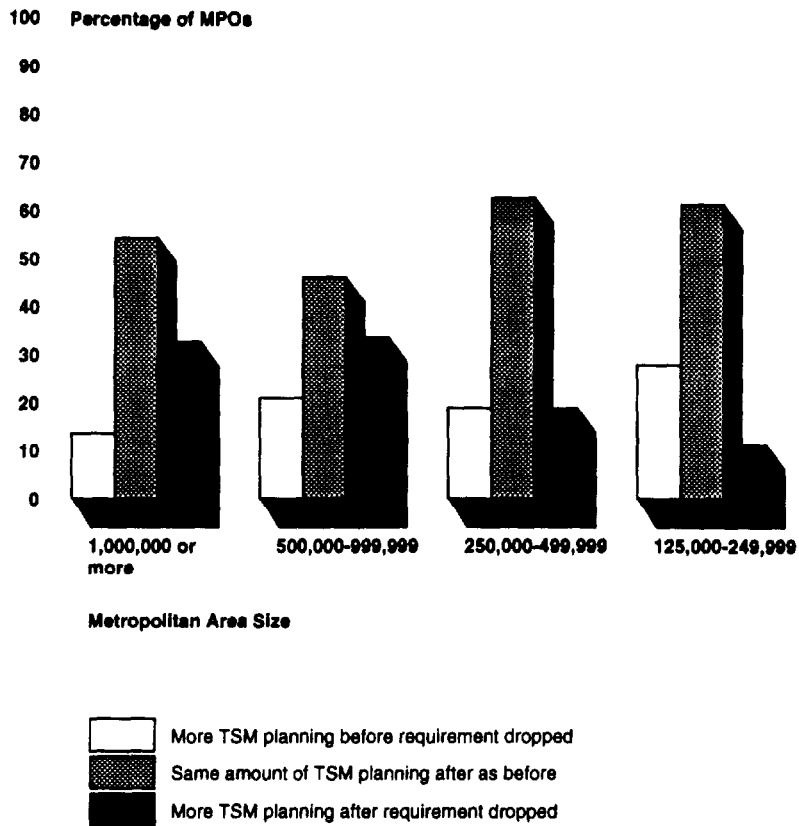
From survey responses and our document review, we found that 96 percent of all MPOs included some form of TSM activity or program in their recent short-term plans, even though MPOs are no longer required to include a formal TSM element. The level of TSM planning since the requirement for this element was dropped remained about the same as before, according to most MPOs.<sup>3</sup> (See figure III.1.) This finding suggests that the requirement change had little effect on the level of TSM planning in many areas of 500,000 or more, the areas most likely to be rated as having severe or serious congestion. We learned a number of other things about the TSM planning process of MPOs, as follows.

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<sup>2</sup>Growth rate was computed by subtracting the population in 1980 from the population in 1990 for each area and then dividing that result by the 1980 population figure. (See questions 4 and 5.)

<sup>3</sup>A number of MPOs in our survey specifically suggested that a requirement to plan TSM activities, similar to that which existed in the 1970s and early 1980s, be reinstated.

Figure III.1: Effects of TSM Planning Requirement Change<sup>a</sup>



<sup>a</sup>As reported by MPOs; based on survey question 19.

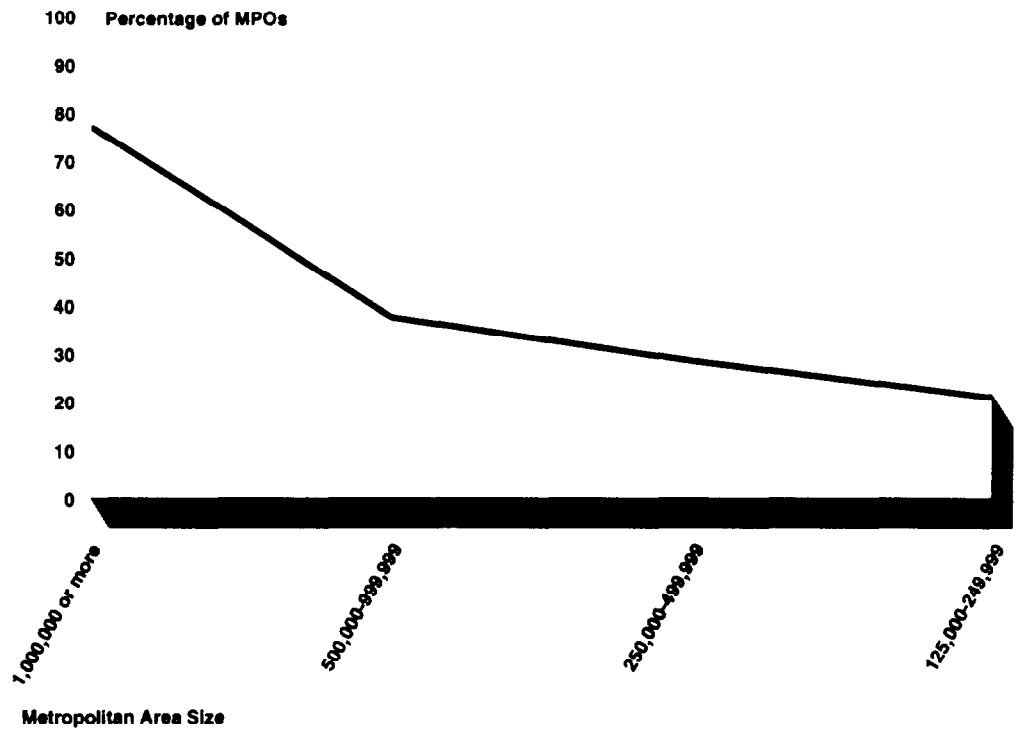
More than 57 percent of MPOs had lead responsibility for all stages of TSM planning, for prioritizing TSM projects, and for coordinating many interest groups for TSM. Half of MPOs in areas of 1 million or more included a TSM section or chapter in their short-range plan, while no more than a third of MPOs in smaller areas did so.

More MPOs (an average of 49 percent across the four types of supply management) emphasized supply rather than demand management activities (an average of 17 percent across the nine types of demand management). Although included in recent short-range plans, demand management activities played only a minor or incidental role in the general planning efforts of 74 percent of the MPOs. For instance, 87 percent of MPOs emphasized supply management techniques such as traffic signalization,

while only 38 percent emphasized demand management strategies such as ridesharing.

The percentage of MPOs emphasizing demand management planning decreased with area size. (See figure III.2.)

**Figure III.2: Inclusion of Several Demand Management Activities in Local Transportation Plans<sup>a</sup>**

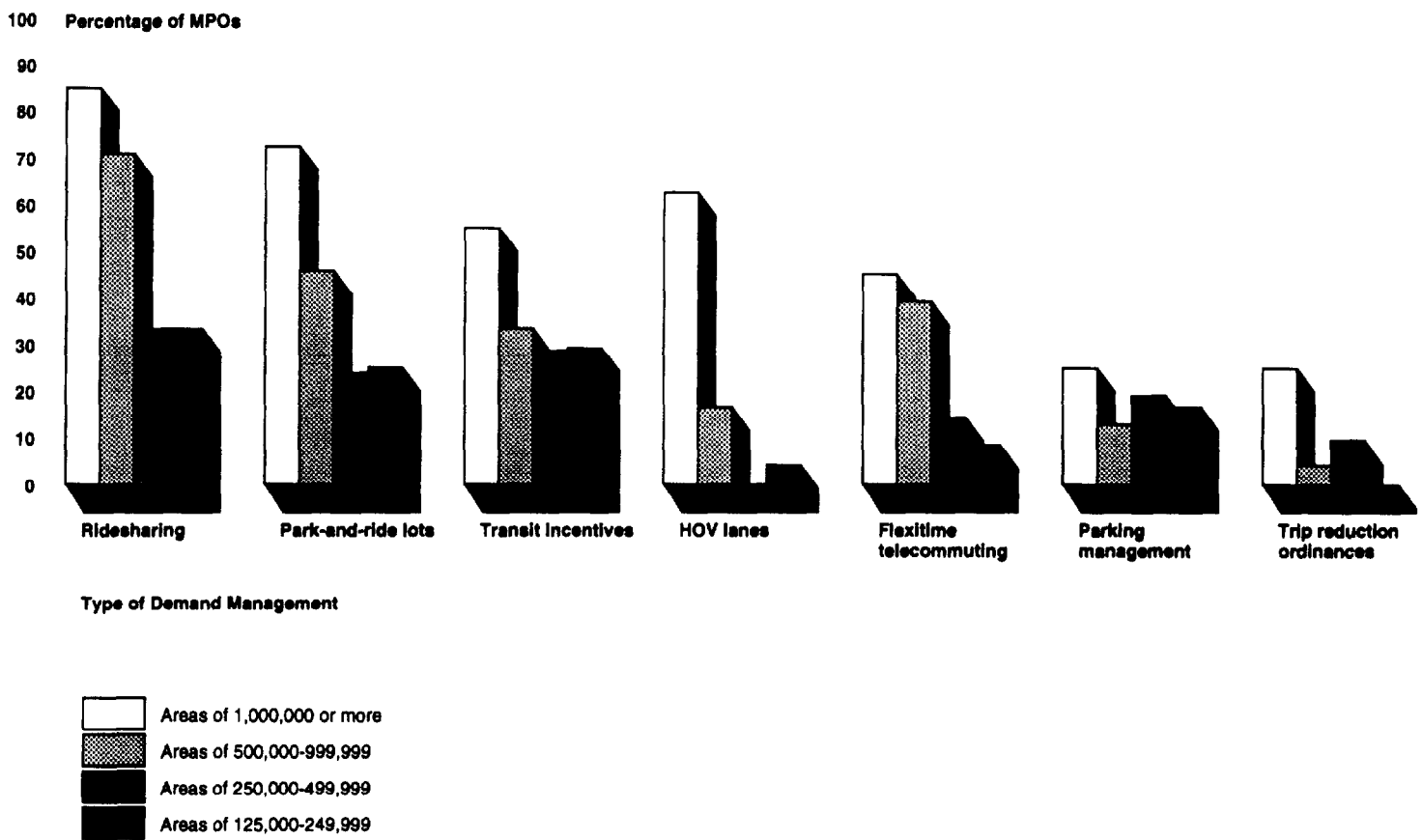


<sup>a</sup>As reported by MPOs; based on survey question 33.

When MPOs planned demand management activities, they were more likely to emphasize traditional approaches such as those associated with ridesharing (38 percent) and transit incentives (29 percent) than innovative strategies such as trip reduction ordinances (6 percent) and

auto-use restrictions (1 percent).<sup>4</sup> We found differences in planning emphasis between traditional and innovative demand management in metropolitan areas of every size. (See figure III.3.)

Figure III.3: Planning Emphasis Given to Individual Types of Demand Management<sup>a</sup>

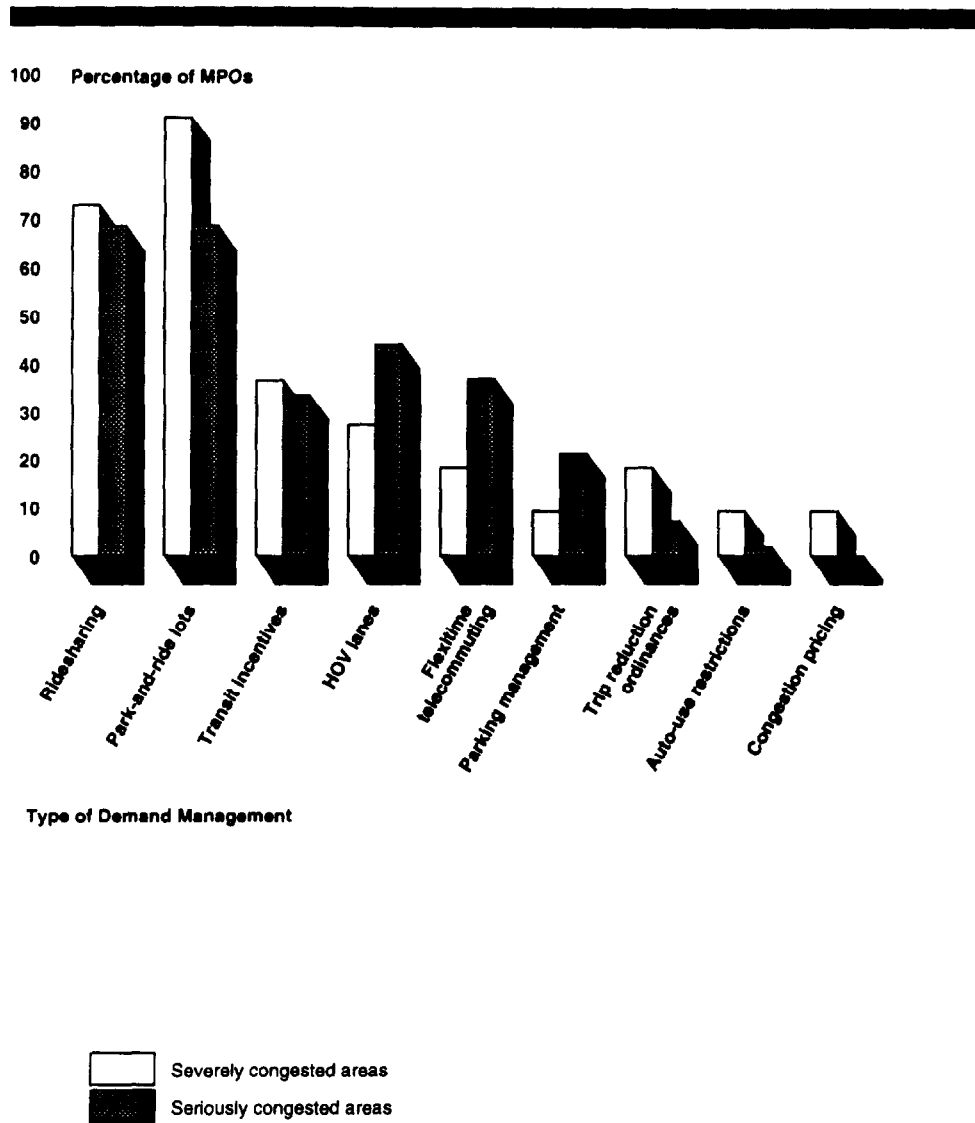


<sup>a</sup>MPOs reporting at least moderate planning emphasis. Auto-use restrictions and congestion pricing were not included because only a few MPOs, in areas of 1 million or more, placed at least moderate emphasis on them (7.5 percent for auto-use restrictions and 2.5 percent for congestion pricing). The first four clusters refer to traditional demand management as defined here; the rest were considered innovative strategies. This analysis was based on survey question 15.

<sup>4</sup>In this report, we defined traditional demand management activities as projects or programs associated with ridesharing, HOV lanes, park-and-ride lots, and transit incentives. All four of these activities were in place in 1980 and were reviewed in *Increasing Commuting by Transit and Ridesharing: Many Factors Should Be Considered*, GAO/CEID-81-13 (November 1980). The remaining demand management activities include flexitime and telecommuting, auto-use restrictions, parking management programs for congestion reduction, trip reduction ordinances, and congestion pricing and were termed innovative, based in part on *Traffic Management: Federal Policies to Encourage Low-Cost Approaches Need to Be Strengthened*, GAO/PEMD-91-26BR (August 1991).

The extent to which different types of demand management were planned varied by area size. MPOs in areas of 1 million or more were more likely to emphasize all types of demand management activities than those in smaller areas; ridesharing, park-and-ride lots, HOV lanes, and transit incentives (all traditional demand management) were the only activities that more than half of these MPOs emphasized. In addition to ridesharing, MPOs in population areas of 500,000-999,999 emphasized planning three innovative techniques—flexitime, parking management, and congestion pricing—almost as much as MPOs in larger areas but only ridesharing was emphasized by more than half of the MPOs in these areas. Less than 33 percent of MPOs in areas of less than 1 million emphasized any demand management activities. Higher congestion levels were not always associated with greater planning emphasis on each type of demand management activity. (See figure III.4.)

Figure III.4: Planning Emphasis Given to Demand Management in Severely or Seriously Congested Areas\*



\*MPOs reporting at least moderate emphasis. Some MPOs in moderately congested areas also emphasized all types of demand management except auto-use restrictions and congestion pricing. Some MPOs in mildly or minimally congested areas emphasized certain types of demand management as well. This analysis was based on survey questions 7 and 15.

## TSM Implementation

Planning by itself failed to ensure the implementation of demand management projects. Except for auto-use restrictions, transit incentives and congestion pricing, MPOs in areas of 125,000 or more consistently reported less emphasis on demand management implementation than on



planning. According to survey responses, implementors consistently emphasized demand management activities less than supply management projects. Only 13 percent of all MPOS, on the average, reported at least moderate implementation emphasis on demand management activities in their regions, whereas 54 percent indicated the same level of implementation emphasis on supply management ones.

Interviews we conducted with state transportation department implementors provided us with some information about why demand management was emphasized less than supply management. These implementors stated that supply management projects had enthusiastic support from their states' transportation community. One state has established a 5-year \$2 million program for supply management efforts, based on state funding. However, in their view, demand management activities have been difficult to market, partly because they involve changing commuter behavior (whereas supply management activities do not). They observed that if demand management activities cannot "sell" themselves within the states, they will not be effective.

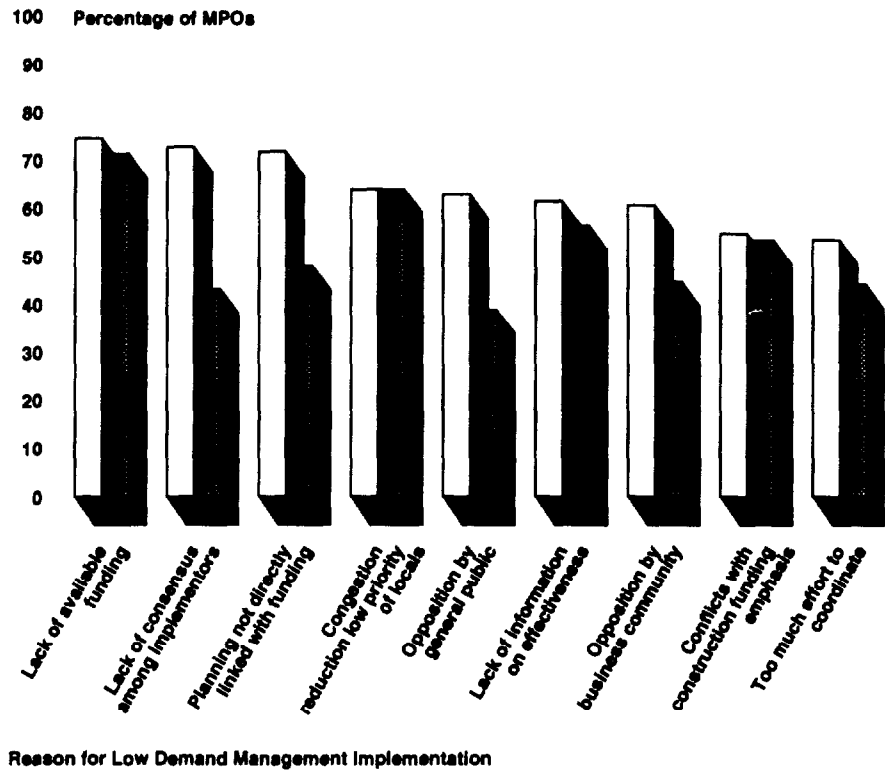
When asked about why more demand management activities were not being utilized in their areas, more than 75 percent of MPOS in areas with a population less than 1 million cited little need to reduce peak period traffic congestion as an important reason, paralleling our earlier finding that 80 percent of all MPOS reported moderate or lower congestion levels. Seventy-nine percent of all MPOS reported that in their opinion, there was insufficient use of demand management activities to reduce traffic congestion within their regions. Of those who reported insufficient demand management use, 71 percent considered lack of available funding for demand management activities as an important reason for low implementation; 64 percent cited as another important reason the low priority given to congestion reduction by local officials because of unwillingness to discourage single-occupancy ridership.



However, there were differences among MPOS in larger and smaller population areas about the importance of other reasons for low demand management usage. In population areas of 500,000 or more, 73 percent of MPOS reported lack of consensus among implementors for demand management and 72 percent cited the absence of a link between planning and funding decisions. In population areas with less than 500,000, 43 percent considered lack of consensus and 48 percent reported absence of a planning-funding link as important reasons for low usage. The reasons for low implementation given most often by MPOS in areas with less than

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500,000 (after available funding and low priority by local officials) were the unavailability of information on demand management effectiveness (56 percent) and an emphasis on demand management conflicting with an emphasis on construction funding (53 percent). In areas of 500,000 or more, 61 percent of MPOS considered lack of effectiveness information and 54 percent cited a construction funding emphasis as important reasons for low demand management usage. (See figure III.5.)

Figure III.5: Important Reasons for Low Demand Management Implementation\*

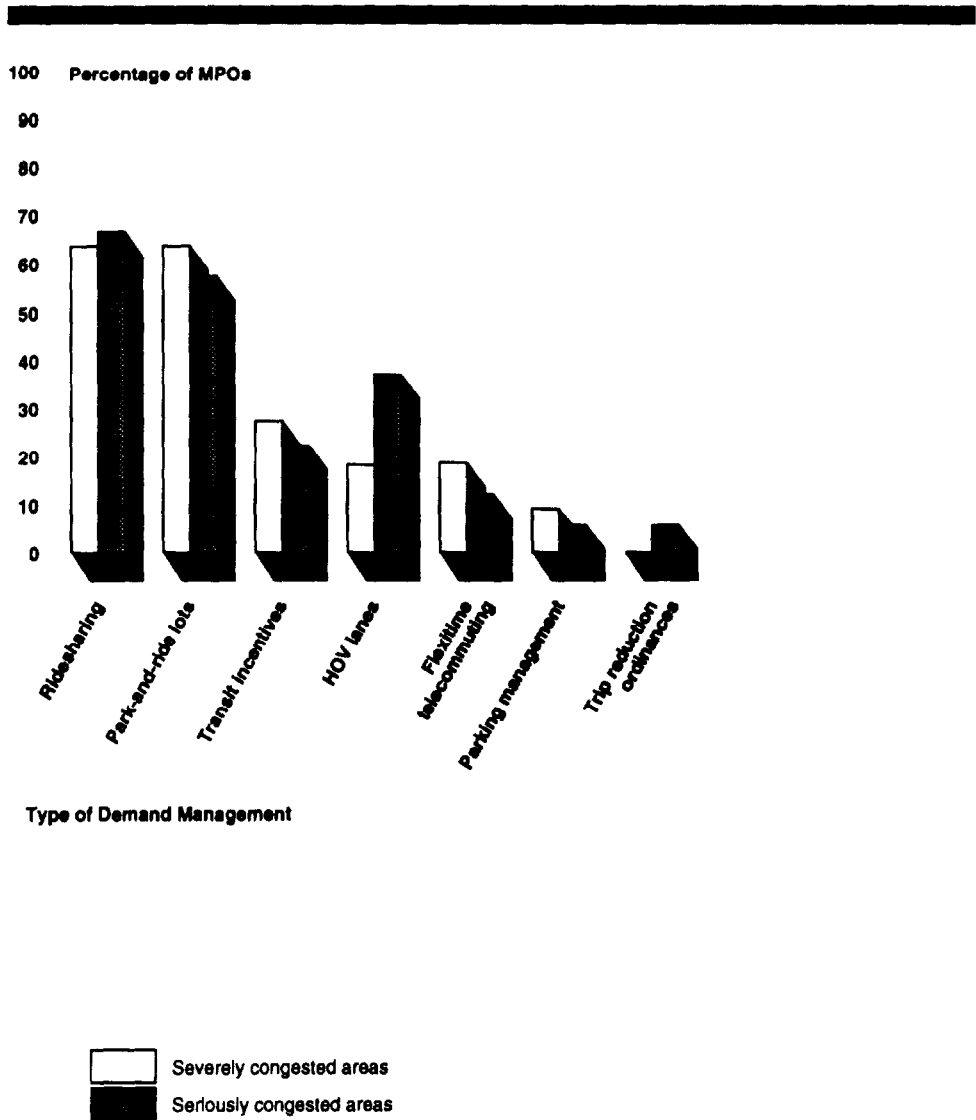


 Areas of 500,000 or more  
 Areas of 50,000-499,999

\*As reported by MPOs; based on survey question 35.

Demand management received low priority in the implementation process, even in metropolitan areas with severe or serious traffic congestion. The survey results indicated that except for ridesharing and park-and-ride lots, implementors in most of the severely or seriously congested areas failed to give even a moderate emphasis to demand management activities. (See figure III.6.)

**Figure III.6: Implementation Emphasis Given to Demand Management Activities in Severely or Seriously Congested Areas<sup>a</sup>**



<sup>a</sup>As reported by MPOs. Auto-use restrictions and congestion pricing were excluded because no MPOs in severely or seriously congested areas reported even moderate implementation emphasis on them. This analysis was based on survey questions 7 and 16.

Although less than 7 percent of MPOs were lead agencies for implementation or funding of all TSM activities, 32 percent of MPOs, mostly in areas of 500,000 or more, were in the lead role for programming of these activities. Fifty-six percent, again mostly in areas of 500,000 or more, had

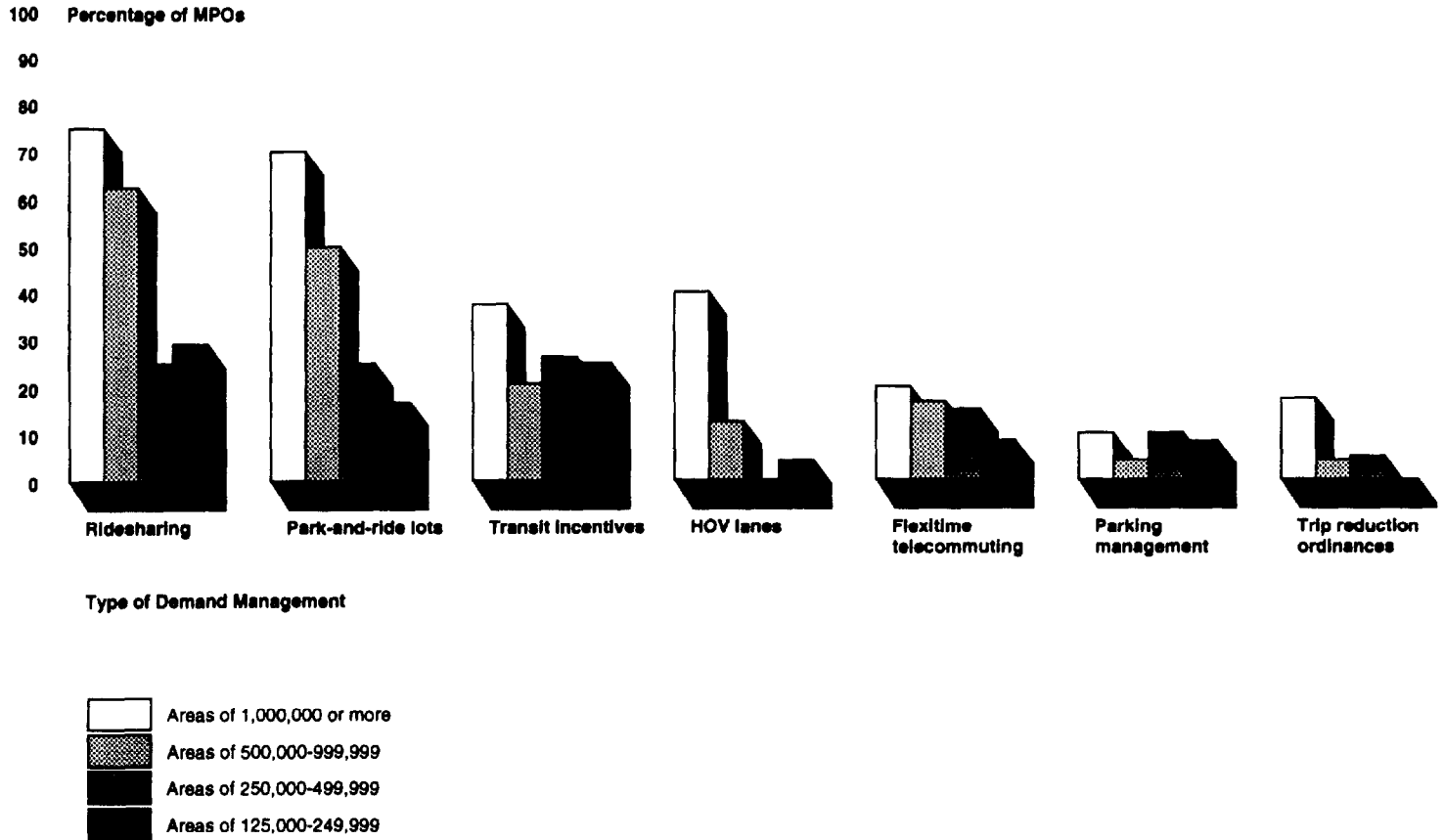
the authority to program federal-aid urban funds for their regions.<sup>6</sup> Seventy-one percent of the survey respondents who program federal-aid funds used some percentage for TSM activities. A greater percentage of MPOs from areas of 1 million or more than from smaller areas reported at least moderate implementation emphasis on each type of demand management activity except for parking management, congestion pricing, and auto-use restrictions.<sup>6</sup> However, ridesharing and park-and-ride lots were the only types of demand management for which more than half the MPOs in these largest areas reported at least moderate implementation emphasis. (See figure III.7.)

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<sup>6</sup>Federal-aid urban funds represent only a small portion of all federal-aid funds returned to states. For example, in 1988, only \$750 million out of \$9.64 billion, or 7.8 percent, was authorized under this funding category.

<sup>6</sup>Almost equal percentages of MPOs in areas of all sizes except those of 500,000-999,999 reported moderate implementation emphasis on parking management. Only one MPO, in an area of 250,000-499,999, reported at least moderate implementation emphasis on auto-use restrictions. No MPOs reported at least moderate implementation emphasis on congestion pricing.

Figure III. 7: Implementation Emphasis on Individual Types of Demand Management\*

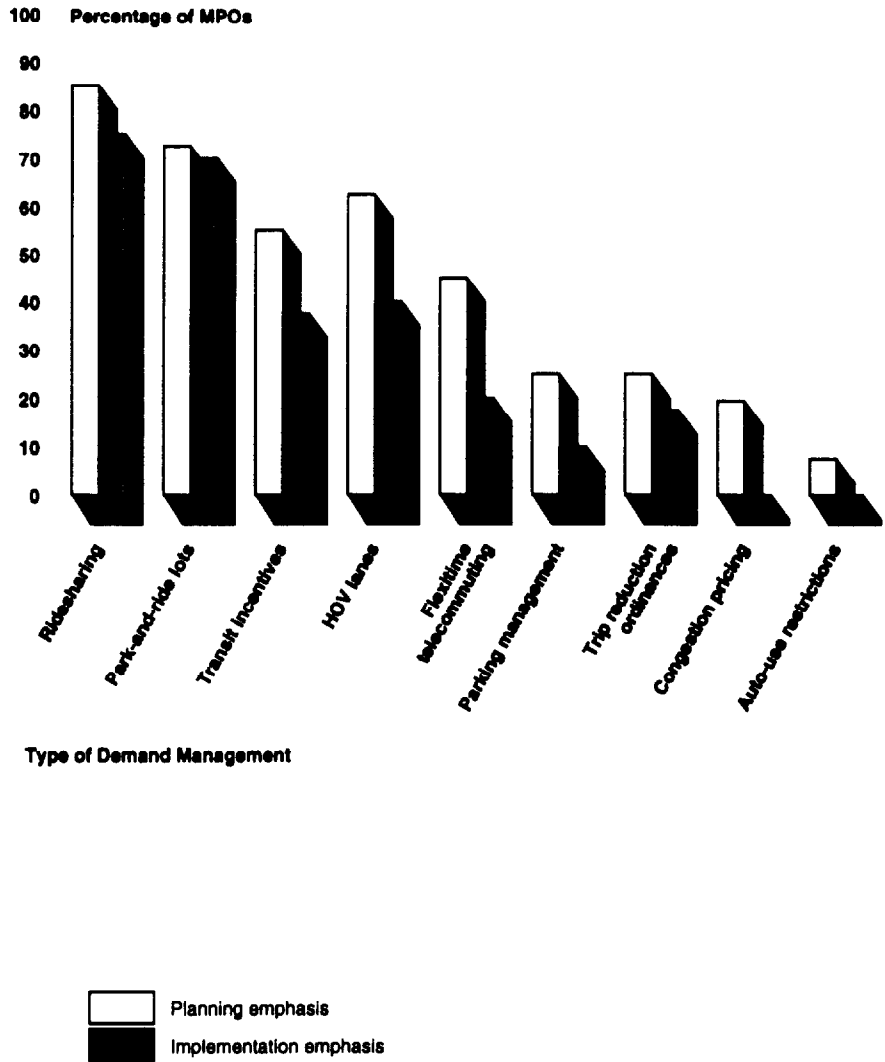


\*MPOs reporting at least moderate implementation emphasis. Auto-use restrictions and congestion pricing were excluded because very few MPOs placed at least moderate emphasis on them. This analysis was based on survey question 16.

MPOs in areas with 1 million or more consistently reported a lower emphasis on implementing (an average of 30 percent) than on planning (an average of 42 percent) every type of demand management activity, except park-and-ride lots. Yet more MPOs in these areas (74 percent) than in

smaller areas (only 19 percent) reported at least some implementation of demand management activities. (See figure III.8.)

**Figure III.8: Moderate Planning Versus Implementation Emphasis on Types of Demand Management\***



\*As reported by MPOs in areas of 1 million or more; based on survey question 16.

**Integration of Air Quality and Transportation Planning**

Air quality concerns do not appear to have been integrated into local transportation planning to any major degree in 70 percent of all population areas. Air quality policy was reported more often than any other federal policy area to have influenced TSM planning and implementation.<sup>7</sup> In addition, we learned the following about the joint planning processes.

Eighty percent of areas of 1 million or more and 75 percent of the areas of 500,000-999,999 in the study failed to meet national ambient air quality standards for ozone. (See table III.2.)

**Table III.2: MSAs' Attainment or Nonattainment of Standards for Ozone**

Status	Metropolitan area size				
	1,000,000 or more	500,000-999,999	250,000-499,999	125,000-249,999	50,000-124,000
Attainment	20%	25%	62%	88%	80%
Nonattainment	80	75	38	12	20
Submarginal	3	4	0	0	0
Marginal	15	25	14	4	20
Moderate	30	21	19	4	0
Serious	8	25	0	4	0
Severe	23	0	5	0	0
Extreme <sup>a</sup>	3	0	0	0	0

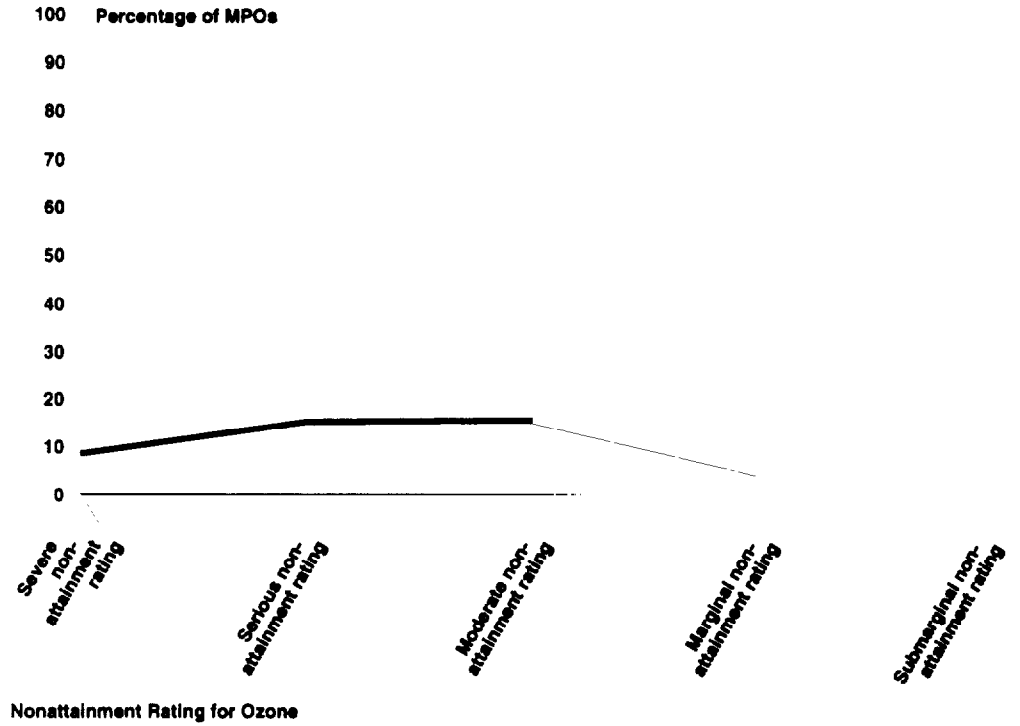
<sup>a</sup>Only one region had an extreme nonattainment rating: Los Angeles.

Only 15 percent of MPOs in areas with ozone pollution levels classified as serious or worse stated that air quality concerns were a major or critical focus in local transportation planning and that many demand management or related activities for clean air purposes were included in their short-range plans. (See figure III.9.)

<sup>7</sup>Less than a third of all MPOs reported that federal regulations (other than for TSM planning) affected TSM planning and implementation in their regions. This statement is restricted only to those MPOs.



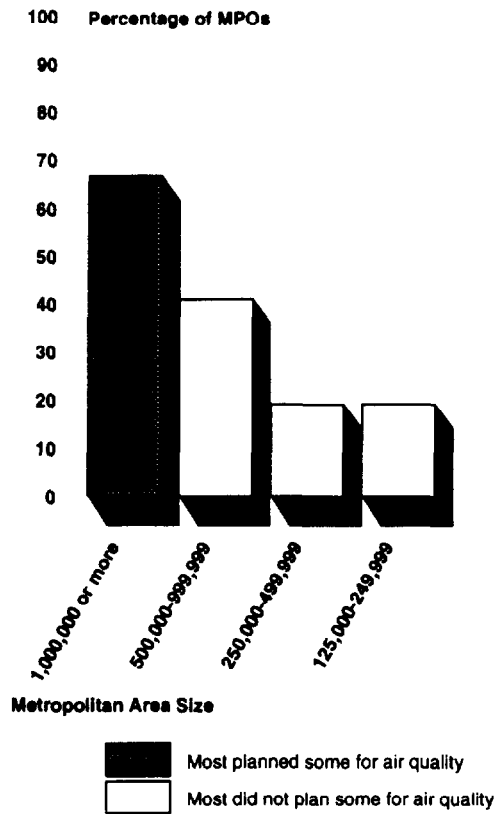
**Figure III.9: Integration of Air Quality and Transportation by Severity of Ozone Rating<sup>a</sup>**



<sup>a</sup>MPOs in areas with ozone problems reporting considerable integration of air quality concerns in transportation planning; based on survey question 37.

Sixty-seven percent of MPOs in areas of 1 million or more reported that at least some demand management or related activities for clean air purposes were included in their most recent short-range plans, but only 26 percent of all MPOs did so. (See figure III.10.) Even in these largest areas, only 31 percent indicated that decisionmakers routinely considered whether or not proposed TSM activities could also improve air quality.

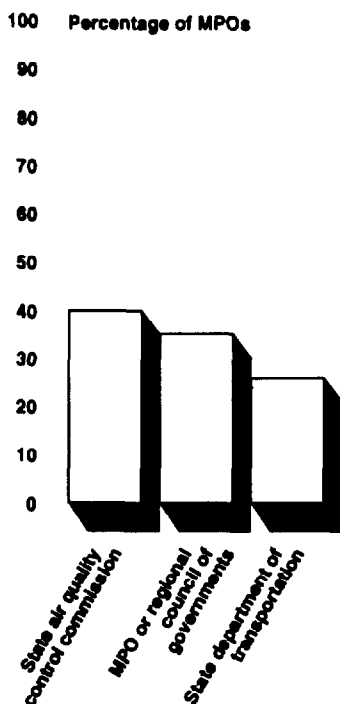
**Figure III.10: Inclusion of Demand Management Activities for Clean Air Purposes in Transportation Planning<sup>a</sup>**



<sup>a</sup>As reported by MPOs; based on survey question 37.

A different agency or governmental organization had primary responsibility for every key stage of the joint planning and implementation process. Fifty-four percent of all MPOs viewed state air quality control commissions as the lead agencies for forecasting auto emissions, 50 percent saw state transportation departments as the lead for implementing demand management or related activities for clean air purposes, and 61 percent reported their own agencies as having the lead role for integrating air quality and transportation planning. However, no more than 40 percent assigned any single agency with leadership responsibility for planning demand management or related activities for clean air purposes. (See figure III.11.)

Figure III.11: Lead Agencies in Planning Demand Management Activities for Clean Air<sup>a</sup>



<sup>a</sup>As reported by MPOs; based on survey question 40.

## Obstacles to Adequate TSM for Congestion and Air Pollution Reduction

### Coordination Problems

Our survey responses and our site visits suggested that a number of common obstacles inhibit demand management planning and implementation, whether for congestion reduction or air quality improvement purposes.

Coordination by MPOs of a wide variety of organizations, agencies, or jurisdictions with an interest in TSM activities is a prerequisite for effective TSM planning and implementation. Although only 45 percent of MPOs reported that demand management activities required too much coordination effort (compared with highway projects), our site visits suggested that the difficulties of coordinating many interests in demand management projects impedes planning and implementation of those projects. We learned, for example, that in the San Francisco area, 14 public transit operators and 97 private ones have to be involved in any regional demand management projects for the projects to be effective.

However, as one implementor observed, although MPOs are responsible for coordinating many agencies, they have had no corresponding authority to require that the plan developed is regional in focus. In his view, demand management approaches were oriented toward regional solutions, since congestion frequently crosses jurisdictional lines. According to another implementor, what was generally perceived to help a whole region might not necessarily be considered by individual local officials to be advantageous for their jurisdictions. In his view, local officials were primarily interested in their jurisdictions.

MPOs must coordinate even more agencies for demand management or related activities targeted for clean air purposes because local and state air quality agencies must participate as well. Additional coordination is needed because of the diffusion of lead responsibility to several different agencies in the joint planning and implementation process, as reported in the survey. For example, the Tampa Bay air quality shed covered an area that included the jurisdiction of at least three MPOs, an equal number of county air quality agencies, and a regional council of governments as well as state transportation and air quality agencies. All of these must be involved in planning any demand management or related activities for clean air purposes. Local environmental protection officials in the Tampa Bay area noted, in our interviews, that the state transportation department had not consulted them nor sought their input when transportation decisions were made. As a result, although there was some coordination with the local MPOs, local air quality agencies have had little say over local transportation projects, even though the Tampa area remained in violation of national air quality standards.

Additionally, several MPOs noted that coordination problems were not limited to state and local levels but have arisen among the federal agencies most involved in these issues—Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and Environmental Protection Agency (EPA), which have not always interpreted regulations in the same way. For example, the Minneapolis MPO observed that ramp meters and HOV toll bypass lanes, by encouraging more carpooling and reducing stop-and-go traffic, decreased overall air pollution but at the same time created individual carbon monoxide “hot spots” (where carbon monoxide emissions build up because of engine idling). According to this MPO, the trade-offs between higher site-specific air pollution levels and lower regionwide air pollution levels need to be recognized in federal policy. The Atlanta MPO noted that FHWA and FTA must be full partners with EPA in

developing and carrying out the new requirements of the 1990 Clean Air Act Amendments.

Perceptions of Unpopularity  
and Private Sector Disinterest

Some implementors expressed the view that many demand management activities remain unpopular with the general public. Several state implementors noted that demand management activities were difficult to market in their states. Elected officials were unwilling, according to some demand management advocates, to impose tolls to reduce traffic (congestion pricing), raise gas taxes, and reduce parking (parking management), fearing voter reaction. Even implementors who have promoted demand management use were concerned about gaining public approval for individual demand management activities.

Implementors who did promote demand management sometimes found other governmental agencies unwilling to follow their lead. Flexitime was promoted by one state transportation department as a means of reducing overall congestion. However, the state government itself failed to adopt the program. Sometimes, even within the state implementing agency, top decisionmakers failed to heed the recommendations of their staff for demand management activities. For example, one MPO reported in the survey that its state transportation department ignored recommendations for park-and-ride lots on major highway projects, even though its own staff proposed them and they were supported by the local MPO.

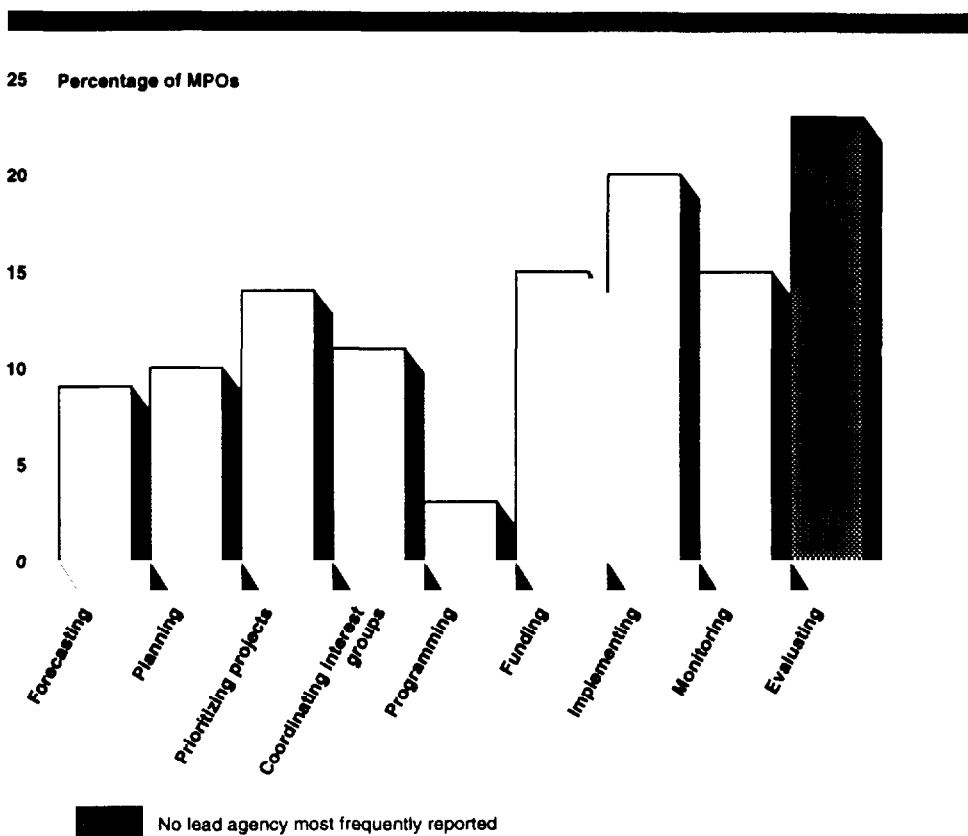
In our site visits, implementors also noted that demand management projects have to compete with more expensive capital projects when funding decisions are made, even though demand management projects cost much less. According to these implementors, highway and mass transit projects have greater visibility and popularity with the public. In their view, low-cost demand management has had no natural constituency of its own, unlike the case of higher cost freeway and mass transit projects, which have vested interests. For example, most of one state's private sector transportation community—contractors, businesses, trucking firms, and highway consultants—has shown little interest in demand management activities according to the state's transportation agency, which has promoted demand management. According to implementors, the transportation field remains dominated by an orientation toward construction projects.

Scarcity of Evaluation Data

Another obstacle to demand management planning and implementation is the unavailability of evaluation information demonstrating the effectiveness of individual demand management activities for reducing

congestion levels. Even when MPOs conducted evaluations themselves, only 11 percent reported frequent or routine evaluation of demand management projects. Fifty-six percent of all MPOs reported conducting evaluations only infrequently or almost never. One reason may be an uncertainty about which agency routinely has lead responsibility for monitoring and evaluating TSM projects. More MPOs (23 percent) in areas of 500,000 or more population reported no lead agency for TSM evaluation activities than for TSM forecasting, planning, prioritizing, coordinating, programming, funding, and implementation. (See figure III.12.)

Figure III.12: Reports of No Lead Agencies for Different Stages of TSM\*



\*From MPOs in areas of 500,000 or more; based on survey question 12.

There was less lead agency consensus on TSM evaluation than on other TSM stages. Considerably less than half (41 percent) of all MPOs agreed on which individual agency routinely had lead monitoring and evaluating TSM efforts. In some areas, the lead agencies for evaluating TSM activities were

## Doubts About the Local Relevance of Demand Management

MPOS; in other areas, it was state departments of transportation; and in still other areas, it was local planning or transportation commissions.

Some planners and implementors considered demand management activities to be relevant to a region only if congestion levels are severe or serious or if there is a central employment district.<sup>8</sup> Even in severely or seriously congested areas, demand management activities were not always viewed as major strategies for reducing traffic congestion. For example, in the past, the San Francisco MPO has viewed demand management as playing only a minor role in congestion reduction for that region. In the view of one state implementor, demand management activities focused only on the symptoms of congestion problems rather than the cause of the problems.

Most of the implementors we interviewed indicated that air quality problems in their regions were not considered severe enough so that they would play an important role in determining whether or not demand management activities were implemented. The exception was the San Francisco area, where demand management and related activities for clean air purposes have been mandated by statute and court action. In both Minneapolis (moderate carbon monoxide pollution) and Tampa (marginal ozone pollution), transportation implementors stated that they did not perceive air quality as a major problem and had not integrated air quality concerns into the transportation process in any major way.<sup>9</sup> According to one Minnesota transportation department implementor, air quality improvement was viewed as an additional benefit of implementing demand management activities but the primary goal was congestion reduction. When TSM activities were being planned and implemented, 47 percent of MPOS stated in the survey that implementors considered only informally whether or not the activity would reduce air pollution. Forty-two percent reported that the implementors gave no consideration at all.

## Summary

Most MPOS were lead agencies for TSM planning, project prioritization, and coordination. Dropping a federal requirement to include a TSM element had relatively little effect on the level of TSM planning, especially by MPOS in areas of 500,000 population or more. Almost all MPOS planned some TSM

<sup>8</sup>Only 20 percent of all MPOs reported in the survey more than moderate traffic congestion in their areas, and even in areas of 1 million or more, just 55 percent indicated severe or serious traffic congestion.

<sup>9</sup>"Moderate" and "marginal" were the ratings at the time of our study.

activities, supply management being planned more often than demand management, and traditional demand management emphasized over innovative demand management. We found that MPOs in areas of 1 million or more were more likely to emphasize demand management planning than MPOs in smaller areas. Most MPOs in smaller areas gave little or no planning emphasis to any type of demand management activity.

Demand management activities received consistently less emphasis in implementation than in planning, according to MPOs. In the survey, funding inadequacy and the low priority local officials gave to congestion reduction because of unwillingness to reduce single-occupancy ridership were reported most often as important explanations for low demand management implementation. According to MPOs in areas of 500,000 or more, other important reasons included disagreement among implementors about demand management and the absence of links between planning and funding decisions. For MPOs in areas smaller than 500,000, the unavailability of information on demand management effectiveness and a demand management emphasis in conflict with a construction funding emphasis were important reasons for low implementation.

Most areas of 500,000 or more failed to meet national standards for ozone pollution levels. Integration between air quality and transportation planning had yet to occur in many areas, even some areas with severe or serious ozone problems. A majority of MPOs in areas of 1 million or more included at least some demand management or related activities for clean air purposes in their plans. We found that MPOs considered themselves agencies for integrating air quality concerns into local transportation planning. They reported state air quality control commissions to be lead agencies for forecasting auto emission trends and state transportation departments to be lead agencies for implementing demand management or related activities for clean air purposes. It was not clear from the survey responses which agency generally has the lead role for planning demand management or related activities for clean air purposes.

A number of obstacles impeded both planning and implementation of demand management. The need to coordinate a wide variety of organizations in any demand management effort inhibited efforts to plan and implement demand management activities. Coordination difficulties were especially acute in planning demand management or related activities for clean air purposes because of the even greater number of agencies and interests that have to be involved. Implementors perceived



that demand management activities are not favored by the general public, are not supported by the private sector transportation community, have no natural constituency of their own, and are difficult to market among elected officials and other governmental institutions.

The unavailability of evaluation information about demand management effectiveness represented another obstacle. Evaluations of demand management activities were conducted only infrequently, and a considerable number of MPOs, especially in areas of 500,000 or more, reported no lead agencies for evaluation in their regions. Finally, some implementors questioned the relevance of demand management activities for their regions. Implementors perceived demand management activities as addressing only the symptoms of congestion, to be used only if congestion is very serious and to be operative only if there is a central employment center. Local air quality concerns did not motivate transportation implementors to promote demand management activities because they have not associated demand management activities with air quality improvement efforts.

# Survey Question Frequencies

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All response frequencies are presented in percentages. Each response was weighted according to the sampling ratio of the stratum to which it belonged (areas of 1,000,000 or more = 1:1, areas of 500,000-999,999 = 1:2, areas of 250,000-499,999 = 1:3, areas of 125,000-249,999 = 1:5, and areas of 50,000-124,999 = 1:7). Questions 8, 23, and 36 were not analyzed because of reliability problems. Percentages were rounded to the nearest whole number unless otherwise specified; consequently, total percentages for individual questions may be greater or less than 100 percent. For questions 39-44, weighted response frequencies were calculated on the basis of all possible responses (including nonresponses). Remaining percentages on these questions indicate failure to check either column option.

United States General Accounting Office



## Survey of Metropolitan Planning Organizations

The U.S. General Accounting Office (GAO) has been asked by the Senate Environment and Public Works Committee to examine federal and local policies pertaining to transportation systems management (TSM) in preparation for reauthorization of Surface Transportation Programs next year. An important part of the reauthorization legislation involves the present and future role of metropolitan planning organizations (MPOs) such as yours. Therefore, GAO is conducting a survey of selected MPOs to gather information on what is being done and what could be done in TSM.

Your MPO is being asked to participate in addressing some crucial issues facing the Congress. Your participation and timely completion of this questionnaire will provide vital information to GAO on your MPO's efforts. The results of this survey will be considered as part of the reauthorization process.

In order to ensure that the information GAO obtains is accurate and complete and that your region's views are adequately represented, we ask that this questionnaire receive your immediate attention and that it and the accompanying documents requested be returned not later than December 21, 1990 in the enclosed self-addressed envelope. Please include a copy of your most recent operating budget. If you have any questions or comments, please call Dr. Thomas Horan at (202) 275-1522 or Mr. James Crosson at (202) 275-1636.

In the event the return envelope is misplaced or is too small for what you are sending, please send the survey and your materials to:

James J. Crosson  
U.S. General Accounting Office  
Room 5844  
441 G Street, NW  
Washington, DC 20548

Name of person primarily responsible for

completing survey \_\_\_\_\_

Job Title \_\_\_\_\_

Organization \_\_\_\_\_

Phone \_\_\_\_\_

GAO CODE # \_\_\_\_\_

**Appendix IV  
Survey Question Frequencies**

**GLOSSARY OF ACRONYMS AND TERMS**

Before beginning this survey, briefly review the glossary below to see how each of the acronyms and terms are used in the survey.

**Congestion Road Pricing :** The levying of a commuter charge so as to provide an incentive for off-peak travel.

**Flexitime :** A work scheduling practice that allows individual employees to choose their own schedules within company-set guidelines.

**HOV or High Occupancy Vehicle Lane :** Restriction of a lane or lanes of a roadway to buses alone or buses and cars with more than one rider per vehicle, usually for limited hours. Sometimes called a carpool lane.

**Level of Service D rating :** Ordinal measure of traffic flow defined in the 1985 Highway Capacity Manual, A being the best and F the worst levels. Level D, often considered the threshold of congestion, involves a traffic density of at least 42 passenger cars per mile per lane at a speed of 46 miles per hour and a ratio traffic volume to facility capacity (V/C) of .93.

**Parking Management :** Program to reduce single-occupancy vehicle trips by restricting the amount of available parking or by increasing the cost of available parking.

**Ramp Metering :** The process of facilitating traffic flow on freeways by regulating the amount of traffic entering the freeway using control devices on entrance ramps.

**Telecommuting :** Working at home on a computer terminal hooked into business offices through phone lines.

**TRO or Trip Reduction Ordinance :** A community's regulation used to limit trip generation, usually from new developments.

**TCM or Transportation Control Measure :** Programs, activities or projects designed to reduce vehicle trip generation in an area for air quality purposes. Many TDM activities are also TCMS. TCMS can be imposed when a region falls into non-attainment status under the National Ambient Air Quality Standards (NAAQS) set by EPA.

**TIP or Transportation Improvement Program :** the short-term (five-year) transportation plan for a region within which all projects to receive public funds must be included. The annual element of the TIP must be certified by the MPO.

**TMA or Transportation Management Associations :** Partnerships between business and local government designed to help solve local transportation problems associated primarily with rapid suburban growth. Sometimes called transportation management organizations or TMOs.

**TSM or Transportation System Management :** Better utilization of existing transportation system in metropolitan areas. TSM includes both supply management--low-cost techniques to optimize capacity--and demand management--low-cost strategies to reduce travel demand or the number of vehicles on a facility. TDM is another name for demand management. TSM activities and projects are designed to reduce traffic congestion without new road construction.

**Transit Incentives :** Provision of money, tickets or tokens to employees by the employer for the purposes of encouraging transit use. The employer may provide the incentive for free or at a discount to employees.

**TDM or Travel Demand Management :** Low-cost techniques to reduce travel demand. These include ridesharing, public transit use, work-hour re-scheduling, high occupancy vehicle lanes, park and ride facilities, parking management, trip reduction ordinances, user fees, congestion road pricing, ramp metering and telecommuting. The focus of these is primarily on behavioral changes rather than facility improvement.

**Appendix IV  
Survey Question Frequencies**

INSTRUCTIONS: Mark each multiple choice question response clearly with an "X". Some multiple choice questions allow only one option while others permit selection of more than one option. Following the multiple choice questions are several open-ended questions. The responses to these questions should be typed or handwritten very legibly. Please complete all questions. If you experience any problems with the questions, please call us at the number we provided. Thank you for your timely participation. (If questions require longer answers or comments than space permits, please attach additional sheets, using the appropriate number.)

**BACKGROUND INFORMATION**

1. How many jurisdictions does your MPO represent? (Provide number for each type of jurisdiction)

- \_\_\_ States      MODE = 1
- \_\_\_ Counties    MODE = 1
- \_\_\_ Cities        MODE = 1
- \_\_\_ Towns or Villages
- \_\_\_ Other (explain) \_\_\_\_\_

2. In addition to being mandated by federal law, which of the following best describes the organizational arrangement of your MPO? (Check all that apply.)

- 46 1.  statutory by state law
- 4 2.  statutory by local law
- 46 3.  voluntary
- 18 4.  other (explain) \_\_\_\_\_

3. Which of the following best characterizes the current organizational structure of your MPO? (Check one.)

- 11 1.  housed within a city planning department
- 12 2.  housed within a county planning department
- 35 3.  housed within a regional council of governments
- 6 4.  housed within some other regional association
- 19 5.  housed as a separate regional agency
- 1 6.  housed as part of the state DOT
- 17 7.  other (explain) \_\_\_\_\_

4. What was the estimated population of the region represented by your MPO in 1990?

\_\_\_\_\_

5. What was the estimated population of the same region in 1980?

\_\_\_\_\_

6. On the average, about what percentage of highway and local road miles in your region are congested, that is, assigned a Level of Service D rating or worse during peak period hours for 1990? (If completely unavailable, provide best estimate.)

10 % of all highway miles at Level D or worse

5 % of all local street miles at Level D or worse

7. Which of the following best describes the level of overall traffic congestion within your region? (Check one.)

- 3 1.  Severe
- 17 2.  Serious
- 44 3.  Moderate
- 27 4.  Mild
- 9 5.  Minimal

8. Approximately how much funding in your most recent MPO operating budget comes from the following sources?

- \$ \_\_\_\_\_ Federal planning monies
- \$ \_\_\_\_\_ Other federal monies
- \$ \_\_\_\_\_ State funds
- \$ \_\_\_\_\_ Funds from local jurisdictions
- \$ \_\_\_\_\_ Funds from private sector
- \$ \_\_\_\_\_ Other (explain) \_\_\_\_\_
- \$ \_\_\_\_\_ Total operating budget

9. How many FTE staff work entirely on transportation at your agency during 1990? 3 = Median

**Appendix IV  
Survey Question Frequencies**

10. In the process of preparing transportation plans, both the Transportation Improvement Program (TIP) and long range plans for your region, approximately what percentage of your MPO's total work time is devoted, on the average, to the following activities:

	Short Range Plan (TIP)			Long Range Plan		
	Low % (0% - 10%)	Medium % (11% - 30%)	High % (over 30%)	Low % (0% - 10%)	Medium % (11% - 30%)	High % (over 30%)
Forecasting socio-economic trends for the region	77	22	1	34	58	8
Conducting impact evaluations about transportation, environment, housing, job needs etc.	67	28	5	60	34	5
Coordinating and packaging transportation plans submitted by local jurisdictions	49	34	17	68	23	9
Meeting with state and local officials to review planning strategies	33	54	13	38	51	11
Sponsoring public community forums on transportation choices	80	18	3	67	29	4
Assessing mobility alternatives, i.e., roads, lanes, transit, demand management activities	57	36	7	43	45	13
Determining air quality needs and issues	81	17	2	87	11	2
Assessing land use alternatives such as jobs/housing mix	85	14	1	66	30	4
Systems modeling	65	29	7	27	43	31
Short range project need assessments	39	42	19	65	27	8
other (explain below)						

11. During 1990, approximately what percentage of your MPO's total work time was devoted to providing specific services other than regional planning (such as data services, sharing staff, contracts to prepare local jurisdictions' plans) for your state and local jurisdictions?

20 % = Median

**Appendix IV  
Survey Question Frequencies**

**TSM**

Transportation Systems Management or "TSM" can be defined in a number of different ways. Here we are using the expression to include two complementary approaches: 1) supply management which involves improving facility operation and utilization with computerized synchronous traffic signal system, motorist aid systems and incident management operations, etc. and 2) travel demand management (TDM) which entails reducing actual usage of the facility through car or vanpools, rideshare match programs, parking management, trip reduction ordinances, road pricing and fringe parking.

12. In the following matrix, which organizational entity above all the rest has the lead responsibility for each stage of TSM planning on most roadways in your region? (If MPO is part of Regional COG or other entity, check only MPO column when appropriate.) **CHECK ONE ORGANIZATION FOR EACH TSM STAGE.**

TSM STAGES								
	Federal Govt	State DOT	MPO	Local Trans. or Planning Comm./Dept.	Regional Trans. Coord. Comm.	Local Transit Agency	Other Regional Agency	No Lead Agency
1. Forecasting	0	28	58	9	0	0	1	4
2. Planning	0	12	71	14	0	<1	1	2
3. Prioritizing projects	0	16	59	16	4	<1	<1	4
4. Coordinating positions of interest groups	0	7	64	9	4	<1	4	12
5. Programming	0	48	32	13	2	0	<1	5
6. Funding	24	47	3	13	0	<1	<1	13
7. Implementing	1	47	6	33	0	1	1	11
8. Monitoring projects	1	33	32	20	1	<1	<1	13
9. Evaluating projects/programs	2	32	41	12	0	<1	<1	13

**Appendix IV  
Survey Question Frequencies**

13. In the following matrix, which organizational entity (or entities) has (or have) supplemental responsibilities such as coordinating groups, forums, publicity and technical assistance for each stage of the TSM process in your region? (If MPO is part of Regional COG or other entity, check only MPO column when appropriate.) CHECK AS MANY ORGANIZATIONS AS ARE APPROPRIATE FOR EACH TSM STAGE.

TSM STAGES							
	Federal Govt	State DOT	MPO	Local Trans. or Planning Comm./Dept.	Regional Trans. Coord. Comm. (if any)	Local Transit Agency	Other Regional Agency
1. Forecasting	2	57	57	41	0	17	7
2. Planning	7	59	47	57	4	33	6
3. Prioritizing projects	6	58	55	50	3	32	2
4. Coordinating positions of interest groups	3	39	52	46	5	26	4
5. Programming	12	56	44	41	2	33	5
6. Funding	51	64	74	43	1	32	6
7. Implementing	10	59	30	37	1	38	5
8. Monitoring projects	17	60	48	47	2	31	3
9. Evaluating projects/programs	15	59	50	50	3	31	4

14. Within your current short range regional plan (TIP), are TSM activities or programs distinctly identified or assigned to a particular chapter or section of the plan? (Check one.)

- 70 1.  No  
30 2.  Yes

**IF YES, PLEASE PROVIDE COPIES OF THOSE PAGES AND/OR SECTIONS OF THE PLAN WHICH RELATE TO TSM ACTIVITIES OR PROGRAMS. ENCLOSE THEM WHEN THE SURVEY IS RETURNED. PLEASE INCLUDE A COPY OF YOUR MOST RECENT OPERATING BUDGET.**



**Appendix IV  
Survey Question Frequencies**

15. Given that there are regional variations, what kind of emphasis was given to the following types of TSM in your MPO's regional plans for the years 1985 - 1990?

	<i>Strong emphasis</i>	<i>Moderate emphasis</i>	<i>Little emphasis</i>	<i>No emphasis</i>
1. Real-time highway surveillance and control systems	5	15	28	53
2. Incident management and motorist aid programs	5	14	26	56
3. Traffic signal system improvements	45	42	13	0
4. Re-striping and widening without major construction	21	50	21	8
5. Ridesharing programs, computerized ridematch programs and vanpool purchases	18	20	29	33
6. Alternative work weeks, flexitime, telecommuting, and provisions to reduce non-work trips	6	10	19	65
7. Transit incentives, and truck transportation incentives	6	23	31	40
8. Auto-use restrictions	<1	1	16	84
9. Parking management programs for congestion reduction	2	15	28	56
10. Trip reduction ordinances or equivalent laws and regulations	2	4	14	80
11. Peak period fees and congestion road pricing	0	<1	5	95
12. HOV lanes on highways and arterials, ramp meter or toll bypass lanes and other car or vanpool facilities	6	5	12	77
13. Park-and-ride and park-and-pool lots	11	24	35	31
14. Public transit improvements	32	41	17	9
15. Other strategy (explain)				

**Appendix IV  
Survey Question Frequencies**

16. What kind of emphasis was given to the following types of TSM in your region by implementors (as evidenced in projects they funded) for the years 1985 - 1990?

	Strong emphasis	Moderate emphasis	Little emphasis	No emphasis
1. Real-time highway surveillance and control systems	9	15	21	55
2. Incident management and motorist aid programs	5	17	23	55
3. Traffic signal system improvements	49	43	4	4
4. Re-striping and widening without major construction	21	55	16	8
5. Ridesharing programs, computerized ridematch programs and vanpool purchases	13	20	25	42
6. Alternative work weeks, flexitime, telecommuting, and provisions to reduce non-work trips	2	8	15	74
7. Transit incentives, and truck transportation incentives	6	17	30	48
8. Auto-use restrictions	0	1	8	92
9. Parking management programs for congestion reduction	0	9	28	63
10. Trip reduction ordinances or equivalent laws and regulations	1	3	7	90
11. Peak period fees and congestion road pricing	0	0	1	99
12. HOV lanes on highways and arterials, ramp meter or toll bypass lanes and other car or vanpool facilities	5	3	7	85
13. Park-and-ride and park-and-pool lots	5	25	33	37
14. Public transit improvements	26	37	28	9
15. Other strategy (explain)				

**Appendix IV  
Survey Question Frequencies**

<p>17. During the 1970s, federal regulation required that MPOs include TSM projects or activities as an integral part of a region's transportation plan. Which of the following best describes how much TSM was implemented within your region as a result of this planning requirement? <i>(Check one.)</i></p> <p>9 1. <input type="checkbox"/> Very few or no TSM programs or activities were implemented as a result of the requirement.</p> <p>63 2. <input type="checkbox"/> Some TSM programs or activities were implemented as a result of the requirement.</p> <p>21 3. <input type="checkbox"/> Many TSM programs or activities were implemented as a result of the requirement.</p> <p>7 4. <input type="checkbox"/> Other (Explain) _____</p>	<p>20. Have any other federal regulations affected or impacted TSM planning and implementation in your region? <i>(Check one.)</i></p> <p>71 1. <input type="checkbox"/> No (Go to Question 22)</p> <p>29 2. <input type="checkbox"/> Yes (go to Question 21)</p>
<p>18. Since the early 1980s, TSM planning by MPOs has been encouraged rather than mandated. Which of the following best describes how much TSM was implemented within your region during the 1980s when TSM planning was encouraged rather than required? <i>(Check one.)</i></p> <p>18 1. <input type="checkbox"/> Very few or no TSM programs or activities were implemented under this change.</p> <p>61 2. <input type="checkbox"/> Some TSM programs or activities were implemented under this change.</p> <p>19 3. <input type="checkbox"/> Many TSM programs or activities were implemented under this change.</p> <p>2 4. <input type="checkbox"/> Other (Explain) _____</p>	<p>21. If yes, explain briefly. (Attach additional sheets to the end of the survey if necessary)</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>19. In your opinion, has there been about the same amount of TSM planning in your region since the federal approach shifted from requirement to encouragement? <i>(Check one.)</i></p> <p>19 1. <input type="checkbox"/> No, there was more TSM planning before the 1980s than now.</p> <p>14 2. <input type="checkbox"/> No, there was less TSM planning before the 1980s than now.</p> <p>49 3. <input type="checkbox"/> Yes, there is about the same amount of TSM planning now as there was before the 1980s.</p> <p>18 4. <input type="checkbox"/> Unable to judge because not associated with MPOs long enough</p>	<p>22. Which of the following activities describe the efforts of your MPO to encourage TSM, both supply management and demand management (TDM), in your region from 1985 - 1990? <i>(Check all that apply.)</i></p> <p>22 1. <input type="checkbox"/> MPO has not been involved in any TSM issues during the past year.</p> <p>22 2. <input type="checkbox"/> MPO prepares promotional literature on TSM activities.</p> <p>10 3. <input type="checkbox"/> MPO has a separate policy committee on TDM issues.</p> <p>22 4. <input type="checkbox"/> MPO has hosted public forums and information sessions on TSM.</p> <p>28 5. <input type="checkbox"/> MPO provides information to the business community on relevant TSM start-up and operational issues.</p> <p>43 6. <input type="checkbox"/> MPO meets regularly with state DOT officials on TSM issues.</p> <p>8 7. <input type="checkbox"/> MPO sponsors workshops and training for local officials and the general public to familiarize all with TSM strategies.</p> <p>39 8. <input type="checkbox"/> MPO holds regular meetings with local public and private transit providers on TSM concerns.</p> <p>24 9. <input type="checkbox"/> MPO works with local TMA(s) in preparation and development of TSM programs or activities.</p> <p>10. <input type="checkbox"/> Other (Explain) _____</p> <p>_____</p>

**Appendix IV  
Survey Question Frequencies**

23. Which of the following TSM activities or programs, if any, is your MPO currently managing or operating within your region? (Check all that apply.)

- 1.  Real-time highway surveillance and control systems
- 2.  Incident management systems
- 3.  Traffic signalization improvements
- 4.  Ridesharing and ridematching programs
- 5.  Vanpool purchases
- 6.  Transit incentive programs
- 7.  Parking management programs
- 8.  Ramp metering programs
- 9.  Congestion road pricing programs
- 10.  Public transit
- 11.  Park-and-ride lots
- 12.  User fee programs
- 13.  Auto-use restriction program
- 14.  Other (specify) \_\_\_\_\_  
\_\_\_\_\_
- 15.  None

24. How often, if at all, did your MPO conduct evaluations of TSM and other related transportation projects from 1985-1990? (Check one.)

- 25 1.  Almost never
- 31 2.  Infrequently
- 33 3.  Periodically
- 9 4.  Frequently
- 2 5.  Almost uniformly

25. Is your MPO generally responsible for programming attributed Federal Aid-Urban (FAU) funds for your region? (Check one.)

- 56 1.  Yes (Go to Question 26)
- 44 2.  No (Go to Question 28)

26. If Yes, how much was received for Fiscal Year 1990?  
\$ \_\_\_\_\_

27. If Yes, approximately how much of that money was committed to TSM projects for Fiscal Year 1990?  
\$ \_\_\_\_\_

28. If No, please explain how FAU funds are programmed.  
\_\_\_\_\_  
\_\_\_\_\_

29. Are there any other federal funding provisions, programs or arrangements which have appeared to facilitate TSM efforts in your region from 1985-1990? (Check one.)

- 67 1.  No (Go to Question 31)
- 33 2.  Yes (Go to Question 30)

30. If Yes, please explain \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix IV  
Survey Question Frequencies**

31. Are there any other federal funding provisions which have appeared to inhibit TSM efforts in your region from 1985-1990?  
(Check one.)

- 81 1.  No (Go to Question 33)  
19 2.  Yes (Go to Question 32)

32. If so, please explain \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**TDM**

Travel Demand Management or TDM refers to activities, programs and efforts to reduce road facility usage. TDM includes car- and vanpooling (and associated ride-sharing programs), park-and-ride lots, auto-restricted zones, parking management, trip reduction ordinances, ramp metering, congestion pricing, user fees, alternative work days and flexitime, telecommuting, transit incentives, HOV lanes and use of mass transit.

33. Which of the following best describes the role TDM has played in the planning efforts of your region for the years 1985 - 1990? (Check one.)

- 38 1.  Demand management activities have generally not been included in the regional plan  
36 2.  A few demand management activities have been included in the regional plan but only in a very minor and incidental role  
2 3.  A number of demand management activities have been included in the regional plan but none have been implemented  
14 4.  A number of demand management activities have been included in the regional plan but only a few have actually been implemented  
12 5.  A number of demand management activities have been included in the plan and many are actually being implemented

34. In your opinion, are TDM strategies currently being utilized enough within your region to reduce traffic congestion? (Check one.)

- 79 1.  No  
21 2.  Yes

**Appendix IV  
Survey Question Frequencies**

35. How important is each of the following reasons as an explanation for the level of TDM utilization (or lack thereof) within your region?

	<i>Of major importance</i>	<i>Of moderate importance</i>	<i>Of minor importance</i>
1. Low need to reduce peak period demand	37	36	27
2. Lack of consensus for TDM actions among various transportation implementors	19	28	53
3. Opposition to TDM strategies by business community	18	25	56
4. Lack of funds available for TDM projects	43	28	30
5. Opposition to TDM by general public	22	20	57
6. Low priority placed on congestion reduction by local officials because of unwillingness to discourage single occupancy riderships	32	27	41
7. Too much effort required to coordinate competing interests for start-up TDM activities compared to highway projects	16	29	55
8. Lack of reliable information on effectiveness of TDM strategies	16	32	52
9. Planning for TDM activities has no direct linkage with funding decisions	16	31	53
10. Emphasis on TDM conflicts with an emphasis on seeking funds for capital construction	25	23	52
11. Other (explain)			

Appendix IV  
Survey Question Frequencies

CLEAN AIR

36. How often, if at all, during 1989 did your region exceed the National Ambient Air Quality Standards (NAAQS)?

For carbon monoxide (10 mg/m3), \_\_\_\_\_ days per year

For nitrogen dioxide (110 ug/m3), \_\_\_\_\_ days per year

For particulate matter (75 ug/m3), \_\_\_\_\_ days per year

For sulfur dioxides (80 ug/m3), \_\_\_\_\_ days per year

For photochemical oxidants (180 ug/m3), \_\_\_\_\_ days per year

37. Which of the following best describes the linkages between air quality planning in your region and transportation planning by your MPO? (Check one.)

- 27 1.  Air quality concerns have been of only passing consideration in MPO transportation planning in this region.
- 43 2.  Air quality concerns have been taken into consideration in MPO transportation planning but have not generally influenced which projects are included in the TIP.
- 19 3.  Air quality concerns have been considered in MPO transportation planning resulting in the inclusion of some transportation control measures (TCMs) in the TIP.
- 6 4.  Air quality concerns have been a major focus in MPO transportation planning which is now closely linked to air quality planning.
- 1 5.  Air quality concerns have become so great that transportation control measures (TCMs) play a critical role in MPO transportation planning.
- 5 6.  Other (Explain)\_\_\_\_\_

38. When TSM activities or programs are selected for implementation, what consideration is given to whether or not they also serve as transportation control measures (TCMs) for air quality purposes? (Check one.)

- 42 1.  No consideration on a routine basis.
- 47 2.  Informal consideration is given but not as a formal part of the TSM decision-making process and consideration is project-specific.
- 11 3.  Consideration as a potential TCM is a routine part of the TSM decision-making process in order to coordinate transportation and air quality efforts

**Appendix IV  
Survey Question Frequencies**

FOR THE FOLLOWING AIR QUALITY EFFORTS IN YOUR REGION, IDENTIFY THE VARIOUS ROLES AND RESPONSIBILITIES OF EACH INDIVIDUAL AGENCY WITH AN "X" IN THE APPROPRIATE BOXES IN EACH COLUMN FOR AIR QUALITY TASK (If MPO is part of Regional COG, check only MPO row when appropriate):

**39. WHO IS RESPONSIBLE FOR FORECASTING AUTO EMISSION TRENDS?**

AGENCIES	Lead or Primary responsibility	Supportive role, technical assistance
1. U.S. DOT	9	23
2. U.S. EPA	9	34
3. State DOT	19	40
4. State Air Quality Control Commission	54	20
5. County/City Government	8	18
6. Regional Council of Governments	3	12
7. MPO	14	38
8. Air Quality Management District	5	15
9. Other agency	5	6

**40. WHO IS RESPONSIBLE FOR IDENTIFYING EMISSION REDUCTION STRATEGIES AND PLANNING TRANSPORTATION CONTROL MEASURES (TCMs)?**

AGENCIES	Lead or Primary responsibility	Supportive role, technical assistance
1. U.S. DOT	6	29
2. U.S. EPA	9	22
3. State DOT	26	33
4. State Air Quality Control Commission	40	25
5. County/City Government	11	25
6. Regional Council of Governments	3	13
7. MPO	35	30
8. Air Quality Management District	5	15
9. Other agency	1	9



**Appendix IV  
Survey Question Frequencies**

**41. WHO IS RESPONSIBLE FOR INTEGRATING AIR QUALITY PLANNING INTO THE TRANSPORTATION PLANNING PROCESS?**

AGENCIES	Lead or Primary responsibility	Supportive role, technical assistance
1. U.S. DOT	9	29
2. U.S. EPA	7	26
3. State DOT	27	44
4. State Air Quality Control Commission	17	33
5. County/City Government	6	27
6. Regional Council of Governments	2	13
7. MPO	61	22
8. Air Quality Management District	1	14
9. Other agency	0	6

**42. WHO IS RESPONSIBLE FOR IMPLEMENTING TCMs FOR AIR QUALITY PURPOSES?**

AGENCIES	Lead or Primary responsibility	Supportive role, technical assistance
1. U.S. DOT	10	26
2. U.S. EPA	13	22
3. State DOT	50	29
4. State Air Quality Control Commission	17	26
5. County/City Government	43	21
6. Regional Council of Governments	1	13
7. MPO	7	50
8. Air Quality Management District	5	15
9. Other agency	6	2

**Appendix IV  
Survey Question Frequencies**

**43. WHO IS RESPONSIBLE FOR CONDUCTING COMMUNITY EDUCATION FORUMS ON AIR QUALITY ISSUES?**

AGENCIES		Lead or Primary responsibility	Supportive role technical assistance
1. U.S. DOT		4	17
2. U.S. EPA		5	20
3. State DOT		8	31
4. State Air Quality Control Commission		47	20
5. County/City Government		17	22
6. Regional Council of Governments		4	9
7. MPO		15	37
8. Air Quality Management District		9	11
9. Other agency		9	4

**44. WHO IS RESPONSIBLE FOR COORDINATING LAND USE POLICIES WITH AIR QUALITY PLANNING?**

AGENCIES		Lead or Primary responsibility	Supportive role technical assistance
1. U.S. DOT		4	15
2. U.S. EPA		7	14
3. State DOT		9	27
4. State Air Quality Control Commission		14	23
5. County/City Government		42	19
6. Regional Council of Governments		8	8
7. MPO		21	34
8. Air Quality Management District		2	14
9. Other agency		9	7

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**Appendix IV  
Survey Question Frequencies**

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45. What role, if any, should TSM, and especially TDM, activities or projects play in the overall transportation system of your region?

46. What steps, if any, need to be taken on a federal level to facilitate the planning of TSM projects or activities by MPOs?

**Appendix IV  
Survey Question Frequencies**

47. What steps, if any, need to be taken on a federal level to ensure that planned TSM projects or activities are carried through to implementation within your region?

48. How would funding specifically earmarked for TSM and TDM projects or activities impact actual transportation decisions within your region?

**Appendix IV**  
**Survey Question Frequencies**

49. How can the federal government better ensure, if at all, that progress in implementing TSM also promotes air quality improvement efforts?

50. Do you have any other recommendations, comments or observations which you would like to make? (Attach additional sheets if necessary.)

51. Would you like a copy of our final report of this study? (*Check one.*)

1.  No
2.  Yes

HAVE YOU ENCLOSED A COPY OF YOUR MOST RECENT ANNUAL OPERATING BUDGET?

HAVE YOU ENCLOSED A COPY OF SECTIONS/CHAPTERS/PAGES RELATING TO TSM AND TDM FROM THE CURRENT TIP?

THANK YOU VERY MUCH!

# Site Visit Findings

## Objectives

The purpose of the site visits was to obtain the views of state and local transportation officials who were involved in programming and implementing TSM projects. We collected information to illustrate

- the kinds of demand management activities currently occurring and the role of MPOs in promoting them,
- implementor attitudes toward federal TSM policies, and
- the extent to which air quality concerns have been incorporated into the local transportation planning and implementation process.

## Organizational Structure of MPOs Representing Three Sites

The Metropolitan Council of the Twin Cities is a regional council that has been designated as the local MPO for the Minneapolis-St. Paul area. However, contrary to the way in which many MPOs are structured, council members may not be local elected officials but instead are appointed directly by the governor.<sup>1</sup> The governor has the authority to remove council members. As a result of this organizational arrangement, the council may be considered a type of state agency.

The Metropolitan Transportation Commission, established by California state law to conduct transportation planning for the nine-county San Francisco area, is an independent regional association designated as the MPO for that area. Policy direction is given to the agency by an 18-member panel, 14 of whom represent local elected officials. The commission has had considerably more leverage over transit planning than over highway planning because the agency has been the designated recipient for section 9 federal transit funds. These were programmed by the commission and in turn implemented by local transit authorities.

The Tampa MPO is housed within the Hillsborough City-County Planning Commission, which has responsibility for managing local transportation, environmental, and land-use planning. The MPO is staffed by the commission. A 10-member board, 8 of whom are local elected officials from the county and the three cities represented by the MPO, govern the agency. The other major cities in the Tampa Bay area, Clearwater and St. Petersburg, are represented by a separate MPO.

<sup>1</sup>The council does have a transportation advisory board, which includes elected officials in order to meet the federal requirement that elected officials serve on the boards of MPOs. The board's primary responsibility is to evaluate projects for federal-aid funding. The council has the authority to reject projects selected by the board.

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## Principal Findings

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### Types of Demand Management in Three Sites

In Minneapolis, at least two transportation management associations were supported by the local MPO. The Metropolitan Council of the Twin Cities has loaned the Improve-494 transportation management association a staff member to serve as executive director for 18 months. Additionally, the council has assisted in the formation of another transportation management association in the downtown Minneapolis area by encouraging the Regional Transit Board, which programs transit funds, to provide seed money for the new organization. The long-range transportation policy of the Minneapolis MPO promotes the use of HOV lanes, ramp metering, ridesharing, parking incentives and other demand management strategies. The council has also established a committee to study an HOV lane system for the area.

A number of demand management activities are in place in the San Francisco area, including HOV lanes, ramp metering, park-and-ride lots, ridesharing promotion, flexitime, parking management, and transit incentives. The local MPO prepared a commuter alternatives manual, a carpool handbook and a traffic mitigation guide. Nonprofit corporations such as Rides (a computer matching service for ridesharing) have promoted ridesharing options, and the Bay Area Economic Forum has encouraged market-based demand management activities such as congestion pricing.

Several demand management activities have been under way in Tampa. The Westshore Transportation Management Association has been in operation for more than a year, and another has been promoting demand management activities. The local MPO has sponsored a study to assess the potential for such a program in the central business district. In addition, the Bay Area Commuter Services Program, part of the Florida Commuter Assistance Program, has promoted demand management activities by providing technical assistance such as computer matching services to interested organizations.

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### Experience With TSM Planning by MPOs

According to transportation officials we interviewed, the level of planning emphasis given to demand management by MPOs depended on

- the relationship between local demand management planning and funding decisions and
- the presence of regional institutional barriers that impede demand management.

## Planning Linked to Funding

Implementors generally indicated that, in their opinion, any MPO planning of TSM activities is likely to be ineffective unless linked to funding decisions made by local and state transportation officials. Successful efforts to reduce congestion through demand management require a regional approach but, according to one California implementor, what may be good for the region as whole may not necessarily be considered advantageous for an individual locality. In his view, local officials, who were responsible for most programming in the area, were primarily interested in their own localities.

As noted by one official from the San Francisco area, demand management, unlike highway and mass transit projects, has not had a natural transportation constituency of its own, for either planning or implementation. As a result, there has been little external pressure on transportation decisionmakers to pursue demand management activities, whereas highway and mass transit interests within the transportation community depend in part on the implementation of their respective transportation options.

Additionally, implementors indicated that low-cost projects have had to compete with higher cost capital projects, which have been perceived by some implementors to have greater visibility and popularity with the general public. State implementors reported that persuading state leaders to endorse demand management strategies in their states was difficult. Even implementors who have promoted demand management use expressed concerns about public acceptability and about traditional problems in getting politicians to establish tolls (congestion pricing), increase gas taxes, and reduce the availability of free parking (parking management).

Demand management strategies can also be overlooked in favor of other larger projects in the decision-making process at least in part because implementors have perceived that demand management deals with only symptoms of the traffic congestion problem rather than the central problem itself. These implementors stated that only when regional growth management and transportation planning are coordinated will congestion be reduced. Despite the low cost of demand management activities,



implementors stated that some type of federal monetary incentive for planned demand management activities was needed to draw the attention of transportation decisionmakers in the programming or implementation phases. We found little support, however, among implementors for establishing a federal funding category for TSM.<sup>2</sup>

### Institutional Barriers

Regional TSM planning efforts by MPOs have remained inhibited because many local transportation agencies in a region have the authority to operate independently of one another. For example, there were 14 primary public transit systems, 59 privately owned and 38 charter transit systems operating in the San Francisco Bay area, some with nontransferable fares and uncoordinated schedules. In this context, regional planning in this area was perceived as a collection of uncoordinated local plans. According to one transit official, the San Francisco MPO had tried to coordinate various plans but lacked the power to ensure the development of a regional plan. According to this official, the MPO might withhold funding temporarily for lack of cooperation but transit operators would eventually receive the funds since transit is considered an essential service.

Institutional problems in the Tampa area were somewhat different. The MPO represents only Hillsborough County (and the cities therein), one of the four counties in the greater Tampa Bay area. Since traffic congestion does not terminate at the county border, the Tampa MPO, in addition to coordinating with state and local governments and transportation providers in its own county, must coordinate demand management projects with other MPOs, with the institutions they represent, and with other interested agencies within its jurisdiction. As a result, more time and effort need to be devoted to ensuring a regional consensus in transportation planning.

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### Implementor Views on Local MPO Promotion of Demand Management

Implementors in Minneapolis reported that the MPO's demand management planning efforts effectively led to the implementation of numerous types of these activities. In the San Francisco area, the Metropolitan Transit Commission has in the past considered demand management activities only in a minor congestion reduction role, although this MPO was compelled to increase emphasis on demand management planning as a result of the California Clean Air Act and a lawsuit by the Sierra Club. Some transportation implementors in the area indicated that the commission had been focusing on demand management planning since

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<sup>2</sup>These statements were made before the passage of the Intermodal Surface Transportation Efficiency Act of 1991.

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then but lacked the authority to force a needed regional approach to demand management. The role of the Tampa MPO in demand management efforts so far has been limited, according to Florida transportation officials, although Tampa MPO officials reported increasing interest in demand management.

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### Implementor Attitudes Toward Federal TSM Policy

Transportation implementors in all three areas indicated that a stronger connection between demand management planning and funding decisions was needed. These implementors recommended that the federal government provide monetary incentives to the state to implement demand management activities. They were opposed to any type of categorical funding for demand management activities because they believed that funding restrictions would penalize states with no serious congestion problems.

Implementor support for a federal requirement for congestion management planning by MPOs was strongest in the area in which many demand management activities were already being planned and implemented and weakest in the area in which demand management activities were gradually being introduced. Minneapolis implementors supported the requirement as a means of developing a more coordinated congestion reduction effort. These implementors also noted that efforts to promote demand management activities by the local MPO have been effective, with many demand management activities in place.

San Francisco area implementors reported that California law already requires that a congestion management plan be developed. However, the legislation provided only broad guidelines and no standard plan format existed. Additionally, the statutes failed to identify a specific funding source, even though the development and implementation of a congestion management plan could become costly. San Francisco area implementors expressed concern that, without funding to support a congestion management planning process, the plan would become just another requirement to "plan." Implementors stated that a federal requirement for demand management planning could be beneficial nationally if the requirement was connected to funding. Air quality officials indicated that a federal requirement was unnecessary for California because state clean air legislation had already established a congestion management system.

Tampa area implementors opposed a federal requirement for congestion management planning, which they viewed as unnecessary. They stated

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that congestion management planning would evolve naturally on the local level as it is needed. In their view, a federal mandate would probably lead to only another requirement that states would have to fulfill in order to receive funding. Thus, implementors from different metropolitan areas disagreed about the need for a federal requirement for congestion management planning.

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## Joint Air Quality and Transportation Planning

Air quality issues had not been a primary concern in either Minneapolis or Tampa, according to implementors there. In general, there had been limited integration of air quality concerns into the transportation planning process in Minneapolis. Although a few specific sites had unacceptable air pollution levels, implementors reported that the region overall did not have a serious air quality problem. Tampa Bay area implementors also reported limited integration of air quality and transportation planning. Hillsborough County Environmental Protection Commission officials indicated that local public and transportation officials have not regarded air quality as a major local concern. Additionally, they reported that inadequate coordination between their agency and the Florida department of transportation may have contributed to the failure to integrate the air quality and transportation planning processes in the Tampa Bay area.

State clean air legislation and legal action both affected the extent to which air quality concerns became part of the local planning process in the San Francisco area. The California Clean Air Act requires the local MPO to develop plans to meet local emissions standards. These plans must include demand management or related activities for clean air purposes to reduce vehicle miles traveled. When the plan is approved by the local air quality management district, it is to be implemented by the agency that also monitors compliance.<sup>3</sup>

Additionally, the lawsuit by the Sierra Club and Citizens for a Responsible Environment resulted in a court requirement for the local MPO to increase emphasis on demand management or related activities for clean air purposes. When the San Francisco area failed to meet federal air quality standards by 1987 (the deadline agreed to in the plan developed by the MPO and other local agencies), the Metropolitan Transportation Commission

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<sup>3</sup>The Metropolitan Transportation Commission proposed a plan including demand management measures for clean air purposes in June 1990. The Air Quality Management District determined that it failed to contain a sufficient number of these measures. A second plan was submitted in November 1990. The Air Quality Management District made some revisions to this plan, and it was incorporated into the regional plan in October 1991.

did not act on its own contingency plan, which was supposed to become operative if the area did not achieve attainment status by the deadline.

## Summary

This study involved three site visits to obtain the views of transportation implementors about the types of demand management occurring and the role of the MPOs in promoting those activities, implementors' perspective on federal TSM policy, and the extent to which air quality concerns were incorporated into the local transportation planning process. The level of planning emphasis given to demand management, according to implementors, depended on the relationship between demand management planning and funding decisions and the presence of regional institutional barriers inhibiting demand management planning. Implementors in all three sites pointed to the need for a stronger connection between demand management planning and funding decisions while opposing a separate federal funding category for demand management. Institutional barriers to effective demand management planning by MPOs existed in San Francisco and Tampa.

Some demand management activities had been under way at each site. The Minneapolis MPO effectively promoted numerous demand management activities and projects. While there are a number of demand management activities in the San Francisco area, until recently the local MPO placed little emphasis on such measures to reduce congestion. In the past, the Tampa MPO has played a minor role in initiating demand management activities in the Tampa area, although the agency has expressed an increased interest in demand management.

Implementors from all three areas recommended that the federal government provide some type of monetary incentive to the states to ensure that demand management activities will be implemented. Clear support for a federally mandated congestion management plan, however, came only from implementors in the Minneapolis area, where demand management planning has effectively led to implementation. San Francisco area implementors, noting that state law already required a congestion management plan, expressed concern that a requirement would be ineffective unless specifically connected to funding. In their view, if funding were made available, the federal mandate would have a positive effect nationally. Tampa implementors opposed a federally mandated plan, which they viewed as unnecessary and likely to become another requirement for states.

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Air quality issues had not been major concerns in the transportation planning and implementation process in Minneapolis and Tampa. Transportation officials in both areas had not considered air pollution levels in their areas to be serious. In the San Francisco area, both the California Clean Air Act and an environmental lawsuit increased MPO emphasis on demand management or related activities for clean air purposes.

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# Related GAO Products

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Traffic Management: Federal Policies to Encourage Low-Cost Approaches Need to Be Strengthened (GAO/PEMD-91-26BR, Aug. 28, 1991).

Smart Highways: An Assessment of Their Potential to Improve Travel (GAO/PEMD-91-18, May 1, 1991).

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