

April 1992

TRANSPORTATION INFRASTRUCTURE

Urban Transportation Planning Can Better Address Modal Trade-offs



146348



RESTRICTED--Not to be released outside the
General Accounting Office unless specifically
approved by the Office of Congressional
Relations.

RELEASED

—

**Resources, Community, and
Economic Development Division**

B-247297

April 2, 1992

The Honorable Quentin N. Burdick
Chairman
The Honorable John H. Chafee
Ranking Minority Member
Committee on Environment and Public Works
United States Senate

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

The Honorable George J. Mitchell
United States Senate

In 1990, 69 percent of peak-hour urban Interstate travel was congested, and 6 out of 10 people lived in areas designated as not meeting national air quality standards. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) authorizes \$155 billion in federal assistance for highway and mass transit programs over the 6-year period ending in fiscal year 1997. ISTEA offers states and localities unprecedented flexibility to address congestion and air quality problems—an estimated \$80 billion can be used for either highway or mass transit projects. Increased funding flexibility is critical as urban areas that are not attaining clean air standards strive to meet requirements of the Clean Air Act Amendments of 1990. Failure to meet these requirements could mean the potential loss of federal highway funds. For some areas, this means that constructing high occupancy vehicle (HOV) lanes and improving mass transit may be required in lieu of traditional lane widening for single-occupant vehicles.

In response to your September 20, 1990, request, we examined issues related to funding flexibility between the highway and mass transit programs. In particular, we evaluated (1) the extent to which highway and mass transit program funds have been used across modal lines and (2) the highway and mass transit planning processes to determine if improvements are needed to make more effective choices in addressing

congestion and clean air problems. In reviewing the planning process, we focused on the federal regulations and criteria available for making cross-modal comparisons between highway and mass transit projects.

Results in Brief

The use of highway and mass transit program funds to finance projects across modal lines has been limited. Of the \$174 billion in total federal-aid highway funds obligated by states and localities since fiscal year 1976, only about 4 percent have been invested in traditional mass transit projects (e.g., bus purchases and rail modernization). Similarly, of the \$40 billion in mass transit capital assistance obligated over the same period, only about 1 percent financed HOV lanes, busways, and other nontraditional transportation projects. Several factors contributed to these results. First, in general, neither highway nor mass transit program funds could be used to finance projects of the other mode. Second, an 80-percent federal matching share for mass transit capital assistance provided little incentive for states and localities to use 75-percent matching share highway funds for mass transit purposes. Third, federal, state, and local officials indicated that historically, states and localities have been reluctant to use either highway or mass transit funds for the other mode because of substantial unmet highway and mass transit needs. Finally, federal and local officials said that the use of highway funds for mass transit purposes has been hindered because state transportation departments, which are dominated by highway programs, have authority over highway funds.

The Department of Transportation's (DOT) highway and mass transit planning regulations do not contain criteria that states and localities can use to make modal trade-offs between highway and mass transit alternatives within a specific transportation corridor. In addition, very few state or local organizations have developed such criteria. Moreover, the criteria used by states and localities to evaluate projects within each mode do not facilitate modal trade-offs—highway criteria are oriented toward the movement of vehicles, while mass transit criteria are oriented toward the movement of people.

ISTEA addresses some of the disparities of previous law by providing for a uniform federal matching share for highway and mass transit projects and giving local officials greater authority over the selection of highway and mass transit projects within their areas. However, DOT could better assist states and localities in using ISTEA's funding flexibility by developing cross-modal criteria—that is, criteria for comparing highway; mass transit; and nontraditional transportation projects, such as HOV lanes. Such criteria

would (1) provide a common basis for quantifying a project's ability to meet mobility, environmental quality, safety, cost-effectiveness, and social and economic objectives and (2) help states and localities to identify the most efficient and effective mix of projects, regardless of mode, to address the nation's serious congestion and air quality problems.

Background

Since the mid-1950s, federal highway assistance has largely been focused on completing the Interstate highway system. The federal-aid urban (FAU) and Interstate substitution programs are exceptions. The FAU program, created in 1970 to respond to transportation problems in metropolitan areas, provided financing for urban highways and public transportation projects such as exclusive bus lanes. In 1973 the program was expanded to include purchases of buses and rail cars and the construction or reconstruction of fixed-rail facilities. Also in 1973, the Interstate substitution program was created to allow state and local officials to withdraw from planned construction nonessential segments of Interstate highways in urban areas and fund substitute mass transit projects. In 1976 the program was expanded to allow the funding of substitute highway projects under any highway assistance program. Because the use of mass transit funds should in some way benefit public transportation, investments solely in highway projects have largely been precluded.

Federal transportation planning requirements establish the framework for making decisions on the use of federal highway and mass transit funds. Legislation passed in 1974 subjected both the highway and mass transit programs to similar planning requirements—that is, a continuing, comprehensive transportation planning process carried out cooperatively by state and local officials (called the 3C planning process). Joint urban transportation planning regulations issued by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA)¹ in 1975, and amended in 1983, set the requirements for the consideration of cross-modal uses of funds. In general, these regulations require that both highway and mass transit projects be included in planning documents and that such projects be listed in transportation improvement programs before states or urban areas receive federal highway or mass transit funds. However, the regulations do not require that cross-modal comparisons be made or that funds be used across modes. Acting within the constraints of federal regulations, decisions to use funds across modes are made at the state and local levels. Appendix I contains a description of the current FHWA/FTA transportation planning and project development processes.

¹Formerly called the Urban Mass Transportation Administration.

Little Historical Use of Highway and Mass Transit Funds to Finance Projects Across Modal Lines

The use of highway and mass transit funds across modal lines has been limited. This is not surprising since, with some exceptions, highway funds could not be used for mass transit purposes and vice-versa. Only about 4 percent of the \$174 billion of federal-aid highway funds invested by states and localities since fiscal year 1976 have financed mass transit projects. The primary focus of the highway program since 1956 has been the completion of the Interstate highway system. The FAU and Interstate withdrawal and substitution (hereafter called Interstate substitution) programs, however, are exceptions, since both permit the financing of mass transit projects. Neither has been used extensively for mass transit.

The use of FAU funds to finance mass transit projects has been very limited. Between fiscal years 1976 and 1991, of the approximately \$11.5 billion of FAU funds invested by states and localities, only \$278 million—about 2 percent—has been used for mass transit projects. (See app. II.) We found several reasons for this situation. First, the federal matching share for mass transit capital assistance projects has been more favorable for states and localities than that for FAU projects (80 percent for mass transit capital projects compared with 75 percent for FAU highway projects). Second, state and local officials told us that in many instances, FAU funds alone were insufficient to finance expensive mass transit projects. Third, federal, state, and local officials told us that historically, there has been a reluctance for states and localities to use highway or mass transit funds across modal lines partly because highway and mass transit needs have exceeded available program funds. Finally, federal and local officials said that because state departments of transportation, which have authority over highway funds, are dominated by highway programs, the use of highway funds for mass transit purposes has been hindered. This is consistent with what DOT found in its 1976 report to the Congress on the urban system program.² DOT reported that only about 6 percent of FAU funds had been used for mass transit between fiscal years 1974 and 1976 partly because of a more favorable federal match for mass transit capital assistance and substantial unmet highway needs.

Similarly, the Interstate substitution program has not been used extensively to finance mass transit projects. As of September 1991, the \$13.2 billion investment of Interstate substitution funds has been split almost evenly between alternative highway and mass transit projects—55 percent for highway projects and 45 percent for mass transit projects. (See

²Urban System Study, Report of the Secretary of Transportation to the United States Congress Pursuant to Section 149, Public Law 94-280, Federal-Aid Highway Act of 1976, U.S. DOT (Dec. 1976).

app. II.)³ However, if areas with the largest investments in mass transit projects are excluded—the District of Columbia and Massachusetts—only 27 percent of program funds financed mass transit projects.⁴ Both the District of Columbia and Massachusetts used their Interstate substitution funds almost exclusively to finance the construction or reconstruction of rail systems. Although the Interstate substitution program was viewed by some state and local officials as providing an opportunity to finance a mix of highway and mass transit projects, state and local officials still had a great desire to satisfy unmet highway needs.

States' and localities' ability to use mass transit funds for highways had been hindered by the requirement that federally financed mass transit projects provide benefits to public transportation. As a result, uses of mass transit funds for highway-related projects have largely been limited to HOV lanes, busways, and transitways—projects that benefit both highways and mass transit.⁵ Only a small portion of mass transit funds has been invested in these types of projects—about 1 percent of all mass transit capital assistance funds invested by states and localities over the last 15 years.⁶ FTA officials said that a larger portion of mass transit funds was not spent on these types of projects partly because (1) mass transit needs exceeded available funds and (2) there was a public desire for mass transit.

In general, ISTEA addresses some of the disparities of previous law. Both highway and mass transit projects are subject to a uniform federal matching share, and local officials are provided greater authority in selecting highway and mass transit projects in their areas. For example, ISTEA provides for a uniform 80-percent federal matching share for highway and mass transit projects financed by either the Surface Transportation Program or mass transit capital assistance grants provided under sections 3 and 9 of the Federal Transit Act. Also, ISTEA stipulates that, with few exceptions, all projects carried out in transportation management areas be selected by metropolitan planning organizations

³The opportunity to withdraw most Interstate segments, except for certain segments under a judicial injunction prohibiting their construction, expired in September 1983. However, funds continue to be distributed for the completion of the substitute projects.

⁴Excluding both the substitute highway and mass transit investments for these two areas results in a revised total Interstate substitution investment of about \$9.6 billion; \$7 billion (73 percent) was invested in highway projects, and \$2.6 billion (27 percent) was invested in mass transit.

⁵Funds from highway programs have also been used to finance HOV lanes, ridesharing, and other nontraditional transportation projects. Since fiscal year 1976, approximately \$245 million of FAU funds and an additional \$356 million in non-FAU highway funds have financed such projects.

⁶Of \$40 billion in mass transit capital assistance invested by states and localities between fiscal years 1976 and 1991, about \$380 million has financed HOV, busway, and other nontraditional transportation projects that benefit both highways and mass transit.

(MPOs) in consultation with states.⁷ Previously, state officials generally selected highway projects and local officials selected mass transit projects separately and then submitted the projects to FHWA and FTA, respectively, for approval. The state could or could not concur with the projects selected by local officials.

Criteria Needed for Comparing Highway and Mass Transit Projects

Comparing highway and mass transit alternatives will become increasingly important as states and localities address the nation's serious congestion and air quality problems. However, the ability to make such comparisons at present is difficult. First, DOT's regulations do not include criteria for making modal trade-offs between highways and mass transit. Second, few organizations have developed criteria for making modal trade-offs. Finally, the criteria that states and localities use to evaluate major capital projects within each mode generally do not facilitate comparisons—highway criteria focus on the movement of vehicles, while mass transit criteria focus on the movement of people. Therefore, criteria for making modal trade-offs are needed that would quantify, on a common basis, highway and mass transit projects' ability to meet essential objectives such as mobility, environmental quality, safety, cost-effectiveness, and social and economic benefits. A common basis for analysis will assist states and localities to identify the most efficient and effective projects, regardless of mode, to help mitigate congestion and air pollution problems. However, flexibility will be needed to permit states and localities to tailor the criteria to meet their own specific situations. Two MPOs we contacted illustrate how common criteria can be used to compare highway and mass transit projects to establish priorities and make funding decisions.

Highway and Transit Selection Criteria Do Not Facilitate Choices

DOT's joint FHWA/FTA transportation planning regulations require state and local officials to consider all transportation modes, including highway and mass transit, when preparing transportation plans. Although the regulations do not require cross-modal comparisons, both FHWA and FTA officials said that state and local officials, in preparing transportation plans, should be comparing highway and mass transit projects within a particular transportation corridor. Such comparisons can help identify those projects, or mix of projects, that efficiently and effectively address transportation problems. Once specific modes are selected—whether

⁷Transportation management areas are all urbanized areas with populations of over 200,000. Additional areas may be designated at the request of governors and MPOs or local officials of the affected areas. Projects within a transportation management area on the National Highway System or carried out under the bridge and Interstate maintenance programs are selected by the state in cooperation with MPOs.

highway or mass transit—then the project development process begins to focus more narrowly on projects within that particular transportation mode.

Although FHWA and FTA officials suggested that cross-modal comparisons be made in developing transportation plans, very little criteria or guidance are available for making such comparisons. The FHWA/FTA joint planning regulations are silent as to criteria. In 1978 DOT received a study, which it sponsored, that synthesized methodologies for evaluating urban transportation system alternatives.⁸ Although the document presented methodologies for assessing the cross-modal benefits of highway and mass transit projects, it was primarily a theoretical discussion of evaluation techniques. A DOT official acknowledged that additional research on this subject was needed. FTA has also issued draft procedures on the analysis of fixed-guideway transit projects (new rail lines, extensions to existing lines, and busways).⁹ However, the information focuses on evaluating mass transit options, not cross-modal comparisons. None of the 10 states and only 4 of the 15 MPOs we interviewed had developed criteria or a process for making cross-modal comparisons.¹⁰ A Transportation Research Board (TRB) official stated that not many organizations were familiar with cross-modal comparisons and that the state-of-the-art for cross-modal criteria was not well advanced.

Virtually all of the federal, state, and MPO officials we spoke with agreed that the factors used to select major projects within the highway and mass transit modes are generally different and do not easily facilitate choices between the modes. As one state official said, the analysis of highway projects focuses on such things as pavement condition and vehicle capacity, while the analysis of mass transit projects focuses on such things as ridership and service requirements. Many federal, state, and local officials believed it is easier to demonstrate the utilization of a highway project, such as accommodating increased vehicle miles of travel by adding lanes, than the utilization of a mass transit project, such as

⁸Evaluating Urban Transportation System Alternatives, DOT, Assistant Secretary for Policy and International Affairs, Office of Transportation Economic Analysis (Nov. 1978). This report was prepared by Systems Design Concepts, Inc., Washington, D.C.

⁹Procedures and Technical Methods for Transit Project Planning, Urban Mass Transportation Administration, DOT (undated). Mass transit analysis of alternatives is discussed in more detail in appendix I.

¹⁰The Capital District Transportation Committee, Albany, New York; Denver Regional Council of Governments, Denver, Colorado; Metropolitan Transportation Commission, Oakland, California; and Puget Sound Council of Governments, Seattle, Washington, were either using, or had used in the past, a process for comparing highway and mass transit projects. See app. IV for a list of organizations we contacted.

accommodating increased ridership by acquiring additional transit vehicles. Available data tend to support this claim. For example, according to DOT, between 1984 and 1989 the growth of daily vehicle miles of travel (a measure of highway use) was four times higher than the growth of highway mileage. In addition, DOT recently reported that, with one exception, the actual patronage of rail transit systems in nine cities was less than half of that originally forecasted.¹¹

The need for cross-modal criteria has been a long-standing problem. In 1978 we reported that to better assist states and localities in applying limited resources to effectively address complex transportation problems, more needed to be done to develop the techniques for measuring the effectiveness of alternative transportation investments.¹² Although increasingly faced with a number of issues that cut across modal lines (such as energy use and the efficient allocation of resources among modes), state agencies had made little progress in doing intermodal planning—that is, seriously examining the trade-offs and interactions between competing and complementary transportation modes. This was due, in part, to a lack of techniques, measures, and methods for making cross-modal trade-offs. At the time, state officials told us that not only did they need better and more reliable information on various transportation modes but they also needed better methods for making modal trade-offs. The states and MPOs we contacted during our current work also said that a lack of common criteria has prevented them from making cross-modal comparisons and that cross-modal criteria should be developed. As one MPO official stated, having criteria to compare highway and mass transit projects would go far in ensuring that funding flexibility promotes cross-modal decision making.

Essential Criteria for Cross-Modal Comparisons

Our work suggests that in comparing highway and mass transit projects to address transportation problems within a specific corridor, several essential criteria should be considered. These include common measures of highway and mass transit projects' ability to meet mobility, environmental quality, safety, cost-effectiveness, and social and economic objectives. Not only would these criteria and the related measures that provide a common basis for comparison better assist states and localities to assess the relative efficiency and cost-effectiveness of alternative projects but the criteria would also help states and localities identify the

¹¹Urban Rail Transit Projects: Forecast Versus Actual Ridership and Cost, DOT (Oct. 1990). Patronage of Washington, D.C.'s rail transit system was only 28 percent below that forecasted.

¹²Making Future Transportation Decisions: Intermodal Planning Needed (CED-78-74, Mar. 16, 1978).

mix of projects necessary to effectively address congestion and air quality problems.

As indicated earlier, the state-of-the-art for cross-modal comparison criteria is not well advanced. The following discussion is not intended to be all inclusive because other factors or measurement techniques may also be appropriate.

Mobility of People and Goods

First, a basic function of transportation is mobility—the ability to get people and goods from one place to another. Highways accomplish this by accommodating the movement of vehicles, while mass transit facilitates the movement of people. Since the common link between highways and mass transit is the movement of people, common measures of people moved will be needed. An FHWA official suggested that such factors as travel time, travel cost, and/or the cost or time savings per passenger could be used as a basis for measuring mobility. Officials from one MPO we contacted also suggested that person-hours of travel or time delayed because of congestion could be used as a mobility measurement.

In developing common measures of mobility, it will also be important to consider the movement of goods and the actual or potential implementation of incident management systems.¹³ The movement of goods (especially by truck) can affect, and be affected by, such things as congestion levels and infrastructure (e.g., highway) condition. Both congestion and deteriorating infrastructure can affect the degree of mobility provided by transportation facilities. Therefore, to ensure the maximum mobility of both people and goods, it will be important to identify and analyze the effect that goods movements have on the need for alternative facilities, such as highways and mass transit. Similarly, incident management systems can affect congestion levels and mobility. A recent study for the Trucking Research Institute found that incident management systems can be effective in reducing congestion and maintaining highway capacity.¹⁴ Again, the implementation of such systems needs to be considered when comparing the efficiency and effectiveness of alternative highway and mass transit investments.

¹³In general, incident management systems detect and verify highway incidents (accidents and other events that cause congestion), provide a response to the problem, and ensure that traffic resumes its normal flow once the incident is cleared.

¹⁴Incidence Management, Cambridge Systematics, Inc., in association with JHK & Associates, Transmode Consultants, Inc., and Sydec, Inc., Oct. 1990. This study was prepared for the Trucking Research Institute of the ATA Foundation, Inc.

Environmental Quality

Second, regardless of whether highway, mass transit, or nontraditional transportation projects are selected, the National Environmental Policy Act, as amended, requires that environmental factors, such as air quality, be considered before a project is initiated. In addition, nonattainment areas—areas that have not met certain air quality standards—are required under the Clean Air Act Amendments of 1990 to (1) consider air quality factors in preparing transportation plans and (2) implement transportation control measures, such as HOV lanes and mass transit improvements, that act to reduce emissions from vehicles. Since one of the purposes of cross-modal criteria is to assist in project selection, such criteria should help identify projects that contribute to meeting environmental objectives, including those outlined in federal legislation. The Environmental Protection Agency and DOT are currently developing guidance for states and localities to use in measuring emissions from highway traffic and mass transit and for comparing these emissions with requirements to improve air quality.

Safety of System Users

Third, an essential element of any transportation network is the safety of its users. Therefore, it will be important that safety factors be included in developing cross-modal criteria for project selection. Such benchmarks as accident rates, fatalities, and injuries per million passenger-miles of travel could be a starting point for developing common measurements of safety impacts. In addition, state and local decision makers will need common measures for assessing the impact of hazardous materials transportation on modal choice.

Cost-Effectiveness of Competing Projects

Fourth, it will be important to identify the cost effectiveness of alternative highway and mass transit projects to help ensure the efficient allocation of transportation resources. A TRB official suggested that individual highway and mass transit projects be reduced to their equivalent annual costs (including both capital and operating costs). This would provide a common denominator by which planners and decision makers could evaluate both high- and low-cost projects—regardless of mode—on an equal basis to determine if the added benefits (e.g., increased mobility, safety, etc.) are worth the added costs. Selecting those projects that yield the greatest benefits per dollar of investment would therefore facilitate an efficient allocation of resources. Other measures of cost effectiveness may also be developed that recognize the importance of other factors. For example, as one state official suggested, a “cost per unit of congestion relief” could be developed. Under this approach, a project’s forecasted congestion relief benefits would be compared with a project’s total costs.

This recognizes the importance of cost-effectiveness as well as mobility improvement through congestion reduction.

Meeting Social and Economic Objectives

Finally, in addition to meeting the mobility needs of individuals, transportation systems also provide social and economic benefits. For example, mass transit systems serve those that either cannot, or choose not to, drive automobiles, while both modes provide the access necessary for economic development. Cross-modal criteria will need to both recognize and measure the extent to which highway, mass transit, and nontraditional projects deliver the social and economic benefits expected of such projects when local and regional priorities are established. This includes measuring how such projects both affect and are affected by land-use decisions and the commercial and residential development and passenger flows resulting from such decisions. It also includes measuring how highway and mass transit projects promote regional and national connectivity by providing access to transportation modes such as intercity rail and aviation. Such indicators as changes in local or regional employment opportunities and income levels are important gauges of the ability of highway and mass transit projects to meet social and economic goals.

Examples of Locally Implemented Cross-Modal Criteria

Some MPOs are currently implementing, or have attempted in the past to implement, criteria that permit a comparison of highway and mass transit. Such criteria have particularly been used in deciding funding priorities once projects had been selected within specific transportation corridors. For example, the Metropolitan Transportation Commission (MTC), the MPO for the San Francisco Bay area, is currently using locally developed criteria to make cross-modal comparisons in helping select projects for the annual transportation improvement program. Under MTC's criteria, highway and mass transit projects are subjectively assessed by scoring individual projects in three separate areas: user benefit, regional priority, and contribution to achieving air quality goals. Scores in each area can range from zero to 20; 60 is the maximum total score. Within each area, common factors such as safety, commitment to prior transportation plans, and congestion reduction impacts are assessed. Factors unique to each mode are also assessed, such as capacity for highways and peak-load passenger movement for transit. According to MTC officials, funding allocations are made on the basis of total project scores. MTC officials also said that this system was developed to help minimize the relevance of the funding source in selecting those projects—regardless of mode—that effectively address local and regional transportation needs.

In 1978 the Denver Regional Council of Governments (DRCOG), the MPO for the Denver, Colorado area, also used criteria and a scoring methodology for comparing highway and mass transit projects to make funding decisions for Interstate substitution projects. According to DRCOG officials, this process was developed, in part, because Interstate substitution funds could be used to fund both highway and mass transit projects. Under the DRCOG decision process, once projects met certain predetermined requirements, such as being regionally significant, they were subjectively scored on such common criteria as their ability to relieve congestion. Funding decisions were made on the basis of a project's score and consideration of additional criteria, such as project cost and geographical representation. A DRCOG official said that, although used only on a one-time basis because previous federal highway and mass transit programs (previous to ISTEA) did not offer substantial funding flexibility, this decision process helped local officials compare highway and mass transit projects.

Appendix III contains a more complete description of the criteria and methodologies applied by MTC and DRCOG for making cross-modal comparisons. MTC and DRCOG were used as examples, in part, because they were recommended by both FHWA and FTA as having attempted to develop objective measures for cross-modal comparisons. MTC officials said that their criteria and scoring process are still being improved and further refinements can be expected.

Conclusions

The use of highway and mass transit funds across modal lines has been limited. This was to be expected since, with some exceptions, highway funds could not be used for mass transit projects and vice-versa. Two highway programs that permitted cross-modal use of funds—FAU and Interstate substitution programs—were not used extensively for mass transit, in part, because federal assistance has not met urban highway needs. Mass transit funds were likewise used for traditional mass transit projects, except for some investments in HOV lanes and other nontraditional transportation projects that benefit both highways and mass transit.

Recent events have changed the environment within which surface transportation choices will be made. Specific actions by federal, state, and local governments will be necessary to address increasing traffic congestion and deteriorating air quality. The Clean Air Act Amendments requires states and localities not only to consider air quality factors in

transportation planning but also to implement transportation control measures such as HOV lanes in nonattainment areas. The ISTEA provides states and localities with unprecedented flexibility to use federal assistance to implement highway, mass transit, or nontraditional transportation projects that efficiently and effectively address these problems. ISTEA also addresses some of the disparities of previous law by providing for a uniform federal matching share for highway and mass transit capital projects and granting greater authority to local officials in selecting transportation projects in their areas.

However, states' and localities' ability to use this flexibility in developing effective solutions is hindered by the lack of criteria and measures for comparing highway, mass transit, and nontraditional transportation projects. DOT can better assist states and localities' by developing criteria and measures to make cross-modal trade-offs. In doing so, it will be important that criteria essential to future decision making be included—mobility, environmental quality, safety, cost-effectiveness, and social and economic objectives. By applying specific values and weights to these criteria and measures, states and localities can more effectively use the funding flexibility provided by ISTEA to identify projects that best address their individual congestion and air quality concerns.

Recommendations

To better assist states and localities in identifying those projects, regardless of mode, that most effectively deal with congestion and air quality problems, we recommend that the Secretary of Transportation take the following actions in coordinating and initiating policies to promote efficient intermodal transportation as required by the Intermodal Surface Transportation Efficiency Act of 1991:

- Develop criteria and related measures for comparing highway and mass transit projects that (1) consider mobility, environmental quality, safety, cost-effectiveness, and social and economic objectives and (2) identify how these criteria and measures may be applied by transportation planners and decision makers. In developing these criteria and measures, the Secretary should solicit input from states, MPOs, and localities as well as others who have an interest and/or expertise in highway and mass transit issues.
- Revise the highway and mass transit planning regulations, as appropriate, to incorporate the criteria and measures developed for comparing highway and mass transit projects and fully encourage the use of these criteria and measures by states, MPOs, and others in selecting projects and developing

transportation plans and transportation improvement programs required by the regulations.

Agency Comments

We discussed the contents of this report with responsible DOT officials and have incorporated their comments where appropriate. As agreed, we did not obtain written comments on a draft of this report. In general, DOT agreed with our findings and indicated that it fully intends to develop criteria for comparing highway and mass transit projects.

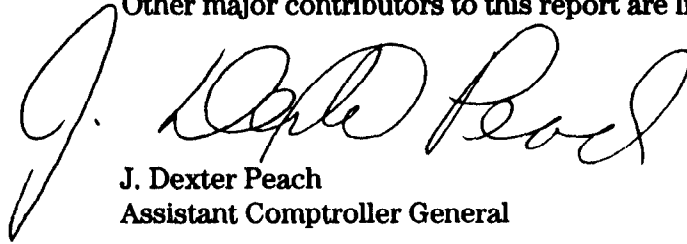
Scope and Methodology

To evaluate the extent of past cross-modal funding flexibility, we obtained financial data from FHWA and FTA officials regarding three federal programs which fund projects that also benefit the other mode—FAU, the Interstate substitution program, and the mass transit capital grant program. We did not, however, independently verify the accuracy of the FHWA and FTA financial data. We also reviewed the laws and regulations pertinent to these programs.

We interviewed federal, state, MPO, and local officials and obtained information from 10 states and 15 MPOs on the joint highway and mass transit planning process. We also interviewed and obtained information from eight providers of mass transportation services. The states and MPOs were selected to provide both eastern and western perspectives and to get a cross section of urban and rural areas.

Our review was conducted between November 1990 and January 1992 in accordance with generally accepted government auditing standards. As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days from the date of this letter. At that time, we will send copies to the Secretary of Transportation; the Administrators, Federal Highway and Federal Transit Administrations; interested congressional committees; the Director, Office of Management and Budget; and participating states, MPOs, and mass transit operators. We will also send copies to other interested parties upon request.

Our work was performed under the direction of Kenneth M. Mead,
Director, Transportation Issues, who can be reached at (202) 275-1000.
Other major contributors to this report are listed in appendix V.



J. Dexter Peach
Assistant Comptroller General

Contents

Letter		1
Appendix I		18
Highway and Mass	Joint FHWA/FTA Urban Transportation Planning Process	18
Transit Planning and	Project Development Process	21
Project Development		
Processes		
Appendix II		25
Federal-Aid Urban		
and Interstate		
Substitution Funds		
Obligated for Highway		
and Mass Transit		
Projects		
Appendix III		28
Examples of Planning	Metropolitan Transportation Commission	28
Processes That	Denver Regional Council of Governments	30
Compare Highway		
and Mass Transit		
Projects		
Appendix IV		34
List of Organizations		
GAO Contacted		
Appendix V		36
Major Contributors to		
This Report		

Tables

Table II.1: Federal-Aid Urban System Funds Obligated for Highway and Mass Transit Projects, Fiscal Years 1976 to 1991	25
Table II.2: Interstate Substitution Funds Obligated for Highway and Mass Transit Projects, Fiscal Years 1976 to 1991	26
Table II.3: Interstate Substitution Funds Obligated for Highway and Mass Transit Projects—Excluding District of Columbia and Massachusetts, Fiscal Years 1976 to 1991	27

Figures

Figure I.1: Joint FHWA/FTA Urban Transportation Planning Process	19
Figure I.2: Major Highway and Mass Transit Project Development Process	22
Figure III.1: Metropolitan Transportation Commission's Criteria and Scoring Measures	29
Figure III.2: Denver Regional Council of Governments' Criteria and Scoring Measures	32

Abbreviations

DOT	Department of Transportation
DRCOG	Denver Regional Council of Governments
EIS	environmental impact statement
FAU	federal-aid urban
FTA	Federal Transit Administration
FHWA	Federal Highway Administration
GAO	General Accounting Office
HOV	high occupancy vehicle
ISTEA	Intermodal Surface Transportation Efficiency Act
MPO	metropolitan planning organization
MTC	Metropolitan Transportation Commission
TIP	transportation improvement program
TRB	Transportation Research Board

Highway and Mass Transit Planning and Project Development Processes

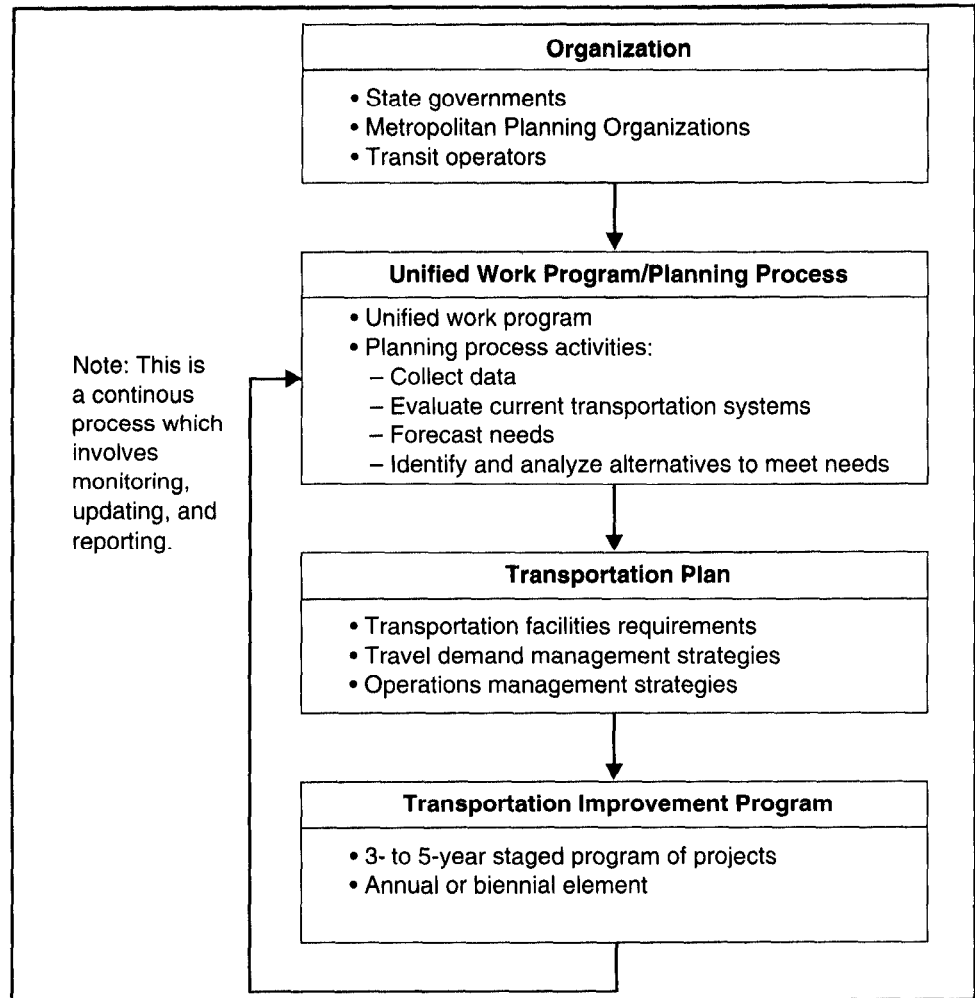
Federal law and joint Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) regulations require states, metropolitan planning organizations (MPOs), and transit operators that receive federal capital or operating assistance to continuously, cooperatively, and comprehensively plan for urban transportation needs. This joint urban transportation process, also known as the 3C planning process, produces transportation plans that include both highway and mass transit projects. The decision to develop a major highway or mass transit project is made during the initial joint 3C planning process. Once a major highway or mass transit project is selected, further project development occurs under separate FHWA or FTA procedures.

The following provides a description of the activities in the urban transportation planning and project development processes.

Joint FHWA/FTA Urban Transportation Planning Process

Urban highway planning and mass transit planning have changed over time. In 1962 the Congress passed legislation mandating an urban transportation planning process and made this a condition for receiving federal highway funds in urbanized areas. Similarly, the Congress required urban mass transit planning in 1964. The highway and mass transit planning processes were made joint processes with the passage of the National Mass Transportation Assistance Act of 1974. In September 1975 FHWA and FTA issued joint urban transportation planning regulations which strengthened the linkage between highway and mass transit planning by making them subject to similar processes. The joint planning process is shown in figure I.1. This process is continuous—that is, planning activities support both new transportation plans as well as any changes to existing plans.

**Figure I.1: Joint FHWA/FTA Urban
Transportation Planning Process**



Source: GAO analysis of FHWA and FTA documentation.

Organization

The joint FHWA/FTA urban transportation planning regulations require all urban areas of more than 50,000 in population to have a 3C transportation planning process. The process is to result in transportation plans which are consistent with the planned development of an urbanized area. As figure I.1 shows, the planning process is generally carried out by states, MPOs, and publicly owned operators of mass transportation services. In some metropolitan areas, other organizations, such as local city or county governments, may also be included in the transportation planning process.¹

¹The designation of an MPO and its membership are made by agreement among the units of local governments and the governor of the state.

The 3C planning process forms the basis for all local and state decisions affecting federal highway and mass transportation assistance in urban areas.

**Unified Work
Program/Planning Process**

The joint FHWA/FTA regulations require the state, MPOS, and certain FTA fund recipients to develop a unified work program which describes all transportation-related planning activities anticipated in the urban area for the next 1- or 2-year period.² The work program includes the purpose, managing agency, and funding source for each planning activity. In developing the unified work plan and assigning responsibility for performing the planning activities, MPOS may utilize staff resources of other agencies, such as state government and local transit operators. Unified work programs must be endorsed by the MPO, and such programs are a prerequisite for receiving federal highway and mass transit planning funds.

Planning activities identify current and future transportation corridor requirements and the highway and mass transit projects that show promise for addressing these requirements. To determine the area's transportation requirements, such as a pavement needing resurfacing or a new capacity enhancement project, planners collect data on socio-economic conditions, land use, travel, and other factors and evaluate the current transportation system. In addition, forecasts are prepared to identify future transportation requirements. Transportation planners are required to consider a range of transportation options—both highway and mass transit—in selecting alternatives that show promise for addressing the area's transportation requirements. However, federal planning regulations do not require cross-modal comparisons between highway and mass transit projects, and the regulations are silent as to the criteria and methodology for conducting such comparisons. Rather, MPOS identify their own planning activities for their region in the Unified Work Plan.

**Transportation Plan and
Transportation
Improvement Program**

The urban transportation planning process requires that a transportation plan and a transportation improvement program be developed for each urbanized area. The transportation plan describes policies, strategies, and facilities to accommodate current and future travel demands. This plan must also provide an analysis of transportation systems management

²The requirement for a unified planning work program is only for urban areas with a population of over 200,000. For urban areas with populations of between 50,000 and 200,000, the state and MPO are required to describe and document how planning funds are to be used.

strategies, including operations and demand management, to make more efficient use of the existing transportation system.

The transportation improvement program (TIP) is a more specific program of transportation improvement projects, covering a period of not less than 3 years, that are consistent with the transportation plan. The TIP also contains an annual or biennial element which lists all transportation project activities that will receive federal funding for a given 1- or 2-year period. The regulations require the MPO and state and transit operators to cooperatively develop the TIP and make project selections within expected funding levels. FHWA and FTA neither prescribe the criteria or methodologies to be used in selecting projects for the transportation plan or TIP, nor require that trade-offs be made between highway and mass transit projects.

MPO endorsement of the transportation plan, TIP, and the annual or biennial element is a prerequisite for receiving federal funds for transportation improvement projects. In addition to the transportation plans, TIPs, and annual/biennial elements, 23 U.S.C. 105 requires each state to annually prepare a statewide program of projects. This program includes a list of projects that the state proposes for federal assistance and is submitted to the Secretary of Transportation for approval. FHWA generally requires that highway projects in urbanized areas proposed on the statewide program of projects be drawn from that area's TIP. Similarly, the Federal Transit Act requires that proposed mass transit projects be included in a program of projects that is submitted for the Secretary's approval.

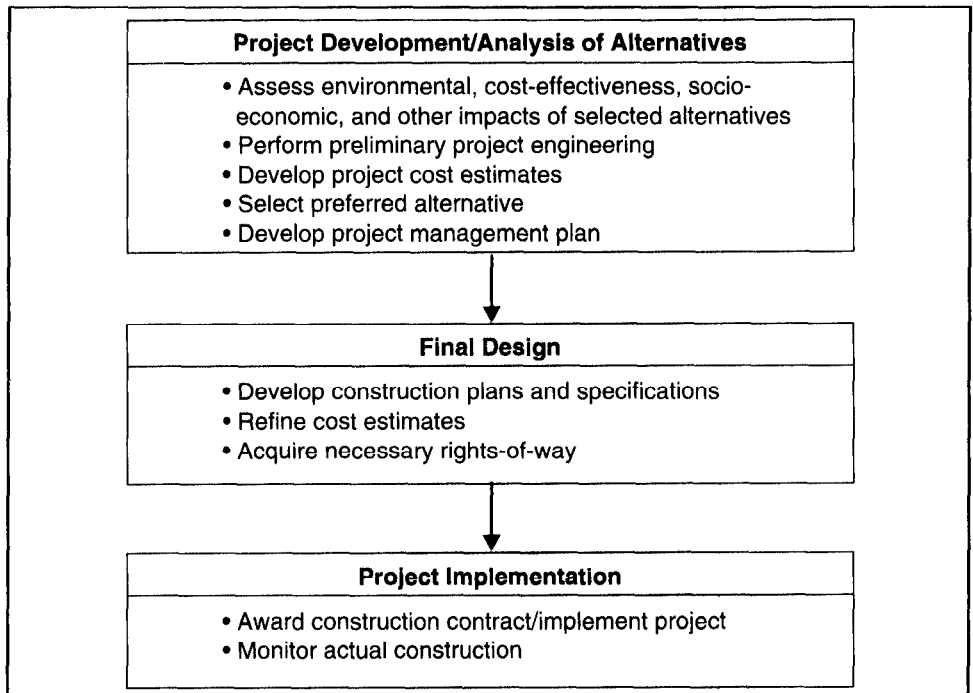
Project Development Process

During the joint 3C urban transportation planning process, states, MPOs, and local transit operators select a mode—either highway or mass transit—to address specific transportation needs. Following this selection, the project development process requires the analysis of the environmental, social, and cost impacts of several alternatives. This analysis leads to the selection of a single preferred project for further development. The project development process is similar for both the highway and mass transit programs, with the exception that mass transit projects must also meet a cost-effectiveness test. Once a single project is agreed upon, both the highway and mass transit programs require similar final design and implementation activities. Figure I.2 illustrates the project development process.

**Project
Development/Analysis of
Alternatives**

Once a highway or mass transit mode is selected for development, the beneficial and adverse impacts of several alternative projects are analyzed to determine the preferred option for final design. Building on the 3C planning analysis, the project development phase gathers more detailed information on the impacts of a smaller number of potential projects. This provides for a more accurate evaluation of a project's merits or demerits. The procedure for developing the detailed information and making final project selections is similar for the highway and mass transit programs, although mass transit projects must also meet a cost-effectiveness test. (See fig. I.2.)

**Figure I.2: Major Highway and Mass
Transit Project Development Process**



Source: GAO analysis of FHWA and FTA documentation.

The highway and mass transit programs are similar in that both require an analysis of the environmental, social, and economic impacts of several alternatives. FHWA and FTA have issued joint regulations for the preparation of environmental assessments and impact statements (EIS).³ In general, these regulations require the consideration of such things as the need for safe and efficient transportation and national, state, and local

³The preparation of an EIS is required by the National Environmental Policy Act of 1969, as amended.

environmental protection goals in preparing draft EISS. In addition, each alternative's potential social and economic impacts are analyzed. After providing an opportunity for public review and comment, any necessary revisions are made and a final EIS is prepared. The final EIS is approved by FHWA or FTA and identifies the preferred alternative.

Major mass transit projects, unlike highway projects, are also subject to FTA's alternatives analysis. This analysis requires that such things as ridership levels and financial feasibility be evaluated, and includes a detailed cost-effectiveness test.⁴ This test requires proposed mass transit projects to meet a cost-per-new-transit-trip threshold of at least \$6 before it can advance to the next phase of development. FTA could refuse to fund those projects that fail to meet this test. In addition, projects that do not produce a net gain in transit ridership compared with lower cost alternative projects must have a greater local financial commitment to receive FTA funds. The highway program, on the other hand, does not impose additional requirements beyond the EIS. Instead, states make their own decisions regarding the use of federal highway funds.

Preliminary project engineering develops greater design detail for those highway and/or mass transit projects that are predicted to have the most beneficial and least adverse environmental, social, and other impacts. In addition, cost estimates are prepared to allow more accurate comparisons of the costs and benefits of competing alternative projects. On the basis of the analysis of alternatives, preliminary engineering, and cost estimates, state and local officials recommend one preferred alternative project for approval. Highway projects are submitted to FHWA for approval, and mass transit projects are submitted to FTA. Project management plans and project implementation schedules are prepared for the selected project.

Final Design

Activities in the final design phase are similar for both mass transit and highway projects. These activities include: refining earlier project cost estimates, developing detailed construction plans, and preparing project specifications. After obtaining FHWA or FTA approval to do so, the state highway administration or local transit operator managing the project may begin to acquire any necessary rights-of-way for the investment. Once the

⁴FTA requires this cost-effectiveness analysis for all major transit investments—e.g., fixed-guideway facilities whose cost exceeds \$100 million. A fixed-guideway facility means any public transportation facility that uses and occupies a separate right-of-way or rails exclusively for public transportation services. ISTEA exempts fixed-guideway projects from this analysis if (1) the project is located within a severe or extreme nonattainment area and the project is a transportation control measure or (2) federal assistance is less than either \$25 million or one-third of the total project cost.

final design is completed and approved, construction activities for the project are listed in the annual/biennial element of the TIP so that these activities will be eligible for federal highway or mass transit assistance.

Project Implementation

The project implementation phase is also similar for both highway and mass transit projects. This phase involves formal requests for proposals for project construction by the state highway administration or the local transit operator. After bids are received, the construction contract is awarded and actual construction can proceed. Each year, expected construction expenditures are included in the TIP/annual element so that the project remains eligible for federal assistance.

Federal-Aid Urban and Interstate Substitution Funds Obligated for Highway and Mass Transit Projects

**Table II.1: Federal-Aid Urban System
Funds Obligated for Highway and
Mass Transit Projects, Fiscal Years
1976 to 1991**

Dollars in millions

State	Total FAU funds obligated	FAU funds obligated for highway projects		FAU funds obligated for transit projects	
		Dollars	Percent	Dollars	Percent
Alaska	\$63.9	\$52.3	82.0	\$11.5	18.0
Calif.	1,288.1	1,236.0	96.0	52.1	4.0
Hawaii	61.1	56.5	92.5	4.6	7.5
Ill.	734.7	727.5	99.0	7.2	1.0
Iowa	120.5	120.4	99.9	0.1	0.1
Minn.	159.0	145.0	91.2	14.0	8.8
N.J.	528.3	526.1	99.6	2.1	0.4
N.Y.	1,003.3	840.9	83.8	162.4	16.2
Ohio	601.7	593.3	98.6	8.4	1.4
Oreg.	79.5	78.7	99.0	0.8	1.0
Pa.	548.7	540.2	98.4	8.6	1.6
Tex.	527.6	526.5	99.8	1.1	0.2
Vt.	61.0	59.2	97.2	1.7	2.8
Wash.	199.1	196.1	98.5	3.0	1.5
Other ^a	5,541.1	5,541.1	100.0	0.0	0.0
Total	\$11,517.6	\$11,239.9	97.6	\$277.7	2.4

Note: Includes only the 50 states and the District of Columbia. Numbers may not add because of rounding.

^aIncludes 36 additional states and the District of Columbia. Amounts were aggregated, since all funds were invested in highway projects. "Other" includes North Dakota, which invested less than one-tenth of 1 percent (\$30,730) in mass transit projects.

Source: GAO analysis of FHWA and FTA data.

**Appendix II
Federal-Aid Urban and Interstate
Substitution Funds Obligated for Highway
and Mass Transit Projects**

**Table II.2: Interstate Substitution
Funds Obligated for Highway and
Mass Transit Projects, Fiscal Years
1976 to 1991**

State	Total funds obligated	Total funds obligated for highway projects		Total funds obligated for transit projects	
		Dollars	Percent	Dollars	Percent
		Dollars in millions			
Ariz.	\$68.6	\$67.5	98.3	\$1.1	1.7
Calif.	139.3	38.7	27.8	100.5	72.2
Colo.	263.8	245.5	93.0	18.4	7.0
Conn.	792.9	746.7	94.2	46.3	5.8
D.C.	2,188.1	224.6	10.3	1,963.5	89.7
Ga.	92.6	92.6	100.0	0.0	0.0
Iowa	298.5	297.1	99.5	1.4	0.5
Ind.	77.2	62.1	80.6	15.0	19.4
Ill.	2,528.6	1,678.6	66.4	850.1	33.6
Mass.	1,451.4	82.9	5.7	1,368.6	94.3
Md.	1,174.5	639.9	54.5	534.6	45.5
Minn.	192.8	183.6	95.2	9.2	4.8
Nebr.	78.3	76.3	97.4	2.0	2.6
N.J.	481.1	345.6	71.8	135.5	28.2
N.Y.	1,301.0	1,000.4	76.9	300.6	23.1
Ohio	243.4	206.4	84.8	37.1	15.2
Oreg.	538.0	383.4	71.3	154.5	28.7
Pa.	493.3	199.8	40.5	293.4	59.5
R.I.	506.4	482.0	95.2	24.4	4.8
Tenn.	217.8	185.0	84.9	32.8	15.1
Va.	78.2	26.4	33.8	51.7	66.2
Total	\$13,205.8	\$7,265.0	55.0	\$5,940.8	45.0

Note: Includes the District of Columbia and only those states that participated in the interstate substitution program. Numbers may not add because of rounding.

Source: GAO analysis of FHWA and FTA data.

**Appendix II
Federal-Aid Urban and Interstate
Substitution Funds Obligated for Highway
and Mass Transit Projects**

**Table II.3: Interstate Substitution
Funds Obligated for Highway and
Mass Transit Projects—Excluding
District of Columbia and
Massachusetts, Fiscal Years 1976 to
1991**

Dollars in millions

State	Total funds obligated	Total funds obligated for highway projects		Total funds obligated for transit projects	
		Dollars	Percent	Dollars	Percent
Ariz.	\$68.6	\$67.5	98.3	\$1.1	1.7
Calif.	139.3	38.7	27.8	100.5	72.2
Colo.	263.8	245.5	93.0	18.4	7.0
Conn.	792.9	746.7	94.2	46.3	5.8
Ga.	92.6	92.6	100.0	0.0	0.0
Iowa	298.5	297.1	99.5	1.4	0.5
Ind.	77.2	62.1	80.6	15.0	19.4
Ill.	2,528.6	1,678.6	66.4	850.1	33.6
Md.	1,174.5	639.9	54.5	534.6	45.5
Minn.	192.8	183.6	95.2	9.2	4.8
Nebr.	78.3	76.3	97.4	2.0	2.6
N.J.	481.1	345.6	71.8	135.5	28.2
N.Y.	1,301.0	1,000.4	76.9	300.6	23.1
Ohio	243.4	206.4	84.8	37.1	15.2
Oreg.	538.0	383.4	71.3	154.5	28.7
Pa.	493.3	199.8	40.5	293.4	59.5
R.I.	506.4	482.0	95.2	24.4	4.8
Tenn.	217.8	185.0	84.9	32.8	15.1
Va.	78.2	26.4	33.8	51.7	66.2
Total	\$9,566.2	\$6,957.6	72.7	\$2,608.7	27.3

Note: Includes only those states that participated in the Interstate substitution program. Numbers may not add because of rounding.

Source: GAO analysis of FHWA and FTA data.

Examples of Planning Processes That Compare Highway and Mass Transit Projects

Two local planning agencies we visited had developed and used scoring processes to assist in comparing highway and mass transit projects. The Metropolitan Transportation Commission (MTC) and the Denver Regional Council of Governments (DRCOG), MPOs for the San Francisco Bay and Denver areas, respectively, have planning processes that subjectively score highway and mass transit projects to make decisions about the use of federal and state funds. Officials from both agencies stated that the intent of scoring projects is to minimize the relevance of the program funding source in selecting projects. These examples do not represent all the planning processes used by local agencies to allocate funds between highway and mass transit projects. However, they illustrate how some local agencies have attempted to compare highway and mass transit projects to allocate funds.

Metropolitan Transportation Commission

In 1990, the MTC began using a scoring process to jointly evaluate highway and mass transit projects for funding under California's 1990 Flexible Congestion Relief program. The Flexible Congestion Relief program provides joint funding for highway and/or mass transit projects that reduce urban traffic congestion. Before the program became effective, mass transit and highway capital projects were funded separately, and there was less need for a direct comparison of such projects. MTC's scoring process prioritizes highway and mass transit capital improvement projects for the region's transportation improvement program. This plan is then used to make transportation funding decisions.

Under the MTC scoring process, counties are first required to submit a prioritized list of all local transportation projects. Each project identified must meet minimum thresholds for such factors as cost-effectiveness, safety, local funding participation, and level of service. If a county's list of projects meets these prerequisites, the projects are added to the lists of eligible projects from other counties to be evaluated by MTC's scoring process.

MTC subjectively scores eligible projects for each of three major categories: user benefit, regional priorities, and air quality goals. The maximum score is 60 points—20 points for each of the three major categories. Table III.1 shows the measures used to evaluate highway and mass transit projects. The user benefit category evaluates projects for technical merit, safety, regional importance, and passenger benefits, among other factors. In general, MTC uses similar criteria to evaluate user benefits for both highway and mass transit projects. However, in some cases, slightly

**Appendix III
Examples of Planning Processes That
Compare Highway and Mass Transit
Projects**

different measures are used. For example, both highway and mass transit projects are measured on congestion reduction merits. But highway projects are also measured by their impact on capacity, while mass transit projects are measured by their expected contribution to passenger movement. MTC combines the scores for each of the user benefit elements to develop an overall score for the user benefit category.

**Figure III.1: Metropolitan
Transportation Commission's Criteria
and Scoring Measures**

Category	Highway elements	Mass transit elements
User benefit (score of 0-20)		
Congestion reduction	Impact on highway vehicle capacity	Impact on transit passenger capacity
Regional importance	Contribution to system continuity; improved movement of goods and people	Contribution to system continuity; environmental impact
Project merit	Shift away from single-occupancy vehicles; safety impact	Quality of service (reliability, safety, system capacity); system efficiency and productivity (rate of return); capital replacement/ rehabilitation
Regional priority (score of 0-20)		
Degree of federal, state, and local financial support	Amount of federal, state, and local financial support	Amount of federal, state, and local financial support
Projects included in short-term regional plan	Commitment to a prior transportation plan	Commitment to a prior transportation plan
Projects included in long-term regional plan	Contribution to regional transportation systems	Contribution to regional transportation systems
Air quality (score of 0-20)		
Pollution control measures	Contribution toward implementing traffic control measures	Contribution toward implementing traffic control measures

Source: GAO analysis of MTC documentation.

**Appendix III
Examples of Planning Processes That
Compare Highway and Mass Transit
Projects**

In addition to the user benefit score, projects' also receive scores in the regional priority and air quality categories. To develop a regional priority score, each project is evaluated for its contribution toward achieving regional priorities as stated in MTC's long-range transportation plan. To develop an air quality score, projects are evaluated for their contribution toward implementing recognized pollution control measures. Once the scoring is complete, MTC combines the project scores from each of three categories and ranks them in descending order according to their total score. MTC then allocates funds to projects on the basis of this ranking. All projects exceeding a certain threshold receive funds. The threshold is determined each year on the basis of the amount of funds available.

MTC officials said that in developing their scoring process, they sought the cooperation and approval of state, county, and city planning agencies, as well as the local transit officials who would be participating in the process. According to MTC, the acceptance of this process by local jurisdictions was essential to the successful implementation of this method of evaluating projects. In addition, an MTC official said that the scoring process has been very beneficial in selecting projects that better address the region's transportation needs. One reason, in his opinion, is that evaluating highway and mass transit projects contributes to a more efficient allocation of transportation resources.

**Denver Regional
Council of
Governments**

In 1978 DRCOG implemented a joint scoring process for prioritizing highway and mass transit projects for Interstate substitution funding. DRCOG normally allocates federal funds separately for highway and mass transit projects. However, DRCOG chose to use a joint scoring process for the Interstate substitution program partly because the program permitted the funding of both highway and mass transit projects, and the funds were not identified with either highways or mass transit.

DRCOG's first step in selecting projects was to ask local transit operators, planning agencies, and the Colorado Department of Highways to submit a list of potential highway and mass transit projects for evaluation that met certain general requirements. These requirements included being regionally significant major construction activities having local government backing and financial support. All projects submitted were then scored according to a list of specific measures developed by

**Appendix III
Examples of Planning Processes That
Compare Highway and Mass Transit
Projects**

DRCOG's transportation committee. A maximum score of 12 could be obtained if all specific measures were met. Table III.2 shows the general and specific measures DRCOG used to evaluate highway and mass transit projects.

**Appendix III
Examples of Planning Processes That
Compare Highway and Mass Transit
Projects**

**Figure III.2: Denver Regional Council
of Governments' Criteria and Scoring
Measures**

General requirements:			
Projects must	<ul style="list-style-type: none"> • be of regional significance, • be major construction projects, • be supported by the local governing body, • demonstrate local financial support. 		
Projects should	<ul style="list-style-type: none"> • further regional air quality improvement goals by encouraging higher vehicle occupancy and decreasing vehicle miles traveled, • consider the mobility of the elderly, the handicapped, and minorities. 		
Possible Scores for Specific Measures			
	+1	0	-1
Description			
Project is/is not on the regional long-term transportation plan;	•		•
Project is/is not on a local transportation plan that supports the regional long-term transportation plan;	•		•
Project is/is not recommended in a related transportation study;	•		•
Project is/is not coordinated with other communities, or is contained within a city boundary;	•	•	•
Project includes/does not include transit design features;	•		•
Project includes/does not include a designated deficient bridge;	•	•	
A score of +1/-1 for the projects with the highest/lowest number of daily commuter trips;	•		•
A score of +1/-1 for the projects with the highest/lowest system capacity;	•		•
A score of +1/-1 for the projects with the highest/lowest improved roadway safety;	•		•
Project does/does not provide for HOV capacity in addition to other transit capacity;	•		•
Project includes/does not include special provisions for elderly, handicapped, and minority individuals;	•	•	
Roadway project provides for transit service or relieves severe congestion.	•		

Source: GAO analysis of DRCOG documentation.

**Appendix III
Examples of Planning Processes That
Compare Highway and Mass Transit
Projects**

Once each project received a set of scores, the projects were ranked according to their total scores. A list of the projects ranked in descending order was then given to the region's transportation committee, which is composed of local government units, the Colorado Department of Highways, the major transit operator, and Council representatives, for review.

In evaluating the project rankings, the transportation committee applied additional measurements, such as project cost and geographical representation, to decide which projects would ultimately receive funding. According to DRCOG, the committee subjectively determined the relative importance of the additional measurements and the projects' scores to achieve the most cost effective use of funds. Using DRCOG's process, approximately 24 percent of the \$263.8 million in Interstate substitution funds available went to fund mass transit or transit-related projects.

In contrast to MTC, which continues to use a scoring process, DRCOG used its scoring process for Interstate substitution projects only. Normally, DRCOG allocates federal funds separately between highway and mass transit projects and does not prioritize projects across modal lines. DRCOG officials attributed their usual practice of funding highway and mass transit projects separately to the limited amount of federal funds available, and a lack of sufficient flexibility in the federal program.

List of Organizations GAO Contacted

Federal Government Organizations

- Department of Transportation
- Federal Highway Administration
- Federal Transit Administration

State Government Organizations

- California Transportation Commission, Sacramento, Calif.
- California Department of Transportation, Sacramento, Calif.
- Colorado Department of Highways, Denver, Colo.
- Maryland Department of Transportation, Baltimore, Md.
- Nebraska Department of Roads, Lincoln, Nebr.
- New Jersey Department of Transportation, Trenton, N.J.
- New York State Department of Transportation, Albany, N.Y.
- Oregon Department of Transportation, Salem, Oreg.
- Virginia Department of Transportation, Richmond, Va.
- Washington State Department of Transportation, Olympia, Wash.
- Wyoming Department of Transportation, Cheyenne, Wyo.

Metropolitan Planning Organizations

- Baltimore Regional Council of Governments, Baltimore, Md.
- Capital District Transportation Committee, Albany, N.Y.
- Denver Regional Council of Governments, Denver, Colo.
- Kern County Regional Council of Governments, Bakersfield, Calif.
- Metropolitan Service District, Portland, Oreg.
- Metropolitan Transportation Commission, Oakland, Calif.
- Metropolitan Washington Council of Governments, Washington, D.C.
- New York Metropolitan Transportation Council, New York, N.Y.
- North Jersey Transportation Coordinating Council, Newark, N.J.
- Omaha-Council Bluffs Metro Area Planning Agency, Omaha, Nebr.
- Policy Committee for the Cheyenne Area Transportation Planning Process, Cheyenne, Wyo.
- Puget Sound Council of Governments, Seattle, Wash.
- Sacramento Area Council of Governments, Sacramento, Calif.
- San Diego Association of Governments, San Diego, Calif.
- Southern California Association of Governments, Los Angeles, Calif.

Local Government Organizations

- Baltimore County Office of Planning & Zoning, Towson, Md.
- Nassau County Planning Commission, Mineola, N.Y.
- New York City Department of City Planning—Transportation Division, New York, N.Y.
- Los Angeles County Transportation Commission, Los Angeles, Calif.
- Orange County Transportation Commission, Santa Ana, Calif.

-
- **Public Utilities Commission, San Francisco, Calif.**
 - **San Francisco County Transportation Authority, San Francisco, Calif.**

**Transit Provider
Organizations**

- **Bay Area Rapid Transit District, Oakland, Calif.**
- **Golden Empire Transit District, Bakersfield, Calif.**
- **Magic City Enterprises, Cheyenne, Wyo.**
- **Maryland Mass Transit Administration, Baltimore, Md.**
- **Metro Area Transit, Omaha, Nebr.**
- **Metropolitan Municipality of Seattle, Seattle, Wash.**
- **Metropolitan Transportation Authority, New York, N.Y.**
- **Tri-County Metropolitan Transportation District of Oregon, Portland, Oreg.**
- **Washington Metropolitan Area Transit Authority, Washington, D.C.**

Major Contributors to This Report

**Resources,
Community, and
Economic
Development Division,
Washington, D.C.**

**John H. Anderson, Jr., Associate Director
Jacquelyn L. Williams-Bridgers, Assistant Director
Richard A. Jorgenson, Evaluator-in-Charge
Kurt K. Heidtman, Evaluator**

**Office of General
Counsel**

Jackie A. Goff, Senior Attorney

**Los Angeles Regional
Office**

**Sam Van Wagner, Program Manager
Timothy Fairbanks, Senior Evaluator
Barbara A. Guffy, Evaluator**

Ordering Information

The first copy of each GAO report is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

**U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20877**

Orders may also be placed by calling (202) 275-6241.
