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Urban Mass Transportation: Options for Federal Assistance

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Congress of the United States
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URBAN MASS TRANSPORTATION: OPTIONS FOR FEDERAL ASSISTANCE

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Congressional Budget Office

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PREFACE

In early 1977, the Congress is likely to consider important new authorizing legislation for the Urban Mass Transportation Administration (UMTA). Although the budget impact for fiscal year 1978 may not be large, the potential financial cost in later years is substantial. In any case, the future form and effectiveness of federal aid to urban transit will be determined by these actions.

This Budget Issue Paper, Urban Mass Transportation: Options for Federal Assistance, provides a framework for evaluating UMTA's budgetary needs and for examining possible alternative mass transit programs. The effectiveness of several different solutions to urban transportation problems is summarized, and a range of possible budget options is described. Also, several program options with relatively minor budget impact are discussed. In keeping with the Congressional Budget Office's mandate to provide nonpartisan analysis of policy options, this paper contains no recommendations.

The authors of this paper were Richard R. Mudge and Porter K. Wheeler. It was prepared in the Natural Resources and Commerce Division of CBO under the general direction of Kenneth Deavers, formerly a member of the CBO staff. Cheryl Miller and Connie Leonard provided secretarial support. The manuscript was edited and prepared for publication under the supervision of Johanna Zacharias. Internal review was provided by Alice Rivlin, Robert Levine, Robert Reischauer, Ed Rastatter, and Jack Garrity.

This paper received extensive external review. Early drafts were sent to the two budget committees, authorizing committees, UMTA, transit operators, and several nongovernmental groups.

Alice M. Rivlin
Director

February 1977

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SUMMARY

Since the early 1960s, the Congress has authorized federal programs to improve mass transportation and has approved over $16 billion in spending authority for these efforts. The most important federal programs are directed by the Urban Mass Transportation Administration (UMTA). Legislation enacted in 1973 and 1974 provided $11.8 billion in new spending authority for UMTA, significantly expanding the federal role.

As fiscal year 1977 began, UMTA's budget showed an unreserved balance of $8.7 billion. However, UMTA indicates that it has "earmarked" or made some form of commitment for all of these funds, leaving little or no money available for new initiatives.

This apparent lack of money for new initiatives makes it likely that new legislation will be considered in the first session of the 95th Congress. Congressional supporters of mass transit indicated their intention to submit new legislation, and a major bill was introduced in January (S. 208).

The impact of new legislation on future budgets could be substantial--proposed program levels range up to $5 billion annually by fiscal year 1982, more than three times the 1976 program. Since much of the program involves long-term capital expenditure, new legislation will not strongly affect outlays in fiscal year 1978, though any increase in operating aid could be spent quickly. The urgency of UMTA's need for near-term spending authority depends upon one's view of its current funding status and upon which method one prefers to use to account for commitments to future spending. Several controversial budgetary aspects are discussed below.

The debate over new authorizing and funding legislation for UMTA programs provides an opportunity to review existing efforts and to consider alternative strategies

for improving urban transportation. This paper provides a framework for evaluating the budgetary needs of UMTA and for examining possible alternative strategies for federal assistance.

CURRENT UMTA PROGRAM

Of the $11.8 billion in new spending authority most recently provided, nearly two-thirds ($7.1 billion) has been budgeted for discretionary capital grants. UMTA exercises considerable discretion over the distribution and use of the capital grants, through which UMTA funds 80 percent of the cost of transit construction and the purchase of transit vehicles. Currently, about 30 percent of the capital funds is used for buses; the remaining 70 percent is split about evenly between the construction of completely new rail transit systems and rail improvements and extensions in cities that already have rail networks.

Another $4.0 billion of UMTA's spending authority was provided by law for grants that are distributed among urbanized areas by means of a formula. The formula allocates funds according to population and population density. Local governments can use these grants either to defray transit operating deficits (on a 50 percent matching basis) or to fund capital projects. Approximately 94 percent of these grants has been used to offset operating deficits. The remaining portion of UMTA's budget authority, roughly $0.7 billion, has been allocated to administration, research, demonstration, planning, and training.

The Federal Highway Administration (FHWA) has two major programs that also can be used for mass transportation. At local option, urban system portions of federal-aid highway money can be used for transit capital programs, although such use has been minimal to date. Also, Interstate highway monies earmarked for "nonessential" urban segments can be used for transit facilities and non-Interstate highways. Such Interstate "transfers" require a separate appropriation for UMTA from general revenues and do not deplete the Highway Trust Fund.

In fiscal year 1977, an estimated $575 million of Interstate transfers will be used for transit grants, almost all of it for the construction of subway or commuter rail systems.

Summary Table 1 shows annual UMTA funding levels for its major program areas for fiscal years 1975-1977.

SUMMARY TABLE 1. UMTA ADMINISTRATIVE RESERVATIONS FOR MAJOR PROGRAM AREAS, IN MILLIONS OF DOLLARS, BY FISCAL YEAR

Program Area	1975	1976	1977 Estimate
Capital Grants	1,197	1,092	1,250
Formula Grants	152	390	650
Interstate Transfer Grants	66	337	575

Source: Table 1 in text.

PROGRAM ALTERNATIVES

Presently, three major strategies or approaches to solving the urban transportation problem are advocated: those that rely on large-scale capital assistance, especially for the construction of new rail facilities; those that emphasize operating aid to defray deficits; and those that stress low-capital projects designed to improve existing systems through a wide range of operational, regulatory, and pricing mechanisms. Of course, these alternatives are not mutually exclusive. Federal programs and policies have emphasized capital and operating assistance, while providing some encouragement for low-capital approaches.

Capital Assistance

Current federal programs place most of their emphasis on capital assistance for the construction of new rail systems, modernization and extension of existing rail systems, and bus purchases. Spending on modernization and bus purchases includes a broad range of projects in varied circumstances that can improve service quality and reduce operating cost, but it is difficult to summarize their overall effectiveness. Rail modernization concentrates on making more efficient use of the large investment in rail transit in older, more densely populated cities, where the automobile is less dominant. Bus purchases reflect the major use of buses by almost every city, and the fact that buses can be a relatively inexpensive, flexible, energy-efficient, and non-polluting way of moving large numbers of people.

However, based on recent experience, there seems to be a real question as to whether new rail transit systems can significantly alleviate urban transportation problems, at least in the short run.

- Such systems tend to be extremely expensive; San Francisco's BART system cost $1.6 billion to construct and the latest estimates are that Washington's 98-mile Metro system will cost over $5 billion.

- Such systems tend to have little impact on auto traffic and congestion. With BART some drivers were diverted to transit, but within a year traffic flows returned to nearly their previous level.

- BART and the modernized and extended rail systems have also experienced large and increasing operating deficits, thus providing state and local governments with a continuously growing, and often unanticipated, burden.

- Heavy rail systems appear to offer little in the way of energy conservation, largely because their construction is so energy-intensive,

because they attract riders from energy-efficient buses, and because they encourage additional trips.

Of course, these results are drawn from the experience of a very few cities. Given the differences in urban structure and transportation problems that exist between cities, it would be incorrect to assume that these short-run failings of new rail systems are sure to be replicated anywhere a new system is established. Furthermore, in the long run, new rail systems may have a significant impact upon urban transportation problems by transforming the structure of urban areas and by making possible regulatory and pricing policies that are deemed infeasible as long as persons have no alternative to a reliance on automobiles. However, capital programs, be they large or small, to be effective probably must be used in conjunction with regulatory or pricing mechanisms specifically targeted at reducing auto use.

Operating Grants

The effects of federal operating aid on urban transportation are difficult to ascertain, both because the program is relatively new and because the impacts are diffuse and difficult to separate from other external influences such as fuel availability. Benefits include new or continued service and lower fares and/or local taxes than would exist in the absence of aid. Ridership effects appear negligible to date.

There is a great demand for operating assistance, but the allocation formula limits the aid available to the cities with the largest deficits. There is special concern that these grants have the unintended effect of reducing local incentives for efficient, low-cost operations. In addition, it is feared that operating assistance may be spent on higher pay for transit workers and lower fares for riders rather than for direct programs that improve operations or expand service. But promising opportunities exist for linking such grants to performance and service criteria.

Low-Capital Projects

Urban transportation projects requiring small amounts of capital appear to be among the most cost-effective transportation programs. This category of projects includes operational, regulatory, and pricing changes.

Operational changes focus on improving the efficiency of the existing urban transportation system through such devices as contra-flow bus lanes, coordinated signals, and controls on vehicle access to freeways. These measures can produce important local improvements in speed and system capacity, but many organizational and jurisdictional problems have been encountered in attempts to implement them.

Regulatory solutions generally act to restrict certain transportation activities in order to free up others. For example, cars may be excluded from downtown areas to ease bus and pedestrian movement, curb lanes or "diamond" lanes can be set aside exclusively for buses and carpools, downtown parking can be restricted to ease traffic flows and encourage transit use, commercial deliveries can be prohibited during rush hours, and work hours can be staggered. Most regulations of these sorts have been local in nature although they have been encouraged by UMTA's Transportation System Management (TSM) program. Generally, these efforts have been successful but difficult to implement.

Pricing solutions attempt to alter either the use or the burden of paying for different modes of transportation by varying the user's expense. While there is little evidence as to their potential effectiveness, a great many pricing solutions have been proposed. These include:

- Charging higher transit fares at rush hour than at other times to shift the costs more onto peak-period users and to encourage greater use when systems are underutilized.

- Charging more for the use of urban commuter roads during rush hour to encourage reliance on transit and cut down congestion.

- Increasing downtown parking charges to encourage the use of transit and car pools.

Presently, there are no federal programs exclusively designed to encourage the adoption of pricing solutions. In fact, there are some disincentives such as the toll prohibition on federal-aid highways.

BUDGET OPTIONS

The decisions facing the Congress on the funding and form of urban transportation assistance are interrelated. For example, if federal policy is to encourage the construction of new rail systems, a considerable amount of new spending authority will be required if more than a few cities are to be helped. Furthermore, it can be expected that local mass transit operators will want some commitment that the federal government will help to cover the operating deficits of the new systems they are constructing.

The range of possible budget options is wide. Five specific options are presented here. They all presume the continued existence of a mass transit program with considerable government control over federal assistance. Non-transit options such as highway programs are not considered here, and non-budget options are considered separately.

Continue Present Policy

The first option is to continue the existing UMTA program at roughly the same level as in recent years. This would mean capital grants of about $1.25 billion a year, with almost 30 percent devoted to buses and the remainder split evenly between new rail transit systems and modernization and extension of existing rail systems. When new spending authority is required in fiscal year 1980, the capital program is assumed to be increased to an annual level of $1.4 billion. (See Summary Table 2.)

Current law calls for the formula grant program to grow from $650 million in fiscal year 1977 to $900 million

SUMMARY TABLE 2. UMTA BUDGET OPTIONS, IN MILLIONS OF DOLLARS, BY FISCAL YEAR

Budget Options	1977	1978	1979	1980	1981	1982	Total 1978-1982
Continue Present Policy							
Total Program Level	2,653	2,755	2,830	3,055	3,105	3,155	14,900
New Budget Authority	455	430	430	910	2,930	2,980	7,680
Outlays	1,890	2,160	2,570	2,700	2,950	2,980	13,360
President Ford's Budget							
Total Program Level	2,999	2,975	3,119	3,169	-- b/	--	--
New Budget Authority	455	455	875	1,275	--	--	--
Outlays	1,830	2,225	NA a/	NA	--	--	--
Expanded UMTA Program							
Total Program Level		3,630	4,030	4,455	4,855	5,255	22,225
New Budget Authority		430	840	3,980	4,680	5,080	15,010
Outlays		2,400	2,980	3,380	3,920	4,290	16,970
Expanded Formula Grants							
Total Program Level		2,755	2,830	3,055	3,105	3,155	14,900
New Budget Authority		430	430	1,890	2,080	2,850	7,680
Outlays		2,280	2,680	2,950	3,270	3,260	14,440
No New Rail Starts/TSM							
Total Program Level		2,745	2,835	2,875	2,815	2,890	14,160
New Budget Authority		530	555	700	2,440	2,715	6,940
Outlays		2,170	2,610	2,750	3,010	2,980	13,520

a/ Not available.

b/ Dash indicates not projected in the Budget.

Source: Table 3 in text.

in fiscal year 1980, and this option assumes continued growth to $1 billion for fiscal year 1982. If industry projections are correct, this should be enough to continue to cover 20 to 25 percent of the nationwide transit operating deficit.

Transit grants through Interstate transfers are assumed to continue at the rate of $575 million a year. However, the future level is difficult to predict since state and local governments exercise the option to transfer.

Under this option, construction of rail projects under way in Atlanta, Baltimore, Buffalo, and Miami would be continued. While commitments to additional new systems could be made, they would not be funded in advance and no actual spending on them would be possible until the early 1980s.

A number of concerns can be raised about continuing the UMTA capital grant program with its current mix of funding. Most importantly, allocating 35 percent of the available funds to build new rail transit systems is cause for review, given the great expense of such systems, their large operating deficits, and their apparent inability to solve the major urban transportation problems.

President Ford's Budget

This option is similar to the present policy option except that Interstate transfer grants are $775 million in fiscal year 1978 instead of $575 million and no new rail systems will be committed or started through 1980. Additional spending authority is required in 1979 and 1980 primarily because of the decision to "fully fund" past commitments, that is, provide advance spending authority sufficient to cover the entire stream of future federal spending for approved projects. At least through fiscal year 1980, this option should have impacts similar to that of present policy.

Expanded UMTA Program

A proposal under discussion among transit officials calls for a major expansion in both capital and formula

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grants, while basically maintaining the same program structure. This expanded budget option assumes capital grants to be $1.9 billion in fiscal year 1978 (up from $1.25 billion in fiscal year 1977), increasing by $300 million a year to $3.1 billion in fiscal year 1982, more than double the $1.4 billion assumed by present policy. One-fifth of capital grants would be earmarked for buses, with the remainder available for rail and other fixed guideway facilities. This option is similar to, but somewhat larger than, that proposed in the new transit bill (S. 208).

In addition to an expanded rail modernization effort, this option would provide adequate funds to complete new starts committed or under construction in Atlanta, Baltimore, Buffalo, Detroit, and Miami. In addition, five to ten additional new systems of moderate size similar to those under way in Atlanta and Miami could be started. Ten new starts means that 23 urban areas would have completed rail systems by the mid-1980s; there are only eight at present.

Formula grants would be increased to $1 billion in fiscal year 1978 and grow to $1.4 billion in fiscal year 1982, enough to cover about one-third of the nationwide transit operating deficit, excluding any increased deficits related to new system starts. If the expanded budget option is intended to defray a substantial portion of large-city deficits, the allocation formula would also have to be changed to reflect the size of the deficit, preferably coupled with some incentive to control cost.

This option presupposes that the structure and mix of UMTA programs are basically sound, but that higher spending levels are needed. The same concerns voiced above regarding a continuation of present policy are applicable to the expanded budget option. On the other hand, more cities would have rail transit available.

Expanded Formula Grants

This budget option would restructure the UMTA program by shifting funds to an expanded formula grant

program, commensurately reducing the size of the discretionary capital grant program. The total UMTA program level would remain unchanged from the present policy option, but the discretionary capital grant program would be reduced to those funds needed to support a somewhat larger rail modernization effort and to complete new rail starts that are in construction or detailed engineering phases. Such systems include Atlanta, Baltimore, Buffalo, and Miami, but not Detroit, where considerable planning remains to be done.

By fiscal year 1982, the discretionary capital grant program would drop to about $700 million, one-half that assumed by the present policy option. Formula grants would be about $1.7 billion, a 70 percent increase over the present policy option and almost $300 million over the expanded UMTA program option. It is assumed that, aside from regular bus replacement, virtually all these funds would be used to help cover operating deficits.

Other impacts of increasing the formula grant program would be to relieve the burden of rapidly growing operating costs and to ease the pressure on state and local taxes that support transit. Linking aid to operating and service improvements could lower the chance of unproductive spending.

No New Rail Starts; Expanded Low-Capital Program (TSM)

This budget option would reflect the doubts about the efficacy of new rail systems in solving urban transportation problems. The UMTA program could be continued without providing funds for additional new rail systems. Rail systems that have received letters of commitment from UMTA (not legally binding) and that are in construction or detailed engineering phases would be completed. The Washington Metro would continue to be funded using Interstate transfer funds. However, cities such as Honolulu and Los Angeles which have received encouragement but no formal commitment from UMTA would be excluded. Existing programs for bus replacement, rail modernization, and operating assistance would be continued.

Under this option, capital program levels differ little from those of present policy in 1977 and 1978, and are very similar to President Ford's budget. However, as construction of the new systems is completed in the early 1980s, capital grants would decline to less than $1 billion, roughly two-thirds the level estimated as present policy.

Low-capital projects (called TSM by UMTA) that focus on increasing the productivity of the existing urban transportation system appear to be very cost-effective. Therefore, it might be desirable to couple a shift in emphasis away from capital-intensive new rail systems with expansion of federal support for such projects. This option assumes a new low-capital program beginning at $100 million a year in fiscal year 1978 and growing to $200 million by fiscal year 1982.

The obvious impact of this budget option is to reduce new rail starts and the attractiveness of the new facility solution. Long-term effects of rail transit on urban development will have been foregone. If low-capital projects can be implemented effectively and are truly low in cost, substantial transportation improvements are possible.

TIMING AND NATURE OF CONGRESSIONAL DECISIONS

The implementation of these budget options would require various combinations of legislative action, including consideration of new authorizing legislation for the UMTA programs and subsequent funding approvals by the Appropriations and Budget Committees.

Full Funding

The calculations underlying Summary Table 2 assume that spending authority is used only at the time that UMTA administratively reserves its grants, just prior to formal obligation. UMTA has many variations of project commitment that imply future spending streams. If Congress imposes a "full-funding" requirement that spending authority be available sufficient to cover future spending

on all levels of UMTA commitments, UMTA will need spending authority earlier and in larger amounts than indicated in Summary Table 2. Full funding would provide increased certainty for UMTA's grant recipients, but other options that also place controls on UMTA commitments should be explored.

Present Policy

A continuation of present policy for mass transit requires relatively little legislative action, because the majority of UMTA programs, including those for capital and formula grants, are presently funded from long-term contract authority, and had unreserved spending authority of $8.7 billion at the start of fiscal year 1977. In the absence of a full-funding requirement, this would be sufficient to maintain the current program level through fiscal years 1978 and 1979. This continuation presumes appropriations actions to approve annual obligation ceilings and liquidating cash, as has been the case in past years. As with all of the options presented, present policy anticipates continuing annual appropriations (providing new spending authority) for two programs, Interstate transfers and commuter rail assistance. Commuter rail assistance would require reauthorization for fiscal year 1979 and beyond.

Other Options

Implementation of the "expanded UMTA program" option would necessitate both new funding authority and appropriations for fiscal year 1979, or even for fiscal year 1978 if full funding is required. The need for accompanying appropriations action represents a major change from previous UMTA legislation due to provisions of the Congressional Budget Act of 1974 regarding new spending authority in general, and contract authority in particular.

The remaining options are relatively straightforward in their immediate need for authorizing legislation and appropriations, but both "expanded formula grants" and

"no new rail starts/TSM" imply potentially complex changes in the authorizing legislation to reflect the shift in program direction. They could generally be funded from existing spending authority until fiscal year 1980, although the "no new rail starts/TSM" option presumes a separate authority and appropriation for TSM grants.

NON-BUDGET OPTIONS

In addition to options that have major budgetary implications, such as those just described, many changes could be made to shift the emphasis or objectives of the federal transit program that would have relatively minor budgetary impact. These options generally cannot be substituted for the major budgetary decisions before the Congress over the next few years, but they could have a significant impact on program effectiveness and, over the long run, reduce the costs of federal transit involvement.

More Explicit Criteria for Capital Grants

More explicit criteria could be established for UMTA's project approval process. Criteria could be put forward in legislation by the Congress. Alternatively, a legislative requirement for UMTA to promulgate criteria subject to subsequent approval by the Congress might be more practical. The notion of Congressionally-specified criteria could be extended to require Congressional approval of all major new projects on an individual basis, as is now done with the Corps of Engineers.

Providing Performance Incentives for Operating Grants

Operating grants lend themselves most readily to incentives. Operating subsidies are now paid only to transit agencies incurring an operating deficit, offering very little incentive for economical and efficient management. A different allocation formula might be based on service measures that would offer encouragement to expand services and attract new riders.

Different Mix of Assistance

An alternative to the previous two options would be a redirection between forms of assistance or an addition of new sections to the Urban Mass Transportation Act. Alternatives vary from simply shifting some of the discretionary funding into specified areas (for example, more spending on research, development, and demonstration projects) to new programs such as separately funded Transportation System Management grants as proposed in the "no new rail starts/TSM" budget option.

Alternative Financing Methods

A more abrupt change would be conversion to a different financing mechanism with much less federal control over the uses of transit assistance. Block grants would remove biases inherent in use-restricted grant programs and encourage local initiative, but their use would also be subject to local pressures and prejudices. Alternatively, the mobility of specified groups could be enhanced by direct subsidy via the issuance of "transit stamps" or other forms of income supplements.

Pricing of Transportation Resources

It is clear that many of the goals of urban transportation assistance could be achieved through pricing mechanisms. Without major capital investment, auto congestion can be reduced and transit ridership can be increased by imposition of auto tolls. However, substantial disruption of current patterns of movement would necessarily be part of such a change, and financial hardships on some individuals and groups would result.

Recognizing Urban Interdependence

Clearly, utilization of the existing public transit system is interdependent with private transportation and trends in land-use and urban development. In recognition of this interdependence, other important programs might be packaged with transit assistance.

Auto improvements. Restrictions on peak usage, vehicle size, energy efficiency, and other characteristics of auto use will probably be much more important in the eventual quality of urban life than any new transit system. The Federal Highway Administration and UMTA do coordinate their urban plans to some extent, but much more is required and numerous institutional barriers must be removed or overcome.

Coordinated urban development. Capital assistance for mass transit should be linked to urban growth and design to assure continuity of the transit system with the demand for tripmaking by urban workers and residents. Development will not proceed as envisioned or at the pace required to support rail transit systems unless commitments on zoning and other land-use controls are prerequisites to capital assistance.

CHAPTER I BACKGROUND AND CURRENT PROGRAMS

BACKGROUND OF FEDERAL INVOLVEMENT

Transportation problems are a common denominator of urban life. They arise whenever and wherever population and economic activities crowd together on small amounts of land. They affect everyone, rich or poor, young or old, white or black, and everyone has complaints about the quality, cost, or general adequacy of urban transportation. Most private individuals are powerless to change these conditions, and state and local officials have only limited ability to improve them. In recent years, the federal government has become involved in trying to solve urban mass transit problems, and significant amounts of federal tax dollars are spent on these efforts.

Historically, intraurban transportation was seen as exclusively a local concern, and the federal role was limited to regulating and improving interstate movements. Many transit companies experienced financial difficulties in the 1920s and 1930s, and, after the peak of transit use during World War II, ridership declined dramatically (a drop of over 50 percent between 1945 and 1955) 1/ as the automobile became the predominant urban passenger mode. During the 1950s and 1960s, transit revenues were unable to keep pace with costs. One result was that "between 1954 and 1963, 194 transit companies went out of business, leaving the typical medium-sized community without bus service." 2/

As private bus companies continued to go out of business, often on short notice, many cities lacked the resources to purchase their assets and continue service.

1/ American Public Transit Association (APTA), Transit Fact Book, 1975-1976 Edition, p. 30.

2/ George W. Hilton, Federal Transit Subsidies, American Enterprise Institute, 1974, p. 3.

Also, it was difficult to secure coordinated efforts from several local, often multistate, jurisdictions. Federal aid was one possible source of the needed funds that could also facilitate areawide coordination. Furthermore, during the 1960s the overwhelming dominance of the automobile in urban areas created great concern about the environment, continued urban sprawl, and lack of mobility for the poor, elderly, and others without access to automobiles. These concerns helped encourage a series of laws during the 1960s that gradually grew into a major federal effort to improve urban mass transportation.

The Urban Mass Transportation Act of 1964 3/ established the basic authority for federal assistance for mass transportation. The Act is administered by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation (DOT), and a review of UMTA's funding provides an opportunity to examine alternative solutions to urban transportation problems, including some that are not now widely used.

The most recent major amendments to the Urban Mass Transportation Act, passed in 1973 and 1974, provided UMTA with additional budget authority of $11.8 billion. 4/

3/ Public Law 88-365, 78 Stat. 302, 49 USC 1601 et seq.

4/ The Federal-Aid Highway Act of 1973 (Public Law 93-87), and the National Mass Transportation Assistance Act of 1974 (Public Law 93-503). Since its inception in 1965, UMTA has received a grand total of $16.1 billion in budget authority, of which $7.4 billion had been administratively reserved (one step before formal obligation) by the start of fiscal year 1977. "Budget authority" represents authority provided by law to enter into obligations that result in immediate or future outlays of government funds. The basic forms of budget authority are appropriations, contract authority, and borrowing authority. UMTA's budget authority is primarily in the form of long-term contract authority. For further details on budget terminology, see the glossary "Budget Definitions," Comptroller General of the United States, November, 1975.

Part of this budget authority will be available in annual installments (due to annual ceilings on appropriations) through fiscal year 1980, and the remainder has been programmed by UMTA for obligation over the same period. However, UMTA has indicated that there is no remaining uncommitted budget authority for capital assistance. 5/

Congressional concern about the adequacy of UMTA's budget authority seems likely to lead to consideration of new authorizing legislation in calendar year 1977. 6/ President Ford's budget for fiscal year 1978 also indicated that additional budget authority would be needed before 1980.

This paper attempts to provide a framework for evaluating the budgetary needs of UMTA and examining possible alternative mass transit programs. It will assist not only in assessing the needs for additonal UMTA funding, but also in deciding on additional program authority that might be added to the Urban Mass Transportation Act. Some combination of additional funding and new or restructured program authority might increase the impact of federal policy on urban transportation problems.

A brief overview of UMTA's activities follows.

5/ For example, see letter of June 29, 1976, to John R. Crowley, Executive Director, Denver Regional Transit District, from Robert E. Patricelli, UMTA Administrator, rejecting Denver's proposed rail transit system.

6/ One Senator on the authorizing committee has expressed the hope that "The new Congress's first legislative priority will be to correct the funding deficiencies that now exist in our mass transit programs." "Remarks" of Senator Harrison A. Williams, Jr., before the American Public Transit Association, April 13, 1976. Senator Williams has since introduced a major new transit bill, S.208, the National Mass Transportation Assistance Act of 1977.

CURRENT UMTA PROGRAMS

UMTA grants are made primarily through two separate programs: a capital program with grants made at UMTA's discretion, and a formula grant program used primarily for operating assistance. Of the $11.8 billion authorized, UMTA plans to spend about $7.1 billion on the capital grant program. The formula grant program was created by the 1974 amendments to the Act that specifically authorized an effort of almost $4 billion. In addition, there are smaller efforts in planning, training, and research, development, and demonstration.

Capital Grants

The capital grant program pays 80 percent of the cost of bus purchases, rail modernization projects, and the construction of new transit systems. UMTA has been programming its rate of obligations so that the capital grant funds will be obligated fairly evenly through fiscal year 1980. About 30 percent of the capital grant funds are budgeted for buses, with the remaining 70 percent for rail transit, now split about evenly between completely new rail systems and improvements and extensions to existing rail networks.

Grants are made upon UMTA's approval of project proposals submitted by local transportation authorities. Past practice has been to fund virtually all bus proposals. Although only one proposal for a major rail system has been rejected (Denver), UMTA often makes major cuts in the size of the requested system. 7/ UMTA has also discouraged some rail proposals or has postponed decisions on them.

7/ For example, UMTA has funded less than 30 percent of the total route miles originally requested for new rail starts. Rail extensions have a somewhat higher approval rate. Letter from Robert E. Patricelli, UMTA Administrator, December 17, 1976.

Of the five new rail systems approved and funded by UMTA, 8/ all but one have been what is called heavy rail, essentially modern versions of the familiar subway or commuter rail line. The exception is Buffalo, which is building a light rail or trolley line. UMTA is encouraging a number of other light rail proposals and appears likely to fund some of them in the future.

UMTA recently announced that four cities (Cleveland, Houston, Los Angeles, and St. Paul) were to receive grants to build "people movers," an automated type of fixed guideway system, to improve circulation in their downtown areas.

At the start of fiscal year 1977, about $4.8 billion in capital funds remained unreserved. However, UMTA has earmarked all of these funds for either normal bus and rail replacement programs in future years or for some form of commitment to fund new rail systems. 9/ As with most construction programs, the actual expenditure (outlays) of the UMTA funds will occur over a longer period. Thus, a brief look at the UMTA program shows sizeable unreserved balances, while at the same time UMTA indicates

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8/ Atlanta, Baltimore, Buffalo, Miami, and San Francisco. Washington, D.C., has a sixth new system, but it is not funded through UMTA's capital grant program. Detroit has received a commitment in principle for a new system, but the mode has not yet been selected.

9/ These commitments are of several types. "Formal commitments" are not legal obligations, but carry a strong moral obligation to furnish funds as promised (Atlanta, Baltimore, and Philadelphia). Other cities (Buffalo, Detroit, Miami, and the four cities with approved downtown people-mover projects) have received "commitments in principle" that will become formal commitments if certain conditions are met (e.g., a no-strike pledge from construction unions). In addition, UMTA has a third category called "anticipated future commitments," which refers to cities (Honolulu, Los Angeles) that are likely to receive commitments when detailed analyses are completed. Further detail is provided in a Staff Draft Analysis, "UMTA Funding -- Is It Adequate?" Congressional Budget Office (forthcoming).

that little if any "free" money is available for further new rail starts or for other new initiatives.

Of course, as UMTA has recognized in its recently released policy statement on major urban transit investments (and in its commitments in principle to Miami and Detroit), it is possible for the long-term costs of all its commitments, including bus and rail modernization grants anticipated in future years, to exceed the currently available budget authority. 10/ But additional funds will almost certainly be available after 1980 to finance future obligations and outlays of projects initiated several years before, since it is unlikely that the UMTA program will be completely dropped by the Congress. In addition, some cities will use Interstate transfer money for transit projects, the budget authority for which can be provided in addition to the normal grant programs. Then too, other cities may withdraw or scale down transit proposals as their priorities change.

Highway Programs for Transit

In addition to the UMTA capital grant funds, some federal highway money is available to fund mass transit investment. At local option, up to $800 million a year from the urban systems portion of the federal-aid highway program can be used for transit, although so far such use has been minimal. 11/ Also, urban areas can decide to build transit facilities and non-Interstate highways in place of "non-essential" urban Interstate segments. This

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10/ Technically, UMTA has so far made grants only for preliminary engineering of systems whose long-term construction costs would surpass available budget authority if fully obligated now. Federal Register, September 22, 1976, pp. 41512 ff.

11/ There is considerable speculation on why use has been so low (never more than 5 percent of available funds). One possibility is that urban roads are in poor condition even relative to local transit. Also, cities have had little difficulty receiving small capital grants from UMTA, so there is not much incentive to use highway funds for the same purpose. In addition, in fiscal year 1975, these funds could not be used for rail transit projects.

is the so-called Interstate "transfer," although no funds are actually transferred to transit from the Highway Trust Fund and a separate appropriation is required. Also, the total Interstate mileage is not reduced, because new segments in other areas are substituted for those withdrawn. The value of Interstate highway segments potentially available for transfer is estimated to total as much as $10 to $12 billion, over and above the almost $2 billion already withdrawn and available for transit projects.

Formula Grants

UMTA has great discretion in the capital grant program, but it has little control over the allocation of formula grants. Funds are allocated among urban areas with populations over 50,000 according to a formula that gives equal weight to population and population density. As long as certain requirements (e.g., maintenance of effort) 12/ are met, local officials can decide whether or not to use the funds for capital projects or to help cover transit operating deficits. Federal funds can be used for not more than 50 percent of the operating deficit (versus 80 percent of capital costs). So far, an average of only 6 percent of formula grant funds has been used for capital projects, with urbanized areas over one million population using less than 5 percent and those with between 50,000 and 200,000 using almost 24 percent for capital purposes. 13/

12/ Maintenance of effort requires continuation of past levels of state and local financial support. Other requirements are that the level of service must be maintained or improved and that elderly and handicapped people receive reduced off-peak fares.

13/ U.S. Department of Transportation, UMTA, Transit Operating Performance and the Impact of the Section 5 Program, November 1976, p. 3, and Table A, p. A-1.

The rate at which formula grant spending can grow is limited by ceilings on annual appropriations specified in the legislation. However, actual grant approvals have been below the permissible ceilings. Of $800 million available, only about $540 million had been obligated at the end of fiscal year 1976.

For many cities, particularly those of small and medium size with modest transit operations, the formula grant allocation can be substantial compared to current deficits. This may decrease some of the pressure for greater operating efficiency, though it may also permit larger expansions in service. For example, urbanized areas of between 50,000 and 200,000 receive formula grant allocations of about 25 cents per rider and 43 cents per transit vehicle mile, as opposed to 6 cents and 18 cents respectively for areas over one million in population. 14/ Of course, many smaller cities will not be able to utilize these sums fully for operating aid because of the small size of their deficit.

Table 1 shows the funds reserved for the major UMTA programs for fiscal years 1975 through 1977.

Looking to the future, as well as deciding on how much budget authority UMTA needs, if any, it is important to decide what direction the UMTA program should take. Is the current UMTA emphasis on rail transit likely to bring about the desired improvements in the nation's urban transportation systems? Would emphasis on less capital-intensive solutions, such as operating aid, be likely to result in more improvement? Are there alternative approaches not now being supported by UMTA that deserve emphasis? For example, should the federal government support programs to encourage state and local governments to experiment with pricing and regulatory solutions to urban transportation problems?

14/ Ibid., pp. 33-34.

TABLE 1. UMTA ADMINISTRATIVE RESERVATIONS a/ FOR MAJOR PROGRAM AREAS, IN MILLIONS OF DOLLARS, BY FISCAL YEAR

Program Area	1975	1976	1977 Estimate
Capital Grants			
Bus	430	338	350
Rail Modernization	515	429	455
New Rail Starts	252	325	445
Total Capital Grants	1,197	1,092	1,250
Formula Grants	152	390	650 b/
Interstate Transfer Grants	66	337	575

a/ Administrative reservations are one stage before a grant becomes an obligation and usually differ only slightly from obligations.

b/ Under the Railroad Revitalization and Regulatory Reform Act of 1976, an additional $55 million is authorized for emergency operating assistance for commuter rail lines affected by the start of ConRail. In addition, $331 million in formula grants remains unobligated from previous years and is available.

Source: U.S. Department of Transportation, Urban Mass Transportation Administration, Submission to Congress, Budget Estimates, Fiscal Year 1976 and Fiscal Year 1977; UMTA, Office of Policy and Program Development.

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CHAPTER II PERCEPTIONS AND PROBLEMS

Before considering alternatives to the current program, we review the major problems of the current urban transportation system and the most common perceptions of these problems.

Clearly, people's perceptions depend on how, when, and where they use urban transportation. The suburban housewife has a different point of view from that of the rush-hour commuter. Similarly, the automobile commuter would rank problems differently from the transit user. And almost everyone consumes urban transportation in several different ways. The person who takes the bus to work may use a car for shopping. The bus driver may commute to work by car. Transit workers and suppliers of equipment have concerns different from most travelers. These varying perceptions often make it difficult to implement potential solutions, because conflicts arise over which urban transportation goals should receive priority.

PERCEPTIONS OF URBAN TRANSPORTATION PROBLEMS

What are the major factors influencing people's perceptions of what is wrong with urban transportation?

Mode used. People are most concerned with the quality of the mode of transportation that they themselves use. Thus, the concerns of auto users often conflict with those of nonusers, particularly regarding methods for improving the congested commute to work. Bus riders would want highway lanes reserved for buses; auto users would probably not. 1/ Auto users may favor aid to transit in hope of

1/ An example of this conflict is the so-called "diamond lane" on the Santa Monica Freeway in Los Angeles. Despite traffic counts that showed average auto delays

reducing auto congestion for themselves. Auto versus nonauto use is probably the most important single factor affecting perception of urban transportation problems.

Trip purpose. Rush-hour commuters have quite different needs from most other travelers, such as shoppers or sightseers. The commuter usually has a specific destination, a fixed schedule, and a relatively narrow choice of modes and routes to satisfy his needs. The off-peak auto traveler often chooses his destination and schedule spontaneously. Thus the rush-hour commuter needs major improvements in a relatively few concentrated facilities in contrast to those making nonwork trips.

Passenger/freight. In general, urban freight transportation is either ignored or viewed as a hindrance to the more "important" movement of people. But passengers and freight compete directly for space on the same road network, even though most attention is focused on auto travel, usually because fewer people are directly involved in truck movements.

Personal mobility. Individual mobility varies tremendously depending on, among other things, a person's age and physical condition, as well as on such largely income-related factors as the availability of an auto and residential location. There are perhaps three broad classes of personal mobility: (1) those who have an auto available; (2) those who depend on transit; and (3) those who because of age or handicap require special transportation equipment.

Federal/state/local. The perspective on a local transportation problem changes at different levels of government. The cost of a project to a locality depends on whether or not federal aid is available and at what matching ratio. A local official might prefer a transit project under local control over an equally desirable highway project carried out by state officials. Federal

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had decreased slightly while the total movement of people increased, public pressure from auto users forced this experimental bus and carpool lane to be closed and returned to regular expressway use (1976).

officials might be more concerned about energy use or air pollution. In addition, differences in emphasis may exist between agencies; for example, the Department of Transportation, the Environmental Protection Agency, and the Federal Energy Administration are bound to have different and sometimes incompatible objectives.

URBAN TRANSPORTATION PROBLEMS

The primary problems encountered in urban transportation occur in the movement of passengers during peak hours, usually the morning trips to work and evening returns. There are, however, other problems associated with the current auto-dominated urban transportation system and the urban structure, energy use, and pricing policies that have accompanied it. The major problems are discussed individually below.

Congestion. The most evident problem in urban areas is rush-hour traffic congestion. Auto travel slows and becomes unpredictable just when most commuters must rely on it. Heavy home-to-work travel regularly lengthens trip times relative to other times of day. The worst traffic snarls are usually related to an accident, a disabled vehicle, or a signal malfunction, the impact of which is magnified at peak hours. Autos in stop-and-go traffic use more energy and create more pollution. The time spent is unproductive, and in many instances traffic volume declines well below maximum capacity, representing pure waste. For transit users, there are crowded conditions (often standing-room only) and schedules are lengthened or disrupted where roads are shared with autos.

Traffic congestion is a nonprice method of rationing scarce highway capacity. Instead of a money toll, users pay with extra time for using the highway at rush hours. Many transit users give up the comfort of being seated or must wait for later vehicles.

Cost of transit service. The most pressing problem for urban transit service is the rapidly increasing operating deficit that must be met each year. Over the past ten years, mass transit operating expenses have grown four times as fast as operating revenue. From total

federal, state, and local operating subsidies of about $1.4 billion in 1975, 2/ funds required to meet operating deficits by 1980 could rise to over $3 billion a year under conservative assumptions (no expansion beyond projects currently in progress or committed). 3/ Nationally, 1975 operating revenue covered only 54 percent of total operating expense, down from 85 percent in 1970. 4/ Increased labor and energy costs promise to continue to drive operating expenses up faster than farebox revenues. The pressure is particularly intense on state and local governments which, in contrast to more heavily subsidized capital expenditures, must cover much of the deficits themselves or else raise fares. In addition, government regulation of mass transit is an increasingly important cost factor.

Service quality and scope. Transit problems are more than simply financial, however. Even with heavily subsidized transit fares and rapid increases in automobile operating costs (especially fuel), transit ridership has shown only minimal increases in the past three years and is still below 1970 ridership levels. 5/ Clearly the quality of transit service (frequency, comfort, convenience) is inadequate to attract more than a handful of automobile commuters. In general, transit management has been slow to adopt service innovations that might increase its market share.

While mass transit continues to lose ground to the auto, it is criticized for providing inadequate service to the suburbs and for people who are wholly dependent on it. The transit-dependent groups include the poor, young, elderly, and handicapped. Many of these people travel in off-peak hours when the level of service is low.

2/ APTA, Transit Fact Book, 1975-1976 Edition, p. 26.

3/ "Funding Needs Questionnaire Summary," APTA mimeo, December 1975, p. B-02.

4/ APTA, op. cit., pp. 26, 28.

5/ Ibid., p. 30. Some cities have been able to show significant ridership increases.

Energy use. Transportation accounts for 25 percent of total national energy use, and, more significantly, 52.6 percent of total petroleum-based energy. 6/ Cars in cities alone consume about 34.2 percent of total transportation energy. 7/ The typical commuter car carries an average of 1.4 people and is one of the least energy-efficient modes of transportation. In contrast, in terms of passenger miles per gallon of fuel, a bus with 30 passengers would be six times as efficient to operate, and a subway car with 35 passengers would be seven times as efficient. 8/ The potential for savings in terms of energy and foreign exchange is clearly substantial.

Pollution. Despite federal, state, and local attempts to curb air and noise pollution, the problem continues to be serious in most urban areas. Vehicles, the auto in particular, account for the bulk of urban air pollution. (The auto is the single greatest source of carbon monoxide, hydrocarbons, and nitrogen oxides.) Transit's contribution is minor because of the relatively few miles travelled by transit vehicles. Also, rail transit uses primarily fixed-site power plants where emissions are easier to control. Transit's contribution to noise pollution is more significant, especially in cities with older rail systems or with buses that have to travel up steep grades.

Automobile air pollution is a difficult problem to solve, since the solution can exacerbate other problems. For example, control devices that reduce automobile emissions at the point of combustion also decrease auto efficiency, thus adding to the nation's energy needs.

6/ U.S. Department of Transportation, Energy Statistics: A Supplement to the Summary of National Transportation Statistics, August 1975, p. 104.

7/ Office of Technology Assessment, United States Congress, Energy, the Economy and Mass Transit, December 1975, p. 3.

8/ APTA, op. cit., p. 46. These are listed as typical off-peak passenger loads.

Devices such as the catalytic converter, which affect emission after combustion, probably have little effect on energy efficiency.

Inefficient pricing. Markets in which prices reflect costs can lead to an efficient allocation of resources. Distortions occur when market prices do not reflect the actual cost of resources. While an appropriate pricing rule is difficult to devise, it is clear that the pricing policy chosen will affect the use and financial position of a mass transportation facility. This in turn has implications for subsidy and taxing policies, although these are not always explicitly recognized or intended.

When prices fall below cost, a deficit results and either prices must rise or a subsidy must be obtained. Since transit fares are not generally based on costs, but rather are strongly influenced by environmental and political considerations, most mass transit systems have incurred large deficits in recent years. Fares often do not even cover operating costs, suggesting that urban transit is underpriced by most purely economic standards.

A similar situation exists for highway use, though the analysis is less straightforward because fares and income statements are not available for individual urban roads. It is clear that urban roadways, particularly limited-access expressways, are much more expensive to build and maintain than other roads. Urban users, however, pay the same federal fuel tax as everyone else. Of course, the level of receipts is proportional to vehicle miles (ignoring fuel economy), which are much higher on urban roads than elsewhere. On balance, it would appear that auto travelers do not pay the full costs of limited-access urban expressways. 9/ Thus, relatively low prices for both transit and roads encourage use and create potential budgetary problems.

9/ Kiran Bhatt, "Are the Urban Road Users Paying for the Roads They Use?" Transportation Research Forum, Proceedings--Seventeenth Annual Meeting, Volume XVII, 1976, pp. 271 ff.; also, J. R. Meyer, J. F. Kain, and M. Wohl, The Urban Transportation Problem, Harvard University Press, 1965, Chapter 4.

The underpricing problem is much more explicit for the peak-hour users of urban transportation. At peak hours, extra capacity is very expensive to provide, yet most transit fares are the same throughout the day. Further, the costs perceived by peak-hour users of urban roads do not include several so-called "spillover effects," including more energy use, more pollution, and more congestion (which multiplies other spillover effects) experienced by all users.

Urban structure. The explosive growth in the use of the private automobile and the accompanying construction of extensive road networks have caused major changes in our urban areas. One result has been decreased residential density, with more urban residents locating in suburban areas. Workplaces and shopping centers are both more scattered, leading to the relative and often absolute decline in the importance of the central business district. In the process, the distance travelled between workplace and residence has generally increased. Reliance on the private auto as the dominant form of urban transportation is not the sole cause of current urban sprawl and suburbanization, although it certainly has made the process easier.

Several major transportation-related problems are inherent in the current U.S. urban structure. In general, urban sprawl uses more fixed resources, including land and energy, and decreased population densities make it much more difficult for transit to succeed, as do lower concentrations of employment. 10/ On the other hand, more transit and some coherent planning across multiple jurisdictions could help redirect past trends in urban structure. However, changes in current tax policy and zoning are probably required to bring about major, permanent changes in urban structure.

Freight movements. Urban freight movements are made primarily by trucks using the same road network as autos.

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10 Regional Plan Association, "Where Transit Works: Urban Densities for Public Transportation," Regional Plan News, August 1976, No. 99.

Small shipment pickup and delivery is an important contributor to urban congestion, especially since each carrier maintains overlapping and uncoordinated service to shippers using a large number of small trucks, each with low utilization. 11/ These trucks may contribute more than their share to traffic congestion by double parking or otherwise disrupting traffic flow. Thus, trucks share common road facilities, and their use may conflict with the flow of traffic. Depending on one's perspective, either autos or trucks could be considered low priority users of congested urban roadways.

11/ U.S. Department of Transportation (DOT) studies have concluded that much of this truck movement is unnecessarily duplicative and wasteful and that in some cities central consolidation of small shipments could reduce truck movement substantially. However, there are many organizational, regulatory, and political problems in starting such a consolidated terminal. See, for example, A Study of the Transportation Facilitation Center Concept, prepared for DOT by the Ralph M. Parsons Company, Final Report, September 1974.

CHAPTER III ALTERNATIVE SOLUTIONS

The transportation problems identified in the preceding chapter are not new. Indeed, many are synonymous with urbanization, and local, state, and federal policies have evolved to address many of these problems. Different groups at different times have favored one or another approach. This chapter attempts to distill these approaches into three categories:

- o Capital-assistance/new facility solutions
- o Operating aid solutions
- o Low-capital solutions, including operational, regulatory and pricing approaches.

Capital assistance has been the most prevalent form of federal aid, with matching funds currently provided for highways, transit systems, and transit vehicles. Upon local initiative, limited transfers are allowed from highway to transit projects.

Operating aid for transit has been much more controversial and only recently provided. Resistance has been based on fears that operating costs, including labor, would escalate in response to the new operating aid, and on problems of reaching compromise on the allocation of funds in the face of wide geographical disparities in the level of deficits.

In general, low-capital solutions, including operational, regulatory, and pricing approaches, have been left to local discretion with federal planning support. Federal aid has not normally been conditioned on the level of fares or the quality of service. In recent years some low-capital approaches have been required for systems receiving federal aid, for example, low off-peak fares for the elderly and handicapped or Transportation System

Management (TSM) projects, 1/ but on the whole these are still matters of local discretion.

Most transportation programs combine elements of these different approaches. The current UMTA program, for instance, emphasizes capital and operating aid while encouraging greater use of low-capital solutions. Each approach is better suited to alleviating certain problems, and each has potentially very different budgetary consequences. For example, operating aid might alleviate the financial problems of mass transit, but not improve service enough to attract auto users. High auto tolls might reduce congestion, but at the expense of mobility and central city development.

This chapter describes the experience to date with each approach, provides a general overview of each approach, and then assesses each on its apparent ability to ameliorate the problems identified in Chapter II.

THE CAPITAL INVESTMENT SOLUTION

Current Transit Aid

The capital investment solution involves federal grants for financing the acquisition, construction, reconstruction, or improvement of mass transit facilities and equipment. UMTA pays 80 percent of project costs. Three basic types of capital projects can be identified: (1) construction of new rail transit systems; (2) modernization and expansion of existing rail systems; and (3) purchase of new buses and other support equipment.

To date, the major share of federal dollars has gone to rail transit systems, although most of the new systems are still under construction. Judging from grant applications at UMTA, UMTA's own budget projections,

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1/ Transportation System Management (TSM) refers to low-capital ways of improving the productivity of the existing transportation network (synchronized traffic lights, exclusive bus lanes, better scheduling, etc.). UMTA now requires that all urban areas over 200,000

and DOT's survey of urbanized area plans, rail transit will remain the largest recipient of capital grants in the foreseeable future. Rail transit accounts for about 75 percent of proposed transit investments nationwide to 1990. 2/

Local projections are important because mass transit systems are planned and implemented by state and local governments. However, UMTA approval criteria and action strongly influence local plans. UMTA now supports a policy of incremental development, in which a series of small segments is built over a number of years, rather than an entire regional rail system as is the case with Washington, D.C.'s planned 98-mile Metro. UMTA also requires that applications for major new capital projects include an analysis of the feasibility of alternative ways to accomplish the same transportation objective, termed an "alternatives analysis." For example, a proposal for UMTA funding of a new heavy rail system should show that bus and light rail alternatives are less cost effective. This emphasis by UMTA on alternatives analysis has already shown the ability to shift the program away from rail and toward more support of bus transit.

General Considerations

Federal policy in mass transit has favored capital support over operating assistance on several grounds. Most commonly and recently, the Administration has argued that capital grants (versus operating grants) serve to restrain growth in operating costs (mostly labor costs) and improve productivity. 3/

This reasoning is intuitively plausible, in that funds spent on construction and equipment do not go for higher transit wages or employment. However, wages and

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must consider a program of TSM projects to be eligible for capital grants. This solution is described in more detail below.

2/ U.S. Department of Transportation, 1974 National Transportation Report, July 1975, Chapter III.

3/ The Budget of the United States Government, Fiscal Year 1977, p. 100.

employment in the construction and equipment sectors are likely to be increased by virtue of the "20-cent dollars" spent on capital items by the local transit authorities, and the larger the project the more probable the increase. The application of the Davis-Bacon Act assures at least "prevailing wage rates," thus often requiring some increase by law. 4/ Further, benefits from the project need exceed only the 20 percent local share for local authorities to consider a proposal, so there is an incentive to overuse capital (which should be equally objectionable to overpaying transit labor). The number of applications for capital grants, as well as their total value, has risen inexorably, and it is just these applications that are put forward as a standard of "need."

Restricting the federal grant to capital use does not determine who the major recipients will be. Total costs include capital, labor, and other operating expenses; a reduction in realized capital costs allows more service, lower fares, or higher labor and other operating expense than would otherwise be the case. The general strength of transit unions (vs. the unorganized commuter), further enhanced by Section 13(c) of the Urban Mass Transportation Act, 5/ which restricts the substitution of capital for labor, suggests that labor is in a good position to capture benefits from capital projects. The final beneficiaries of capital assistance grants are not

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4/ Via Section 13(a) of the Urban Mass Transportation Act. The Davis-Bacon Act requires payment of "prevailing wage rates" on construction projects funded by federal grants. These local "Davis-Bacon" wage rates, published periodically by the Department of Labor, are roughly equal to average wages for given occupations but have been found to average 50 percent higher than non-union rates. For more detail, see "An Analysis of Certain Aspects of the Administration of the Davis-Bacon Act," a staff study of the Council on Wage and Price Stability, May 1976.

5/ Section 13(c) of the Urban Mass Transportation Act protects the interests of employees affected by federal assistance, for example, bus drivers who lose their jobs because of a new rail transit line.

predetermined, although the transit user is presumably included.

Whether or not a causal relationship can be established between capital aid and specific operating costs, the federal aid programs for capital and operating assistance do in fact interact in the following important fashion. New transit systems, as well as extensions to old ones, have almost invariably experienced operating losses. 6/ These additional deficits must be financed in some way, and the first call is likely to be for more federal support.

Other considerations that have favored federal assistance for capital projects are the inability of local jurisdictions to fund capital expenditures (e.g., the relative difficulties of local bonding), the lasting and visible nature of a capital-intensive project (which makes local political commitment more appealing), the political reaction to the very visible geographic imbalance in operating deficits (at least the discretionary funds are available to all), and the development potential created by massive construction programs.

On more theoretical grounds, many of the economic arguments for subsidy are based on market and pricing problems created by rail transit's heavy fixed costs. If transit users are charged their share of these fixed costs, fares would have to be set at unacceptably high levels; but if, as is typical, fares are set to recover only a part of operating costs, transit will never be self-supporting. Capital assistance can alleviate many of these pricing problems.

6/ One, and probably the only, exception is the Lindenwold Line in southern New Jersey. This new (1969) highly automated line did cover operating expenses in its early years, although in more recent years fare increases have not kept pace with rising costs and modest operating deficits have resulted.

Project Experience

Project experience with new rail transit systems to date suggests strong reservations regarding their ability to reduce transport costs, even considering spillover costs such as air and noise pollution, and to achieve their goals of improved service and increased ridership. On the financial side, the two most recent major capital projects, BART in San Francisco and Metro in Washington, D. C., have suffered substantial construction cost overruns, thus threatening to turn the capital contribution into a "bottomless pit" much like that feared with operating subsidies. 7/

At the same time, the BART example illustrates the ability of local government to finance a major portion (80 percent) of the capital costs 8/ -- in fact, federal assistance was provided only very late in the construction stage and went primarily for equipment. Whereas the San Francisco Bay Area financed 80 percent of BART capital costs via bonding to be retired by specific tax levies, Metro area governments provided a much lower share and bonded against farebox revenues and general revenues rather than specific tax levies. 9/ The Metro choice seems unfortunate, since no net revenues are now expected for bond retirement and the operating deficit will also require financing; both these funding needs have come to light after construction is far advanced.

Granted that BART and other rail systems have proved to be more expensive than anticipated, it is

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7/ Of course, these cost overruns are not unique to transit projects. In recent years, they have occurred in most large construction projects.

8/ Wilfred Owen, Transportation for Cities, The Brookings Institution, 1976, p. 25.

9/ Funds were also provided from non-UMTA grants and Interstate transfers.

possible that rail transit still could be less costly overall than bus and auto, especially since many costs associated with the auto are often said to have been overlooked. A recent study compared the "full costs" of peak-hour work trips in the San Francisco area for bus, auto and rail (BART). 10/ In addition, to including direct operating costs for each mode, local services related to highways (e.g., road maintenance), time costs (including congestion), and environmental costs (noise and air pollution) were incorporated. Each mode was also assumed to be constructed and operated optimally (for example, congestion tolls were imposed on autos to ensure expressways operated at full capacity). Thus, the study is most relevant for system-wide decisions whereas many transportation decisions are made on an incremental basis.

The results are shown in Figure 1 for a subcompact auto, BART (with feeder bus for residential collection and distribution), and integrated bus (includes residential, line-haul, and downtown trip segments). The comparison for a standard sedan is similar, but showed a trip cost of 21 cents (5 percent) more than a subcompact auto. Bus is clearly the least costly mode, and BART the most expensive. Except for shorter, high density routes (as shown in Figure 1), even auto is less costly than BART. As the study notes:

> The first striking thing ... is the relatively high cost of BART. ... BART is considerably costlier than equivalent bus service. ... BART is for the most part more expensive than the private automobiles it was designed to supplant. 11/

10/ Theodore E. Keeler, et al, The Full Costs of Urban Transport, Part III: Automobile Costs and Final Intermodal Cost Comparisons, University of California, Berkeley, 1975.

11/ Ibid., p. 127. Similar conclusions were reached in an earlier study; see Meyer, et al, The Urban Transportation Problem.

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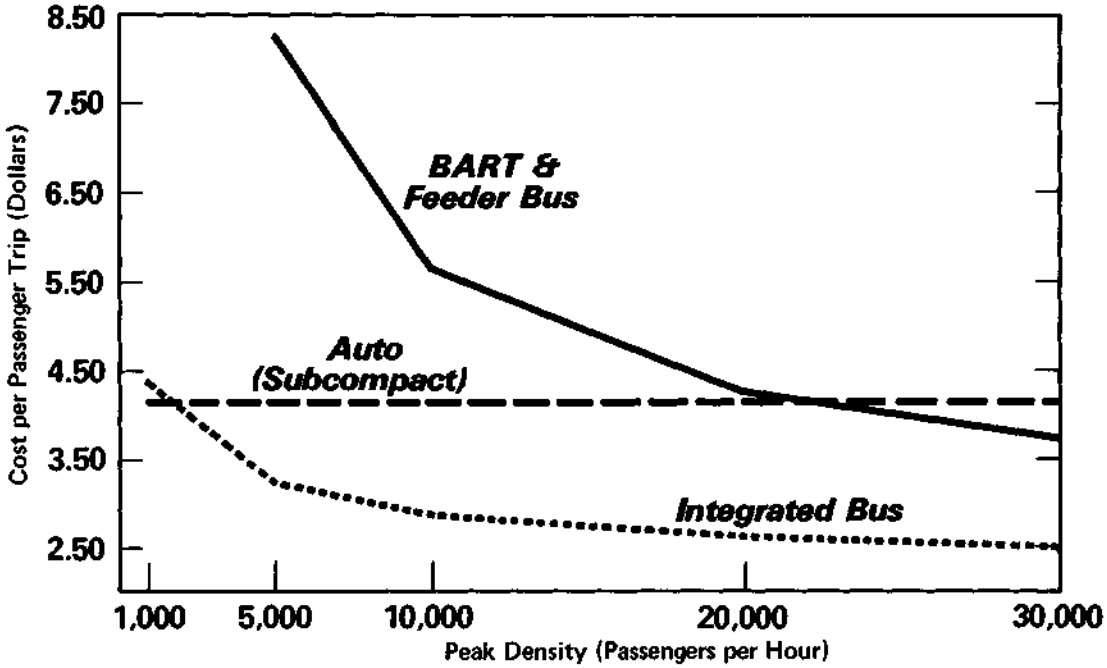
Figure 1

Comparative Costs of a Six-Mile Line-Haul Trip Plus Collection and Distribution



Source: Theodore E. Keller, *et al, The Full Costs of Urban Transport, Part III: Automobile Costs and Final Intermodal Cost Comparisons* (University of California, Berkeley, 1975), p. 128.

While this study focused on the BART system, its overall conclusions probably are generally applicable, even though the precise magnitude of its findings may not apply to all urban areas.

A recent study by the Regional Plan Association (RPA) 12/ concluded that as of 1970 only six or seven cities that did not have heavy rail rapid transit in operation or construction at that time had sufficient downtown job density to justify it. Of these, Atlanta and Baltimore (a borderline case according to RPA) have since started construction; Detroit has received a letter of commitment in principle from UMTA; Pittsburgh is likely to receive UMTA funds for an upgraded light rail system; UMTA anticipates making a commitment to Los Angeles if further study confirms preliminary analysis; and Dallas and Houston have not yet submitted proposals. Miami and Honolulu were not included in the RPA list. The RPA study also indicated that bus service was feasible in relatively low density residential areas.

Considerable resources have also been devoted to capital programs for modernizing and expanding existing rail systems. The number of cities in this category will grow rapidly in future years as systems are completed in Washington, Atlanta, Baltimore, Buffalo, and Miami. It is not easy to summarize past project experience with this program since the projects funded have been quite diverse, ranging from major replacement programs that purchased new cars and equipment, to correcting problems created by deferred maintenance, to complete new transit lines. In general, the goal has been to maintain or perhaps increase the productivity of the large existing investment in rail transit systems. The program has permitted cities such as New York to regain some operating effectiveness lost because of earlier extensive deferred maintenance that resulted from efforts to control operating expenses.

12/ "Where Transit Works: Urban Densities for Public Transportation," Regional Plan News, August 1976, No. 99, p. 22

Bus purchases are the final major area in the capital grant program. Again, little formal evaluation has been attempted and broad generalizations are dangerous because buses are used in very diverse conditions. In 1973, however, DOT's Transportation System Center stated that, on average, buses create benefits 1.7 times as great as their costs, a higher ratio than that for any other UMTA program. 13/ It is certainly true that buses are flexible, energy efficient, relatively nonpolluting, and effective in moving large numbers of people. However, federal capital assistance could stimulate premature replacement to reduce maintenance costs. 14/

Efficacy of Capital Assistance

Comparison of major capital programs

It is difficult to compare the overall effectiveness of the three major types of capital-intensive transit solutions: new rail systems, modernization and expansion of existing rail systems, and buses. However, since this is such a major part of the current UMTA program, we have attempted a comparison. The reader must remember that local circumstances are very important in determining the best approach and that many factors, including some that are difficult to quantify, enter into any choice. Nonetheless, the results of this comparison are quite striking.

Table 2 shows roughly how much could be bought for an extra $1 billion spent on buses, on new rail systems, or on rail modernization. The bus figures are for the purchase of vehicles only, whereas new rail

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13/ Quoted in George W. Hilton, Federal Transit Subsidies, American Enterprise Institute, 1974, p. 83.

14/ See William B. Tye, "The Capital Grant as a Subsidy Device," in The Economics of Federal Subsidy Programs, Part 6 -- Transportation Subsidies, Joint Economic Committee, February 1973.

TABLE 2 PURCHASE POWER OF $1 BILLION - 1975 DOLLARS

Mode	Quantity	Passenger Capacity Peak	Off Peak
Bus	16,666 buses	1,250,000	500,000
New Rail (tunnel)	21.5 miles		
	17 stations		
	350 cars	94,500	24,500
New Rail (cut & cover)	29.5 miles		
	24 stations		
	490 cars	132,000	34,000
New Rail (elevated)	37 miles		
	31 stations		
	620 cars	167,500	43,500
Rail Modernization (cars only)	2,170 cars	586,000	152,000

Assumptions:

Bus: Average bus costs = $60,000
Peak bus capacity = 75; off peak load = 30 a/
One round-trip per hour
No special right-of-way required

Rail (general): Average station spacing = every 1.2 miles (2 km)
20 transit cars for every 1.2 miles (2 km)
Average transit car costs $535,000 including pro rated share of costs for yard and shops b/
Peak rail car capacity = 135; off peak load = 35 a/
Two round-trips per hour

Rail (tunnel): Right-of-way construction costs = $17.8 million/km c/
Underground station = $9.7 million c/

Rail (cut & cover): Right-of-way construction costs = $10.3 million/km c/
Underground station = $9.7 million c/

Rail (elevated): Right-of-way construction costs = $9.9 million/km (land purchase, if any, extra) c/
Elevated station = $2.1 million c/

Rail (modernization): Transit car = $456,000 b/
No additional yard and shops are required

a/ American Public Transit Association, Transit Fact Book, 1975-1976 Edition, p. 48.

b/ Chicago Transit Authority data for 1975, as reported in Newsline, Transportation Research Board, Vol. 2, October 1976, p. 4.

c/ UMTA unit cost data for 1975 as reported in Newsline, op cit, p. 4.

systems include right-of-way as well. The third major component of the current capital program, improvements to existing rail systems, is much more difficult to standardize for cost estimation, since projects are geared to particular local conditions. However, in this example it is assumed that only new transit cars are purchased as part of rail modernization, and no costs are included for track and station improvements.

The numbers in Table 2 are not definitive, but their order of magnitude appears to be correct. Buses are compared with three types of heavy rail construction: subways built by tunnelling, subways built by "cut and cover" (a technique that involves excavation of the right-of-way, construction of the subway, and subsequent restoration of the surface), and elevated rail lines. Clearly, the bus mode dominates the rail alternatives by a substantial margin in terms of number of vehicles and peak-hour transportation capacity provided.

Significant increments to bus service could be made in many cities at the cost of a single, short, rail system. Nationwide there are about 50,000 transit buses, so Table 2 indicates that $1 billion would purchase a one-third increase in the nationwide bus fleet, enough to serve many cities. But the $1 billion would buy only 30 additional miles of heavy rail, just a 6 percent increase in existing mileage, and an amount unlikely to serve more than one or two cities.

On the other hand, rail transit is a wholly self-contained system, whereas this example assumes buses use already existing right-of-way. The gap between rail and bus also narrows when the different life cycles of each are considered. A typical bus lasts 12 to 15 years, while a transit car lasts at least twice as long and a tunnel can hold up for decades more. An offset to such longer life is the probable increase in maintenance expenditure as the rail system ages. Also, rail facilities reach a finite capacity limit and usually require substantial new investment to increase this limit, whereas, at least in the short term, highway capacity can usually be increased significantly through a range of low-capital techniques (described in the third solution below). The

net effect of these considerations is probably to narrow, but not to close, the difference in capacity between bus and rail modernization. The difference between bus and new rail systems remains substantial.

Rail transit capital grants

This section examines the efficacy of rail solutions in general. Because it is the most recently completed new rail system and because considerable effort is being made to measure its effectiveness, the BART experience will be used as the primary example. Although the conclusions drawn from BART appear strong enough to be applied to other new systems, it should be remembered that other new systems with different designs and in different urban areas might be able to perform somewhat better. In particular, complementary measures to discourage use of the auto could significantly increase the "success" of transit.

Auto congestion. New rail systems appear to have little impact on auto traffic -- about 27-32 percent of BART riders were diverted from single-person auto, well below original projections of over 60 percent. 15/ However, vehicle trips on the key San Francisco-Oakland Bay Bridge corridor show virtually no change, even though BART appears to carry about 19 percent of cross-bay traffic. 16/

Air and noise pollution. Since auto trips appear fairly stable, total trips by all modes must have

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15/ Metropolitan Transportation Commission, San Francisco Bay Area, "The Bay Area Rapid Transit System -- Current Status and Impacts," August 1975, prepared for the U.S. Department of Transportation and the U.S. Department of Housing and Urban Development under the BART Impact Program, pp. 12-13.

16/ Gordon A. Shunk & Wayne English, "The Burdens and Benefits of BART, A Preliminary Case Study of Rapid Transit Impacts," in Proceedings -- Seventeenth Annual Meeting, Transportation Research Forum, 1976, p. 285.

increased and the net impact on the environment is probably negative.

Transit deficits. One characteristic of new rail systems is increased operating deficits. For example, over half the BART transbay riders were diverted from buses. Thus, decreased ridership and increased bus deficits caused substantial service cutbacks by the bus operators. The highly capital-intensive nature of BART itself was not a sufficient condition to reduce operating and maintenance costs to where they are covered by farebox revenues. BART's fiscal year 1976 operating deficit totalled over $40 million, or about $1.23 per ride. 17/ In part, this was because fares were held down and operating costs are nearly five times higher than expected. It also reflects the fact that ridership is lower in total than projected and more highly peaked. Furthermore, the crossbay ridership profile is remarkably homogeneous, consisting primarily of the young, well-educated, and affluent, hardly the group who are most transit dependent or needing subsidization.

Transit quality. The quality of the line-haul commuting trip is significantly improved in terms of speed and comfort. However, for those people whose origins and/or destinations are some distance from a transit station, there is the added inconvenience of gaining access to BART either by private car or by another form of public transportation. The time spent in gaining access and transfering to the transit vehicle is more bothersome to most people than the time spent on the line haul. Thus, the high-quality line-haul service offered by BART or Metro may be diluted when considering the entire trip.

17/ Melvin M. Webber, "The BART Experience -- What Have We Learned?" The Public Interest, No. 45, Fall 1976, pp. 92, 97 & 100. Total operating costs average about $1.95 per ride with fares averaging about 72 cents per ride. Including annualized capital costs, the average cost per ride is about $4.48.

Pricing. The capital grant program does not directly control pricing. Fares commensurate with operating costs should be possible if the operator chose to move toward such a policy, since 80 percent of the capital costs are paid by UMTA. Also, no control over auto charges is conferred on the transit operator, and a unilateral fare increase in the face of low-priced auto competition is unlikely.

Urban structure. BART impacts on urban structure will evolve over a longer period. Since only two to three percent of urban trips is affected, it is difficult to attribute changes in urban structure solely to BART. The major impacts are likely to be a strengthening of the downtown areas (both San Francisco and Oakland) and a reduction in the hardships of long-distance commuting that might encourage more people to move to the suburbs.

Energy. Heavy rail transit appears to offer little as an energy conservation tool. One study contends that BART has already used 44 percent of its total energy requirements for its first 50 years because of the huge amounts of energy consumed in construction. 18/ There is also evidence that suburban-oriented rail systems such as BART and the Lindenwold Line in New Jersey, by encouraging new and longer trips, by providing park-and-ride access, and by diverting people from relatively fuel-efficient buses, may actually increase regional energy use. 19/ Of course, the added benefits of new trips must be considered also.

Rail modernization and bus grants

The current rail modernization and bus programs are similar in that they involve replacement of old equipment and some expansion of already existing operations. Both

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18/ T.J. Healy, Total Energy Requirements of the BART System, Santa Clara University, July 1974.

19/ David E. Boyce, et al, "Impact of a Suburban Rapid Transit Line on Fuel Consumption and Cost for the Journey to Work," prepared for the Federal Energy Administration, December 1975.

programs build on significant existing facilities and operating organizations. However, both rail modernization and bus improvement efforts include a broad range of different types of projects under widely varying circumstances that make it difficult to summarize their overall effectiveness. In contrast, new rail starts represent easily identifiable major additions to a region's transportation system.

In general, except for major rail modernizations (for example, a new transit line or a new fleet of cars) or significant bus fleet expansions, the impact of any particular project on urban transportation problems is apt to be marginal and is clearly constrained by the existing system. However, in the absence of these programs, the quality of transit service would clearly deteriorate with a corresponding decline in ridership and an increase in use of the auto.

Both of these capital programs should have a beneficial impact on the operating cost of service per vehicle mile traveled. This is true primarily because new equipment should require less maintenance than the older equipment it replaces. Of course this is temporary, and maintenance will increase as the equipment ages. Any improvement in unit costs should either decrease the size of the operating deficit or perhaps allow fares to increase less rapidly than otherwise. Of course, the potentially large capital costs involved should be weighed against these operating improvements.

Similarly, new equipment should raise the quality of service somewhat. However, unless the improvements are on a scale sufficient to change the character of the service, it is unlikely that urban transportation problems as a whole will be significantly alleviated, although further deterioration may be prevented and transportation alternatives preserved.

The impact of these programs on energy use is unclear. The latest equipment tends to be more energy efficient but to have the latest energy intensive options as well (e.g., air conditioning).

The other major urban transportation problems -- congestion, pollution, and urban structure -- will be relatively unaffected by either rail modernization or bus improvements.

OPERATING AID SOLUTIONS

Significant improvements can be made to urban transportation using the existing investment in highways, rail, and bus systems with no, or only modest, additions of capital. The most obvious approach is to expand service frequency and coverage of the public modes and provide operating subsidies. These may not be "cheap" solutions. Operating subsidies for existing transit systems alone can easily consume large sums. (Another category of solution, the low-capital solution, which addresses operating methods and efficiency more directly, is discussed in the next section.)

Current Aid

Under current programs, UMTA's formula grants are the major source of federal operating aid for urban transportation. 20/ This money is allocated between urbanized areas with populations over 50,000 by a formula giving equal weights to population and population density. The formula grants are funded through Section 5 of the Urban Mass Transportation Act of 1964. Although the formula grants may also be used for capital purposes, such use has been minimal to date (only 6 percent of the funds granted), so that the formula grant program closely resembles a program of operating aid in practice. There

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20/ The Railroad Revitalization and Regulatory Reform Act of 1976 includes a provision for short-term aid to commuter rail lines affected by ConRail. This program is now in Section 17 of the Urban Mass Transportation Act. Another source of aid would be any local urban rail freight branch lines that were not included in ConRail and are receiving operating subsidies under the Regional Rail Reorganization Act of 1973.

are few restrictions on use of the funds, but it is not clear whether operating aid dominates because it is preferred by local decision-makers or because there are other non-formula grant sources for capital assistance.

A fairly rapid increase in the level of funding is built into the legislation--from $300 million in fiscal year 1975 to $650 million in fiscal year 1977 and $900 million in fiscal year 1980. In calendar year 1975, actual formula grants were about 21 percent of all government (federal, state, and local) transit operating assistance. Approximately 41 percent of total transit revenues came from federal, state, and local operating subsidies.

General Considerations

Operating aid can be used to help finance existing operations or for new, expanded services. The major restrictions are that the existing level of local, non-farebox operating aid not be decreased and that federal aid be used for no more than 50 percent of the operating deficit. 21/ In theory, such flexibility can work two ways. It can improve decision making by permitting local governments to make tradeoffs that maximize local benefits. However, there is also the possibility that the increased aid will be absorbed by cost increases without providing real improvements in transit service.

Federal operating aid is so new that little empirical evidence is available, but there is concern that the money may be used in relatively inefficient ways or for nontransit purposes. For example, concern has been expressed that transit unions will increase their contract demands in response to the new "windfall." 22/ The 50 percent federal

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21/ There are also some modest requirements for regional planning, financial coordination, and reduced off-peak fares for the elderly and handicapped. Other, more general UMTA restrictions also apply.

22/ See for example remarks by Charles Martindale, Finance Manager, Tidewater Transportation Commission, in Passenger Transport, Volume 34, No. 41, October 8, 1976, pp. 6-7.

share could weaken the incentive to economize on all components of operating cost, in the same way that capital aid may encourage overinvestment. Also, there are fewer outside checks on the components of operating expenses than on the cost elements of a capital grant application.

One set of alternatives involves the inclusion of incentives for improving transit service. Incentives would attempt to change some aspect of the transit situation, rather than simply treat the deficit symptom. For example, operating aid could be tied to specific local actions such as: increased transit vehicle miles; improved service to various transit-dependent groups; meeting specified national standards for maintenance; higher downtown parking fees for autos; etc. Basing transit operating aid on such actions offers localities incentives to improve service and/or lower fares.

Different forms of subsidy have been proposed in recent years. For example, the transit operating subsidy program might be made part of a larger block grant that could cover other urban expenses such as traffic control or highway maintenance. This would permit more explicit local consideration of tradeoffs between the operating expenses of different forms of urban transportation. 23/ Of course, like any dedicated grant, to the extent that localities use the operating grant program to "free up" funds they would otherwise have spent on the transit deficit, the current UMTA formula grant program has impacts similar to a block grant.

Project Experience

Current information on the effects of federal operating aid on urban transportation is limited, both because the program is relatively new and because the impacts are diffuse and difficult to relate to specific amounts of

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23/ The formula grant program does allow choices between operating and capital expenses for mass transit.

federal aid. Relatively little use of the program has been made by smaller cities, partly because their formula grant allocations are large relative to the size of their transit operations and because their absolute need for operating assistance is small. Also, funds for areas under 200,000 are funneled through the Governor, rather than going directly to local authorities.

The current allocation formula distributes the funds from city to city quite differently from what their existing deficits or existing transit usage might suggest. Thus, although New York City receives the largest share of funds ($51.3 million in fiscal year 1976), its grant receipts amount to only about 4 percent of its total transit revenues and cover less than 8 percent of its bus and subway deficit. Since any additional operating expenses would have to be covered locally, there is an incentive to control costs in New York and other large-deficit cities. In contrast, outside the 25 largest urban areas, the allocated funds are likely to equal more than half the anticipated operating deficits. 24/ Since at least 50 percent of the deficit must come from nonfederal sources and the local contribution must be maintained, the federal funds could not all be spent on operating deficits unless the deficits grow. Some funds would thus be used for capital items or carried over into the next year. It is too early to say whether this situation will produce larger deficits in future years.

Efficacy of Operating Aid

The effectiveness of federal operating subsidies in meeting the major urban transportation problems is unclear. Since the program began in 1975, transit service, as measured by transit vehicle miles operated, has increased slightly, but small increases had been realized since 1973. Ridership, measured by revenue passengers, has remained basically unchanged, though small increases

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24/ Unpublished UMTA projections, combined areas.

began in 1973. 25/ As a DOT evaluation of formula grants states, increases cannot be attributed solely to the formula grant program, although some contribution was probably made. 26/ By keeping transit fares lower than they would otherwise be, transit ridership is somewhat greater than if no federal subsidies were available; but ridership impacts are probably relatively small for two reasons. First, not all of the subsidy is likely to be used productively, 27/ or it may replace state and local subsidies--both factors would moderate any reductions in fares. Second, there is some evidence that the fare level is relatively unimportant as a determinant of transit ridership. 28/ However, even if fare increases had been used instead of the available federal operating aid for calendar 1975, the average national fare would have increased by only 5 cents, from about 30 cents. In some particular urbanized areas the potential impact on the fare and thus on ridership can be substantial, since funds

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25/ APTA, op. cit., pp. 33, 36.

26/ U.S. Department of Transportation, UMTA, Transit Operating Performance and the Impact of the Section 5 Program, 1976, p. 13. However, by far the greatest percentage growth in ridership and service was shown by urbanized areas of under 200,000, the same areas which were allocated the largest share of formula grants relative to the size of their transit operation.

27/ To date there is no concrete evidence on this point, but, as with any program of increased aid, it is unlikely that it will all be used to increase productivity or expand service. In particular, it is likely that labor unions that have had salaries held down by budget restrictions might use increased operating aid as a rationale for greater salary demands. Similarly, suppliers may be able to increase prices.

28/ G. Kraft, "Free Transit Revisited," Public Policy, Volume 21, Winter 1970, pp. 79-105.

potentially available for operating aid approach and even exceed $1.00 per rider. 29/

Operating subsidies do result in an income transfer to transit users in particular and to urban areas in general. However, there are certainly more efficient ways of accomplishing income transfers, some of which are mentioned in Chapter V, Non-Budget Options. The income redistribution effects are probably minor since the income distribution for transit users approximates that of society as a whole. 30/

LOW-CAPITAL SOLUTIONS

Types of Low-Capital Solutions

The two solutions discussed above, capital assistance and operating aid, both involve substantial commitments of federal funds. This section focuses on solutions that require relatively little capital investment, emphasizing instead marginal improvements in the existing mass transit system. These solutions encompass a broad range of operational, regulatory, and pricing actions whose objective is to use the existing transportation network, both highway and transit, more effectively. Although discussed as separate categories of project experience below, these three types of actions interact with each other and with programs of capital and operating assistance.

Operational improvements

UMTA has recently instituted a planning requirement called Transportation System Management (TSM) that encourages cities to undertake innovative changes (TSM

29/ U.S. Department of Transportation, UMTA, Transit Operating Performance and the Impact of the Section 5 Program, 1976, Table F, pp. A 32-35.

30/ M. Wohl, "Users of Urban Transportation Service and Their Income Characteristics," Traffic Quarterly, Volume 24, January 1970, pp. 21-43.

actions) in their transportation operations. 31/ These changes are not limited to transit; traffic management to improve vehicle flow could be a major element of TSM activities. For example, a particularly promising operational improvement involves allowing buses priority access to expressways while metering auto ramps to maintain an optimum traffic flow. Other proposals include synchronized or bus-actuated traffic signals, computerized scheduling and routing, and various peak-hour restrictions.

The TSM approach bears a number of similarities to the TOPICS 32/ program run by the Federal Highway Administration from fiscal year 1970 through fiscal year 1973. Indeed, the TSM requirement is part of the joint UMTA and Federal Highway Administration planning regulations, and highway funds could be used for many projects. UMTA funds could be used for capital or operating portions of a project, or a demonstration approach could be used. However, no money is currently earmarked exclusively for TSM.

Regulatory actions

Whereas the TSM plans for operational improvements are still at a formative stage, regulatory solutions have long been prevalent in transportation programs. Licensing, parking restrictions, auto and truck fees, and turning restrictions are all common.

However, the federal role in urban transport is fairly new and most regulations have been local in nature, though often encouraged or suggested via UMTA planning support and demonstration programs. 33/ The current process does not dictate which particular regulations or other actions to adopt.

31/ Federal Register, September 17, 1975, vol. 40, pp. 42976 ff.

32/ Traffic Operations Program to Increase Capacity and Safety.

33/ For example, UMTA is now selecting three cities for demonstrations of auto free zones.

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Pricing actions

The description of pricing solutions must be less precise because there is no coherent program currently being implemented. Indeed, current programs such as capital grants and operating subsidies are essentially the opposite, that is, solutions whose ultimate result is to avoid charging a price equivalent to the cost incurred. It is important to note that all solutions must be supported by some price and tax structure, whether or not the result is a self-supporting facility. The use and funding needs of any transit system will be highly dependent on pricing decisions. For an obvious example, the size of the operating deficit incurred depends on the fare level as well as the service level. If New York City maintains a 50 cent fare, it is likely to have a greater "need" for operating subsidy than would be the case with a 70 cent or 80 cent fare. 34/ Higher peak transit fares might generate revenues to alleviate ever-mounting deficits, while lower off-peak fares might stimulate use in periods when facilities are underutilized and costs are low. For autos, a charge that reflected the full cost of peak-hour auto commuting might relieve congestion and/or generate the revenues to alleviate it through new transit or highway construction. Energy taxes might reflect the full "social" cost of consuming energy reserves.

General Considerations

Operational improvements

The new TSM program is an attempt to encourage cities to focus on projects other than massive new rail or bus systems. However, most low-capital projects are relatively unglamorous even though they may be substantially more productive of benefits compared to capital-intensive

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34/ This statement assumes, following most studies, that transit demand is at least somewhat inelastic with respect to fare, so that higher fares generate higher total revenues; that is, the increase in fares more than offsets the drop in ridership it causes.

projects. TSM-type projects are likely to encounter widespread organizational and jurisdictional problems in implementation. By forcing many individuals to discipline their travel behavior and to pay higher travel costs, TSM implementation may result in a loss of short term "goodwill" for local leaders.

Regulatory actions

There seems little question that many transit goals can be pursued via regulation--existing regulations such as reserved curb or turning lanes for bus movement and reserved exclusive lanes for express bus or carpool use have promoted improved transit service. However, regulatory procedures that attempt to promote worthwhile goals such as free flow of transit vehicles often have uneven impacts, and the net contribution of a regulation cannot be judged without close observation of offsetting losses.

In most cases the regulatory process restricts some activities in order to free up others; for example, autos are restricted to make bus or pedestrian movement easier. In other cases, such as traffic control, the hope is to benefit all by bringing order where there could be chaos. Somewhere in between, and more controversial, are the granting of franchises for taxis and requirements as to public ownership, labor protection, etc.

Pricing actions

It is perhaps a truism that lower prices encourage use. Deep subsidies such as the UMTA capital grant program create an excess demand for capital investment in transit by reducing the immediate cost. Operating subsidies alleviate transit financial difficulties while not attacking the real factors behind urban transportation problems in general and the industry's deficits in particular. One of those underlying problems appears to be the underpricing of urban auto travel, both in terms of resources used and of congestion and other spillovers imposed on others. If it seems obvious that more "free" roads have not solved many urban traffic problems, then it is also probably true that more "free" transit would not do so either.

The appropriate cost-based price for urban auto use could conceivably be established, but it will be difficult to measure costs adequately, to apportion them among various joint users, and to identify and measure the spillover effects. These are classic problems in transport economics: What price fully reflects the cost of serving peak users? What is the value of time lost because of congestion?

However, these technical dilemmas do not seem to explain the general reluctance to implement prices that relate to the cost of service rendered. This reluctance must reflect in part the uncertainty of a market-oriented pricing solution; it certainly reflects a concern for potentially adversely affected groups (e.g., low-income commuters) and a reluctance to engage in what might be called interference in local affairs. Any individual facing a higher price will, at least in the first instance, be adversely affected and is likely to resist the change. The motorist does not want to pay a large bridge toll or a higher parking charge; the rail commuter does not want to pay extra for traveling to work at his accustomed peak hour. Of course, they all pay indirectly in congestion time and collectively in higher state and local taxes.

Project Experience

Operational improvements

Contra-flow bus lanes are one type of project that is often mentioned as a candidate for TSM-type activity. During most peak periods, traffic is predominantly in one direction, toward the downtown in the morning, away in the evening. There is usually excess road capacity in the opposite or non-peak direction. A contra-flow lane involves converting one of these lanes for temporary use in the direction of peak flow, usually through the use of temporary lane markers, overhead signs, and additional personnel for monitoring purposes. Thus, instead of three lanes in both directions, there may now be four lanes of traffic in the peak direction and two in the opposite direction. Contra-flow lanes can be restricted to buses and/or carpools as an incentive for people to

switch from single-occupancy cars to more efficient forms of transportation. 35/

A bus contra-flow lane is operated by the Port Authority of New York and New Jersey on the New Jersey approaches to the Lincoln Tunnel. 36/ The lane is 2.5 miles long and took only 10 weeks to place in service, though several years of negotiation of agreements had gone before. The initial cost was only about $200,000, though the more sophisticated version originally planned was estimated at $1.5 million. This bus-only contra-flow lane has been in operation since late 1970, now handles about 700 buses with between 25,000 and 35,000 seated passengers in the peak hour, and could handle more. The lane saves 10 to 25 minutes a trip.

The low-capital nature of this project is readily apparent, since a rapid transit line with similar capacity would cost approximately $45 million to build 37/ and require substantially more than 10 weeks to begin operations. In addition to providing better service for bus passengers, auto and truck traffic in the regular lanes should now move somewhat faster because of the absence

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35/ Such restrictions may create wasted capacity if bus and carpool volume is low or irregular.

36/ Urban Corridor Demonstration Program Exclusive Bus Lane, Tri-State Regional Planning Commission, July 1972 (National Technical Information Service, No. PB-229-015). Also, conversations with Port Authority of New York and New Jersey personnel. A recent change in the federal highway statutes permits the use of Interstate highway funds for this purpose. UMTA capital and formula grants can be used as well.

37/ This estimate is based on 1975 average construction costs for elevated rail line and elevated stations for Metro. Underground construction would cost about twice as much. Newsline, Transportation Research Board, Vol. 2, No. 8, October 1976, p. 4.

of buses and the diversion of some previous auto users to buses. 38/

The reservation of a highway lane for transit vehicles does not always proceed smoothly, however. A "diamond lane" for buses and carpools was recently (1976) instituted on the Santa Monica Freeway in Los Angeles, but was returned to regular expressway use as a result of the public outcry regarding the perceived deterioration in auto travel.

Regulatory actions

A current example of a regulatory solution is the attempt to improve transit service for elderly and handicapped persons--this is a subgroup of transit users with specialized problems and the policy goal seems unexceptional.

A hierarchy of regulations has grown up around this issue:

(1) Section 16 of the Urban Mass Transportation Act declares it to be "national policy that elderly and handicapped persons have the same right as other persons to utilize mass transportation facilities and services;"

(2) UMTA has issued regulations regarding the accessibility of subway stations and new transit buses to the elderly and handicapped which require certain design criteria to be met, including a maximum floor height of 24 inches for new buses;

(3) In the 94th Congress the House Public Works Committee considered but did not report a bill

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38/ The Golden Gate Bridge Authority in San Francisco operates express buses over a similar contra-flow lane. Although fares cover a larger proportion of operating costs than on BART, the fare per passenger-mile is less. The operating deficit is covered by auto bridge tolls. Henry Bain, "New Directions for Metro," The Washington Center for Metropolitan Studies, December 1976, p. 40.

(H.R. 3155) that would require that every vehicle used for mass transit be accessible to elderly and handicapped persons. A bill (S.208) introduced in the 95th Congress has a similar provision. 39/

Without questioning the basic goal of improved mobility for the elderly and handicapped, three aspects of the current approach are worth noting.

First, the entire system is being redesigned, rather than trying to offer specialized services, such as taxi or other telephone-summoned vehicles, for this small and specialized clientele. Every bus could require additional capital expenditure--a recent CBO estimate for equipping new buses with wheelchair lifts suggested initial increased federal capital costs of $32 million or more annually. 40/ This is enough to purchase 500 standard buses.

Second, no account has been taken of the impact on system operations of such service. Bus trip times will be slower, making labor and equipment needs higher, and an additional maintenance item has been added. Thus service to other users may deteriorate and operating costs will climb.

Third, the specification of design criteria such as floor height for all fleet buses rather than standards of service quality and accessibility can directly impact the competitive position of bus manufacturers. In specifying the 24-inch bus floor height, that is, the distance from ground to the bus floor, UMTA departed from the "Transbus" prototype that had been targeted at 22 inches, and thus threw the supplier's market into at least short-term confusion.

39/ Full accessibility is already required for all buildings constructed with federal aid, including transit stations.

40/ Draft CBO Cost Estimate on H.R. 3155 (unpublished). The added cost represents about 10 percent of the purchase price per bus.

Pricing actions

Experience with pricing projects is quite limited to date. There have been some peak/off-peak transit fare differentials, notably in the Washington, D.C., area, and some price and service differentials to carpools, notably in San Francisco and Washington, D.C. Therefore, a hypothetical project will be examined.

Imagine a congested area that is well defined geographically. Impose higher parking charges in that area and require a special auto license to drive into the area during peak hours. Establish external parking and public transit to serve those who formerly drove, and allow carpools to enter without a license. The impact will be clearly to depress single-person auto trips into the area, reduce travel times for bus and carpool users, and collect revenues with which to defray the cost of providing the bus service.

A close approximation to the project described is actually under way in Singapore, where that government has restricted auto access to the central area. 41/ Our example is essentially the Singapore experiment, but we were reluctant to rely on its empirical results since the project began only in June, 1975, and results are very preliminary. Further, such foreign experience may not be transferable to the United States. UMTA would like to fund a demonstration along these lines, but has been unable to find a city willing to try it. 42/

41/ Peter L. Watson and Edward P. Holland, "Congestion Pricing--The Example of Singapore," in Urban Transportation Pricing Alternatives, Transportation Research Board, May 1976.

42/ Most recently, the Berkeley, California, City Council considered and rejected a proposed UMTA-funded auto congestion pricing experiment.

Efficacy of Low-Capital Solutions

Operating improvements

TSM-type projects that focus on marginal improvements in the efficiency of existing urban transportation systems are potentially among the most cost effective federal transportation programs. They can produce important local improvements in several of the major problems identified in Chapter II. TSM projects are quite diverse, so it is difficult to summarize where they are or are not effective. However, they have relatively little short-term impact on regional problems such as urban structure. The focus is rather on fine-tuning the available capacity to existing demand. TSM projects can often improve transit service and auto traffic at the same time, with beneficial effects on energy use, air pollution problems, and auto congestion. In general, transit deficits should remain stable or decrease (or at least not increase as fast) as the result of most TSM projects.

Regulatory actions

Regulatory actions can potentially address any problem, but effective regulations that produce net benefits require very careful formulation. The regulatory example given earlier really addressed only accessible service for the elderly and handicapped, but it has implicit capital costs that should be explicitly considered. The crucial point is that other problems may be exacerbated by the imposition of this (or any) group of regulations; for example, operating deficits may worsen and service deteriorate slightly. Meanwhile, the potential for a high increase in mobility through more specialized services needs to be thoroughly explored.

Pricing actions

Pricing solutions can directly address several urban transportation problems. The pricing example discussed earlier, higher auto fees for peak-hour use in the central city, could alter the level of traffic flow, though a period of trial and error may be required to arrive at the appropriate fees. Of course, the fee may be so high that many people can no longer afford to drive and are forced to use transit or not travel at all, either of which they may view as an inferior option. Substantial reductions in air and noise pollution are achievable

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commensurate with traffic reduction and reduced congestion. Basically, higher prices on auto use incorporate congestion and other social costs in the user-perceived price.

As with pollution impacts, substantial reductions in energy use are possible. However, long-term effects depend on the degree to which people reorient their activities to the low-density suburbs beyond the area of pricing controls. Some aspects of central locations would become more attractive, both because of less congestion and because by living centrally one may avoid the expensive auto trip. In the long run, if auto use is much preferable to the alternatives provided, and if other locations may be substituted, then activities will disperse, alleviating the congestion but stimulating urban sprawl.

Total transport cost under various pricing alternatives must receive serious attention, since the risk of pursuing a deleterious project is present. That is, if the license fee were set too high, the streets might be underutilized; the added parking and bus-service cost might outweigh the benefits obtained from less traffic, raising total transport costs. To the extent that special transit services are provided, transit costs and probably deficits will increase. However, there are auto-generated revenues to offset this possibility, though the purpose of higher prices is not simply to raise funds for transit. Finally, a more realistic price on auto use would also permit some upward leeway for transit fares.

CHAPTER IV BUDGET OPTIONS

Chapter III described three types of solutions to urban transportation problems: capital-intensive new facility solutions; operating aid solutions; and low-capital solutions including operational, regulatory, and pricing innovations. Any Congressional decision to provide new authorization for UMTA programs will involve not only choices about the level of financial assistance, but also choices about which general type of solution to emphasize. The range of options is wide, and decisions on the funding level and type of solution are interrelated. For example, continued emphasis on the construction of new rail systems and modernization of existing rail systems would require considerable new budget authority in the near future. Further, new facilities will almost certainly need additional operating assistance later. On the other hand, low-capital solutions require smaller budget commitments, but do not have widespread support, and would encounter numerous organizational and jurisdictional problems in implementation.

Since the major transit interest groups do not seem likely to ask for changes in the character of the transit program, the authorizing committees are likely to be presented with a view that the need of the UMTA program is primarily for more budget authority. This is clearly reflected in the demands being made by transit operators, transit labor, and state and local leaders. However, based on the discussion in Chapter III, it is not clear that a simple continuation or expansion of the current program is the best way to achieve high quality, cost-effective urban transportation broadly perceived.

This chapter presents and considers in some detail five budget options for the UMTA programs. The various non-budget options described in Chapter V, including most of the possible program restructuring alternatives, are not considered here, nor are non-transit options such as highway programs or walking paths. Thus, the budget options discussed here presume the continued existence of a mass transit program with considerable governmental control over the distribution and uses of transit assistance.

Three of these options, (1) "present policy," (2) "President Ford's budget," and (3) "expanded UMTA program," all presuppose that the current UMTA program structure and mix are essentially sound. These three options represent alternative extrapolations from the current program, and they would all continue the major role of discretionary capital grants. The "expanded UMTA program" option would boost the UMTA program level without significant change in the mix of solutions and is favored by many transit supporters and industry representatives.

The two remaining options would reduce the role of discretionary capital grants, reflecting doubt about major new rail systems as an effective solution, though in each case such systems could still be undertaken. The "expanded formula grants" option presumes that the overall program level is appropriate but shifts the mix toward more formula grants, predictable allocations that could be used for either capital (including rail) or operating needs at local option. The fifth option, "no new rail starts/TSM," gradually contracts the overall program level by reducing the discretionary capital program, but introduces a dedicated source of support for low-capital solutions.

Table 3 displays the projected multi-year costs of each of these major options, and they are examined in detail in the following pages.

MASS TRANSIT BUDGET OPTIONS

Continue Present Policy

The first option is to continue the existing UMTA program at roughly the same level as in recent years. This option combines capital assistance emphasizing rail facilities with operating aid. For the discretionary capital grant program, present policy would mean obligations of about $1.25 billion a year, with a little over 30 percent devoted to buses and the remainder split evenly between new rail transit systems and modernization and extension of existing rail systems. At this level,

existing UMTA budget authority will be used up in fiscal year 1980. At that time, additional budget authority is assumed in our projections to continue the capital grant program at a slightly higher annual level of $1.4 billion. (See Table 3.)

Current law calls for the formula grant program to grow from $650 million in fiscal year 1977 to $900 million in fiscal year 1980. This present policy option assumes continued growth to $1 billion for fiscal year 1982. If industry projections are correct, operating deficits will grow at approximately the same rate, leaving the percentage of the deficit defrayed by federal operating subsidy roughly constant at between 20 and 25 percent.

Transit grants through Interstate transfers are assumed to continue at the rate of $575 million a year called for in the 1977 DOT Appropriations Act. However, the future level of Interstate transfers is difficult to predict since state and local governments exercise the option to transfer.

Under this option, construction of rail projects underway in Atlanta, Baltimore, Buffalo, and Miami would be continued at the currently anticipated pace. While commitments to additional new systems could be made, no actual spending on them would be possible until the early 1980s. However, given the long lead time for planning and engineering of these systems, this would probably not cause serious disruption to UMTA's programs.

Impact of a present policy approach

A number of issues can be raised about continuing the UMTA capital grant program with its current mix of funding. Most importantly, the allocation of 35 percent of the funds to building entirely new rail transit systems is cause for review given the great expense of such systems and their apparent inability to solve the major urban transportation problems. (See the discussion of the capital-investment solution in Chapter III.)

Once a major rail facility is in operation, conditions are somewhat altered. Clearly, an effort should be made to make the most efficient use possible of the large investment already in place. Existing rail systems are

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TABLE 3. UMTA BUDGET OPTIONS, IN MILLIONS OF DOLLARS, BY FISCAL YEAR

	1977	1978	1979	1980	1981	1982	Total 1978-1982
Continue Present Policy a/							
Capital Grants	1,250	1,250	1,250	1,400	1,400	1,400	6,700
Formula Grants	650	775	850	900	950	1,000	4,475
Grants from Interstate Transfers	575	575	575	575	575	575	2,875
Other b/	178	155	155	180	180	180	850
Total Program Level c/	2,653	2,755	2,830	3,055	3,105	3,155	14,900
New Budget Authority	455	430	430	910	2,930	2,980	7,680
Outlays	1,890	2,160	2,570	2,700	2,950	2,980	13,360
President Ford's Budget d/							
Total Program Level	2,999	2,975	3,119	3,169	-- f/	--	--
New Budget Authority	455	455	875	1,275	--	--	--
Outlays	1,830	2,225	NA e/	NA	--	--	--
Expanded UMTA Program							
Total Program Level		3,630	4,030	4,455	4,855	5,255	22,225
New Budget Authority		430	840	3,980	4,680	5,080	15,010
Outlays		2,400	2,980	3,380	3,920	4,290	16,970
Expanded Formula Grants							
Total Program Level		2,755	2,830	3,055	3,105	3,155	14,900
New Budget Authority		430	430	1,890	2,080	2,850	7,680
Outlays		2,280	2,680	2,950	3,270	3,260	14,440

	1977	1978	1979	1980	1981	1982	Total 1978-1982
No New Rail Starts/TSM							
Total Program Level		2,745	2,835	2,875	2,815	2,890	14,160
New Budget Authority		530	555	700	2,440	2,715	6,940
Outlays		2,170	2,610	2,750	3,010	2,980	13,520

a/ This closely approximates the definition of current policy assumed in Five-Year Budget Projections: Fiscal Years 1978-1982, Congressional Budget Office, December 1976. The only differences are that when major new budget authority is added in fiscal year 1980, the capital grant program is increased by $150 million, other programs are increased by $25 million, and the formula grant program continues to grow in 1981 and 1982. Also, a slightly faster spendout rate is used here.

b/ Includes the research, development and demonstration program, planning and training grants, administration, and operating aid for commuter rail lines.

c/ Total program level is measured by UMTA's administrative reservations, which are one stage prior to obligation.

d/ The program level for fiscal year 1977 assumes that $346 million in formula grants apportioned but not reserved in previous years are all reserved in fiscal year 1977 in addition to the $650 million apportioned in fiscal year 1977. The program level and new budget authority for fiscal year 1979 and fiscal year 1980 are extrapolated from the budget and backup materials. In particular, Interstate transfer grants are assumed to be $775 million a year after fiscal year 1977. New budget authority in fiscal year 1979 and fiscal year 1980 is due largely to the assumption that all UMTA commitments and "commitments in principle" will be "fully funded" when they are committed rather than when the individual grants are administratively reserved.

e/ Not available.

f/ Not projected.

largely in older, more densely populated cities with relatively concentrated travel patterns (e.g., Boston, Chicago, New York, and Philadelphia), where the automobile plays a less dominant role and where, in fact, traffic growth could probably not be accommodated in central areas. Most of UMTA's investment in these areas is for major replacement or upgrading programs that purchase new transit cars, replace outmoded equipment such as signals, or correct problems created by previously deferred maintenance. However, proposed transit extensions for even these cities should continue to be analyzed with the same skepticism applied to other major investments.

UMTA currently (fiscal year 1977) reserves about $350 million a year for bus purchases. The bus is a flexible, energy-efficient, and relatively non-polluting means of moving large numbers of people. A comparison of the purchasing power of $1 billion (see Table 2 in Chapter III) found that the bus mode dominated rail in terms of number of vehicles and peak-hour capacity obtainable. UMTA's informal policy of funding virtually all bus applications reflects this, as does the major use made of buses in cities of almost every size. There are still many problems with most bus system operations, but these largely involve administrative problems in coordinating bus movements on an auto-oriented highway network and in an operating environment influenced by a multiplicity of local jurisdictions. They do not seem to reflect problems inherent to buses.

President Ford's Budget

The fiscal year 1978 budget proposed by President Ford is similar to a continuation of present policy except that Interstate transfer grants are $775 million, up from $575 million in fiscal year 1977, and other UMTA programs (primarily grants for technical studies and research, development, and demonstration) increase by $20 million to $145 million. More importantly, the President's budget proposes that no new rail starts be committed at least through fiscal year 1980 and that past commitments be "fully funded." Past commitments to Atlanta, Baltimore, Buffalo, Detroit, and Miami would be completed, and presumably further new systems could be started after

1980. The capital grant program would be held at $1.25 billion at least through fiscal year 1980.

Impact of President Ford's proposal

The President's proposal is very similar to present policy through fiscal year 1980, except that no commitments to new rail starts would be permitted. Greater reliance on Interstate transfers is assumed. If the policy of no commitments to new rail starts continues after 1980, this option is similar to the "no new rail starts/TSM" option discussed below, except that President Ford did not propose a new low-capital program. No program details are available beyond 1980.

Expanded UMTA Program 1/

A proposal being discussed among transit supporters calls for a major expansion in both capital and formula grants, while basically maintaining the same program structure. In Table 3, this expanded-program budget option assumes capital grants to be $1.9 billion in fiscal year 1978 (up from $1.25 billion in fiscal year 1977), increasing by $300 million a year to $3.1 billion in fiscal year 1982, more than double the $1.4 billion assumed by present policy. One-fifth of the capital grants would be earmarked for buses, with the remainder available for rail and other fixed guideway facilities.

In addition to an expanded rail modernization effort, this option would provide adequate funds to complete new starts committed or under construction in Atlanta, Baltimore, Buffalo, Detroit, and Miami. In addition, five to ten new systems of moderate size similar to those under way in Atlanta and Miami could be started. Five new starts assumes all grants would be completed by the end of fiscal year 1982; extending grants beyond 1982 would allow more new starts but entail administrative reservations and outlays from additional budget authority to be provided in the future. The undertaking of ten new starts implies that 23 urban

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1/ This option resembles, but is somewhat larger than S.208, the proposed National Mass Transportation Act of 1977, recently introduced in the Senate.

areas would have completed rail systems by the mid-1980s; there are only eight at present.

Formula grants would be increased to $1 billion in fiscal year 1978 (up from $775 million called for in current legislation) and then expand to $1.4 billion in fiscal year 1982. This amount should cover about one-third of the nationwide transit operating deficit for current systems; it does not reflect increased deficits related to new system starts. If the expanded budget option is intended to defray a substantial portion of large-city deficits, the allocation formula would also have to be changed to reflect the size of the deficit, preferably coupled with some incentive to control cost. The outlay estimates for this option in Table 3 should be adjusted downward if the current formula were maintained.

Impact of an expanded UMTA program

Program expansion would allow additional new-system approvals and provide more operating aid. However, the concerns voiced above regarding a continuation of present policy are applicable to the expanded budget option; problems with present policy are likely to be exacerbated at higher federal cost. Simple expansion of the UMTA program would probably reduce the pressure for more effective assistance programs. The risk of future deficits would certainly be increased if rail systems proliferate in lower-density urban areas, especially without adjustment of tax incentives and substantive controls on zoning and auto use.

Expanded Formula Grants

The overall deficit incurred industry-wide is much larger than available federal assistance. For example, for calendar year 1975 the national operating loss was about $1.5 billion, while fiscal year 1975 formula grants were authorized at only $300 million. Also, existing operating assistance is allocated so that cities with the largest deficits can defray only a small portion with federal assistance. Thus, while the program allows federal assistance of up to 50 percent of local operating deficits, the support falls far short of this level for the larger systems and for the industry as a whole.

Bus replacements follow a regular, predictable life cycle, and formula allocations, rather than discretionary grants, provide a regular, predictable flow of funds. In contrast, most rail investments are lumpy and concentrated in a few cities, making a discretionary program the most feasible approach for major federal assistance.

In recognition of these two points, this budget option would restructure the UMTA program by shifting funds to an expanded formula grant program, commensurately reducing the size of the discretionary capital grant program. The total UMTA program level would remain unchanged from present policy, but the discretionary capital grant program would be reduced to those funds needed to complete existing new rail starts (Atlanta, Baltimore, Buffalo, and Miami) and for a somewhat larger rail modernization effort (from $450 million in fiscal year 1977 to $600 million in fiscal years 1981 and 1982).

Virtually all regular capital needs would be financed out of the expanded formula grant program, as would operating assistance, with local officials deciding the appropriate mix between the two. Under this option, the discretionary capital grant program would drop to about $700 million in fiscal year 1982, 2/ one-half that assumed by the present policy option, and one-quarter that assumed in the expanded UMTA program option. By fiscal year 1982, formula grants would be about $1.7 billion, a 70 percent increase over present policy and almost $300 million over the expanded UMTA program. It is assumed that, after meeting regular capital needs, virtually all these funds would be used to help cover operating deficits. Such use would require a new allocation formula that reflects more closely the size of operating deficits and the need for bus replacements and other capital spending.

2/ Miami is assumed in this option to be the only current new rail start still receiving UMTA capital grants after fiscal year 1980, estimated at $100 million a year.

Impact of expanded formula grants

One impact of increasing the formula grant program would be to relieve the burden on farebox revenues. That is, users would pay lower fares than otherwise, given the level of state and local assistance. Further, state and local taxes would not have to be increased as rapidly to absorb deficit growth.

If the formula grant program is to be expanded, alternative subsidy mechanisms should be considered that include incentives for improving transit service and controlling costs. For example, operating aid could be tied to ridership or to specific local actions that would attempt to improve some aspects of the transit situation, rather than simply treating the deficit symptom. Several performance incentives are discussed in Chapter V.

Reallocation of funds to the formula program entails less discretionary capital funding, which in turn implies fewer major rail system starts and probably somewhat lower bus capital spending overall. Local authorities would of course be free to construct major facilities, using the more gradual flow of formula assistance or Interstate transfers to supplement locally generated funds. Local governments would have more flexibility to determine their own program emphasis and would have a more predictable funding base to plan against. Further, depending on the formula, the distribution of federal assistance could be made to approximate current transit use more closely.

No New Rail Starts/Expanded Low-Capital Program (TSM) 3/

Since there is such doubt about the efficacy of new rail systems as solutions to urban transportation problems, an alternative budget option would be to continue the UMTA program, but to provide no funds for

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3/ The acronym TSM, Transportation System Management, represents a planning requirement encouraging low-capital improvements.

additional new rail systems. Existing programs for bus replacement, rail modernization, and operating assistance would be continued. New rail systems that have received letters of commitment from UMTA and are under construction or proceeding with detailed engineering studies would be completed (Atlanta, Baltimore, Buffalo, and Miami). The Washington Metro would continue to be funded using Interstate transfer funds. However, cities that have received encouragement from UMTA, but no formal commitment (for example, Honolulu) would be excluded. Detroit would also be excluded, even though it did receive a letter of commitment in principle, because considerable planning remains (the mode has not even been selected).

With this option, capital program levels vary only slightly from present policy in fiscal years 1978 and 1979, but as construction of new systems is completed in the early 1980s, capital grants would decline to less than $1 billion, roughly two-thirds the level estimated in present policy. Until fiscal year 1980, this option is comparable to President Ford's budget regarding capital programs, but as current new starts are completed, capital grants would decline correspondingly.

Low-capital projects that focus on increasing the productivity of the existing urban transportation system appear to be among the most cost effective federal programs. Therefore, it might be desirable to couple a shift in emphasis away from capital-intensive, new rail systems with expansion of federal support for low-capital projects. This option assumes a new low-capital program beginning at $100 million a year in fiscal year 1978 and growing to $200 million by fiscal year 1982.

Impact of no new rail starts option

The obvious impact of this budget option is to reduce the attractiveness of new rail starts and the new facility solution in general. New low-capital funds could be used for projects such as priority access and ramp metering systems, synchronized and/or bus-actuated traffic signals, computerized bus scheduling, peak-hour auto restrictions, speeding clearance of disabled vehicles, etc. These projects require a coordinated effort

by many government jurisdictions and transportation organizations, yet are very low in direct project-related cost, so flexible use of the dedicated funding (with appropriate oversight) would be desirable. Careful thought toward how to encourage implementation would be necessary.

Given the small number of new rail systems and their relatively poor performance in meeting transportation objectives, it is unlikely that the overall quality of urban transportation would be reduced below that resulting from present policy. Indeed, if low-capital projects can be effectively implemented and are truly low in cost, then substantial improvements are likely. The payments toward defraying large-city transit deficits would remain, but the long-term effects of rail transit on urban structure and development will have been foregone.

TIMING AND NATURE OF CONGRESSIONAL DECISIONS

Consideration of mass transit funding by the Appropriations and Budget Committees will be based on current and possible new authorizing legislation. A major new bill, S.208, has already been introduced. In making choices regarding this and other legislation Congress will determine federal policy towards mass transportation for at least several years to come.

Several alternative courses of action have been outlined above and their budgetary consequences were presented in Table 3. This section links these budget options to implementing legislative actions. For all the options, incorporation of non-budget options in the authorizing and appropriations acts would be opportune wherever they are determined to have beneficial program effects.

Full Funding

The calculations underlying Table 3 assume that budget authority is used only at the time that UMTA administratively reserves its grants, which is just prior to formal obligation. UMTA has other, lesser levels of

project commitment that imply future spending streams but do not result in administrative reservations.

If Congress imposes a "full-funding" requirement that budget authority be available sufficient to cover future spending on all levels of UMTA commitments, UMTA will need additional budget authority earlier and in larger amounts than indicated in Table 3. 4/ Full funding would provide increased certainty for UMTA's grant recipients regarding future-year continuation of projects now under way or approved. However, there are alternatives to full funding that also place some controls on the rate at which UMTA can commit funds, and these options should be explored. For example, the current practice of setting ceilings on annual obligation levels could be extended to limits upon UMTA commitments as well.

Continue Present Policy

A continuation of present policy for mass transit requires relatively little legislative action, because the majority of UMTA programs, including the capital and formula grants, are presently funded from long-term contract authority, and UMTA had unreserved budget authority of $8.7 billion at the start of fiscal year 1977. These funds are available for obligation, and, in the absence of a full-funding requirement, they would be sufficient to maintain the current program level through fiscal years 1978 and 1979. This continuation presumes appropriations actions to approve annual obligation ceilings and liquidating cash, as has been the case in past years.

The option of continuing present policy, like all of the options presented, anticipates that appropriations providing new budget authority for two annually-funded programs, Interstate transfers and commuter rail assistance, will continue at a present policy level of $430

4/ This full-funding requirement is alluded to in President Ford's budget request, and was until recently the unofficial modus operandi for UMTA.

million annually. One of these programs, commuter rail assistance, would require reauthorization for fiscal year 1979 and beyond. Thus, new legislation providing budget authority for the major programs for fiscal year 1978 is not critical. 5/ On the other hand, if program revision and future direction are to be provided, legislative action should not be put aside to await financial crisis.

Expanded UMTA Program

Implementation of the "expanded program" option would necessitate both new funding authority and appropriations for fiscal year 1979, or even for fiscal year 1978 if full funding is required. The need for accompanying appropriations action represents a major change from previous UMTA legislation due to provisions of the Congressional Budget Act of 1974. Specifically, legislation granting new spending authority in general, and new contract authority in particular, is no longer effective without an accompanying appropriations act (Section 401 of the Budget Act). Thus, either a large current-year appropriation or some form of advance appropriation would be required to make contract authority effective. Multi-year appropriations have been approved for only a few cases to date, and inclusion of authority for the immediately following fiscal year would require a waiver from Section 303 of the Budget Act, which makes bills providing budget authority out of order until the first concurrent resolution is agreed to. To finance an expanded program, Congress will need to consider whether budget authority should be one lump sum, several annual installments in advance, continuing one-year appropriations, or some other alternative.

Other Options

The other three options are relatively straightforward. President Ford's proposed budget is similar to

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5/ For more details see "UMTA Funding - Is It Adequate?" Staff Draft Analysis, Congressional Budget Office (forthcoming).

present policy and would require little legislation. Implementation of full funding would require authorization and appropriation of new budget authority in fiscal year 1979, and appropriation for Interstate transfers and commuter rail would need to be $25 million higher at $455 million.

The two remaining options, "expanded formula grants" and "no new rail starts/TSM," need authorizing legislation and appropriations and call for potentially complex changes in the authorizing legislation to reflect the shift in program direction. The formula grants could be expanded by increasing the already authorized ceilings on liquidating appropriations and providing budget authority as eventually required (in fiscal year 1980 under these assumptions). The "no new rail starts/TSM" option suggests a newly authorized section for TSM grants in the Urban Mass Transportation Act, with its own budget authority. Appropriations could then be made explicitly for this program, while continuing to liquidate obligations incurred for the remaining UMTA programs. Alternatively, appropriations language reserving current contract authority for TSM could be introduced. In this case, new budget authority would not be required until fiscal year 1980.

CHAPTER V NON-BUDGET OPTIONS

Many changes could be made in the federal transit program that would have relatively minor budgetary impact. These so called "non-budget options" represent shifts in program emphasis and objectives or changes in the way in which program objectives are pursued. For example, new forms or combinations of assistance could be offered, or grant criteria could be changed or made more explicit.

This chapter describes a relatively comprehensive, but by no means complete, set of options for changes in the current UMTA program. These options generally cannot be substituted for the major budgetary decisions before the Congress over the next few years, but they could have a significant impact on program effectiveness and, over the long run, change the costs of federal transit involvement.

More Explicit Criteria for Capital Grants

Generally, more explicit criteria could be established for UMTA's project approval process. This might involve absolute criteria; for example, a minimum population density or minimum size employment center might be required before a new rail transit line would be considered. Another approach would be relative criteria, comparing different cities. For example, a transit proposal whose combined annual capital and operating cost per rider exceeded the next city's alternative by more than a certain percentage could be excluded.

Criteria could be put forward in legislation by the Congress. Alternatively, a legislative requirement for UMTA to promulgate criteria subject to subsequent approval by Congress might be more practical. In either case, variations in local conditions will be difficult to account for. The notion of Congressionally-specified criteria could be extended to require Congressional

approval of all major new systems on an individual basis, as is now done for the Corps of Engineers. 1/

Providing Performance Incentives for Operating Grants

Current federal assistance is not strongly tied to performance requirements with incentives to provide quality service. Operating grants would most readily lend themselves to such incentives. Subsidies are now paid only to transit agencies incurring an operating deficit; the higher the operating loss, the higher the subsidy, within limits, that can be received. To a large extent, the amount of federal aid is independent of actions by transit companies or employees. Thus, federal aid offers little incentive for economical and efficient management.

Numerous alternatives are available that could provide such incentives. The primary problem is: What are the specific objectives of the operating assistance program? Presumably, the objectives include increased service and ridership, which suggests that formulas might be based on the number of revenue passengers, vehicle miles, or other service measures. Such formulas offer encouragement to expand service and attract new riders. Operators could benefit financially from providing service in a cost-effective manner, since these grants would not be based on the size of the deficit. Some incentive program would be particularly important if formula grants were expanded (see the "expanded formula grants" budget option in Chapter IV).

Subsidy formulas based on ridership and service levels have often been proposed and were debated during

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1/ Congressional project approval would make explicit the Congressional intent as to the number and location of major (fixed guideway) transit systems. Of course, a disadvantage is that decision-making would be moved directly into the political process, which might require expanding the number of systems approved in order to expand the political base of support.

Congressional consideration of the 1974 amendments to the Act. There are two inherent problems of implementation. First, cities with large transit systems would receive most of the funds, resulting in a heavy geographical imbalance and a major redistribution relative to the current formula grant program. The legislative history of 1973-1974 suggests major political difficulties in achieving such a redistribution of operating aid. Second, if aid were based on ridership, entitlements would be created whose level might be difficult to predict. On the other hand, if tight ceilings have been imposed on total aid available, the desired incentives for increased ridership would be reduced.

Different Mix of Assistance

An alternative to altering the criteria for capital grant decisions and/or the formula used to allocate grant funds would be a redirection of federal aid, either between forms of assistance or via the addition of new sections to the Urban Mass Transportation Act. Two such possibilities are treated as budget options in Chapter IV above: (1) shifting emphasis from discretionary capital grants toward formula grants, or (2) creating separate funding for low-capital projects. her alternatives include shifting some of the dis- etionary funding toward more spending on research, development, and demonstration projects, or increased grants for managerial training or other specified programs.

Research and development to improve operating efficiency is a natural activity for federal aid, since there would be nationwide applications for any promising findings. Equipment design and specification could be advanced. Development of computerized scheduling packages could assist local analysis of route and service changes.

More demonstrations could provide practical experience from projects which are otherwise politically unacceptable and unlikely to be applied for. For example, a Singapore-type pricing experiment or reserving some

streets for all-bus operation would clearly require some sort of demonstration grant, possibly with a minimal local share, not so much to fund the experiment as to entice a locality to take part. Major demonstration funding would allow more experimentation, since UMTA tends to take the lead in demonstration programs, as opposed to reviewing applications under the normal grant procedures. Demonstrations are also a good way to gather project experience before encouraging applications from a large number of cities.

Managerial and marketing ability of transit operators could be upgraded with considerable potential for transit improvement. Expertise in bus scheduling, routing, passenger marketing, etc., cannot be "granted" to current operators, but major training initiatives could be expanded.

Studies and assessments could be required by the Congress for use in its deliberations. This legislative option has been taken with increasing frequency, although it is difficult to ensure a useful end product. The quality and usefulness of the studies often vary with the explicitness of the Congressional mandate and the level of dedicated funding provided.

Alternative Financing Methods

Block grants

A more abrupt change would be conversion to block grants or revenue sharing. Assuming that the funds were restricted to transit or general transportation uses, this approach would remove some of the biases inherent in the capital and operating restrictions of current assistance. Also, block grants would avoid the need for federal standards that are difficult to apply uniformly across metropolitan areas, while encouraging local initiative. Of course, if local actions are tightly constrained by political considerations, the granting of additional local autonomy in the use of federal assistance funds might prove a mixed blessing toward alleviating transportation problems. As discussed in Chapter III, it is often politically easier as well as more

popular to mobilize a community around constructing a new transit system than buying unglamorous buses or implementing low-capital solutions.

Direct subsidies to individuals

Current transit subsidies are general in nature, with benefits flowing through existing transit systems to riders, land-owners, transit workers, suppliers, and in some cases, construction workers. To the extent that the objectives of transit assistance can be identified with mobility of specific groups, such goals might be achieved more directly. For example, "transit stamps" could be issued to low-income or elderly individuals, who could use them for riding any mode of transportation. 2/

Such a scheme, in addition to directly benefiting the desired recipients, allows the target groups to choose their preferred mode, rather than letting the transit authority make that choice. This is a direct approach to the problem of low mobility for poor people, but could also be extended to other groups. However, the use of specialized programs for each symptom of poverty (lack of medical care, adequate food, transportation, etc.) may run counter to general reform of the welfare system.

Pricing of Transportation Resources

It is clear that some of the goals of urban transportation assistance could be achieved through the price structure. Without major capital investment, auto congestion could be reduced with high tolls while transit ridership would be encouraged. However, substantial disruption of current patterns of movement would necessarily be part of a change to high auto tolls, and hardships on some individuals and groups would result. A reluctance to dictate major changes in daily travel routine (or its cost), except through newly added facilities,

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2/ Variations of this approach are used in West Virginia and Kansas City.

seems to explain why transit needs continue to be translated into requests for more federal dollars.

If prices were to reflect underlying resource costs, many inputs into urban trips would become more costly. Energy, parking, freeways, and transit use are all characterized by underpricing, albeit for potentially justifiable reasons. Higher prices would discourage nonessential use and reduce the need for financial assistance. Prices closer to cost could be stipulated directly or encouraged indirectly by reducing the federal matching share. Congress should consider at what point budget priorities in other areas suggest more reliance on pricing to pay for transportation.

New Program Combinations

The ultimate goal of federal assistance should be to improve the quality of urban life, and investments in mass transit should be coordinated with federal and local policies toward solving other urban problems. (UMTA and the Federal Highway Administration already do require coordinated local transportation planning.) The myth that the urban problem is primarily one of transportation, or that the construction of large-scale rail transit systems or any other solution alone will somehow improve the urban condition, has distracted policy makers from the reality of the situation. The reality is that urban problems are very complex and involve much more than simply transportation per se. Clearly, utilization of the existing public transit system is interdependent with private transportation (mainly auto), and trends in land use and urban development. In recognition of this interdependence, two important programs which might be packaged with transit assistance are discussed below.

Auto improvements

Any plan to improve urban transportation must incorporate the private automobile. Assistance that focuses only on the small percentage of trips currently carried by public transit is certain to arouse dissatisfaction from the vast majority of people who continue to use the auto. This dissatisfaction is likely to lead to

political disagreement, particularly if attempts are made to restrict private auto use in order to encourage greater use of transit. Further, the highway system can satisfy more diverse demands and is often cost competitive with mass transit. Restrictions on peak usage, vehicle size, energy efficiency, and other characteristics of auto use could be more important in the eventual quality of urban life than any new transit system. Low-capital improvements should focus on auto and transit movement together.

Coordinated urban development

If urban planning were ideal, all public and private transportation would be coordinated with commercial and residential activities. Successful comprehensive planning is unlikely to evolve, but overall planning aspects cannot be ignored.

Capital assistance for mass transit should be linked to urban growth and design to assure that the transit system is consistent with the expected future demand for tripmaking by urban workers and residents. Development will not proceed as envisioned or at the pace required to support rail transit systems unless commitments on zoning and other land-use controls are prerequisites to capital assistance.