

### Metropolitan Transit Commission

The MTC members are appointed by the Metro Council, which also approves the MTC budget and ensures that it is consistent with adopted regional policies. There are eight commissioners and a voting chairman appointed by the governor.

The MTC primary focus is operating the existing bus system efficiently; involvement in implementing an LRT line is not a high priority.

### Federal Elected Officials

The study area is in the 5th Congressional District of Minnesota, so most interaction has been with that office. The two U.S. Senators and the representative of the 3rd Congressional District, which has the southern terminus, have also shown interest in the study.

The 5th District Congressman has given close attention to the study. He has had reservations about the value of LRT as a transit concept and concern about the costs of construction and the availability of funding. The other elected officials have expressed appreciation for the information, but await the results of the study and the community's desire before committing themselves to any action, although they all want to resolve a transportation issue that has been around for 20 years.

### Federal Agencies

Several federal agencies are involved, but only UMTA and FHWA have been involved continuously.

UMTA's position reflects the federal government policy of "no new rail starts." This makes it difficult to ensure that the EIS will be acceptable, particularly the alternative analysis. When the study started, UMTA was an active participant; since the change in federal policy, however, communication has decreased. The FHWA has actively participated in the study. The local office is staffed by professionals who have helped by interpreting rules quickly and clearly. They encouraged UMTA to take

part in the study effort and helped the Minnesota DOT change a bridge design at 34th Avenue and I-494 to incorporate LRT if it became the recommended transit alternative.

The present administration's lack of clarity in the areas of alternative analysis and funding makes planning a more difficult and prolonged process.

### LESSONS LEARNED

The Hiawatha Location and Design Study has taught the following valuable lessons:

- Make LRT part of the total development program. Implementing the Hiawatha corridor plan must include a land use development plan and agreement on appropriate public policies to carry out the program as well as the transportation alternative. Without them, the proposal to build LRT would not have been acceptable.
- Build a broad constituent base. Community support is needed to resolve the transportation issues in the corridor. Residents of the concerned neighborhoods, local businesses, labor, the downtown business community, and elected officials must be convinced of the value of the alternative selected.
- Let neighborhood HATF representatives present the plan. Neighborhood representatives make effective advocates. They can illustrate community understanding of the issues and give reasons for their recommendations.
- Present the plan when the right external conditions exist. Five years ago the plan would not have been accepted because of conflict with regional policies. Conditions for action are favorable now: the problem has been around "too long"; part of Minneapolis is ready for significant redevelopment; and jobs and housing are important issues in the city.

## Leverage--A Proposal for the Federal Role in Public Urban Transit

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The purpose of this paper is to outline the federal government's role in transit—i.e., leverage. Federal involvement in transit dating back to the early 1900s is examined to show how earlier policies contributed to the problems faced by transit operators today. The paper suggests that the federal government change its role from grantor to investor and thus leverage its funding so that the net economic benefit to the nation is greater than the federal investment and greater than if there were no federal involvement at all.

The current administration in Washington has made drastic changes in funding for urban mass transit. Its policies are based on two major philosophies: the superiority of the free market and the decentralization of power from Washington to state and local governments. Both philosophies contradicted the current system of federal spending on mass transit.

Government subsidy to industry is contrary to the free market philosophy: businesses should be run without government intervention; the nation's transit companies once were profitable enterprises and should remain so; transit should continue to operate only on routes where a profit can still be made. Although the fundamental idea—to reduce an unwieldy, inefficient central government—is sound, we believe that this philosophy to public transit is naive and ill advised.

This paper outlines a role in transit that clearly belongs to the federal government—i.e., leverage. It discusses problems faced by transit operators today caused by federal policies and programs that interfered with financing mechanisms, devastated the supply industry, and created inflation in the cost of labor, construction, and procurement. The federal government has been involved in the transit industry since the early days of the street-railroad industry, and before its involvement ends it has a

responsibility to undo the problems it created and to help put the industry back on its feet.

This paper discusses some policies and programs that could help achieve these goals. The government should stop acting as a "grantor" with giveaway programs and assume the role of "investor." Through leverage, a small outlay can produce large benefits or cost savings to the public transit industry.

## CURRENT STATE OF TRANSIT

### Financial Condition

The public transit industry in America faces a widening gap between revenues and operating costs. Recent budget cuts and the phase-out of federal operating subsidies will increase this gap. Although a recent phenomenon, subsidies have become an important revenue source for financially troubled transit agencies and for local governments that face revenue shortages of their own.

Over the past 10 years, government subsidies increased from 19 percent to 59 percent of total transit revenue.<sup>1</sup> This increase reflects policy decisions, made at all levels of government, that transit systems contribute to the public good and should not be abandoned. As fares were kept low and operating costs increased, in 1974 the federal government agreed to provide operating assistance. The federal share, 21 percent in 1975, quickly jumped to approximately 30 percent and held steady at that level.<sup>1</sup>

Subsidies have plugged the growing gap between revenues and expenses, but that gap is now widening because fares have held steady or decreased when measured in uninflated dollars. Transit costs, particularly labor costs, have grown at so much faster a rate than the general rate of inflation that many commentators and legislators are beginning to reconsider the subsidy program. They claim that transit is not a public responsibility; that it is a poorly run private enterprise that does not compete with the automobile; and that if it cannot pay its own way, it deserves to fail.

Such claims ignore the fact that public transit in this country has never paid its own way, even when it had a virtual monopoly on intracity transportation. In its early period it relied on investor/owners who derived indirect benefits other than profit from ownership.

The first of these were land speculators, such as Henry Huntington of southern California. His Pacific Electric Railroad was financed by the sale of subdivisions at the end of its rail lines. Land buyers thus supplied construction capital and a sure source of ridership for the system when it was built.

This was true of many streetcar systems at the time when electric cars were on the rise. However, around the turn of the century, revenue from the regulated 5-cent fare was not sufficient to keep pace with the rising operating costs, similar to the situation today.

Between 1902 and 1917 the wage bill of American Transit companies increased by some 256 percent while revenues increased by only 179 percent. Many transit operators became bankrupt during this period, unable to meet operating costs and interest payments on their borrowed capital.<sup>2</sup>

The next group of investors to subsidize the street-railroad industry were the electric utilities.

Most electric utilities were, during the first quarter of this century, publicly regulated such that they could not show a return on their investments greater than some fixed percentage. With the markets for electric power expanding rapidly and producing growing income, they sought outlets for investment of their capital which would insure a steady demand for electric power while enabling the utilities to show only

limited short-term profits. Because public transit operations were in need of capital, and utilized electric power almost exclusively, the match seemed a perfect one.<sup>2</sup>

In 1935, this marriage of interests was dissolved by the Public Utility Holding Company Act, a law intended to break up utility trusts; allow more competition for electricity, gas, water, and transit; and reduce the utilities' influence over these industries. A side effect was to send the transit industry into a wave of bankruptcies and financial problems.

The transit industry became less and less profitable and was high on the list of targets for divestiture. Provisions of the Act allowed the utilities to sidestep the political issues inherent in abandoning an unprofitable industry and concentrate their resources in areas with a better return. Without such provisions, municipal governments and citizens dependent on streetcars and transit systems would have made it impossible for the utilities to give up their transit holdings. The Act may have had some short-term benefits for increased competition, but overall it was devastating to the transit industry.

Automobile use began to cut heavily into transit ridership during this period as well, with two results: it decreased revenue and the resultant automobile traffic hampered streetcar service. The electric railway operators recognized the problems and sought solutions. One was to develop a faster, more agile car; another was to scrap rail lines and replace them with buses. Consequently, suppliers in the bus industry became the next group to rescue transit operators from financial ruin through holding companies such as National City Lines:

By 1939, National had acquired some 29 transit systems, financed almost entirely by stock shares sold to General Motors, Firestone Tire & Rubber, and, through its subsidiaries, Pacific (later American) City Lines, to Phillips Petroleum, Standard Oil of California, and Mack Manufacturing Corp. By 1947 (the date of the anti-trust indictment) National controlled 46 transit companies, including major operations in Los Angeles, Miami, Philadelphia, Oakland, St. Louis, Baltimore, San Diego, Providence, and Rochester.<sup>3</sup>

For such companies, the attraction of transit investment was largely the tax advantages to be gained. They could purchase an obsolete, worn-out capital investment at a fraction of its book value and write it off at a higher amount. As with the electric utilities, they also gained a secure market for their products.

The arrangement did not last, however. Once the transit systems were modernized and converted to buses, the tax advantages were lost. And, in 1947, the federal government instituted antitrust action against National City Lines and GM. By the mid-1950s they had divested themselves of most of their transit operations:

With private investors to take over these ailing transit companies, and faced with the prospect of total abandonment of transit service, many municipalities reluctantly became the owners of public transit operations during the fifties and sixties.

Municipalities have, in recent years, continued to operate many uneconomic transit routes which had been successively handed down from land speculators to public utilities to automotive industry holding companies and finally to public ownership.<sup>2</sup>

Public ownership has not significantly changed the profit situation in the transit industry. The industry has always been in financial hot water and was at the brink of abandonment and bankruptcy three times, only to be saved

by investors whose interest was served by transit's survival. It has always needed such infusions of outside capital and a means to dilute its operating losses with income from a more profitable, associated industry. Those who call for the transit industry to pay its way with fare revenues have not taken into account those who have subsidized it from the start.

Physical Condition

Equipment maintenance is a serious problem in the transit industry. Only things critical to daily operations can be funded. Unfortunately, preventive maintenance is neglected, which has caused severe deterioration of vehicles and fixed facilities. The rail operators face the worst problems. They have more equipment to maintain and more complex vehicles to operate. For example, the maintenance problems in Philadelphia are becoming extreme:

On a fall day in 1979, of the 220 Broad St. subway cars, only 26 were available for service. For months, numerous trains were routinely cancelled, and express service had been ended. Ridership was declining.<sup>4</sup>

Other U.S. rail transit systems cite similar experiences. Maintenance costs in an inflationary economy can be expected to increase. However, rail transit maintenance costs have risen faster than inflation, primarily because of escalating labor costs. Federal regulations, discussed later in this paper, have contributed to the situation.

Both light rail and heavy rail vehicles are now more through modern technology, particularly electronics and automatic control. Some of these sophisticated additions aim at reducing operating costs by increasing fleet efficiency. However, more complex equipment demands a more skilled maintenance staff but, because funds are short, transit authorities are unable to hire or train the skilled staff needed to maintain the new equipment. Scheduled funding cuts can only exacerbate the problem.

Transit Equipment Market

Compared with other industrial and commercial markets in the United States, the market for transit equipment is neither rich nor healthy. For example, the Budd Company, which is German owned, is the only surviving American company that produces rail cars, and it produces no light rail cars. The market for light rail cars is small (Table 1), and long periods elapse between orders. The demand for heavy rail cars is larger but occurs in peaks. No manufacturing industry can survive a sporadic market, and both light rail and heavy rail car business is now going to foreign concerns that do not depend solely on the American market.

Figure 1 shows that rail car prices have escalated almost twice as fast as those for other rail equipment. Mora<sup>5</sup> shows that this effect is constant with a number of different transit procurements, suggesting that the causes are not specific to local conditions.

These problems are national and the federal government contributed to their cause. For example, capital funding for new rail cars was made through grants. These were made with no indication that future grants would be forthcoming, so transit authorities tended to place large single orders—to get the vehicles while the getting was good.

The federal government could help stabilize the rail transit vehicle market through ongoing grants or guaranteed loans to transit operators, who could then guarantee to purchase a specific number of cars each year. This would provide a stable base for the supply industry and provide a basis for standardization of equipment. It would reduce, or at least slow, the escalation of car prices. The net cost to the federal government would be less than the overall reduction in costs that could be realized—significant savings leveraged.

OTHER FEDERAL INTRUSION

The federal government has always assumed a major role in the transit industry. Some of its actions in the industry's

Table 1. Light rail vehicle market, 1980-2014<sup>a</sup>.

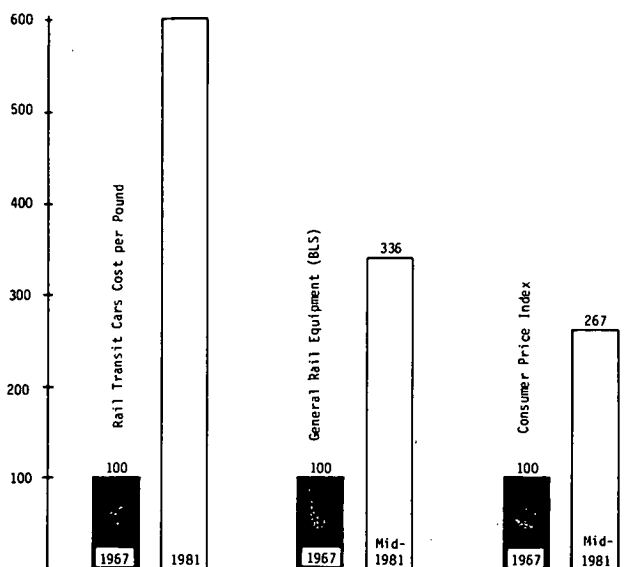
Transit Authority	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-14	Totals
<b>Existing Systems:</b>								
<b>(Replacements)</b>								
GCRTA	48					48		96
MBTA	75 <sup>b</sup>				135	75		205
MUNI	15			100		15		130
PAAC	55					55		110
SEPTA	148		148		141			437
NJT	15					15		30
<b>Totals</b>	<b>356</b>		<b>148</b>	<b>100</b>	<b>276</b>	<b>208</b>		<b>1 008</b>
<b>New Systems or Expansions:</b>								
NFTA	35					35		70
Tri-Met	26					26		52
SEMTA	<sup>c</sup>							
<b>Totals</b>	<b>61</b>					<b>61</b>		<b>122</b>

<sup>a</sup>25 year lifetime for LRVs is computed from date of placement in service.

<sup>b</sup>Reflects 75 cars to be ordered during the period 1980-1981.

<sup>c</sup>Not yet defined.

Figure 1. Comparison of cost growth, 1967-1981.



early years were intrusive and destructive. Although in the past 20 years, through UMTA, it has served as investor of last resort, there are still areas where federal encroachment has harmed the industry.

#### Antitrust Suits

The federal government instigated antitrust actions against utilities and automotive companies, which were the last private industries to invest in transit companies. These actions eliminated major capital sources for the transit industry and ultimately forced it into the public sector.

The divestiture also took away the management expertise the utilities provided and created a vacuum in the transit companies' upper management level.

#### Labor Regulations

Labor regulations imposed by the federal government as conditions to aid have increased transit costs. Section 13(c) of the Urban Mass Transportation Act protects the interests of transit employees affected by federal transit grants. Specific clauses require "protection of collective bargaining rights, the protection of individual employees against a worsening of their positions with respect to their employment; assurances of employment to employees of acquired mass transportation systems and priority of reemployment of employees terminated or laid off."<sup>6</sup>

This section of the Act has become very controversial, since it may have strengthened transit unions. Certainly transit salaries have increased much faster since public takeover. Some 48 percent of the increase in operating costs between 1967 and 1978 is due to cost-of-living increases for transit workers.<sup>7</sup>

Two other provisions of Section 13(c) have affected the industry. Some labor-saving innovations that might increase productivity have not been adopted because of the job protection provisions of the Act. Also, the industry must maintain such obsolete work practices and inefficient work rules as overstaffing rail cars and banning part-time bus drivers.

Another labor regulation, the Davis-Bacon Act, has directly influenced the cost of new rapid transit systems, busways, and other capital projects. It "requires that highest prevailing union wage rates be paid to workers on federally aided construction projects."<sup>8</sup>

#### UMTA Regulations

UMTA regulations have also contributed to the transit systems' operating deficits, most notably the requirement for access for the handicapped. Section 504 of the Rehabilitation Act of 1973 demands that all main-line, fixed transit facilities be accessible to wheelchairs. Compliance with this regulation was recently suspended, but while it was in effect its cost was high.

Another federal requirement that has affected operating revenues relates to the elderly. "In order to utilize federal operating assistance, transit operators must permit riders over 65 to ride at half-fare during off-peak hours."<sup>8</sup> Off-peak hours have only light loads and are money-losers, and thus this requirement may have contributed to deficits.

#### CONCEPT OF LEVERAGE AS THE FEDERAL ROLE

The federal role in urban transit is sure to change. The policy of the current administration is to end operating assistance. Beyond that, the country's economic situation may not allow federal support in many areas where it has become common. Unfortunately, the transit industry does not have the political power to maintain its current funding level. If providing transit service is again regarded as a local responsibility, the federal role in transit will be to leverage its funding so that the net economic benefit to the nation is greater than the federal investment and is greater than if there were no federal involvement at all.

The concept of leverage—that the output, or final result, must be greater than the input, or investment—is a simple formula that determines all budgeting in the free market. There are certain areas to which the government can apply this formula and achieve results that would not be possible without its assistance. The following are examples:

- Research and development,
- Testing and demonstration,
- Standardization,
- Technical assistance, and
- Financial programs and incentives.

#### Research and Development

The benefits of research and development (R&D) programs conducted at the local and state levels are limited. With funding so critical, it is probable that few funds will be allocated for R&D at the local level.

Many problems are common to all local transit operations, and properly directed R&D can solve them—not only technical problems but also social and economic problems. For example, rail car costs have outstripped those of general rail equipment by 76 percent (Figure 1). Mora<sup>9</sup> shows that the factors causing these cost increases might be controlled if better understood. The potential benefits of a detailed study and possible solution of the cost escalation problem are enormous. Rail car prices are approaching \$1 million per car. New York recently received bids for approximately \$800 000 per car. The 76 percent difference is about 43 percent of a rail car's cost. At \$800 000 each, this amounts to about \$348 000. If only one-fourth of this difference could be saved, it would amount to \$87 000 per car. The total possible savings on the 2640 light and heavy rail cars that will be purchased in the 1980s is \$230 million, \$36 million of this for light rail.

The rising cost of rolling stock is just one sphere where the potential savings are staggering. The cost of transit facilities construction and how it compares with similar, nontransit construction should also be examined.

Transit equipment often causes the greatest problems, and poor management, worn out equipment, and poor maintenance are blamed. Better management methods and better training and motivation of maintenance personnel are topics for research that have a high payoff potential.

No industry can afford technological stagnation. If

properly applied, technology has the potential not only to save money but to transform an entire industry. To ignore the need for technological R&D in transit would doom the industry's future. Electric-powered light rail transit does not depend on the petroleum supply. Research has developed power distribution systems to use the regenerative power produced when cars are decelerating. The Japanese have experimented with flywheels in stations that store braking energy and return it when the train accelerates to leave the station. Another, simpler application uses regenerative energy to heat water and sells the hot water to commercial or residential complexes along the transit route. Reduced energy consumption and energy independence are not just local issues.

The U.S. government has never helped finance private development of transit equipment. U.S. industries must compete for the domestic market with foreign companies backed by their governments. It is not unusual for foreign governments to subsidize private R&D efforts, but this practice is forbidden here. When an American company uses government funds for R&D it must agree to share the results, and no smart businessman is going to share any new idea that can give him an edge in the market.

A private and government joint R&D effort is a good example of leverage. To the U.S. transit operating industry, such a partnership could mean a domestic source of needed equipment; to the transit equipment industry, it could mean new jobs and a chance to compete in foreign markets.

#### Testing and Demonstration

The testing and demonstration phase is an area of product development where a partnership between government and industry would be both valuable and necessary. Many transit equipment improvements have been developed without federal funding. However, they must be tested and demonstrated in demanding, everyday transit operations. This is often too costly for transit authorities and their suppliers.

In the mid-1960s Westinghouse developed its Skybus automated people mover system. Only now, over 15 years later, is it finally being built to be demonstrated for transit service, and then only after competitive award. Based on this experience, no prudent management would budget private R&D money to develop light rail equipment in the United States. Any further reduction in government funding for product testing will discourage private investment in such development.

The need for an ongoing test and demonstration program is shown by problems that were encountered with recent procurements where new designs were specified. The trucks for the New York R-46 cars are one example; cracks in the suspension system of the Grumman bus are another. Many problems encountered with the SLRV at Boston were resolved and subsequently benefited San Francisco. (In effect, the early purchases in Boston served as a test program for San Francisco.) A proper test program for these new designs might have averted costly consequences.

#### Standardization

Since 1970, UMTA has led the rail transit industry in efforts to develop standards. It is important to understand that this cannot be done on a local level. Only with transit authorities and industry working as a team will standards be achieved. As with R&D and testing programs, the benefits are great, but the costs are too high for the operating and supply industry alone.

Some achievements to date in rail standardization that benefit the whole industry are the development of standard procurement terms and conditions, a model rail car guarantee/warranty,<sup>2</sup> and a light rail transit car specification guide. A Service Evaluated Products List was also developed—a "Consumers Report"—that relates the experi-

ence of transit authorities with certain rail car subsystem equipment. UMTA's Transit Reliability Information Program (TRIP) provides a unique reliability data base.

McGean<sup>10</sup> shows that the potential benefits of standardization more than justify UMTA's involvement. For example, the standardization program will reduce the cost of new transit cars in the following ways:

- By simplifying the procurement process;
- By facilitating joint car buys by two or more transit authorities; and
- By reducing the costs of major car subsystems such as motors, compressors, and air-conditioning.

Analysis shows that joint car buys could save \$17 to 24 million per year,<sup>10</sup> and subsystem standardization could save approximately \$6 million per year.

Standardization can reduce the need for large inventories of spare parts, the lead time for ordering new parts, and the cost of parts. This can effect a potential overall saving of about \$6 million per year.

Standardization can improve reliability. The savings from a reduced rate of failure can be from \$2.8 to 10.2 million per year,<sup>10</sup> and the improvement to operating productivity can be even greater.

Rail car standardization can save \$30 to 50 million per year. The UMTA rail car standardization philosophy is based on industry self-regulation. Clearly this is an area where the concept of leverage will work.

#### Technical Assistance

As discussed earlier, the federal government helped create the current state of transit in the United States and, thus, now owes the industry the technical assistance it needs to overcome its difficulties.

Areas of technical assistance are as follows:

- Develop improved management, operations, and maintenance methods and procedures through grants.
- Develop and conduct training programs for transit management, operating, and maintenance personnel.
- Study specific cost escalation problems.
- Reduce and/or eliminate federal regulations that contribute to cost escalations.
- Develop federal regulations that favor cost reductions.
- Sponsor programs where transit authorities can meet to work toward a common goal (an example is the Authorities Conference Committee, the ad hoc group of light rail authorities that participated with Pittsburgh during its vehicle specification development and provided important review input to the Light Rail Transit Car Specification Guide).<sup>11</sup>

#### Financial Programs and Incentives

Although the applications of leverage already discussed can be valuable, the transit industry's most urgent problem is financial. If the federal government withdraws operating funds, transit authorities must find help elsewhere. Local government revenues may be too low to maintain the same level of service. The federal government can provide incentives that will elicit other public and private local commitment. The local/federal matching capital grants program is one form, and there are others not yet tried.

The Department of Housing and Urban Development offers a grant program with leverage as its focus. The Urban Development Action Grant (UDAG), designed specifically to implement several urban policies with a minimum of federal funding, judges applicants partly by their success at leveraging. The less federal funding required (as a percentage of total investment), the better. HUD officials

look for a ratio of 3 to 1 or better in a successful application.

The UDAG program works because it is not concerned with normal budgeting and funding. It is a small pool of federal money available to anyone who wants to go out, do some leg work, get some commitments, and come back with a suitable application. No other program in the field of urban transportation is comparable to it.

Operating assistance parallels the block grant concept: a sum of money is given with no strings attached except to account for how it is spent. Capital grants are categorical; i.e., a host of conditions must be met, including alternatives analyses, Buy America, and E&H accessibility. To date, no grant is tied specifically to leverage.

Adding leverage to the capital grants program as another categorical condition is not proposed here. A grant with a small portion having leverage as its main criterion and available only to communities who could demonstrate its efficient application is a possible approach.

An earlier section of this paper proposed a federal loan program that might provide loans directly as well as loan guarantees. This, coupled with the Economic Recovery Tax Act of 1981, might create a strong incentive for local commitment of tax revenues. The biggest problem in lease-back sales is finance.

Because the government has been partly responsible for the rise in operating deficits, it could provide a financial incentive to reduce deficits. This might be matching actual cost savings by local transit authorities that reduce deficits and do not reduce services. The recipient authority would agree to use the federal incentive payments to improve productivity by providing more services and/or improving its capital plant.

These incentive finance programs have the potential to leverage local commitments. The loan program would provide the greatest amount of leverage, because the only costs to the government are administrative and the time cost of money. The incentive plan to reduce deficits could be applied only until a local commitment is made to fill the gap left by ending operating assistance.

## CONCLUSION

The federal government is partly responsible for the current state of transit and consequently has the responsibility to help find solutions, especially if it plans to cancel its previous programs that worked toward these solutions.

A concept has been proposed in which the federal government acts as the lever to gain local funding commitment, to induce investments by industry to develop better products, and to encourage operating cost savings. Federal involvement is based on a simple qualification: The

benefits to the nation must be greater than the investment.

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# Feasibility Criteria for Light Rail Transit

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The evaluation of rail technology as a potential component of regional transit systems has been the subject of extensive studies throughout the country in the past decade. Particular interest has developed in the last few years with respect to light rail transit. In 1980, the Minnesota Legislature directed The Metropolitan Council, the regional planning agency, to conduct a feasibility study on the deployment of LRT in the Twin Cities. For the study,

feasibility was defined as "the ability of an LRT line to achieve regional transportation goals in comparison with other transportation alternatives." This paper describes the feasibility criteria developed in the Twin Cities to evaluate a proposed project. A dichotomy was established between qualifying and nonqualifying criteria. The minimum are those conditions that would have to be met to make a project feasible for further evaluation.