U.S. Department of Transportation
Urban Mass Transportation Administration

# Financial Planning Guide for Transit

## April 1989

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**in conjunction with:**
**Morgan Stanley & Co.**
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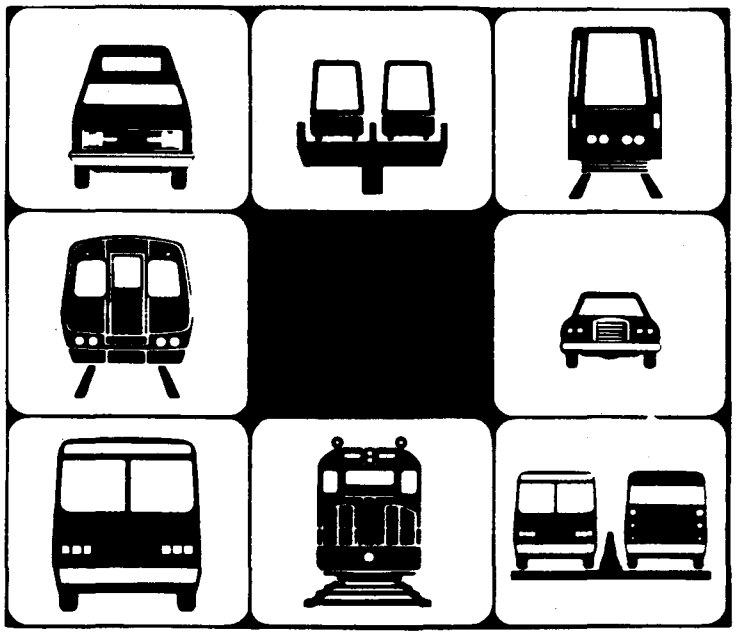



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16. Abstract


The Financial Planning Guide for Transit presents the details of the overall financial planning process and the procedures that make up the process. The Guide is designed to aid public agencies and interested private parties in the preparation of comprehensive and realistic financial plans -- for new capital investments, recapitalization efforts, and the ongoing operation of existing services. The major elements of the Guide are:

- definition of the financial planning process, including the relationship between financial analysis and other planning functions, procedures for identifying sources of revenue, administrative/institutional arrangements and responsibilities in transit financing, and the types of information needed at each planning level;
- identification of how cost and revenue projections are developed for financial planning purposes, including identification of financial forecasting techniques, selection and projection of new sources of revenue, and performance of sensitivity analyses, and
- description of the development and implementation of a financial plan, including discussion of market financing mechanisms and requirements, how dedicated revenue sources and market financing programs are developed, the development of financing packages, and performance of financial capability analysis.

The Guide has been designed to be useful both in meeting UMTA's planning and reporting requirements (e.g., in demonstrating financial capacity) and in guiding local agencies in evaluating and addressing their own financing needs either in providing the "local match" to Federal funds or in developing sufficient financing to proceed without Federal funds, if such an approach is considered feasible.


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**NOTICE**

Any errors in this guide are the responsibility of the authors. The report does not necessarily reflect the opinion or policy of the Urban Mass Transportation Administration.

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## ACKNOWLEDGEMENTS

This document was prepared by Multisystems, Inc., in conjunction with Morgan Stanley & Company, Inc., Price Waterhouse, and Public Financial Management, Inc. The project manager and principal author of the report was Daniel Fleishman of Multisystems. The other principal contributors to the report were James Pearson (Price Waterhouse), Michael Connors (Public Financial Management), and Gregory White (Morgan Stanley); additional contributors were Anthony Palmere (Multisystems), Annette Demchur (Price Waterhouse), David Howe (Morgan Stanley), Richard Harris (Morgan Stanley), Peter Kessenich (Public Financial Management), David Paul (Public Financial Management), James Joseph (Public Financial Management), and Samuel Katz (Public Financial Management). Certain material in the report was taken from previously prepared UMTA material, written by Edward Thomas, Samuel Zimmerman, Don Emerson, James Ryan, and Rob Martin.

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# CHAPTER 1: INTRODUCTION

## 1.1 THE NEED FOR GUIDANCE IN FINANCIAL PLANNING

Rising costs, an ever-increasing demand for new funds and the desire to promote greater financial responsibility have led the Urban Mass Transportation Administration (UMTA) to place a new emphasis on the need for sound financial analysis and planning. The decision to construct a transportation facility, purchase transit equipment, provide new service, or merely maintain existing service represents a major financial commitment, especially when one considers out-year operating, maintenance and capital replacement costs over the life of the physical assets involved. Before a commitment to new facilities, equipment or service can be made, prudent management dictates that decision-makers consider the financial implications of implementing and operating proposed improvements in the context of operating and maintaining the existing transit system.

Serious problems can result when financial planning is not adequately performed. Such cases include the many " New Start" cities which have been forced to reduce overall service levels in order to afford putting new lines into service, and, as has been the case far too often, rail lines originally intended to save operating funds but which have increased the overall cost. Only one of the proposed new rail transit system projects reviewed in a study of eleven systems was judged to have an adequate financial plan.[1] In other cities, investments have been made on rail lines that end up neither being operated at their originally intended levels of service nor having the originally intended feeder bus services. Transit agencies with fleets well in excess of peak requirements are widespread in the transit industry, again reflecting serious miscalculations of the financial requirements to maintain desired service levels.

These factors indicate that improvements in the decision-making process and the quality of financial planning are needed to ensure that transit service is not interrupted due to a lack of adequate financial resources. When projects are programmed and grants are made, facilities and equipment should remain in service and be maintained and operated as originally specified in the grant contract. This can be assured when there is a high level of financial scrutiny to ensure efficient and effective use of scarce transit funds before the funds are actually committed.

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1 James J. Lowery & Co. Financial Ratings of Proposed New Start Fixed Guideway Projects, prepared for UMTA, January 1985.

In this vein, UMTA has issued (in mid-1987) guidelines to be followed by all applicants for Federal funds in documenting their "financial capacity" to carry out proposed projects. In particular, the Financial Capacity Analysis Policy[2] defines the basis on which UMTA will assess the financial capacity of its grantees. As described in the policy circular, there are two basic aspects to financial capacity: the general financial condition of the public transportation operating enterprise and its nonfederal funding entities; and the financial capability of the agency and its funding entities, which includes the sufficiency of their funding sources to meet future operating deficits and capital costs. (These components are discussed in Chapter 2 of the Financial Planning Guide.)

## 1.2 LEGISLATIVE AND REGULATORY BACKGROUND

The most recent and broadest legislative statement of the importance of financial planning as an aid to transit decision-making was in the Surface Transportation and Uniform Relocation Assistance Act (STURAA) of 1987. Section 310 of STURAA states that the transit planning process shall include "development of long-term financial plans for regional urban mass transit improvements and the revenue available from current and potential sources to implement such improvements." Section 303 of STURAA, which deals with new fixed guideway projects, calls for the Secretary of Transportation to determine that proposed projects are "supported by an acceptable degree of local financial commitment, including evidence of stable and dependable funding sources to construct, maintain and operate the system or extension." This language supplements previous legislative requirements for Federal financial capacity determinations. All sections of the "Urban Mass Transportation Act of 1964, as amended" which deal with the basic Federal grant-in-aid programs (3, 5, 8, 9, 9A, 18, and 16) require the Secretary of Transportation to determine an applicant's "legal, financial and technical capacity to carry out the proposed project" prior to approving a loan or grant.

UMTA's regulations and policies affecting the planning and programming of Federally-funded transportation improvements describe how these requirements are implemented with respect to planning and programming. In particular, the urban transportation planning regulations that appeared in the June 30, 1983 Federal Register provide that, as a minimum, the Transportation Improvement Program (TIP) shall include "a realistic estimate of the total costs and revenues for the program period" (Section 450.204 (b) (4)) and the proposed source of Federal and non-Federal funds (Section 450.208 (b) (3)).

In recent policy statements, UMTA has made its interest in transit financial issues even more explicit. UMTA's "Major Capital Investment Policy," published in the Federal Register on May 18, 1984, outlines how UMTA will consider local fiscal effort in decisions on Federal funding of fixed guideway proposals. This policy supports the development of stable and reliable funding sources for ongoing costs in order to reduce the risk that, after making a very large capital investment, local resources will not be available to adequately operate and maintain the transit system. It also explicitly states

2 The Financial Capacity Analysis Policy is described in UMTA Circular 7008.1 (March 30, 1987).

that "preference will be given to projects which have long-term, dedicated sources of local funds committed to defray operating deficits."

Finally, UMTA's administration of its statutory and regulatory financial planning and capacity provisions was clarified in the aforementioned "Financial Capacity Circular." As suggested above, that document outlines how UMTA will conduct the assessment of grant applicant financial capacity required by law in the context of the project development process.

## 1.3 THE FINANCIAL PLANNING GUIDE

The above concerns, combined with 1) the realization that certain cities may wish to pursue major capital investments even in the absence of heavy Federal support, and 2) the significant impact on transit financing brought about by the Tax Reform Act of 1986,[3] have prompted UMTA to develop a series of guides to assist applicants in the conduct of financial planning and analysis. UMTA recognizes that the challenge of obtaining increasing amounts of non-Federal financing requires new and more sophisticated financial planning techniques.[4]

Thus far, UMTA has laid out the framework for performing financial analysis during the project planning phase of project development in its Procedures and Technical Methods for Transit Project Planning. Other UMTA-sponsored reports describe alternative sources of revenue and methods for forecasting revenue.[5]

What has been lacking to date, however, has been a single comprehensive source of guidelines and details on the technical aspects of financial planning. This includes defining the financial planning process and providing information on the specific procedures and methods used in the process. This Financial Planning Guide is aimed at

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3 The Tax Reform Act has effectively reduced the ability of public bodies to use tax-exempt financing by disallowing tax exempt status for certain types of uses and by increasing restrictions on reinvestment of bond proceeds. (The implications of the Act on transit financing are discussed further in Appendix C of this Guide.)

4 For instance, Sections 306 ("Advance Construction") and 308 ("Leased Property") of the FMTA have introduced new opportunities and greater flexibility in the local financing of transit capital investments. Section 306 stipulates that a public body carrying out a project without Federal funds may apply for the Federal share of the costs after the fact. In other words, if the approved Federal share is not available at the time of construction, the responsible public body is eligible to receive its Federal share once additional funds have been apportioned. This provision is discussed further in Appendix B. Section 308 amends Section 9(j) of the UMT Act of 1964 by allowing UMTA grants for capital projects to be available to finance the leasing of facilities and equipment where leasing would be more cost-effective than acquisition or construction. Leasing is discussed further in Chapter 4.

5 For instance, the Rice Center of Houston has prepared a series of studies on alternative sources of transit revenue and financing strategies; see the Bibliography.

assisting local and state agencies, as well as the private sector, in the preparation of comprehensive and realistic financial plans related to new capital investments (e.g., rail starts) and recapitalization efforts -- especially where those efforts include a component of growth or are likely to cause an increase in operating and maintenance costs in future years -- as well as to the continued operation of existing services.

The intended audience for this Guide is mainly public agencies, but the Guide should also prove useful to private companies that might be interested in investing in essentially public projects. It is expected that such companies will particularly benefit from the discussions of the public project development process and the role of financial planning. This expanded audience is consistent with UMTA's policy to encourage greater participation of the private sector in the delivery, operation and maintenance of public transit services, facilities and equipment.

The Financial Planning Guide serves as a companion piece to other project planning guides (e.g., concerning cost estimation, environmental analysis, travel demand forecasting, and land use development analysis) sponsored by UMTA. The contents of the Guide are as follows:

- **Chapter 2. Financial Planning in the Transportation Planning Process**

This chapter briefly describes the transportation planning process and explains how financial planning fits into the overall planning process. Included are discussions of the basic characteristics of financial planning, the context for financial planning, the relationship between financial analysis and the technical functions of transportation planning, the types of information needed at each planning level, and the process of developing financing alternatives. (This chapter has been designed to serve as a stand-alone overview of the financial planning process.)

- **Chapter 3. Financial Planning Inputs**

This chapter discusses the major inputs to the financial planning process -- revenue and cost estimates -- and the specific procedures, methodologies, tools, and assumptions used in making these estimates. Included are brief discussions of financial forecasting techniques, the process of projecting revenues (from both current and new sources), the process of projecting capital financing requirements, the process of projecting operating deficit funding requirements, and the performance of sensitivity analyses.

- **Chapter 4. Financial Plan Development**

This chapter describes the procedures and requirements involved in developing a financial plan. Included are discussions of analyzing financial capacity, developing debt financing strategies, developing privatization strategies, and selecting and evaluating new sources of revenue.

- **Chapter 5. Financial Plan Implementation**

This chapter summarizes procedures involved in implementing the financing strategy and revenue sources identified in the financial plan. Included are descriptions of designing and implementing a debt issue and implementing new sources of revenue. The discussion covers the selection and roles of key actors and the procedures to be followed in marketing and executing the plan.

# CHAPTER 2: FINANCIAL PLANNING IN THE TRANSPORTATION PLANNING PROCESS

## 2.1 CHARACTERISTICS OF FINANCIAL PLANNING[1]

Three types of activities are undertaken in financial planning:

1) assessment of financial condition (i.e., a financial "health test");

2) assessment of financial capability (i.e., estimation of financial parameters and analysis of future cash flows); and

3) preparation of a financial plan (including identification, analysis and evaluation of alternative sources of funds).

The first two steps represent the components of the financial capacity analysis, as introduced in Chapter 1; the third step follows this analysis.

The assessment of financial condition considers factors which may affect the ability of the transit agency to operate, maintain and make needed investments in the existing transit system. Principal among these factors are the economic vitality of the region, debt management history of the funding entities and the historical financial burden of transit expenditures. The analysis of economic vitality examines historical trends and forecasts of economic indicators tied to the pledged sources of revenue and to the various expenditures (both transit and non-transit). Other components of the financial condition analysis include a review of transit debt management practices, analysis of the financial burden of transit when compared to non-transit expenditures, and the direction of local public transportation policy issues.

Assessment of financial capability addresses the stability and reliability or robustness of the revenue base and its ability to meet specific future requirements. Many revenue sources are based on general service agreements between public agencies or private businesses and are funded from general revenue or company earnings. Others are specifically dedicated to transit uses. Additional funding sources may be derived from cost-sharing strategies, public borrowing or leveraging of public assets. The assessment of

1 It should be noted that this chapter has been developed as a self-contained resource, summarizing the elements of the financial planning process.

financial capability compares current and projected estimates of pledged revenues to transit capital and operating and maintenance costs.

In order to evaluate financial capability, out-year projections of costs and revenues are developed, along with other indicators of the financial capability of the transit agency and its funding partners. Depending on the phase of the development process, these other indicators may include identification of the levels of the commitments to finance future capital, operating and maintenance costs of the transit system. The assessment of financial capability provides information for answering the following questions:

- What are the primary elements and sub-elements of the proposed transit projects in the Transportation Improvement Program (TIP) or program of projects?

- What are the capital, operating and maintenance costs of providing transit services, facilities and equipment over the useful life of the facilities and equipment?

- What revenues and other sources of funds will be pledged to the transit system and what level of authorization and appropriation has occurred with respect to the sources of revenue?

- What roles and responsibilities will state and local governments and private concerns have in carrying out the proposed transit program, including making new capital investments while operating, maintaining and recapitalizing the base system?

In many instances, existing sources of funds will be insufficient for meeting future capital, operating and maintenance costs of a transit system. New sources of funding, be they new taxes or strategies to share the costs with the private sector, should be identified and evaluated in the context of specific projects. Private investment options in particular should be given serious consideration. These types of investment options will frequently be defined in three dimensions, including a transit technology and operating dimension, a land development dimension (to the degree that private land owners will benefit from the capital investment), and a financing dimension (if private sector equity is proposed).

The financial planning and analysis process consists of the following functions:

- assessment of financial condition

- assessment of non-user benefits

- non-fare revenue forecasting

- fare revenue forecasting

- operating and maintenance cost estimation

- capital cost estimation
- sensitivity of revenue and cost estimates to uncertainty in key variables
- cash flow analysis
- identification and evaluation of financing strategies and new revenue sources
- preparation of financial plan(s).

These functions, as well as their roles within the overall transportation planning process, are described briefly in Section 2.3, following a discussion of the overall context for financial planning. The functions are then discussed in greater detail in Chapters 3 and 4.

## 2.2 THE CONTEXT FOR FINANCIAL PLANNING

Financial planning refers to the development of financial information for use in decision-making. Financial planning is an integral part of comprehensive transportation planning, not a separate process with independent products. As such, it takes place at a number of points in the planning/project development continuum.

The traditional transit planning and programming process takes place at three basic levels: short range planning, long range planning, and project planning. There is a need for adequate financial analysis and planning at each level, although the nature of the planning/analysis effort differs significantly among planning levels -- and among different-size areas.

However, regardless of a region's size, at some point during the ongoing or "3-C" planning process, the Metropolitan Planning Organization (MPO) or its designee should establish the region's general financial condition. This can be accomplished by assessing historical trends and forecasts of revenues, expenditures (both transit and non-transit), assets and liabilities, and economic indicators tied to dedicated sources of revenue. The financial condition assessment would be complemented with an analysis of financial capability that compares historical and projected trends in dedicated revenues to transit capital, operating, and maintenance requirements.

The financial capacity analysis will determine whether the existing revenue base is sufficient to operate the existing transit system, modernize outdated facilities, replace equipment as it wears out, and undertake any proposed new initiatives. If significant financing deficiencies exist, new revenue sources should be considered. The results of this analysis should be included as part of the adopted transportation plan.

In the smaller, stable communities, a financial condition assessment may be all that is required for financial capacity analysis. If both the transit system and the general financial environment within which it operates are stable and in balance and no new major initiatives are planned, it should be easy to demonstrate financial capacity without extensive additional work.

The general planning/programming process -- for a large metropolitan area, which would undertake all three levels of planning -- is summarized in Figure 2-1. The planning and programming processes are described below.

### 2.2.1 The Ongoing Planning Process

To maintain eligibility for Federal transportation funds, the MPO in each urbanized area must conduct a continuing, comprehensive, and cooperative (3-C) planning process. Through this process, local agencies identify transportation problems and analyze potential solutions. This leads to the adoption of a transportation plan.

The adopted transportation plan should identify the planned transit system, including the kinds of equipment and facilities that the region intends to have in place by the horizon year. Where fixed quideway transit facilities are contemplated, the plan should include a list of those corridors that might require a major transit investment, with the range of feasible (financially and otherwise) and potentially desirable public and private investment alternatives identified in each corridor.

In stable, small urbanized areas, short-range planning may be all that is needed for public transportation. In such cases, the plan often focuses on existing service, with an emphasis on making the current system more effective and efficient. The planning process would consider low to medium cost capital and operational improvements with a short to medium term implementation period(i.e. less than five years), as well as strategies for improving productivity and increasing ridership, such as utilizing the private sector for various operations or maintenance activities.

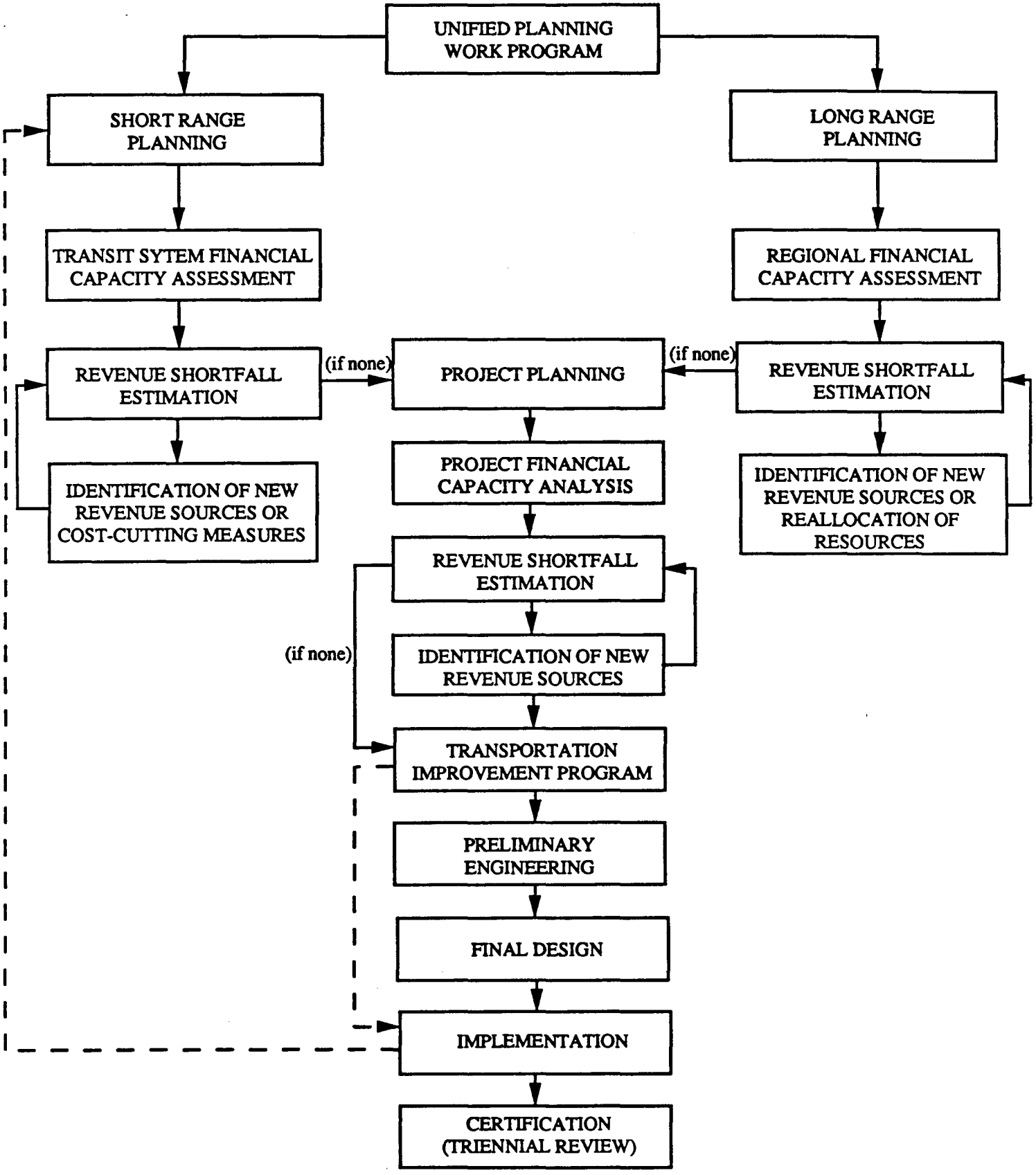
Funds for carrying out the ongoing planning process and project planning are programmed through the unified planning work plan (UPWP). The UPWP describes the planning activities to be performed by the MPO and other participating agencies during a one to two year period. When developing the UPWP, local agencies should assess the availability of needed financial information and review the status of financial planning in the region, and include within the UPWP activities necessary to rectify any shortcomings

### 2.2.2 The Programming Process

A key product of the 3-C planning and project development process is the TIP. The TIP identifies improvements from the transportation plan that are recommended for Federal funding during the program period (three to five years). The annual (or biennial) element of the TIP lists projects to be implemented during a one (or two) year period. The TIP becomes the operational means of stating regional priorities for Federal funding.

More detailed financial planning for specific transit investments should be undertaken during the development of the TIP and its annual element, using the more precise cost estimates and implementation plans that should be available at that time. The TIP should document the results of this analysis, including the following:

## FIGURE 2-1: TRANSIT DEVELOPMENT PROCESS (LARGE URBAN AREAS)



- the capital and operating cost of the improvements included in the TIP over the expected service life of these projects,

- the cost of maintaining existing services, repairing and modernizing existing facilities, and replacing worn out equipment,

- total capital and operating costs compared with anticipated revenues, and

- an analysis of alternative financing approaches (i.e., where revenues are insufficient); this analysis should consider the revenue-generating potential of each source, changes in the amount and distribution of financial burdens, and institutional and legal issues.

Necessary mechanisms for funding the capital and operating costs of projects in the annual element, as well as for maintaining existing services, should be in place before the TIP is submitted for UMTA approval.

Where the TIP contains only low cost projects (e.g., purchase of a small number of vehicles and/or construction of a small park-ride facility), the financial analysis would be less complex than for TIP's containing more costly projects. As suggested above, where planning and programming are oriented toward maintaining the existing transit system, a general financial condition analysis may provide sufficient information for determining financial capacity in its entirety.

### 2.2.3 Planning for Major Capital Investments

For new starts and fixed guideway extensions, major expansions of bus service, and large scale rail modernization projects, additional detailed financial analyses should be undertaken. This is required because these large scale investments can have the most serious financial consequences for a transit operator and local funding entities.

Support for these requirements has been conveyed through the Congressional concern for the financial capability of potential grantees and an interest in increasing local fiscal efforts in financing major investments. For example, the Conference Report accompanying the Department of Transportation and Related Agencies Appropriations Act, 1986,[2] required that the full funding contracts for three new start projects provide for a stable and reliable financing plan. This plan, according to the conferees, should "identify actions to be taken if revenue forecasts prove to be inadequate concerning capital and operating costs." The conferees also stated that cost overruns in excess of agreed upon extraordinary costs shall be paid from non-Federal sources, and that the transit provider must provide assurances for adequate bus operations to support the system and other transit needs.

UMTA's Major Capital Investment Policy defines a four step planning and project development process for new fixed guideway projects and extensions to existing systems.

2 Conference Report 99-450, pp. 331 and 335.

This process establishes the framework for analyzing and evaluating financial capability. A similar framework is suitable for evaluating major rail modernization projects and bus service expansions. The four steps in the process -- system planning, alternatives analysis, preliminary engineering, and final design -- are described below.

## System Planning

System planning is the term used in the Major Capital Investment Policy to describe the ongoing (3-C) planning process. During system planning, local transportation problems are identified and alternative solutions to those problems are evaluated. Where this process identifies fixed guideway alternatives, large scale rail modernization, and/or major bus service expansion as potential solutions, preliminary cost-effectiveness and financial capability analyses are undertaken to determine whether these potential investments warrant more detailed analysis in the context of current and future financial conditions.

The financial information produced in system planning assists local decision-makers when regional trade-offs are made, thus paving the way for more detailed evaluations in project planning. Before seeking UMTA approval to initiate the project planning stage, local officials will be expected to complete a financial capability analysis, as defined above, for the mass transit element of their adopted transportation plan. If current financial resources are clearly inadequate, with little prospect of additional non-Federal financial aid, alternatives analysis (project planning) will not be initiated.

## Alternatives Analysis (Project Planning)

Alternatives analysis (henceforth referred to as project planning to note applicability to major modernization and major service/fleet expansion projects) involves the detailed study of a range of public and private investment alternatives within a corridor or subarea of the region. During project planning, each alternative is evaluated in terms of cost, effectiveness, and environmental consequences. Financially feasible projects deemed cost-effective at the conclusion of project planning would be considered for preliminary engineering.

The alternatives considered in project planning are those that are potentially cost-effective and financially feasible solutions to the corridor's (or a sub-area's) transportation problems, as determined in system planning. The financial capability assessment performed as part of the ongoing planning process thus defines the envelope within which alternative transportation improvements and related financing packages can be evaluated during project planning.

During project planning, the financial analysis performed in system planning is reevaluated and updated to account for the availability of more reliable capital and operating cost and revenue estimates. A range of financing options, including joint public/private and wholly private ventures, is defined and evaluated. Revenue sources for both capital and operating purposes are identified, analyzed and evaluated with respect to legal and institutional issues, yield (i.e., ability to meet the major investment requirements and systemwide costs), and sensitivity to economic, political and

administrative conditions. In addition, the financial condition of each funding entity is established. The financial aspect of project planning concludes with the adoption of a financing plan for the locally preferred alternative.

If discretionary funds are being sought for a major new facility, the Federal decision at the conclusion of project planning is whether to support preliminary engineering for the locally preferred alternative. Key factors in the decision are the cost-effectiveness of the investment and the strength of the local financing plan. The decision will take into account the answers to a number of key financial questions. First, does the plan envision Federal participation significantly less than the maximum level permitted by statute? This is consistent with the Congressional goal of raising the local share of major new transit investments to fifty percent in order to leverage scare Federal funds. Second, does the plan provide the financial capability to implement the proposed project, to operate and maintain it over its useful life,and to operate and maintain the rest of the region's transportation system? The answer to this second question would take into account the cost of the proposed investment, the cost of ancillary services (e.g., feeder buses) without which the investment will not produce its full measure of benefits, and the cost of maintaining other existing transit facilities and operations.

Figure 2-2 shows an example of the basic framework for evaluating cash flows within project planning.[3] As shown, the analysis begins with the base system (i.e., the "no-action" alternative). Current revenues are tested for their capability to cover routine capital costs, including replacement and rehabilitation costs, and operating/maintenance (o&m) costs. If the current revenues are sufficient, then the next (in terms of capital cost) alternative -- Transportation Systems Management (TSM)[4] -- can be considered. If projections of current revenue sources do not match estimated costs, then it is necessary to identify new revenue sources and/or alternative means of financing. These new sources of funds are tested for their capability to go beyond the TSM option. If there is capability, then capital-intensive alternatives (e.g., light rail or busway) can be considered. If the revenue projections for the capital-intensive alternatives meet their projected costs, then the alternatives are deemed financially feasible.

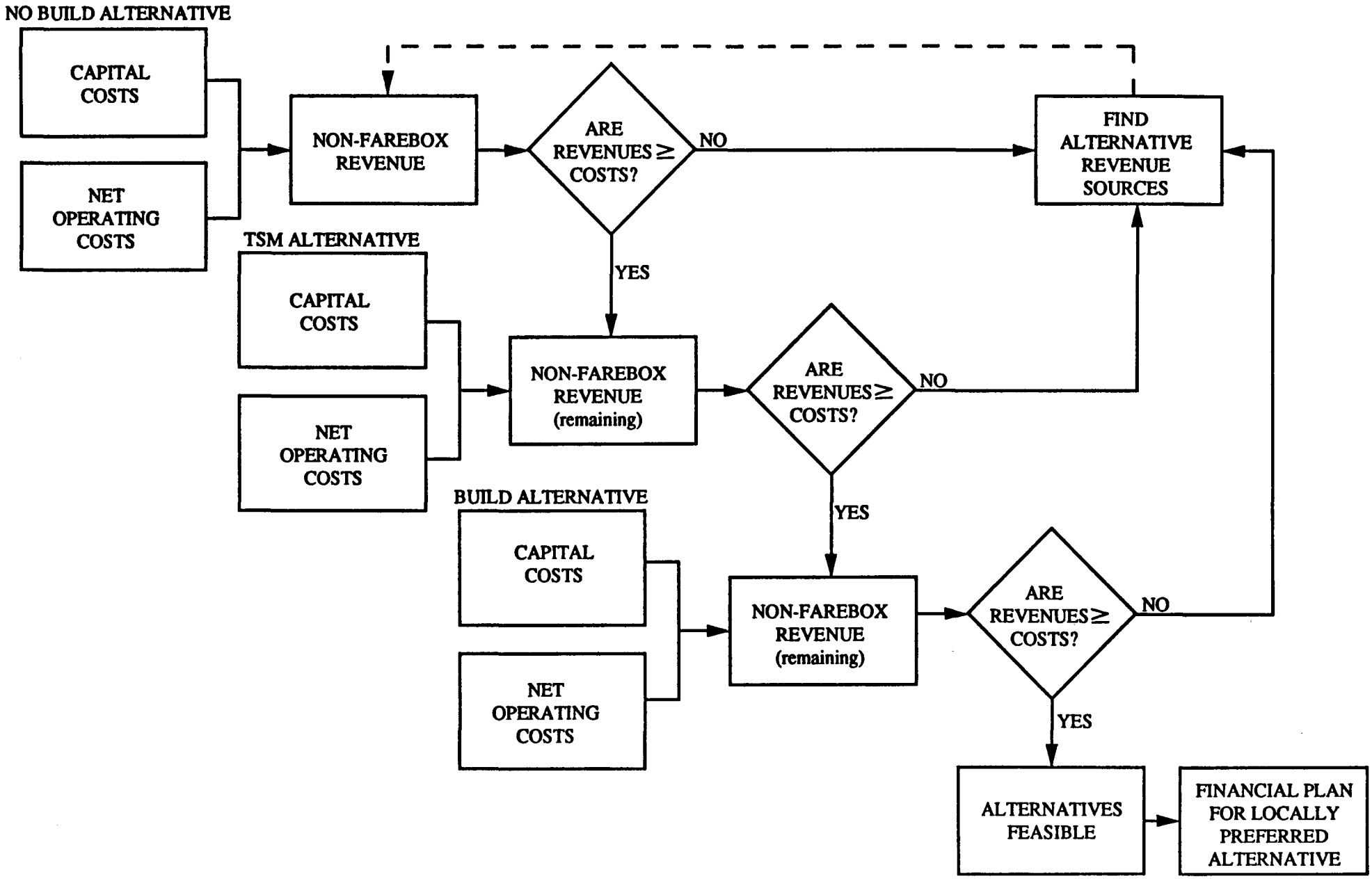
## Preliminary Engineering

Preliminary engineering produces three kinds of information that are key to financing the preferred alternative. First, it yields more precise estimates of project capital and operating costs. There should be sufficient confidence in these estimates to establish annual funding requirements by source. Second, during preliminary engineering non-Federal funding agreements are developed in final form and executed. Where necessary, referenda for new sources of revenue and for bond issues should be held during

3 Typically, more than three alternatives are considered in project planning, but this figure has been simplified.

4 The TSM alternative consists of low cost capital improvements (e.g., park and ride lots, transit freeway bus ramps, and signal preemption), capital rehabilitation and replacement projects, or bus route modifications.

**FIGURE 2-2: FRAMEWORK FOR CASH FLOW ANALYSIS**



preliminary engineering, and public and private funding entities should enter into any necessary financial agreements. Third, preliminary engineering is the time to finalize local supportive actions such as zoning changes as adjuncts to joint development initiatives, preliminary franchise agreements (where vendor financing is part of an investment option), security pledges, and subordinations in instances where debt financing is part of an investment option. If private providers are involved, preliminary engineering would include establishment of an organization for developing and operating the system.

At the conclusion of preliminary engineering, the Federal decision of whether to support the project and, if so, the nature of that support hinges on the results of the financial capability and cost-effectiveness assessments produced during the preliminary engineering. If the decision is to proceed, negotiations on a full-funding contract will commence. During these negotiations, the Federal Government and the grantee will seek agreement on the financial responsibilities of the parties in implementing the project. For UMTA, the essential issues covered in this agreement are construction cost overruns, operating and maintenance guarantees, and financial controls during project execution.

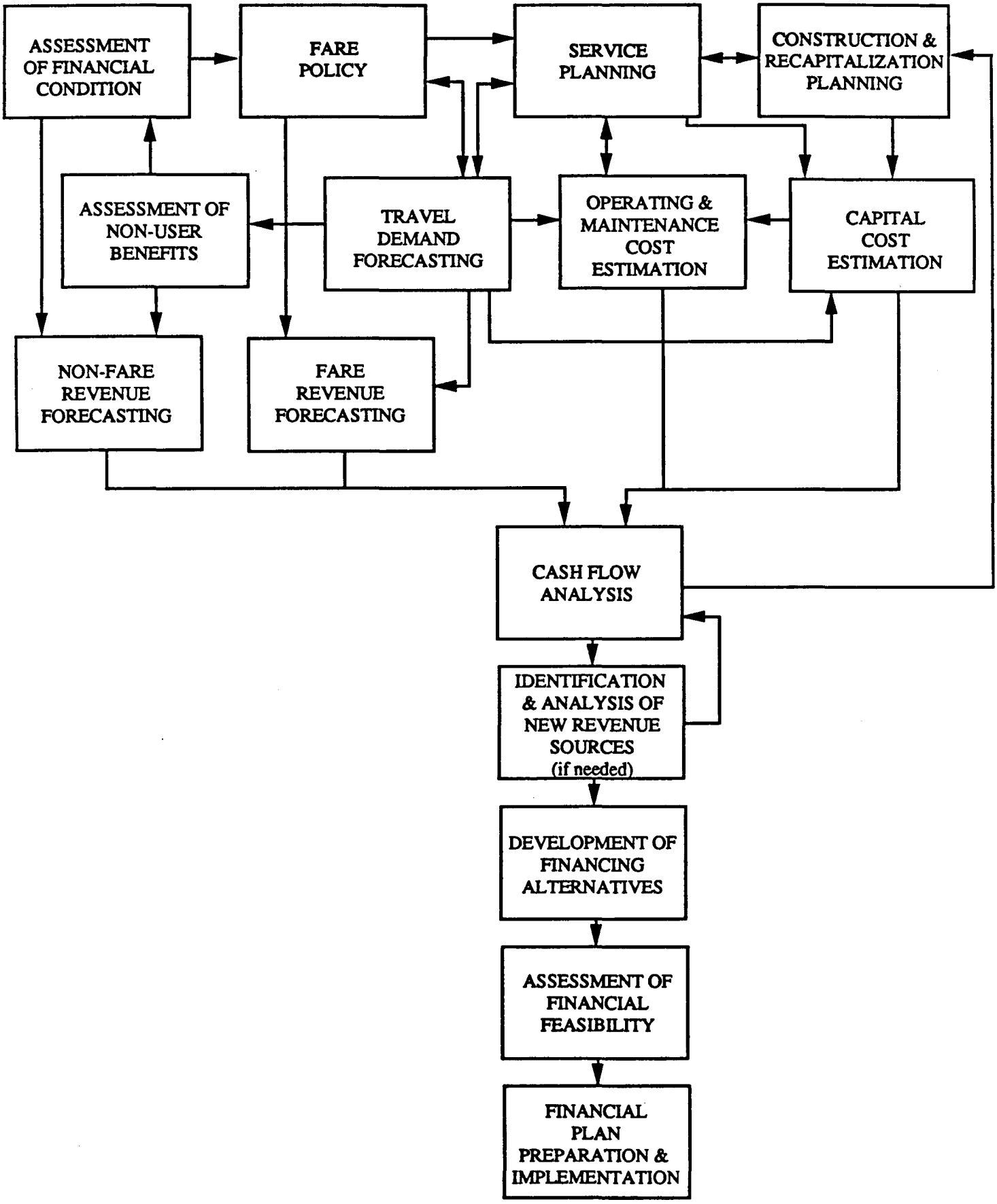
**Final Design, Construction and Operation**

After all contractual agreements developed at the conclusion of preliminary engineering have been executed, project implementation begins. The major financial analysis issue from here on is to insure that the financial conditions and assumptions that all contractual agreements are founded upon (e.g., costs, revenues, inflation, general economic conditions) remain valid. To the degree that an active monitoring program detects changes which require a response, the financial (and transportation) planning process should develop the appropriate solutions.

## 2.3 THE RELATIONSHIP BETWEEN FINANCIAL ANALYSIS AND THE TECHNICAL FUNCTIONS OF TRANSPORTATION PLANNING

Financial analysis and planning should be integrated into all levels of the transit planning process. Those "traditional" transportation planning functions specifically dealing with financial analysis include definition of service plans and capital projects, development of fare policy, estimation of capital, operating and maintenance costs, forecasting travel demand and operating revenue, assessment of economic and development impacts, and project evaluation. Financial analysis functions include identification of alternative financing strategies, estimation of non-operating revenues, sensitivity analysis, assessment of financial condition and analysis of cash flows. The interrelationship among the different functions -- and the nature of the functions themselves to some extent -- will differ from one level of planning to the next. Nevertheless, financial information and analysis are needed for decision-making at each level. The "ideal" interrelationship among planning functions is shown in Figure 2-3. The nature of these functions and their interrelationships are discussed briefly below; each function is also summarized on an individual summary sheet in Appendix D. Those functions that represent major elements of financial analysis and planning are discussed in detail in the remaining chapters of this Guide.

## FIGURE 2-3: FINANCIAL PLANNING PROCESS



## Fare Policy

The establishment of a fare policy is an important element in the financial analysis process in that the adopted fare policy (i.e, fare structure and level) directly affects revenues. As such, the fare policy affects calculations of the system operating deficit and, thus, future annual cash flow requirements. The impact of fare policy on revenues is twofold: 1) the fare structure and level have a direct impact on revenues in that they dictate the amount of revenue per trip; and 2) the fare level has a direct impact on ridership -- and therefore on revenues -- because transit demand responds to price.

Of course, revenues -- and the ability to accurately forecast revenues -- are also affected by other aspects of the fare policy, most notably the level of disaggregation of the fares (i.e., differential fares for elderly/handicapped, students, off-peak travel, etc.) and the availability and pricing of multiple-use fare prepayment instruments (e.g., monthly passes). The level of disaggregation will affect the accuracy of demand estimation -- and hence revenue forecasting. The pricing of prepaid passes (i.e., the number of trips required for the user to "break even") will have a direct impact on revenues.

Because transit demand is affected by price, the revenue impact of fare changes should be derived from the current ridership level and an estimate of the price elasticity of transit demand. The price elasticity of transit demand can be estimated from empirical data from previous fare changes or from the experience of other transit systems. The price elasticities can then be applied to the demand forecasts for discrete market groups to evaluate the impact of alternative fare policies on ridership and farebox revenues. Because the fare policy affects demand, it also represents an input to service planning, which is integrally related to demand forecasting. Transit fare policy is usually set by the transit agency board of directors, based on the recommendations of the transit staff coupled with local policy priorities.

## Assessment of Non-User Benefits

The assessment of non-user benefits is important in evaluating transit alternatives, as well as in developing new revenue sources. These benefits include travel impacts (e.g., reduced traffic congestion), environmental impacts (e.g., reduced air pollution, noise levels and fuel consumption) and economic/development impacts (e.g., increased employment, retail sales, rents, and property values).

## Assessment of Financial Condition

As part of the overall financial analysis, it is important to determine and document the financial condition of the transit agency and its funding partners. As discussed in Section 2.1, the financial condition analysis measures the region's economic vitality in relation to costs and revenues related to transit operations. The economic vitality measures cover real estate and business activity, as well as socioeconomic indicators. Examples of measures of financial condition include: long term debt as a percent of total assets, long term debt per capita, debt service as percent of revenue, coverage ratio, farebox recovery ratio, ridership trends, and transit costs as a percent of total local government expenditure.

## Travel Demand Forecasting

Accurate demand forecasting is a critical input to financial analysis, since demand directly affects both fare revenues and the magnitude of non-user benefits. The predicted level and nature of demand indicate the appropriateness of the alternative levels of service being considered, as well as the likely impact of fare changes. In short range planning, changes in demand (e.g., due to a planned fare increase, route modification, or service level change) may be projected on both a route and system level basis. In long range system and project planning, forecasts are made of total regional travel and the modal split for each of the alternatives being evaluated. The demand (and hence revenue) forecasts, together with the cost projections developed in other tasks of the planning process, are important inputs to evaluating and comparing the financial feasibility and cost-effectiveness of proposed service alternatives. More refined demand forecasts are developed after a project enters preliminary engineering. The forecasts during the P.E. phase provide more useful information in refining service plans, in estimating operating and maintenance costs, in sizing stations and ancillary facilities, and in forecasting revenue.

There is a broad range of commonly-used demand forecasting methods, including network models, judgement, trend analysis, non-commitment response surveys, crossectional analysis, regression models, and elasticity models. The specific technique employed depends on the desired accuracy, the time and resources available, the planning level (i.e., short range vs. long range vs. project planning), the scope of the forecast (i.e., whether it is for existing routes or new routes), and the availability of data for developing the estimate. It may be appropriate to use a combination of techniques. For instance, short-term projections typically rely on historical experience and incorporate elasticity-based methods to estimate how the existing base of ridership may change over the forecast period. Long-term projections, on the other hand, typically rely on network-based models which define ridership from a zero base. These estimates are commonly derived for the project's design year and omit interim events.

## Service Planning

Service planning is closely related to a number of other planning functions, and is thus a key element in the financial analysis process. Basically, service planning translates transit service policies into operational plans, and involves the routine adjustment of existing service levels to meet changes in demand and/or the evaluation of major investments. Short range planning focuses on the former, while long range and project planning include both levels of activity. Annual service levels are developed at the latter planning stages; this facilitates the plugging in of service changes (i.e., associated with major capital improvements). The major output of the service planning function at all planning levels is the specification of service levels by mode, corridor and/or route. Service levels are defined in terms of peak vehicle requirements, platform hours of service, and vehicle-miles for line-haul, local and feeder services. These statistics are used in the projection of operating and maintenance costs.

The service planning process is interdependent with travel demand forecasting -- and therefore closely related to fare policy as well. These functions should be carried out in an iterating fashion to bring transit service (supply) and demand for transit into "equilibration."

**Fare Revenue Forecasting**

Fare revenue forecasting is an essential part of financial analysis in that it is where the farebox revenue stream component of the operating deficit is determined. Fare revenue is directly affected by the fare policy (i.e., structure and level) and ridership projections. Current revenue can be estimated either by 1) breaking out ridership by fare category and calculating revenues for each fare category, or 2) determining an average systemwide fare (based on the proportion of riders in each fare category) and multiplying by total system ridership. Trend analysis, elasticity analysis, simple regression models or econometric models can be used in forecasting future operating revenues. In calculating fare revenues it is necessary to adjust for "fare loss", through fare evasion, short-changing or inaccurate ridership counts. These occurrences, as well as transfers, complicate the ability to forecast revenue; this situation is discussed further in Section 3.2. Fare (as well as non-fare) revenue forecasting should also be subjected to sensitivity analysis. In projecting fare revenues, for instance, the impacts of different demand forecasts should be tested.

**Non-Fare Revenue Forecasting**

Non-fare revenue forecasting also employs professional judgement, trend analysis, simple regression analysis, and econometric modeling. Non-fare revenue sources include broad-base taxes and various benefit sharing strategies. The specific technique used will depend on the type of revenue source in question, the variables that influence the source, the availability of local data (for model calibration and validation), and the level of accuracy needed. Existing funding sources should be described in terms of type of source, level of commitment, disbursement mechanism, degree of predictability, and necessary legal authorizations. Alternative scenarios should be projected based on different assumptions regarding availability of different funding sources. Sensitivity analyses should also be performed to test the impact of changes in various economic factors (e.g., personal income, employment, population, retail sales, value of real property, and inflation rates) that can influence the amount of revenue generated. The combined estimate of fare and non-fare revenue forecasts represents the total projected revenue stream. The projection of annual revenue then represents one side of the cash flow analysis "equation."

**Operating and Maintenance Cost Estimation**

The accurate estimation of operating and maintenance (o & m) costs is key to the identification of cash requirements. These estimates are based on the ridership level derived from the travel demand forecast, the service level defined in the service plan and the operating environment. The o & m cost estimation process in turn results in a schedule of operating costs that supports the determination of operating deficit funding requirements (i.e., within the cash flow analysis).

In order to estimate o & m costs relative to the service plan, the likely impact of the service plan on the transit system's existing cost structure must be thoroughly analyzed. In particular, it is important to identify the types of costs that will change with the implementation of the service plan, versus those that are likely to remain fixed at current levels (except for inflation-related growth). For those factors expected to change, a determination is made whether they change in steps or are continuous. Along with service-related costs, it is also important to analyze the o & m cost impact of the transit agency's recapitalization program. For instance, what are the maintenance cost increases associated with the deferral of capital investment in new vehicles, track rehabilitation, or cable up-grade?

In projecting o & m costs for major capital improvements (i.e., in project planning), the incremental o & m costs associated with each project alternative are expressed in current year (or "year of expenditure") dollars. In comparison, constant year dollar estimates either reflect the time value of money, i.e., are discounted, or are stated in base year terms with no discounting. Current year estimates are adjusted in the costing analysis for any increases due to real price changes and changes resulting from anticipated inflation.

A number of cost cutting measures should also be considered in estimating o & m costs. Many transit agencies have found contracting with private operators to be an effective means of reducing system o & m costs while continuing to provide a high level of service. Others have examined labor practices, such as use of part time drivers for peak time operations, as a means of lowering the operating deficit. For example, one transit alternative may include several new express bus routes which only operate during the peak periods; these routes would be excellent candidates for testing the impact of part time operators on the o & m cost estimates. Service reduction is another area for testing impacts of alternative assumptions on operating deficits. This test is particularly relevant when the patronage forecasts for the transit alternatives reveal lightly used routes.

A number of different cost model structures have been developed for projecting o & m costs. These structures generally incorporate the use of either of two basic approaches: 1) cost allocation; or 2) resource build-up. The cost allocation approach relates each type of cost to the unit measure of service (e.g., peak vehicles, hours, miles, or passengers) with which it is most closely related (e.g., fuel cost to vehicle miles or driver cost to vehicle hours). The resource build-up approach estimates staffing, utility, and materials needed for a specific unit of service, defines unit costs, and calculates resulting costs for each cost category.

Operating cost estimates should also be subjected to sensitivity analysis. Sensitivity tests might include variables like service levels, labor productivity and cost escalation rates. The service and productivity variables can be expressed as frequency distributions for the purpose of establishing probability confidence intervals around expected values or variances. The analysis of differential inflation rates is important because of the uncertainty in estimating future inflation rates. One approach to developing these rates is to use historical trends in local inflation as the basis for future inflation rates. Other approaches are to consult with local economists or financial institutions or to seek support

from econometric forecasting firms. Once developed, the alternative differential inflation rates are tested for their impact on the annual o & m cost estimates.

## Construction and Recapitalization Planning

Construction planning is the process used to define the requirements and timing of facility development and replacement. The construction plan -- or schedule -- is dependent on the service plan and the facility requirements resulting from this plan. The construction plan serves as input to the estimation of capital costs and the cash flow analysis -- and may also impact service planning, especially short range planning. During project planning, the construction plan is developed to obtain a time-based estimate of the projected cash requirements. During the preliminary engineering phase, the transit agency refines the construction plan to illustrate a "draw down" schedule of construction costs for the different phases of each construction project. This draw down schedule determines the project's periodic effect on cash requirements and serves as input to the construction management process.

Because the construction plan delineates future costs and therefore revenue needs, the cost estimates developed from this plan require adjustments for future inflation. Additionally, sensitivity analyses should be conducted to assess the cost impacts of slippages in the construction schedule and the potential utility of an accelerated or expanded implementation schedule.

A recapitalization needs assessment and plan is an important yet sometimes overlooked part of the financial analysis process. The purpose of this step is to determine the schedule and costs for rehabilitating or replacing existing rolling stock and other capital assets in order to support existing and future levels of service.

The recapitalization plan, similar to the construction plan, is developed to project annual capital needs and the associated costs. The assessment of recapitalization needs is a component of the capital cost estimation step and affects capital financing requirements as well as cash management. The recapitalization needs assessment can be conducted under alternative scenarios, utilizing different strategies for replacing and rehabilitating the capital assets. The cost impacts of the scenarios can be analyzed in conjunction with the construction cost estimates and the projected revenues to determine capital financing requirements.

## Capital Cost Estimation

Capital costs are estimated on the basis of the service plan, the recapitalization plan and travel demand. These estimates provide information essential to the assessment of alternative financing plans. The estimates result in the identification of capital costs by year for the financial planning horizon. These costs, when adjusted for inflation and real price changes, support the identification of capital financing requirements.

The specific technique used for estimating capital costs depends on the nature of the projects or items being costed. For instance, for segments of alternatives that can be analyzed at a fairly aggregate level, a "typical cross-section" for the segment is defined.

Detailed unit costs are used with quantities taken from the typical sections to derive costs per lineal foot for each section. A similar approach is used to derive a per-station composite cost for various station types -- at-grade, elevated, subway, terminal, etc. Plan and profile drawings are prepared for each alternative and quantities -- lengths, number of over-and underpasses, special features, etc. -- are taken off. "Segment costs" are computed to represent the capital cost of each identified segment, exclusive of systemwide elements and add-on items. Segments that cannot be handled with the typical-section approach are those with special conditions -- typically major structures or an uncertain alignment in areas with major existing structures or difficult terrain. These segments are costed in detail, with drawings, detailed quantities, and detailed unit costs. Again, the cost estimates for these segments are exclusive of systemwide items and add-on costs. Systemwide elements for rail investments include vehicles, electrification, and signal/control systems, since these items are not well-defined on a segment-by-segment basis. They are costed with unit costs applied to systemwide quantities. Add-on items consist of contingency allowances and the costs of engineering and construction management services. These items are usually costed through multipliers that express the add-on costs as percentages of the estimated baseline capital costs.

In estimating capital costs, it is important to address the following issues, in addition to straightforward cost items: 1) estimating the impacts of construction delays on construction (and operating) costs; and 2) estimating the impact on costs of the bid advertising and contract letting schedule. It is also important to assess the potential for reducing capital costs through private sector initiatives (e.g., private financing, ownership, and operation through a "turn-key" approach). Such privatization strategies have been estimated to produce substantial savings over traditional public financing and ownership.

Furthermore, as suggested under o & m cost estimation, the estimation of capital costs should also consider the impact of capital improvements on operating costs. Integrating capital and operating cost estimation should enable the transit agency (and the funding source representatives for a proposed project) to: 1) anticipate and adjust for trade-offs between the capital budget and the operating budget over both the short-term and the long-term; and 2) establish an interface between the capital budget, the operating budget, capital needs programming, the budgeting process, and the scheduling of projects. With regard to sensitivity analysis, capital costs may be tested for different inflation rates, different interest rates (i.e., to assess their impact on debt service requirements), and changes in construction or recapitalization schedules (e.g., to assess the possibility and usefulness of an accelerated -- or lengthened -- implementation schedule for each project under consideration).

## Cash Flow Analysis

Cash flow analysis (also commonly referred to as "financial capability analysis" in UMTA's guidelines) involves comparing future cash flow needs with available revenues (i.e., "revenue shortfall estimation"). The inputs to this process are total revenue estimates, construction and recapitalization plans, and the capital and operating cost estimates. This analysis must include a definition of both cash flow requirements associated with current-state conditions (i.e., the cost and revenues resulting from a

perpetuation of existing services and policies) and incremental cash flow associated with a major capital project.

The cash flow analysis shows the extent, if any, of revenue shortfall for both capital and operating/maintenance costs. Revenue shortfall can be depicted graphically, with past and projected revenue trends plotted graphically against past and projected operating and capital costs. Revenue shortfall should be estimated at each of the three major planning stages, as discussed earlier.

**Identification and Analysis of New Revenue Sources**

If it is shown that existing revenue sources do not have the capacity to cover future operating deficits and/or capital financing requirements, it is necessary to identify new sources and then make new forecasts of total revenue. Initially, a wide range of funding sources and strategies are considered; these sources might include broad-based taxes, charges on benefiting properties, and income from joint development efforts (the full range of alternatives sources/strategies is summarized in Section 2.5 and discussed further in Chapters 3 and 4). Next, a preliminary screening of alternatives takes place. This process involves an initial evaluation of the applicability of each strategy to the transit agency's financing needs, based on such factors as the strategy's legality, institutional feasibility, public acceptance and potential yield. Once a set of potentially appropriate strategies has been identified, specific financing alternatives can be developed, based on the specific capital and operating needs in question. The procedures used in identifying and evaluating new sources are discussed briefly in section 2.5 of this Guide, and in greater detail in Chapter 4.

**Development of Financing Alternatives**

Financing alternatives for meeting future capital and operating requirements of major investments are developed based on the cash flow analysis and the identification, analysis and evaluation of new revenue sources (and forecast of total revenue). Each alternative should identify the specific source and uses of funds (e.g., including annual debt service requirements, if applicable) in future years. The typical financing alternatives are: 1) pay-as-you-go, 2) some form of debt financing, and 3) private sector financing. Usually, a combination of these alternatives is considered.

**Assessment of Financial Feasibility**

Once financing alternatives have been developed, the financial feasibility of the proposed transit improvements must be assessed. Measures of financial feasibility (e.g., operating ratio and operating deficit as percentage of dedicated tax revenue) are produced and are used to ensure that sufficient funds -- both from existing and new sources -- would be available to cover the capital and operating costs of any transit alternative being considered. Examples of financial feasibility "guidelines" are as follows: 1) maintain a certain percent recovery of operating costs from the farebox; 2) keep operating deficit less than a designated percentage of dedicated tax revenues; 3) keep capital expenditures within remaining dedicated tax revenues (including bonding), plus additional funds from other financing strategies; and 4) maintain an acceptable coverage

ratio. The assessment of financial feasibility becomes part of the overall evaluation of transit alternatives.

**Financial Plan Preparation and Implementation**

The final step in the financial analysis process is typically the preparation of a financing plan and implementation strategy. This plan is prepared following the completion of the financial capacity analysis and, for major capital project planning, following the circulation of the Draft Environmental Impact Statement. The financing plan integrates the analysis related to funding both any major capital investment and the overall system's capital and operating deficit. The development plan, which should be prepared concurrently with the selection of the locally preferred alternative (i.e., in project planning), includes the following tasks: additional analysis to more fully describe the financing alternative(s) to be used; identification of the specific steps needed to secure financing; and development of information for use by the funding partners to rate the investments.

The implementation of the financial plan includes identification and selection of the proper financing professionals, including financial advisors, investment bankers, underwriters, and marketing firms. The exact combination of outside professionals needed will depend on the nature and complexity of the financing alternatives developed, coupled with the in-house capabilities of the transit agency, MPO and/or state transportation agency.

## 2.4 TYPES OF INFORMATION NEEDED AT EACH PLANNING LEVEL

The activities making up financial planning require a broad range of input data. For some planning activities, the input information is derived from other functions; for instance, fare revenue forecasting requires details on the transit system's fare policy and demand forecasts as the primary inputs. Documents that may be particularly useful include annual reports, financial statements, audit reports, and bond documents. Other necessary information is derived from sources outside of the transit agency (e.g., socioeconomic and land use data projections). Much of the latter data is used to produce indicators of financial condition and capability, for instance. The basic types of information used in financial planning are listed in Table 2-1; the information needs of the specific planning functions are shown in the summary sheets in Appendix D. The data requirements of the major planning functions are discussed further, along with analysis and forecasting procedures and techniques, in Chapter 3.

## 2.5 EVALUATING AND SELECTING NEW SOURCES OF REVENUE AND FINANCING STRATEGIES

As indicated earlier in this chapter, the existence of operating deficits and unmet capital financing requirements indicate the need to develop new sources of revenue or financing strategies--perhaps in conjunction with cost reduction measures--to cover the shortfall. A broad range of revenue-producing and cost-cutting strategies has been

**TABLE 2-1: TYPES OF INFORMATION NEEDED IN FINANCIAL PLANNING**

| Type of Information/Data | Source |
|---|---|
| Fare policy | Transit agency |
| Transit ridership | Transit agency |
| Regional travel patterns | MPO, transit agency |
| Service network and plan | Transit agency, MPO |
| Elasticity measures (i.e., related to fare changes) | Regional experience, National studies[5] |
| Economic projections (i.e., interest and inflation rates) | U.S govt. (OMB), CBO, econometric forecasters |
| Regional projections (e.g., population, h.h., size, income) | Regional planning agencies, Census |
| Land use projections (e.g., trip generators, development patterns | Regional planning agencies, Census |
| Existing funding sources and eligible uses | Transit agency, MPO, state DOT, UMTA |
| Past trends in funding | Transit agency |
| Fare revenues (historic and projected) | Transit agency |
| Transit operating budget | Transit agency |
| Past trends in operating costs | Transit agency |

5 Key sources are listed in the Bibliography.

**TABLE 2-1: TYPES OF INFORMATION NEEDED IN FINANCIAL PLANNING (continued)**

| Type of Information/Data | Source |
|---|---|
| Transit agency's taxing/debt financing capabilities | Transit agency, Financial and legal consultants, state govt. |
| Capital assets inventory | Transit agency |
| Fleet and facility maintenance and recapitalization requirements and policies | Transit agency |
| Assumptions regarding yield of potential revenue sources | MPO, financial consultants |
| Information on alternative revenue sources | National studies, APTA, other transit agencies |
| Legislation related to alternative revenue sources | Legal consultants, state legislature, city planning agency |

applied among U.S. transit systems, and these -- and untried -- approaches have been documented and discussed at length in recent literature.[6]

The steps to be followed in evaluating and selecting new sources of revenue typically include 1) identify alternatives, 2) define evaluation criteria, 3) screen alternatives on a preliminary basis, 4) analyze and evaluate alternatives, 5) select most promising and appropriate alternatives; and 6) detail implementation steps. These alternatives are then incorporated into a project financing plan. These procedures are described briefly in this section, and discussed in greater detail in Chapter 4.

### 2.5.1 Identify Alternative Revenue Sources and Financing -Strategies

The initial step in this process is for the transit agency (or other body) to identify new revenues sources or financing strategies that are potentially applicable. Traditionally, transit operations and capital expenditures have been funded virtually exclusively through public sector sources (i.e., Federal, state and local programs or contributions). However, continual budgetary pressures over the past few years have caused the Federal and State governments to encourage localities to assume greater responsibility for financing transportation infrastructure. The potential revenue sources include taxes and private sector financing techniques that have been implemented by transit agencies, or seem appropriate for transit. A good place to start is with approaches that are currently in use at other transit agencies, as these would have passed certain evaluation "tests." In other words, a tax or private financing technique that is in place must have been judged to be institutionally feasible, efficient, and acceptable at some level. Thus, only its applicability to the area in question must be assessed. This applicability will depend on various factors, including the technique's legality in the city or region (e.g., under the transit authority's enabling legislation or under state tax laws), its legality under the current Federal tax code (e.g., with regard to a transit agency's ability to benefit from its tax exempt status), the nature of the region's economic, political, and social climate, and the nature of current revenue sources, and the general financing approach to be used.

With regard to the last item, there are four basic financing approaches to consider: pay-as-you-go, borrow, lease, or secure private equity financing.[7] In other words, will the costs be covered directly through an on-going revenue source (e.g., some form of tax or user fee), through issuance of bonds, through entering into a lease arrangement, or through a private financing arrangement. Advantages and disadvantages to each of these financing approaches are discussed in Chapter 4. The nature of the approach can strongly influence the selection of specific revenue sources or financing techniques. For instance, if a bond is to be issued, it will have to be secured and repaid through some stable and predictable revenue source. Depending on local and state regulations, as well as the perceptions of the bond market, certain on-going revenue sources may or may not offer sufficient security. This issue is also discussed in greater detail in Chapter 4.

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6 See the Bibliography for reference on this subject.

7 This distinction is particularly germane to discussions of construction or other major capital expenditures, but it applies in a general sense to operating deficits as well.

The major financing strategies fall into two general categories:

- issuance of debt or leasing, and
- privatization.

The major "alternative" revenue sources (i.e., other than the traditional sources of subsidies -- UMTA, state and local government) for transit fall into three basic categories:

- taxes and user charges
- use of property and property rights, and
- benefit sharing.

The sources/strategies generally included in these categories are described briefly below.[8] Table 2-2 presents transit-related examples of the different strategies and sources.

**Issuance of Debt and Leasing**

This category includes the most common strategies for financing and/or reducing the overall costs of purchasing equipment or constructing facilities. Certificates of participation (also known as "equipment trust certificates") are used to finance equipment purchases (or lease-purchase agreements) by dividing the cost among many investors; in other words, each investor owns a percentage of a piece of equipment and "leases" that share back to the transit agency or city. In a sale/leaseback agreement, private investors are recruited to buy all or part of certain transit equipment (or facilities); the investors then lease the equipment back to the transit agency.[9] In a vendor financing arrangement, transit vehicle manufacturers assist transit agencies in financing the purchase of their vehicles or other assets (e.g., through provision of low interest loans). A grant or revenue anticipation note is a short-term financing mechanism through which a transit agency borrows tax-exempt funds against future revenues in order to reduce cash flow imbalances and possibly to increase investment opportunities.[10] Finally, issuance of bonds is a common long-term debt mechanism used by transit agencies to provide large amounts of capital; bonds must be secured by a dedicated tax revenue source or some other type of predictable long-term revenue stream.

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8 For more complete descriptions of the various options the reader is directed to the references listed in the Bibliography.

9 Another strategy that has been widely used by transit agencies -- safe harbor leasing -- is no longer legally permitted. Laws permitting safe harbor leasing have a "sunset" provision, allowing it only for equipment that is placed in service by 12/31/87 or that had been ordered by 3/31/83.

10 The ability of transit agencies -- or any tax exempt public bodies -- to reap investment benefits through any such type of "interest arbitrage" was significantly reduced by the 1986 Federal tax code. The potential benefit of such an investment must now be weighed against the cost of the requisite legal opinion, as well as financing fees.

**TABLE 2-2: EXAMPLES OF APPLICATIONS OF FINANCING STRATEGIES AND REVENUE SOURCES**

| Strategy | Location | Application |
|---|---|---|
| **Issuance of Debt and Leasing** | | |
| Certificates of Participation | Los Angeles | SCRTD sold $29 million in 10-year equipment trust certificates (at 8% interest) for purchase of 1000 buses. |
| Sale/Leaseback arrangements | Houston | MTA used sale/leaseback with a bank to reduce initial outlay for buses. |
| Vendor Financing | New York City | Bombardier, Ltd. arranged for financing for MTA procurement of 825 rail cars. |
| Grant/Revenue Anticipation Notes | Philadelphia | SEPTA has issued grant anticipation notes on a annual basis since 1981. |
| Issuance of Bonds | Boston | MBTA frequently issues general obligation bonds backed by the full faith and credit of the Commonwealth. |
| **Privatization** | | |
| Private Equity Financing | Tampa, FL | Construction of Harbour Island People Mover was totally financed -- and is operated/maintained by a private developer. |
| Private Operation | Los Angeles | Six private bus companies operate of Service over 130 commuter express routes in L.A. area. |

**TABLE 2-2: EXAMPLES OF APPLICATIONS OF FINANCING STRATEGIES AND REVENUE SOURCES (continued)**

| Strategy | Location | Application |
|---|---|---|
| **Privatization (continued)** | | |
| Contracting | Johnson Co, KS | Co. contracts with a private operator for Service for all transit service (6 express, 4 local routes). |
| **Taxes and User Charges** | | |
| Sales Tax | Atlanta | 50% of MARTA's annual revenue comes from a 1% local option sales tax. |
| Motor Fuel, Toll or Parking Tax | Miami | 20% of Dade County's annual revenue comes from 4/gallon local option fuel tax. |
| Motor Vehicle Fees | Seattle | 20% of METRO's annual revenue comes from a 1% state motor vehicle excise tax. |
| Payroll or Income Tax | Portland, OR | 50% of Tri-Met's annual revenue comes from 0.6% corporate payroll tax. |
| Utility Tax | New York City | Transit is subsidized in part through surplus water and electric charges. |
| Property Tax | Minneapolis/ St. Paul | 40% of MTC's annual revenue comes from a 1.5-2 mil property tax. |
| Lottery | Arizona | The state legislature earmarked $190 million (over a 10-yr period) of lottery receipts for the local Transportation Assistance Fund. |

**TABLE 2-2: EXAMPLES OF APPLICATIONS OF FINANCING STRATEGIES AND REVENUE SOURCES (continued)**

| Strategy | Location | Application |
|---|---|---|
| **Use of Property and Property Rights** | | |
| Leasing/Selling Development Rights | Washington, D.C. | WMATA expected to receive $3.5 million through leasing development rights in 1986. |
| Leasing/Selling Facilities | Fargo, ND | City of Fargo leases part of Land or city-owned transit terminal to Greyhound for $32,000/yr. (15 years). |
| **Benefit Sharing Strategies** | | |
| Special Benefit Assessment | Miami | Assessments are expected to generate $20 million over 15 years. to repay bonds issued for the people mover. |
| Density Bonus | New York City | Developers of Lincoln West (a residential/commercial development) provided over $30 million toward reconstruction of subway stations in exchange for a density bonus from the city. |
| Tax Increment Financing | San Francisco | Financing for building Embarcadero Station came, in part, from sale of t.i.f. bond. |
| Cost Sharing Arrangements | Los Angeles | SCRTD negotiated an individual station maintenance and capital sharing agreement for proposed people mover. |

**TABLE 2-2: EXAMPLES OF APPLICATIONS OF FINANCING STRATEGIES AND REVENUE SOURCES (continued)**

| Strategy | Location | Application |
|---|---|---|
| **Benefit Sharing Strategies (continued)** | | |
| Impact Fees | San Francisco | City imposed $5/sq. ft. fee for new downtown office space; fee is paid as a condition of obtaining certificate of occupancy. |
| Connector Fees | Miami | Dade Co. expects to receive $5 million in connector fees for downtown portion of Metrorail. |

## Privatization

This category includes three strategies involving direct participation by private entities; one is a financing strategy, while the other two represent strategies for reducing operating costs. Private equity financing of transit facilities typically takes the form of development, construction, and possibly ownership and operation of a fixed guideway system. The few examples of this approach in the U.S. to date have involved new large scale developments in need of transit service and access to other areas. Private operation of service involves provision of bus service (e.g., express routes) by private operators, without public subsidy. This may take the form of a private bus operator taking over a transit route, or perhaps a shuttle service sponsored by an activity center or major employer. Such arrangements may allow a transit agency to drop an unproductive route, or possibly to avoid expanding service to accommodate a new activity center. A "franchise fee" may or may not be charged in order to capture some of the excess revenue for the public benefit. Contracting for service also involves private provision of service, but under contract to (and thus subsidized by) a city, county, transit agency or other public entity. This approach is designed to reduce the public entity's cost, by taking advantage of the typically lower operating costs of private providers. An agency can contract out regular transit service or certain specific services (e.g., express routes or specialized elderly and handicapped service).

## Taxes and User Charges

The tax-based mechanisms in this category have been widely used as dedicated sources of transit revenue. These taxes generally relate to benefits provided by transit, and are considered to be justified and supported by these benefits. Where they are directly used to provide transit funding, such taxes are typically major sources of transit revenue -- often the largest single source. The sales tax is the most popular type of tax used to support transit in the U.S. Taxes on motor fuel, tolls, and commercial parking represent "auto use" charges as what is essentially a cross subsidy to transit. Taxes on motor vehicle registration, title and/or license fees represent other tax-based sources related to automobile use and/or purchase. Revenue from a corporate payroll or employee income tax can also be used to support transit; a corporate payroll tax is imposed on all employers (or those over a certain size) within a transit service district, while an employee income tax is levied on all individuals living or working in the service district. Utility (e.g., electricity, gas, water, etc.) taxes or fees, based on rate of consumption, can be added to regular use charges and used for transit funding. Revenue from property taxes can also be distributed to transit agencies. Finally, proceeds from the state lottery have been used for certain types of transit service in two states (Arizona and Pennsylvania).

## Use of Property and Property Rights

The strategies included under this heading represent mechanisms through which a transit agency can produce revenue through its land holdings. Leasing/selling development rights produces revenue through "joint development," i.e., leasing or selling air or subsurface rights associated with capital improvements. A transit agency may also

generate revenue through leasing/selling all or parts of unused or underused land or facilities to interested developers or businesses.

**Benefit Sharing Strategies**

The strategies in this category represent mechanisms through which a transit agency collects revenue (or in-kind contributions) from non-user beneficiaries who benefit from -- or have some impact on -- a specific transit project or improvement. These non-user beneficiaries include land developers, property owners, and local governments. A special benefit assessment is essentially a tax levied by a transit agency on all private properties specifically benefiting from a particular transit facility -- i.e., located within a "special benefit district." Tax increment financing is another tax-based mechanism, related in this case to property taxes and the change in property values within a special district (i.e., attributable to public improvements such as transit projects). A density bonus involves an agreement by a developer to contribute to a particular transit improvement in return for receiving additional development rights or considerations. A cost-sharing arrangement also involves an agreement by a developer to help pay for a particular transit improvement -- either because the improvement was necessitated by the development, or because the developer wishes to receive the benefits of the improvement (e.g., to gain direct access to a rail station). An impact fee is a one-time charge imposed on new developments to compensate for their impacts on local transportation volumes. Finally, connector fees are charges assessed developers or owners of structures adjacent to major transportation facilities for making direct connections to those facilities (e.g., through "knockout" panels or joint plaza areas).

To summarize, a transit agency should review the experiences of other transit agencies in developing and applying various strategies as one element in identifying an appropriate set of financing/revenue options to consider. Of course, certain types of strategies or sources, while viable in one location, may prove institutionally infeasible or politically unacceptable in another. The following section summarizes the selection and evaluation of financing alternatives.

### 2.5.2 Select and Evaluate Financing Alternatives

In selecting and evaluating alternative financing strategies and revenue sources, it is necessary to, first of all, develop a rational and logically sound evaluation framework. The initial step in this process is to define a set of evaluation criteria. The criteria that should be used to evaluate revenue sources and financing strategies fall into the following categories:

- financial issues, including projected revenue yield, stability, and marketability (i.e., of debt instruments);

- social/political issues, including public acceptance, equity and incentive effects;

- legal/regulatory issues, including current legislative authorization (local, state, and Federal) and legality, as well as changes or new legislation needed; and

- administrative/institutional issues, including nature of revenue collection and monitoring mechanisms, as well as implementation, ownership, operation, and management of the transit improvement.

While not all of the individual criteria would be applicable in every situation, the general types of issues typically must all be addressed in selecting appropriate sources/strategies. The relative importance of different criteria will depend on the nature of the strategies being considered. For instance, for a strategy that has already been used or authorized in the area in question, legal/regulatory issues would be less critical than for a strategy that would require new state legislation or local regulatory changes. Financial issues would be equally important in considering both strategies.

In any event, the range of issues that must be considered can make the evaluation of revenue options quite complicated. The complexity of this task is further exacerbated by the fact that the process of selecting financing alternatives often parallels the development of transit alternatives.

Due to the long lead time required in developing and implementing most types of financing strategies, the process of evaluating and selecting the strategies typically begins well before a specific transit alternative has been selected. Thus, the final selection of financing alternatives cannot generally be made until the details of the final transit alternative have been developed; the relevant details include cost and fare revenue estimates, length and location of guideway (if applicable), transit technology, and administrative/organizational arrangements (i.e., public vs. private construction, ownership, and operation).

Prior to that point, however, a preliminary screening of financing strategies and revenue sources should take place. This screening essentially involves two components: 1) identification of the most appropriate financing approach (pay-as-you-go, borrow, lease, or private equity financing), and 2) identification of potential revenue sources--i.e., to support and/or supplement the general approach. The screening of individual sources/strategies can be based on experience in similar situations elsewhere, coupled with a preliminary investigation into the nature of the local political/institutional/regulatory setting. Clearly, qualitative assessments are necessary for most of the evaluation criteria at this stage. Nevertheless, it should be possible to eliminate certain types of sources/strategies from further consideration, while identifying certain others as having potential for meeting revenue needs and thus warranting additional examination.

Following the initial screening, an in-depth evaluation of financing alternatives takes place. This process involves further investigation into political, legal, and administrative issues--where indicated by the screening--coupled with a full financial analysis. The financial analysis will reveal the ability of each financing alternative under consideration to meet the revenue needs of the transit alternatives under consideration. In order to

carry out the financial analysis, it is necessary to, first, develop (or refine) estimates of the revenue yield of each financing alternative and the revenue needs for each transit alternative. These estimates then provide the input to a financial model, which is used to analyze the capability of different combinations of revenue sources/financing strategies to cover the different aspects of the project in question (i.e., up-front construction costs, annual operating expenses, debt service expenses, and temporary financing needs). The model should incorporate key assumptions such as interest and inflation rates and should test the impact of variations in such factors as project timing and timing of levels of expenditures.

Of course, beyond the actual revenue yield of a revenue source or financing strategy, "marketability" is also a key concern where debt and private equity financing are to be considered. In other words, what will be the return on investments to investors, and how secure is the financing instrument? Marketability may also apply to the perceived input of a revenue-generating mechanism (e.g., a benefit assessment district) on the market for future development in an area.

The results of the financial analysis, coupled with the evaluation of political/legal/administrative issues, should now be used to select one or more financing strategies and revenue sources for each of the most likely transit alternatives. Once a specific transit option has been chosen, the appropriate financing package can be developed into a full financial plan--i.e., including descriptions of all revenue sources (existing and new), and cash flow projections. Finally, the strategies stipulated in the financing plan must be implemented. The specific implementation actions will vary depending on the types of financing alternatives to be utilized, but they might include such activities as preparation of a bond or local option tax referendum, marketing and sale of bonds, drafting and securing passage of special benefit assessment enabling legislation (and then establishing an assessment of district), or negotiation of a sale-leaseback arrangement. The development and implementation of a financial plan are discussed further in Chapters 4 and 5.

## 2.6 SUMMARY

This chapter has presented an overview of the transit financial planning process, with summaries of the individual planning functions and a discussion of how financial analysis and planning fit into the overall transportation planning process. As explained, financial planning consists of four basic components: 1) assessment of financial condition, 2) identification of future financial requirements, 3) assessment of financial capability, and 4) preparation of a financial plan. The first component is used to measure the financial "health" of a transit agency and the region in general; when combined with the third component, it measures the ability of the agency to meet its future financial requirements. The future financial requirements are outputs of the transportation planning process. The fourth component includes the identification of new sources of revenue to meet any shortfalls revealed in the financial capability assessment.

While the nature of the analysis effort differs for different types of planning efforts and in different-size areas, comprehensive financial analysis and planning are necessary at all three basic levels of transportation planning: short-range, long-range, and project

planning. In each case, it is necessary to determine the transit agency's ability to meet both on-going operating deficits and routine capital needs (e.g., fleet replacement and minor facility improvements), as well as any major capital investment financing requirements. At each stage of planning, financial analysis functions are closely interrelated with more general transportation planning functions. Many of the planning and analysis functions require output from other functions, and in some cases, the process is iterating and the flow of information goes both ways. An obvious example is that capital investment proposals may be constrained by financial realities.

Finally, at all planning levels, where the cash flow analysis indicates that existing revenue sources are insufficient, it is necessary to develop new financing strategies and revenue sources. A range of approaches has been used in transit projects in the U.S. and many of these make substantial use of private sector resources and/or techniques. Selecting appropriate strategies and sources requires 1) identifying those that are potentially applicable, 2) establishing evaluation criteria, 3) screening alternatives, and 4) analyzing and evaluating alternatives. A financial plan is then developed and ultimately implemented. The details of the technical aspects of financial planning are discussed in the remaining chapters of this Guide.

# CHAPTER 3: FINANCIAL PLANNING INPUTS

This chapter discusses the major inputs to the financial planning process. Individual sections cover 1) general financial forecasting techniques and tools, 2) the process of estimating fare and non-fare revenues, 3) the process of estimating capital financing requirements, 4) the process of estimating operating deficit funding requirements, and 5) the performance of sensitivity analyses on key variables.

## 3.1 FINANCIAL FORECASTING TECHNIQUES AND TOOLS

This section of the Financial Planning Guide discusses the techniques, models, and tools available to the transit financial planner. The section includes:

- a review of the financial forecasting process focusing on the special problems facing the financial model builder,
- a summary of the generally accepted techniques for modeling transit cash flow and investment analysis, and
- a presentation of financial forecasting software packages available for use on microcomputers.

### 3.1.1 The Financial Forecasting Process

The financial forecasting process contains two general components: (1) the projection of cash flows (in terms of costs and revenues) and (2) the analysis of alternative investment and/or borrowing strategies. Financial forecasting models and techniques can assist in the financial planning process by providing information necessary for a determination of the adequacy of the existing revenue base to cover future costs, and then computing the effects of alternative investment or borrowing plans for meeting future year funding gaps.

The projection of future cash flows for a transit system involves the calculation of four cash streams: capital costs, operating and maintenance costs, fare box revenue, and non-farebox revenue. These estimates are provided for a number of future periods. These periods may be expressed for key years on an annual, quarterly or monthly basis depending on the stage of project development.

A major concern in modeling cash flow streams is the selection of time parameters in the model. This selection depends on the model's purpose. The three time relevant parameters are: 1) the model's cycle length (month, year, 5 year increments); 2) the length of time covered by the model; and 3) the key periods of time in the model. For example, budget cash flow models typically require quarterly estimates, cash draw down schedules require annual estimates, and project planning may need only 5-year and key year forecasts. Each model method discussed may be developed for any of these time periods, though some are better suited to specific time periods.

A second major concern of financial planning is the issue of intervening year analysis for long range project planning. An "intervening year" as defined in this text is a year occurring between the initial operational configuration (IOC) of a new system or the extension of an old route, and the year in which the system matures to be fully operational and fully utilized according to design (the design year). Intervening year analysis has five key steps:

- identify cost effects on the overall system of the new project as it becomes operational (either in phases or all at once);

- identify ridership and revenue along the new line from IOC to the design year (usually an increasing function based on percent of system that is operational, progress toward projections of economic change in the area, and population changes anticipated);

- identify recapitalization needs and costs to the existing system, especially in long range projects with IOC elements that may require repair or replacement before design year is achieved;

- identify routing and scheduling impacts on the current system as the new elements are phased into the system; these will have both cost and revenue implications; and

- identify changing conditions in economic activity and property values that could affect public-private joint ventures and other dedicated, non-fare revenues available for system funding.

The most efficient means of dealing with the issue of intervening years depends on the stage of project planning and the availability of data with which to project cash flows. In the early stages of planning, a key intervening year analysis will usually meet planning needs. For this analysis, key cost and revenue years are identified (e.g. I0C major route restructurings, new phase openings, or current system replacement expenditures) and costs and revenues are identified for those key years. All other intervening years are interpolated between I0C, key years, and the design year.

When a transit operator has annual cost data for the intervening years within the context noted above and is in the later stages of project planning, it may make sense to generate year by year cash flow projections. These projections require cost data and revenue assumptions for each intervening year and are much more analytically intensive

than key year analysis. The investment in year by year analysis can be justified by the enhanced precision of model output (especially for multi-million dollar investment projects). This precision will allow for a financial plan that takes best advantage of the financial condition and needs of the agency so that bond issues and debt repayment may be timed to minimize cost consequences to the agency. Adjustments to I0C, interim phase construction, and the design year may also be tested on such a model, with the same goal of minimizing project costs by responding to cash flow needs for the project, the current system, and any recapitalization requirements projected.

After all cash flows for relevant periods are forecast, determination of an investment or borrowing strategy is based on the projection of these future cash flows. When cash flows are positive, surplus funds are available for investment and can serve to increase income. When cash flows are negative, funds must be borrowed to meet expenses and interest expenses must be paid. Both investment and borrowing decisions affect the final cash position of the transit agency, and thus feed back into the final cash flow projection. (The development and evaluation of cash flows are discussed further in Chapter 4.)

### 3.1.2 Financial Forecasting Techniques

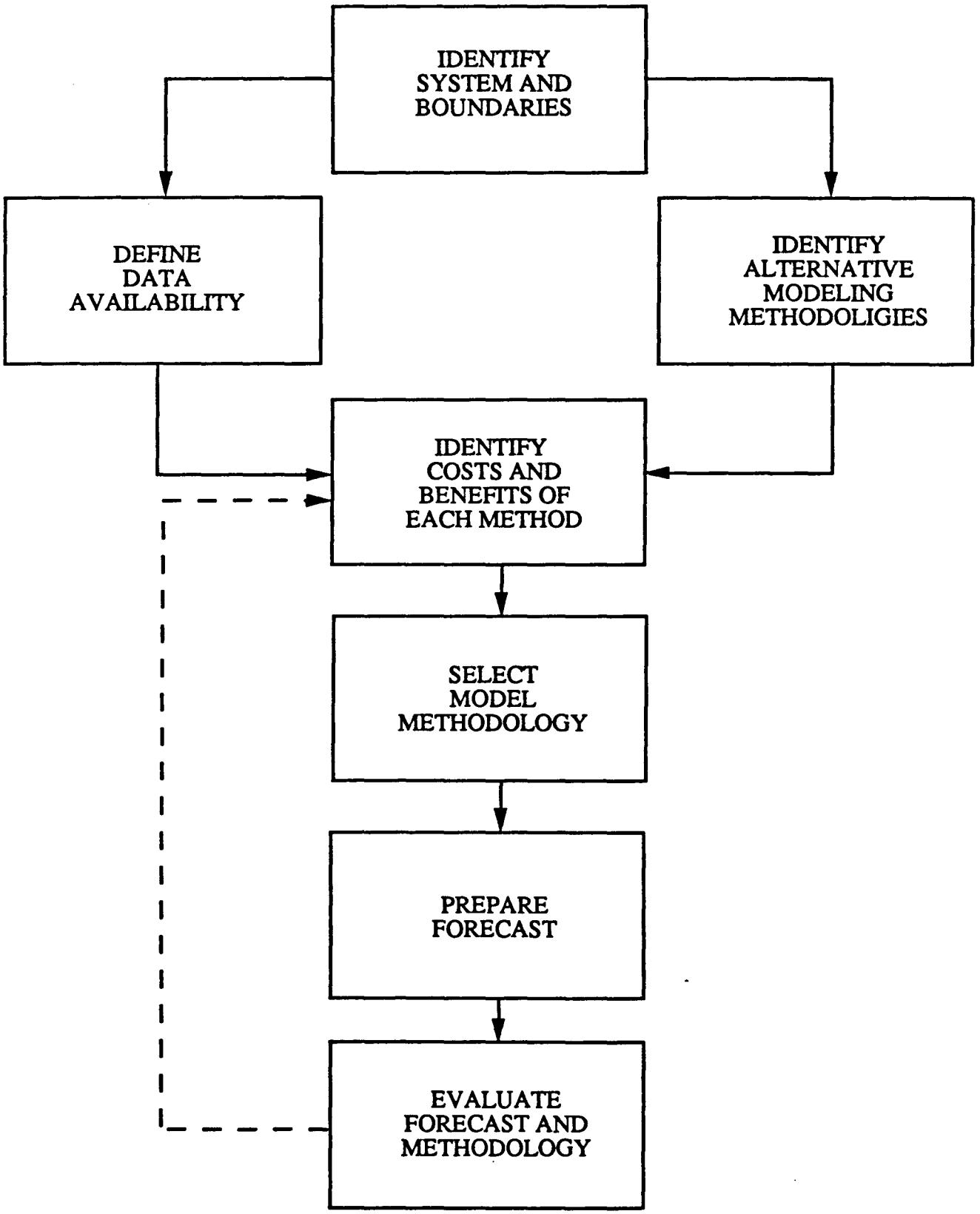
There are five generally accepted types of models used in financial forecasting and analysis by transit operators:

- time series models,
- regression analysis,
- simulation models,
- econometric models, and
- Delphi method/professional judgment.

Selection and use of a particular modeling method should be done following the general method illustrated in Figure 3-1. This process ensures that the model prepared will be as efficient as possible given the constraints on the modeling process, as determined by: 1) data availability, and 2) funding availability. Modeling data needs and costs vary dramatically, as can the precision of the estimates created by the model. A modeler must trade-off this precision against the cost of the model. The important steps in model selection and use include:

- identify system boundaries: clearly state which services are involved in the analysis and the level of detail desired in the model;
- define data availability: a certain amount of cost and revenue data is normally collected by transit operators on a routine basis; more data may be collected at additional cost, if desired;

FIGURE 3-1: GENERAL PROCESS FOR MODEL SELECTION



- identify alternative modeling methodologies: several methods may be used to address a problem or set of problems posed;

- identify costs and benefits of each method: costs of model construction and data collection change as the precision of the model estimate changes; the cost to gain each level of precision for each method should be determined and used as input in choosing a model;

- select model methodology: once the desired precision is known and the costs weighed against budget considerations, the model method should be selected;

- prepare forecast: use the model to forecast the desired element or elements of the overall financial forecasting process; and

- evaluate forecast and methodology: check the forecast for reasonableness and sensitivity of assumptions. A desire for changes or more detail may indicate the need to re-evaluate the cost-benefit decision and the model selection.

At the model identification and selection phases, the analyst should consider the uses, strengths, and weaknesses of each available modeling method. Table 3-1 summarizes these techniques in terms of their inputs, outputs, advantages and disadvantages. Table 3-2 summarizes application of these techniques to the steps in the financial planning process.[1]

### 3.1.3 Use of Existing Software in Applying Forecasting Techniques

Transit agencies can use a range of commercially available microcomputer software to support the financial planning process. Available software falls into two basic categories: (1) general application models, which provide basic tools for use in various financial planning steps; and (2) specific application models, which provide preset formats for performing specified steps in the financial planning process.

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1 For information on individual modeling techniques and their uses in financial forecasting, the reader is directed to the following reports:

- Rice Center. Transportation Revenue Forecasting, prepared for UMTA, June 1987.

- Government Finance Research Center. Transit and Highway Revenue and Improvement Forecasting Templates: User's Handbook, prepared for U.S. DOT/FHWA, July 1987.

## TABLE 3-1: SUMMARY OF FINANCIAL FORECASTING TECHNIQUES, MODELS, AND TOOLS

| TECHNIQUE | INPUTS REQUIRED | OUTPUTS | ADVANTAGES | DISADVANTAGES |
|---|---|---|---|---|
| Time Series Analysis | • Historical data on the forecast variable | • Calibrated model to forecast selected variable | • Relies on readily available data<br>• Considers several periods | • Assumes consistent relationships over time<br>• Does not explain causal relationships |
| Regression Analysis | • Selection of dependent and independent variables<br>• Theory explaining the relationship between dependent and independent variables<br>• Times series or cross sectional data for all variables in the equation | • Calibrated model to forecast dependent variable<br>• Description of the relationships between the model variables<br>• Statistical estimates of confidence | • Estimates a relationship over time<br>• Includes explanatory factors<br>• Supported by statistical tests of validity | • Requires mathematical sophistication<br>• Requires a substantial data base<br>• Assumes consistent relationships over time<br>• Cross-sectional data portrays "average system" |
| Simulation Modeling | • Theory describing relationships between variables<br>• Data supporting the relationships | • Calibrated model to forecast selected variable<br>• Forecast for selected variable | • Flexible<br>• Provides insights to system operations<br>• Easy to modify relationships between selected variables | • Development is labor intensive<br>• Assumes consistent relationships over time<br>• Difficult to obtain independent verification |
| Econometric Modeling | • Selection of dependent and independent variables<br>• Theory describing relationships between variables<br>• Time series or cross sectional data for all variables in the equation<br>• Statistical software package | • Calibrated model to forecast dependent variable<br>• Statistical estimates of confidence | • Includes explanatory factors<br>• Based on actual system conditions<br>• Supported by statistical tests of validity | • Data intensive<br>• Assumes consistent relationships over time<br>• Costly |
| Delphi Method | • Selection of a panel of experts<br>• List of questions for the panel to consider | • Forecasts of the variables in question | • Considers diverse perspectives<br>• Can project factors which cannot be modeled<br>• Includes factors that cannot be included in a mathematical model | • Difficult to assemble panel of experts<br>• Panel biases<br>• Difficult to test sensitivity of results |

## TABLE 3-2: SUMMARY OF APPLICATIONS OF FINANCIAL FORECASTING TECHNIQUES

| Function | Planning Level: Short Range | Planning Level: Long Range | Planning Level: Project Planning | Software | Reference |
|---|---|---|---|---|---|
| Demand Forecasting | • Simulation (Elasticity)<br>• Time Series<br>• Regression | • Simulation (Network)<br>• Econometric | • Simulation (Network/UTP) | UTP Network Model<br>Trip Generation<br>MicroTRIPS<br>MINUTP<br>DEL: TIME Center | Pricing and Project Eval. Meyer et al., 1971. |
| Fare Revenue Forecasting | • Time Series<br>• Simulation (Elasticity)<br>• Econometric<br>• Regression | • Simulation (Elasticity)<br>• Econometric | • Simulation (Elasticity) | Fare Policy Evaluation<br>TOP: Transit Ops Planning<br>DEL: TIME Center | Planning for Fare Changes Kemp, 1984. |
| Non-Fare Revenue Forecasting | • Time Series<br>• Regression<br>• Econometric<br>• Delphi | • Regression<br>• Econometric | • Simulation (Cash Flow) | TIME Center Spreadsheet App.<br>Operating Budget/ Cash Flow Model<br>Rail Transit Cap. Cash Flow | Transportation Revenue Forecasting Guide. Rice Center, 1986. |
| Economic Forecasting | • Time Series<br>• Delphi | • Time Series<br>• Regression | • Regression<br>• Simulation<br>• Econometric | TIME Center Budget Calculator<br>Halley & Cohort<br>DRI Model | Economic Report of the President Annual Publ. |
| Operation and Maintenance Cost Forecasting | • Time Series<br>• Regression | • Simulation<br>• Econometric | • Simulation (Cost Build-up)<br>• Econometric | UBUCKS<br>FLEETMATE<br>TIME Budget Calc.<br>Operating Budget Prep. System | Bus Route Costing Prodeedures UMTA, 1984. |
| Capital Cost Estimation | Takes Input from Long Range Planning Models and Implementation Programs | • Simulation<br>• Econometric | • Simulation (Cash Flow Model) | CPMS: Capital Program Mnmt.<br>FLEETMATE<br>EZFLEET1 & 2 | Transit Capital Planning in the Bay Area UMTA, 1983. |

### 3.1.3.1 General Application Packages

There are three types of general application software packages which transit financial planners can use: spreadsheet, financial, and statistical packages. The most flexible are the spreadsheets. They allow the user to construct various types of mathematical models and/or relational data bases. The financial models are spreadsheets that are designed to calculate significant financial statistics. Statistical packages provide the user with a range of options for performing precise statistical calculations on either time series or cross sectional data. In this section we present a brief description of the typical uses of existing software in the financial planning process.

#### Spreadsheet Programs

Spreadsheet programs can be used for almost all of the modeling methods described in the preceding section. Cost models can be calibrated and operated on a spreadsheet. Many commercially available transit cost models are templates, or overlays, for commercial spreadsheet programs such as VisiCalc and Lotus 1-2-3. Time series and regression models can be run on some spreadsheets, e.g. Lotus and VisiCalc, through the application of a module called VisiTrend. Spreadsheet models are also well-suited for cash management, cash flow, and other types of financial models. Most spreadsheet packages allow the user to prepare presentation graphics of several types (see Figures 3-2, 3-3, and 3-4); such graphics as pie charts, bar graphs, and line graphs can enhance the communication of financial data and performance data.

#### Financial Models

Financial models, which are actually a subset of the spreadsheet programs, are well-suited to the "pure" financial steps of the financial forecasting process. Fare revenue estimation, calculation and projection of nonfare revenue, O&M cost estimation, revenue shortfall estimation, capital cost estimation, and cash management modeling are the best uses for these models. Financial packages can also be used to conduct regressions of nonfinancial data such as ridership and economics, but that is not their primary purpose.

#### Statistical Modeling Packages

Finally, statistical packages are most applicable for time series models and specialized multivariate forecasts or simultaneous equation models. Travel demand estimation, projection of tax revenues and other subsidy support, and estimation of economic variables are the most important uses of these packages. Sophisticated financial forecasting is also possible with some programs which feature financial calculations, such as present value and capital investment analysis.

**FIGURE 3-2: EXAMPLE OF A LINE GRAPH, OPERATING REVENUE PER YEAR**

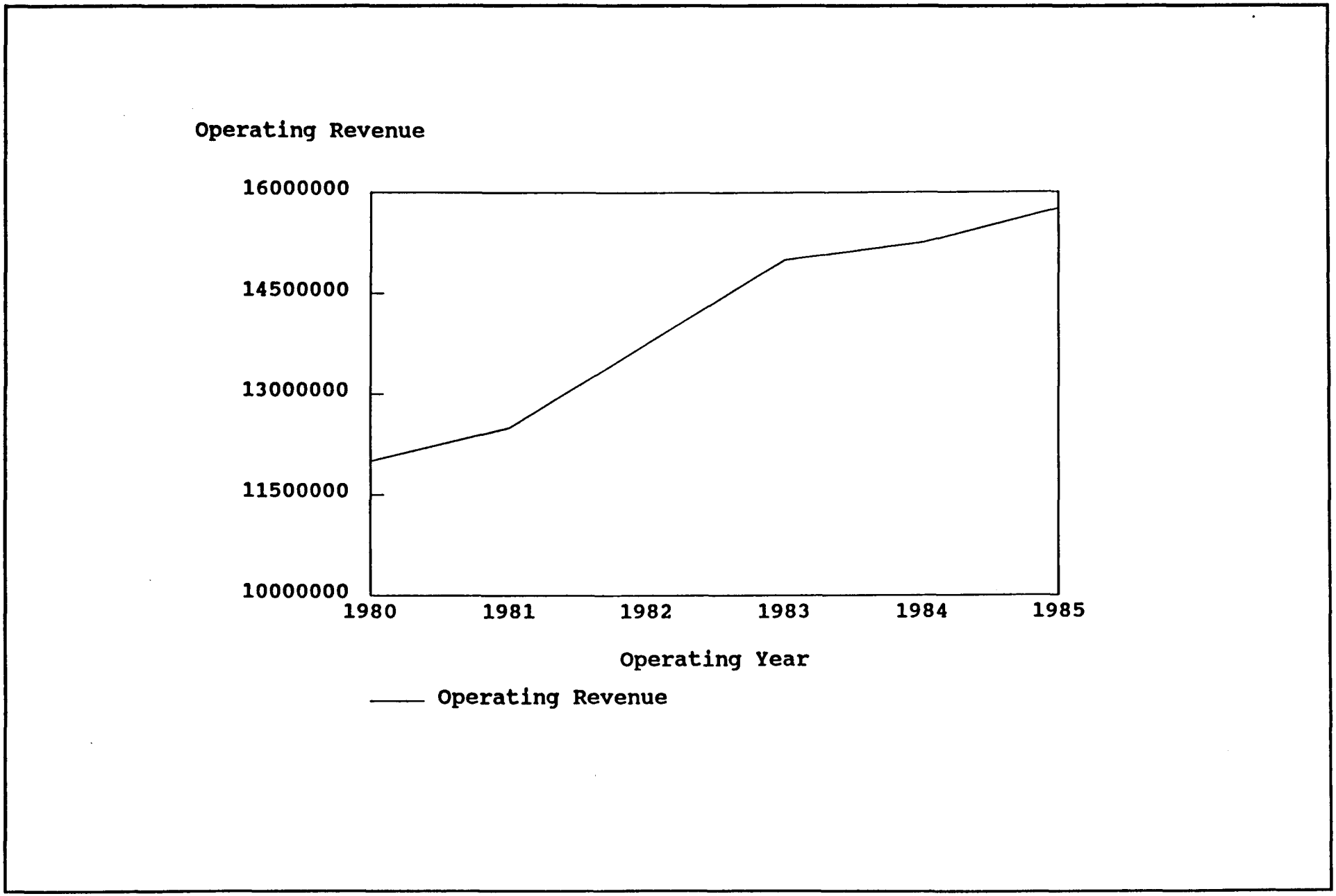


**FIGURE 3-3: EXAMPLE OF A BAR GRAPH, OPERATOR COST PER VEHICLE MILE PER YEAR**

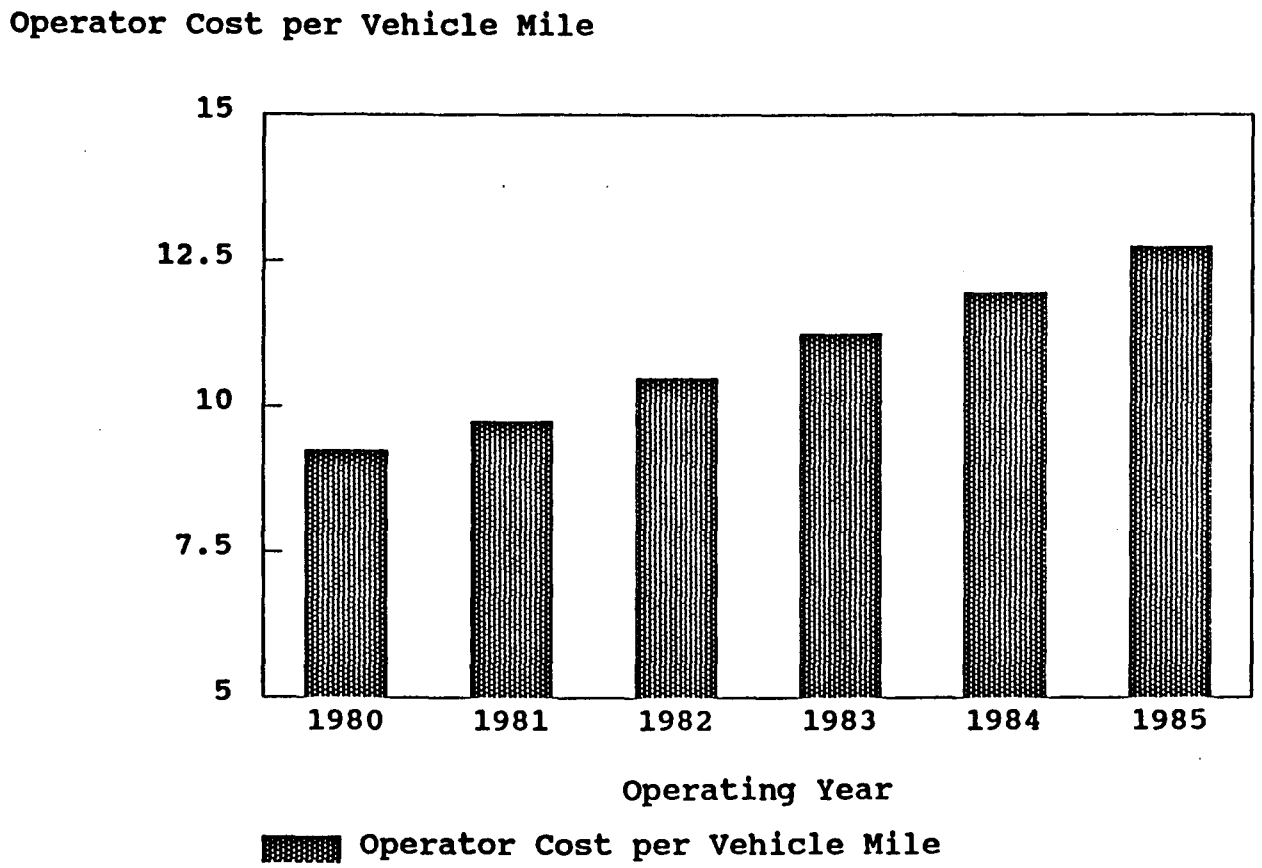
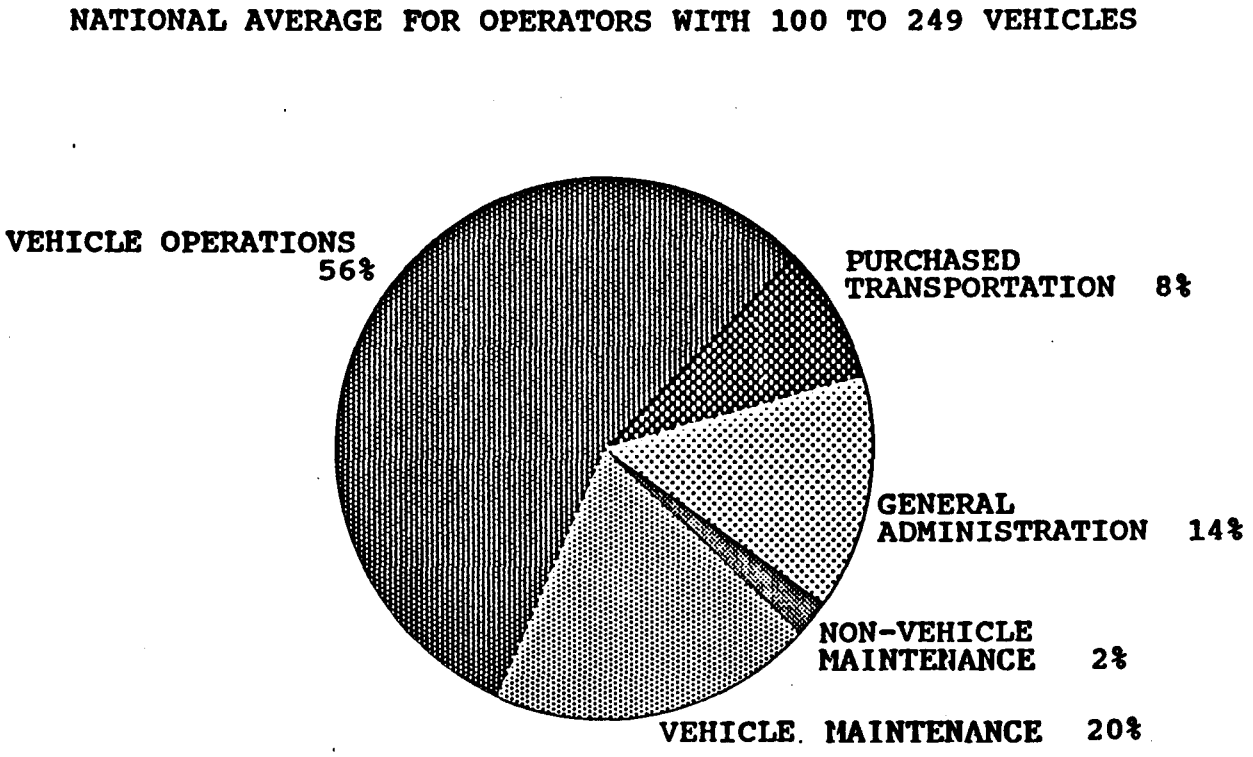


**FIGURE 3-4: EXAMPLE OF A PIE CHART, TRANSIT OPERATING EXPENSES BY FUNCTION**




Source: 1984 Section 15 Reports

### 3.1.3.2 Specific Application Models

Several microcomputer models meet the specific requirements of the financial forecasting process. Most models apply to more than one step of the process. Table 3-3 displays a sample of software packages and indicates the specific steps in the financial forecasting process to which they apply. Information on individual models can be found in the U.S. DOT Software and Source Book, as revised in February 1986. The code for the Operating Budget/Cash flow manager can be found in Financial Management for Transit: A Handbook, also published by the U.S. DOT.

## 3.2 THE PROCESS OF PROJECTING REVENUES

### 3.2.1 Introduction

This section discusses the process of projecting revenues. Transit revenues consist of two basic elements: farebox and non-fare sources. Figure 3-5 highlights the portion of the financial planning process covered in this discussion. Determination of fare revenue involves three steps in the ideal financial planning process. These steps include:

- fare policy: Determines the revenue per passenger by passenger type,
- travel demand forecasting: predicts the number of passenger trips per year by passenger type, and
- fare revenue forecasting: combines fare policy and passenger trip information to estimate total receipts from provision of transportation services.

Determination of non-fare revenue also involves three steps in the ideal financial planning process. These three steps include:

- existing fund sources: describes both current and anticipated sources of non-fare revenues, including subsidies, dedicated taxes, and non-transportation activities,
- economic forecasts: projects economic factors external to transit operation that affect non-fare revenue sources, and
- non-fare revenue forecasts: projects income from funding sources taking into account the external economic indicators.

Sensitivity analyses are conducted with the models used to project transit revenues to determine a range of likely values. Once the sensitivity analyses are complete and the most likely revenue levels are identified, fare and non-fare revenue streams are combined in a seventh step in the financial planning process: total projected revenue stream.

## TABLE 3-3: MICROCOMPUTER APPLICATIONS FOR USE IN THE FINANCIAL FORECASTING PROCESS

| Application Title and Source | Primary Model Function | | | | |
|---|---|---|---|---|---|
| | Revenue Forecasting | Cost Estimation | Capital Planning | Sensitivity and Cash Management | Financial Plan Preparation |
| FLEETMATE (Multisystems) | | X | | | |
| TIMS (Bispec Systems) | | X | | | |
| Vehicle Cost Analyzer (Ernst & Whinney) | | X | | | |
| Fleet/Equipment Management (Byrd, Tallamy et al) | | X | | | |
| FLEET-TRAK (Inst. of Police T&M) | | X | | | |
| The Fleet Controller (Fleet Computing Int.) | | X | | | |
| Fleet Management/Equipment (The MCS Group) | | X | | | |
| VehicleCTRL (Display Data Corp.) | | X | | | |
| EZFLEET1 & 2 (ATE Managment Co.) | | X | | | |
| Vehicle Maint. Info. Sys. (LTK Management Services) | | X | | | |
| Parts Inventory Control (LTK Management Services) | | X | | | |
| TRAMMIS (R.L. Banks & Bechtel) | | | X | | |
| Space Requirements for Bus (New Alternatives, Inc.) | | | X | | |
| BUDGET, LABOR ANALYSIS, AND MULTIBUDGET (ATE) | X | X | | X | |
| Operating Budget Preparation (SEPTA) | | X | | | |
| Driver Extraboard Model/UBUCKS (Booz-Allen and Wilson Hill) | | X | | | |
| Rail Transit Capital Cash Flow (Peat Marwick Mitchell) | X | | X | | |

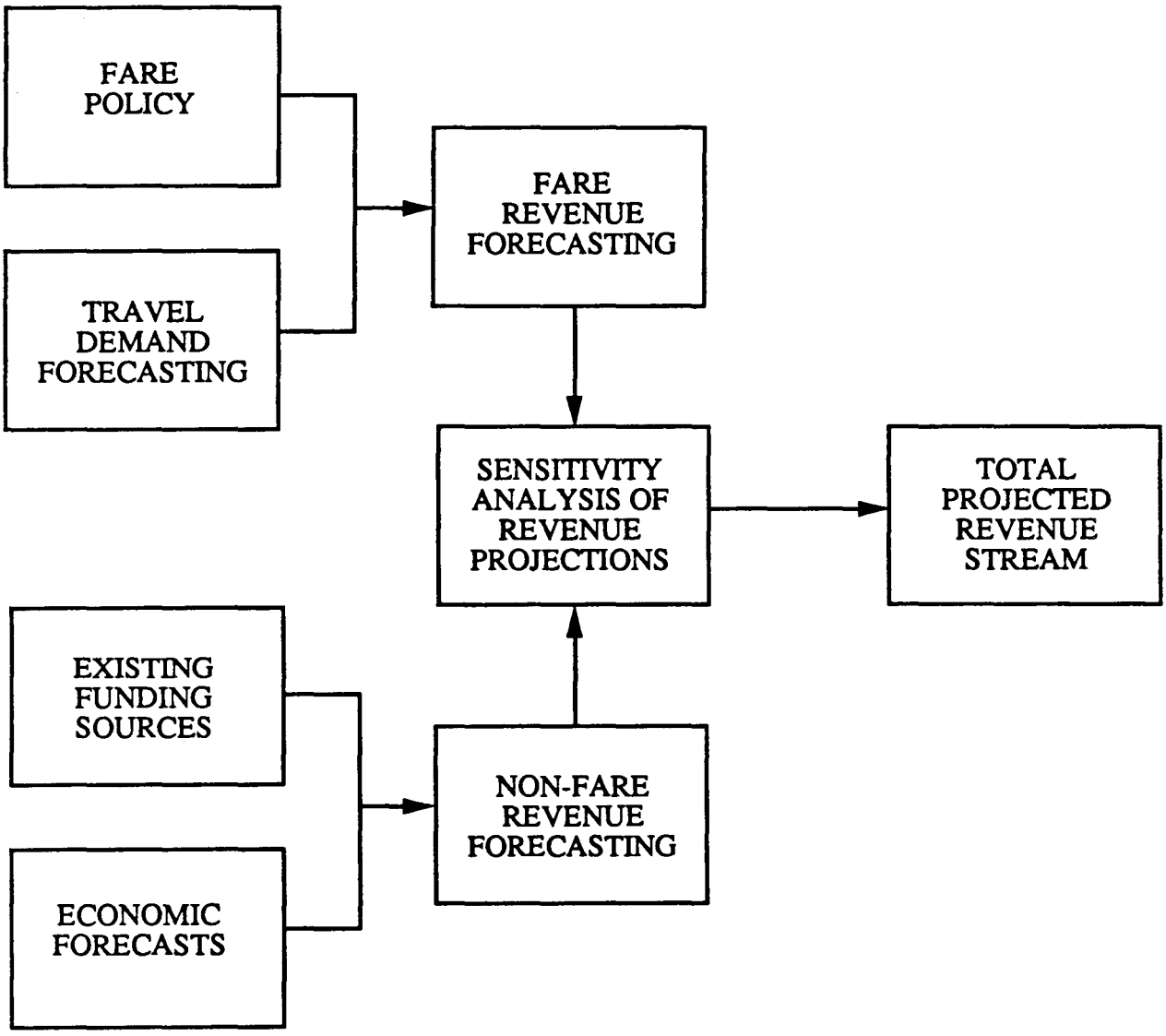
## TABLE 3-3: (continued)

| Application Title and Source | Primary Model Function | | | | |
|---|---|---|---|---|---|
| | Revenue Forecasting | Cost Estimation | Capital Planning | Sensitivity and Cash Management | Financial Plan Preparation |
| Budget Calculator (TIME Support Center) | X | X | | X | |
| EZDATA Micro (ATE) | X | | | | |
| Processing Passenger Survey Data (Golden Gate Bridge District) | X | | | | |
| Service Montoring Package (TIME Support Center) | X | | | | |
| STOPS (Criterion Inc.) | X | | | | |
| Fare Policy Evaluation (TRAAC/TIME Support Center) | X | | | | |
| DEL: Disaggregate Elasticity (TRAAC/TIME Support Center) | X | | | | |
| TOP: Transit Operating Planning (TIME Support Center) | X | X | | | |
| FRACAS: Transit Operations Plan (TIME Support Center) | X | X | | | |
| Transit Ridership Forecasting Model (U. of Wisconsin, Milwaukee) | X | | | | |
| Spreadsheet Applications (TIME Support Center) | X | | | X | |
| Statistical Sampling of Trip Data (TIME Support Center) | X | X | | | |
| HALLEY & COHORT (FHWA) | X | | | | |
| TRIPGENT: Trip Generation Model (Bernardin, Lochmueller & Assoc.) | X | | | | |
| Trip Generation (Microtrans Corp.) | X | | | | |
| Mode Choice (FHWA) | X | | | | |
| RTD Pivot Point Logit Model (FHWA) | X | | | | |

## TABLE 3-3: (continued)

| Application Title and Source | Primary Model Function | | | | |
|---|---|---|---|---|---|
| | Revenue Forecasting | Cost Estimation | Capital Planning | Sensitivity and Cash Management | Financial Plan Preparation |
| EXTRA: Express Transit Analysis (DeShazo, Starek, & Tang) | X | X | | | |
| EMME/2 (INRO Consultants, Inc.) | X | | | | |
| MicroTRIPS (PRC Engineering) | X | | | | |
| MINUTP (COMSIS Corp.) | X | | | | |
| MOTORS (M. M. Dillon Ltd.) | X | | | | |
| TRANPLAN (DKS Associates) | X | | | | |
| TransPro (Transware Systems) | X | | | | |
| TMODEL/TMODEL-EX (Professional Solutions) | X | | | | |
| Forecast Annual State Population (New Mexico State Highway) | X | | | | |
| CPMS: Capital Program Management (COMSIS) | X | X | X | | |
| Operating Budget/Cash Flow (US DOT) | X | X | X | X | |
| THRIFT (Govt. Finance Research Center) | | | | | X |
| BONDCALC (Govt. Finance Research Center) | | | | | X |
| BBLEASE (Govt. Finance Research Center) | | | X | | X |

FIGURE 3-5: REVENUE PROJECTION: STEPS IN THE FINANCIAL PLANNING PROCESS



### 3.2.2 Fare Revenue Projection

Fare revenue projection is the process used to determine the expected amount of revenue that will be collected from user fees. Transit fare revenues are a function of fare structure, fare levels, and ridership. Fare policy determines fare structure and levels. Travel demand forecasting projects ridership.

#### Fare Policy

The fare policy defines both the fare structure and fare levels for a transit system. As an integral part of determining public demand for transit, fare policy is generally set by the transit board, based on recommendations from staff and management. In setting fare policy, several factors must be considered, including:

- cost of service,
- nature of target market segments,
- desired fare structure (e.g., distance-based vs. flat),
- special subsidies for reduced fares to elderly, handicapped, and other ridership groups,
- price sensitivity of riders in various groups,
- possible fare differentiation by time of day, vehicle type, etc.,
- pricing of multiple use fare instruments,
- transfer policy, and
- political considerations.

The fare policy defines the ridership groups and determines the relative fare level paid by each group. Actual prices are then established for each fare type (express, peak, off-peak, elderly, etc.). Fare policy options are often evaluated using different service options and in coordination with travel demand forecasting models, as discussed in the next section.

#### Travel Demand Forecasting

Travel demand estimation is used to project ridership on existing and proposed routes. Ridership projections are based on consideration of fare policy and (existing or planned) service levels. Ridership, fare policy, and service level decisions are frequently made in an iterative process, so that final fare and service decisions maximize ridership and achieve the market service goals of management.

A variety of modeling methods have been developed to estimate future ridership. These models represent all of the general types of forecasting techniques discussed in Section 3.1. However, for project planning and long range planning, simulation-type models are the most appropriate. The specific simulation modeling methods most often used include:

- elasticity models,
- pivot-point models,
- similar route models,
- non-commitment response surveys, and
- network models.

Elasticity, pivot point, and similar route models depend on previous ridership information to forecast future ridership. Network and non-commitment response models build-up ridership projections based on economic, geographic, social, and survey data. It is important that each modeling method can be used to test various alternatives in service quality and costs against established market segment preferences. In each model, market segment preferences are determined by analysis of historical data and/or a survey of the target population.

Elasticity, pivot-point, and similar route models are more frequently used in short range planning to estimate route-level ridership and the route-level ridership impacts of changes in the system. Network models and non-commitment response surveys are useful in both project and long range planning to forecast ridership of a new system or changes to an existing system.[3]

---

3 For further information on travel demand forecasting and the different modeling techniques, please refer to the following sources:

- Barton-Aschman Assoc., Inc. Traveler Response to Transportation System Changes (Second Edition), prepared for USDOT/FHWA, July 1981.
- Ecosometrics, Inc. Patronage Impacts of Changes in Transit Fares and Service, prepared for USDOT/UMTA, September 1980.
- H.S. Levinson. Characteristics of Urban Transportation Demand, A Handbook for Urban Planners, prepared by Wilbur Smith and Deleuw Cather for USDOT/UMTA, April 1978.
- Multisystems, Inc. Route-Level Demand Models: A Review, prepared for USDOT/UMTA, January 1982.
- Multisystems, Inc. Estimating Patronage for Community Transit Services, prepared for USDOT/FHWA, October 1984.

## Fare Revenue Forecasting

Fare revenue projection culminates with the third of the steps in this portion of the financial planning process, fare revenue forecasting. This step consists of two phases:

- project gross fare revenue based on fare policy and travel demand estimates, and
- adjust gross fare revenue projection for fare degeneration (i.e., fare loss due to pass use, fare expansion, shortchanging, etc.)

The resulting fare revenue projection, combined with non-fare revenue, yields total revenue for the period of the projection.

Gross fare revenue results from the multiplication of ridership forecasts by fare price. The ridership forecasts should be disaggregated by market segment (i.e., based on differentiation of fares for different user groups and/or different time periods) in order to achieve the most accurate fare forecasts. Segmented ridership projections are then multiplied by the corresponding fare levels. Gross fare revenue is found by summing the resultant fare revenue across the market segments.

Gross fare revenue projections should next be adjusted to account for fare loss. Depending on the system, fare loss can be a significant factor in determining revenue. The fare revenue projections should be adjusted to account for both actual fare loss due to fare evasions, short-changing, or pass use and fare loss due to inaccurate assumptions in the forecasting model such as inaccurate ridership projections. Average fare degeneration can be estimated by applying historical data to the following formula:

$$DEG = [AF/^{n}((F_e/TRIP_e) * PRO_e)]$$

---

Demand forecasting sources (continued):


- USDOT/FHWA. Urban Transportation Planning System, Introduction and Operating Instructions, (periodically updated).
- USDOT/UMTA. Introduction to Transit Operations Planning: Participant Notebook. 1985.
- USDOT/UMTA. Procedures and Technical Methods for Transit Project Planning (Draft), September 1986.

where:

| | | |
|---|---|---|
| DEG | = | Fare degeneration |
| AF | = | Average fare |
| F | = | Scheduled price for fare element |
| TRIP | = | Average trips per fare |
| PRO | = | Proportion of users in a fare element |
| e | = | Fare element or market segment |
| n | = | Number of fare elements in fare structure |

The degeneration factor is then multiplied by the forecast of fares based on projected fare and ridership. This produces a final fare forecast which includes an assumed degeneration of fares based on historical miscounting, evasion, and collection error rates.

### 3.2.3 Non-Fare Forecasting

Non-fare revenue forecasting provides projections of all sources of revenue to the transit operator that are not the result of charges for transportation services. This process encompasses three elements in the financial planning process:

- identification of existing and proposed funding sources,
- economic forecasts, and
- non-fare revenue forecasting.

At the end of this phase, the transit agency will have projections for each existing and proposed source of non-fare revenue. These projections, combined with fare revenue forecasts, yield total revenue forecasts.

#### Identification of Funding Sources

In this step of the financial planning process, the existing and proposed sources of non-fare revenues are identified. The existing and potential funding sources can be broken into four categories.

- subsidies: Federal, state, and local government entities provide subsidy funds from general revenues to support transit operation. In this phase, all current and proposed government subsidies should be separately listed. All laws pertaining to the provision of subsidies should also be compiled and reviewed.

- dedicated taxes: Many transit operators are partially supported by taxes dedicated for transit use. These taxes are shares of motor fuel (e.g., California, Oregon, and Federal government) taxes, sales taxes (e.g., California and Florida), motor vehicle registration fees (e.g., Oregon), lotteries (e.g., Pennsylvania), and bridge tolls (e.g., California). Laws and tax

bases describing each dedicated tax should also be carefully studied in preparation for financial forecasting.

- non-transportation business activities: A number of transit authorities generate revenue which does not arise from the provision of the transportation services. Income in this category includes revenue from the sale or lease of transit property, the operation of concessions, and the renting of advertising space in transit facilities.

- non-traditional sources: Benefit assessment districts, tax increment financing, negotiated investment, and other means of identifying private sector beneficiaries of transit and capturing that benefit to support the system are increasingly popular. These methods, in use now or in the future, should be anticipated by the model.

In preparation for financial forecasting, all sources of existing funding sources should be listed. All historical data relating to funds from each source should be compiled. This data, in combination with the economic indicators developed in the next step of the process, will be used to forecast non-fare revenues.

The final stage in this step is to list all proposed sources of non-fare revenues. These may be determined by reviewing the local, state, and Federal legislative agendas for new funding sources, or reviewing internal transit authority plans for adding funds. The range of non-fare revenue sources available to transit operators is discussed in Section 2.4 and 4.3 of this Guide.

**Economic Forecasts**

This step produces projections of economic indicators external to the transit operator yet which affect service needs and revenues. Economic indicators including interest rates, inflation rates, employment, population growth, household incomes, market demand for certain types of economic activity (housing, retail, hotels, office space, recreation), and auto ownership all potentially influence the need for transit and/or the performance of non-fare revenue sources. Economic forecasts are used in several stages of the financial forecasting process. Our discussion in this section is limited to its relationship to projecting non-fare revenue.

The economic indicators that may impact non-fare revenues can be generally categorized as follows:

- general economic indicators: Employment, population, income, interest rate, general inflation rate, and other major economic indicators are needed to forecast revenues from such strategies as the sale of concessions by the transit authority or the sale or lease of transit property. These projections would help determine the revenue potential of these strategies by defining such factors the consumer environment, availability of money, and the general health of the economy.

- tax base: General revenue and dedicated tax support of transit depends upon the collection of taxes, and thus the tax base. Projected growth or decline in the tax base affects general income and property tax projections. Retail sales forecasts affect sales tax projections, and forecasts of auto use affects projection of registration and motor fuel tax receipts.

Economic forecasts can either be purchased from firms specializing in forecasting or produced in-house. Government sources for annual projections of inflation rates, unemployment rates, interest rates, and other important data include the Economic Report of the President, the Congressional Budget Office's The Economic and Budget Outlook, Federal Revenue Bank economic forecasts, and annual forecasts by major economic and trade journals. As discussed in Task 3.1, the most useful economic forecasting is done with multivariate econometric models.[4]

## Non-Fare Revenue Forecasting

Total non-fare revenue forecasting combines the results of the existing and proposed non-fare revenue sources and economic forecasting steps. All existing and potential sources of non-fare revenue are documented and forecast; the sensitivity of those forecasts to the influence of economic conditions must also be considered. The sensitivity analyses should include alternative assumptions about the future level of funding from the non-fare revenue sources to account for the uncertainty of these levels. Several modeling techniques may be used in this step, based on which non-fare revenue source is being forecast. Specific techniques for conducting sensitivity analysis are discussed in Section 3.6. The final results are summed to yield total non-fare revenue projections for each period or time horizon in question.

The method selected to forecast each non-fare revenue source depends upon two factors: (1) relationship of the source to outside influences, and (2) availability of historical data. If the performance of the source is influenced in a predictable way by one or more variable, simulation or econometric models should be used. If the source is constant over time, simple trend analysis should be used. Each funding source should be analyzed by each of these criteria, then forecast using the appropriate method.

Methodologies for projecting several individual types of revenue sources and/or financing techniques are described below; additional methodologies are described in the Rice Center and Government Finance Research Center reports cited on page 3-5.

### Taxes or User Fees

Non-fare revenues such as a dedicated sales tax on retail goods can be projected using econometric models. A simple example of such a model is as follows:

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4 Discussion of the construction of such a model is beyond the scope of this Guide. For further information and details on such models, see, for example, Akira Takayama, Mathematical Economics, Cambridge University Press.

$$DST = a_1 + b_1 RS + e_1$$

$$RS = a_2 + b_2 Y + b_3 CPI + b_4 I + e_2$$

where:

| | | |
|---|---|---|
| DST | = | dedicated sales tax revenue |
| RS | = | retail sales |
| Y | = | average personal income |
| CPI | = | consumer price index |
| I | = | investment rate of the population |
| $a_i$ | = | constants |
| $b_i$ | = | coefficients |
| $e_i$ | = | error terms |

Such a model should be tested for its validity and calibrated using historical data for the community from which the agency draws its dedicated tax.

Revenue from motor fuel taxes, tolls, motor vehicle fees, and parking taxes may be forecast using a simple simulation model and data collected from the state or local transportation authority. Such a model for motor fuel taxes might look like the following, though all models of this type will share the same basic elements.

$$RMFT = TGP * TPG * LR$$

where:

| | | |
|---|---|---|
| RMFT | = | revenue from a motor fuel tax |
| TGP | = | total gallons purchased in the area effected by the gas |
| TPG | = | tax per gallon |
| LR | = | loss ratio, or the average annual difference between a simple calculation of historical gallons sold and tax rates to yield tax that ought to have been collected and the tax that was collected |

This simple statement of the model may be expanded to include steps for actually calculating gallons consumed based upon average vehicle gallons per mile and miles driven in the study area. Trend data is useful for forecasting future driving, parking, and toll facility use patterns, though more sophisticated models may be needed if a parking or toll facility is new, or if other developments in the area are expected to alter historical auto use or ownership patterns.

Payroll or income tax modeling has long been done by federal, state, and local agencies. The models tend to be complex, multistatement econometric models accounting for shifts in employment levels, inflation, wage rates, interest rates, population, and types of employment, among other things. A more straightforward approach would be a trend analysis. In both cases, the analyst should make an attempt to

identify tax evasion rates. A trend analysis of tax receipts may implicitly control for evasion; a more detailed model of income tax rates must include an evasion factor.

**Use of Property and Property Rights**

Models of this source of non-fare income are dependent on the contract written to lease or sell the property involved. As such, it not necessary to build a detailed model. It requires that the one-time cash income or income stream over time be stated as part of all non-fare revenue to the system.

If the transit system wishes to project property income from a position prior to a contract, a delphi technique would usually be the best source of information. Potential real estate cash flows streams are usually best estimated by professional appraisers and developers independent of the agency or any potential buy or lease partner.

**Benefit Sharing Strategies**

There are two major steps to modeling benefit sharing revenue sources. The first step is to estimate 1) the benefits that will accrue to local property owners following the construction of a transportation development, and/or 2) the transportation impacts of new development.[5] The second step is to model the income arising from an assessment, fee, or negotiated investment based upon that assumed benefit or impact.

Estimating Benefits to Non-Transit Users

One of the most important -- and controversial -- aspects of instituting benefit sharing techniques (in particular, benefit assessment districts) is the determination of the non-transit user benefit generated by an infrastructure improvement. There are two basic methods that have been used to accomplish this task. These two methods include:

- comparable development - in this method, the analyst locates a comparable transportation improvement performed in a similar socio-economic environment; or

- benefit build-up - in this method, economic activity is calculated starting with an estimate of ridership changes and spending characteristics.

The comparable development method predicts the level of non-user benefit by performing a before and after study of major economic variables in the area around a transportation improvement. Both the area and the transportation project should be similar to the project under consideration. Key variables usually noted include sale price of commercial and residential property, lease rates, rate of construction (or net leasable square feet in the area before and after completion of the project), wage rates in the area,

5 The calculation of benefits/impacts is necessary to establish a defensible basis for imposing the assessment or fee. Such a basis may prove important in attempting to clear both legal and institutional hurdles to implementation.

and average monthly sales per square foot of retail space. These indicators should be measured before the construction of the project begins and after the design year is achieved. The difference in the real values of each variable is calculated, and some portion of the difference is attributed to the construction of the transportation improvement. This last issue is very important. An area may have no other incentives forcing changes in economic activity, or may be in the middle of a boom that has nothing to do with transportation access. These factors have to be considered when weighing the value of transportation in generating economic benefits.

Other major problems with this method of analysis stem from the inability to locate an area that is similar enough to the proposed new project site, both economically and in the type of transportation improvement to be provided. Time period is also a factor. Growth patterns of the 1960's may not be relevant to plans for the 1990's.[6]

The benefit build-up method calculates non-user benefits by forecasting economic activity resulting from ridership--i.e., spending and employment activities. Economic activity can be measured by the amount and type of spending per person in an area. By increasing the number of people brought into an area, the economic activity in the area should increase.

The first step in this process is to identify current spending and employment patterns in the area. Retail expenditures, hotel expenditures, and commercial and residential square feet per person may then be calculated. Projections of new people, by purpose, coming into the area around the transit improvement are then multiplied by the expected expenditures per person.

The usefulness of this method depends on the quality of the calculations of per person spending, employment and residential patterns in the area, as well as the stability of these patterns over time. When the design year of the project is several years from the start of construction, these calculations become harder to accept due to the dynamic nature of any area's economic growth. The other major disadvantage of this method is that it is dependent on projecting ridership, a variable that is also subject to a number of assumptions. Because so little hard data is available to support the Benefit Build-up modeling method, the analyst must always check each level of assumptions to assume both consistency and reasonableness.

In both the comparable development and benefit build-up methods the analyst should also account for costs avoided by the developer. In some cases a developer may be able to reduce the expense of constructing parking and related facilities due to improved access to the property from mass transit. (In the case of parking, this may require negotiation with the local area officials, as parking requirements are usually set by local ordinance.) Other avoided costs should also be calculated as benefits to the developers.

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6 For an example of a study of before and after property values, see Wharton Transportation Program. Value Capture in Transit: The Case of the Lindenwold High Speed Line, UMTA, April 1986.

Estimating Transportation Impacts of New Development

In contrast to the theory behind other benefit sharing techniques, the imposition of impact fees is based on the notion that new development -- especially when it comprises substantial amounts of office and retail space -- generates a significant level of new traffic in and around the development area, thereby placing a potentially heavy burden on the existing transportation network (streets, transit, and parking facilities). The impact fee is intended as a means of mitigating this burden--i.e., the proceeds from the fees are used to expand existing transportation facilities and/or to construct new facilities.

Calculating transportation impacts is more straightforward than calculating benefits. Standard trip generation rates associated with different types of space can generally be used. Where projected traffic exceeds existing capacities, a strong case can be made for the need for the developers/property owners to help shoulder the costs of expansion or new construction of transportation facilities.[7]

Projecting Revenues from Benefit Sharing Strategies

Once the level of benefits or impacts has been established, a specific formula is developed to allocate assessment, fee, or contribution levels among property owners. Development of such a formula requires the following types of considerations:

- the total amount of revenue required (based on capital financing requirements, operating deficits, debt service, administrative expenses, etc.),
- the basis for the assessment/fee/contribution rate (e.g., per square foot of new space, per $ value of assessed property value, per $ income from projected rent or retail sales, or per person trip generated),
- the temporal nature of the assessment or fee (i.e., one-time or annual, plus length of time if the latter),
- the treatment of existing, new (i.e., already planned), and future (i.e., not yet planned) development, and
- differentiation in the rate based on relative degree of benefit or impact (e.g., relative distances of buildings from proposed transit stations).

For instance, a benefit assessment district was established in downtown Miami in 1984 to recover $20 million of the cost of constructing the Metromover project, plus $7 million in related debt service (over a 15-year period). The district encompasses

7 Of course, while the basic argument appears to be rather straightforward, imposition of impact fees is also controversial, especially in areas containing existing development. Questions of fairness (e.g., vis a vis the treatment of new or existing development) and legality (e.g., regarding a public body's legal ability to enact such a fee) have constituted major barriers to the use of impact fees to finance transit improvements; this issue is discussed further in Chapter 4.

approximately 700 properties located within the Metromover service area. The assessment rate was initially set at 18 cents per net leasable square foot, although the rate is adjusted each year to account for new development.[8]

In developing such a formula, it is also important to ascertain the impact of these strategies on the property owners/developers being assessed. Since these parties expect a certain level of return from their investments, if the imposition of fees or special assessments effectively reduces the rate of return to an unacceptable level, owners/developers may decide to relocate to an area without such fees. As such, any transit benefit sharing strategy being considered must take into account all other types of fees or contributions required of the developers or property owners in an area (i.e., for affordable housing or other public services). While it may be difficult to determine the specific threshold of "acceptable return" for an individual developer, the impact of the assessment or fee must be taken into consideration.

Once a formula has been established, the best way to model the income from these sources is with a simulation model. This is due to the need to accommodate potentially dynamic processes in the local economy while accounting for cash flows and an in-place inventory of commercial and residential development.

An example of a model for projecting benefit assessment district revenues is shown below. This model represents a benefit assessment based on square footage of developed space, assumes a single assessment rate on all types of space and assumes that the rate does not change from year to year.

$$R = BAR\,(SF_1 + SF_2 + \ldots SF_t)$$

where:

- $R$ = total benefit assessment revenue over the assessment period
- $BAR$ = benefit assessment rate ($ per sq. ft.)
- $SF_1$ = projected footage of assessed floor space in the first year of the assessment period
- $SF_2$ = projected square footage of floor space in the second year of the assessment period (i.e., existing plus new)
- $SF_t$ = projected square footage of floor space in the final year of the assessment period (i.e., existing plus new).

Since impact fees are typically collected on a one-time basis, the model for projecting impact fee revenues differs slightly from the above benefit assessment model. Rather than calculating the rate on all square footage each year (i.e., existing plus new development), the impact fee after the initial year is applied only to each year's new development.

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8 Rice Center. Alternative Financing for Urban Transportation--The State of the Practice, for UMTA, July 1986, p. 32.

$$R = IF (NSF_1 + NFS_2 + \ldots NFS_t)$$

where:

| | | |
|---|---|---|
| R | = | total impact fee revenue over the fee period |
| IF | = | impact fee rate ($ per sq. ft.) |
| $NSF_1$ | = | projected square footage of assessed floor space in the first year of the fee period. |
| $NSF_2$ | = | new projected square footage of assessed floor space in the second year of the fee period. |
| $NSF_t$ | = | new projected square footage of assessed floor space in the final year of the fee period. |

The key elements of a model for estimating the revenue in a tax increment financing program are as follows: 1) inventory of property to be assessed; 2) ability to adjust the value of the property over an adjustment period; and 3) clear statement of the factors driving property values and new construction.

Connector fees, cost sharing or negotiated investment revenues are best modeled with professional judgement or as simple cash flow models based on existing contracts, similar to property leases and sales. The same applies to strategies involving the issuance of debt, where the most important part of the calculation of income is: (1) establishing the income target; and (2) planning the debt in the market or with a vendor such that the combination of principal value and cost of interest will yield that income target. The model of the cash flow proceeds will follow from the type of deal made and the interest rates available at the time the deal is accepted. (The determination of debt requirements is discussed further in Chapter 4.)

After the projections of each non-fare fund source are completed for the entire projection period, they should be summed to produce the total non-fare revenue contribution to total transit revenue.

### 3.2.4 Total Revenue Projection

Fare revenue and non-fare revenue should be added together to calculate total revenue for the projection period. This final step, while relatively simple, reflects the detailed work of seven steps in the financial planning process. Total revenue forecasts should be compared to former years' actual revenues to ensure that projections seem reasonable (i.e., to a professional familiar with the transit system). If projections do not seem reasonable, they should be checked to ascertain which assumptions made during the projection process created or contributed to the questioned result. Revised assumptions should be tested and approved, and new projections checked for reasonableness.

The result of this last step is projection of total system revenues for the target time period of the financial forecast. These projections should be used, along with projections of annual capital and operating expenses, to project the transit authority's net cash position in each of the forecast years. The combination of the total projected revenue

stream, the operating deficit funding requirements, and the capital financing requirements can be used in the financial capacity analysis to determine the ability of the operator to meet its financial needs. In short-range planning, an identified revenue shortfall signals the need to either look for new additional funding sources or reduce services. At the long-range planning level, the financial capacity analysis is used to make decisions about projects. If revenue shortfalls are projected, it may be decided to delay projects or search for alternative funding sources. If a project planning financial capacity analysis shows a revenue shortfall, it is necessary to identify new sources of revenue; this is discussed in Chapter 4.

## 3.3 THE PROCESS OF PROJECTING COSTS

### 3.3.1 Introduction

This section discusses the process of projecting capital and operating and maintenance costs. Figure 3-6 highlights the portion of the financial planning process covered here. Projection of capital costs is based on a combination of recapitalization and new construction expenses; this cost estimate then translates into capital financing requirements. Projection of operating and maintenance costs is based on service planning and travel demand forecasting outputs; when fare revenues are subtracted, this cost estimate represents operating deficit funding requirements. The two major cost elements are discussed below.

### 3.3.2 Projecting Capital Financing Requirements

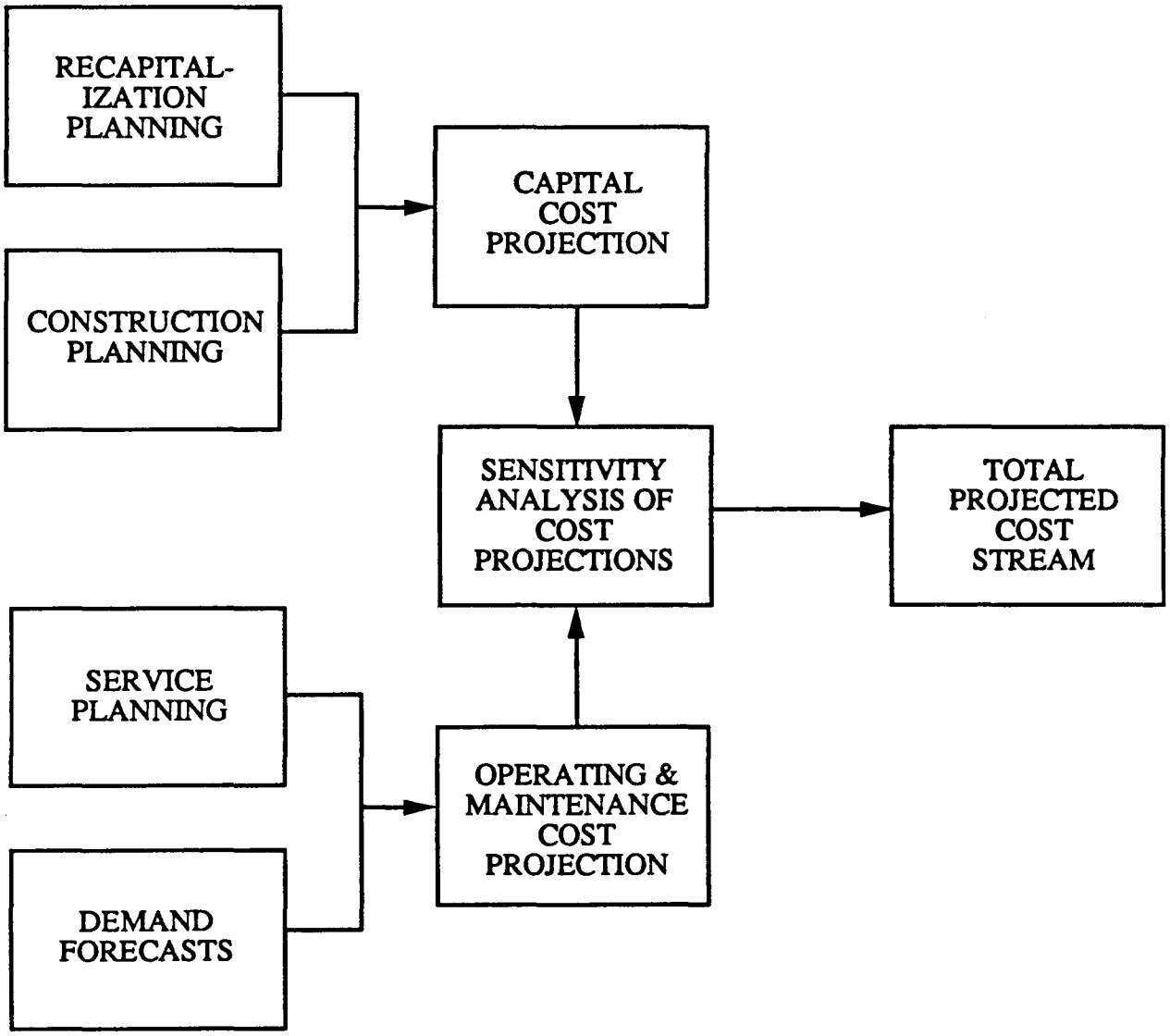
#### Introduction

Transit's history of chronic underestimation of capital costs has plagued its financial planning efforts and undermined its credibility in many communities around the country. The careful, realistic estimation of project costs must become a priority for transit agencies, especially in a climate of increasingly stringent requirements for -- and reduced levels of -- grants from UMTA. In estimating capital financing requirements it is thus important to gauge the accuracy of the estimates, particularly in light of the uncertainty inherent in the process. Incorporating these capital cost estimates into a transit system's general financial plan enables that system to accurately balance the immediate cost of capital improvements against the ongoing costs of operating a system. This section includes an overview of cost estimation methodologies and a discussion of capital cash flow requirements for financial planning. The interrelationship between capital and operating costs is addressed following the discussion of operating cost estimation. (Details on estimating capital costs are presented in Chapter 3 of UMTA"s Procedures and Technical Methods for Transit Project Planning and are therefore not spelled out here.)

#### Overview of Capital Cost Estimation Methodologies

The actual estimation of capital costs involves several different techniques, depending on the type of cost under consideration. Recapitalization of resources involves rehabilitation and replacement (R&R) of existing facilities and vehicles. The need for

FIGURE 3-6: COST PROJECTION: STEPS IN THE FINANCIAL PLANNING PROCESS



R&R is attributable to the following reasons: 1) functional obsolescence related to a part deteriorating 2) technological obsolescence, related to availability of a technological advance, and 3) changes in requirements due to policy changes (i.e., regarding safety or level of service). The inputs for R&R cost estimates are typically a system's inventory of assets and the expected life of the assets. These elements include capitalized (i.e., existing) asset values, projected asset values, and R&R cycle assumptions (i.e., percentage of overall assessment value to be replaced and on what cycle).

In many cases, aggregate replacement costs will show a marked variation from one year to the next (i.e., due to differing R&R cycle lengths), resulting in significant peaks in R&R costs in some years. This requires either establishment of a reserve -- or sinking -- fund to handle sudden increases, or smoothing out of the cost stream to eliminate major swings. The latter can be accomplished using a multi-year rolling average; for example, WMATA in Washington, D.C. uses a seven-year rolling average, in which three years are averaged before and after the target year.

Estimating the construction costs of new investments obviously requires a very different approach than for recapitalization. During project planning, two levels of engineering effort are used, one for "typical" facilities and the other, much more detailed, for "special" situations. For segments of alternatives that can be analyzed at a fairly aggregate level, a "typical cross-section" for the segment is defined. Detailed unit costs are used with quantities taken from the typical sections to derive costs per lineal foot for each section. A similar approach is used to derive a per-station composite cost for various station types -- at-grade, elevated, subway, terminal, etc. Plan and profile drawings are prepared for each alternative and quantities -- lengths, numbers of over-and underpasses, special features, etc. -- are taken off. "Segment costs" are computed to represent the capital cost of each identified segment, exclusive of systemwide elements and add-on items.

Segments that cannot be handled with the typical-section approach are those with special conditions -- typically major structures or an uncertain alignment in areas with major existing structures or difficult terrain. These segments are costed in detail, with drawings, detailed quantities, and detailed unit costs. Again, the cost estimates for these segments are exclusive of systemwide items and add-on costs.

Systemwide elements include vehicles, electrification, and signal/control systems, since these items are not well-defined on a segment-by-segment basis. They are costed with unit costs applied to systemwide quantities. Add-on items consist of contingency allowances and the costs of engineering and construction management services. These items are usually costed though multipliers that express the add-on costs as percentages of the estimated baseline capital costs. The computation of cash flow requirements for construction projects is discussed below.

## Computing Cash Flow Requirements for Capital Expenses

The financial analysis of transit alternatives under consideration (e.g., in project planning) requires a year-by-year estimate of the funds that will be needed for construction. Development of this time stream requires an estimate of the length of the

construction period, the percentage of costs (expressed in constant base-year dollars) that will be incurred in each year, and the inflation rate during the period. Since the total capital funding needed for a project will include the effects of inflation through its construction period, the financial analysis of the alternatives requires that costs also be projected in "current" dollars -- dollars valued in the year in which they are expended.

Inflation costs are generally computed with multipliers that reflect the compounded effect of the projected inflation rate. The factors are computed with:

$$\text{inflation factor}_n = (1 + i)^n$$

where i is the inflation rate and n is the number of years after the base year. For example, a project estimated to cost $200 million (1987 dollars) would have a cash flow requirement computed as follows for an annual inflation rate of 5 percent, a 4-year design and construction period, and costs estimated for a base year of 1987:

| Year | Fraction of Costs | Expenditure (1987 $) | n | Factor | Expenditure (current $) |
|---|---|---|---|---|---|
| 1987 | 0.05 | 10 MM | 0 | 1.000 | 10.0 MM |
| 1988 | 0.25 | 50 MM | 1 | 1.050 | 52.5 MM |
| 1989 | 0.40 | 80 MM | 2 | 1.103 | 88.2 MM |
| 1990 | 0.30 | 60 MM | 3 | 1.158 | 69.5 MM |
| Total | 1.00 | 200 MM | | | 220.2 MM |

Project planning efforts often assume that the inflation rate for transit construction projects will be equal to general inflation in the economy, reflected by changes in the Consumer Price Index. In the absence of evidence to the contrary, this assumption should be considered adequate.

Assumptions on the length of the construction period should recognize both the optimal staging of construction and any constraints that may prevent the ideal schedule, particularly funding constraints. Along this line, the construction schedule, as well as inflation and interest rates, should be subject to sensitivity analysis.

The objective of the sensitivity analysis of the construction schedule is to assess the possibility and usefulness of an accelerated or stretched out implementation schedule for each alternative. Opportunities for cost savings are identified and so are the potential for cost increases absent inflation. Second, inflationary trends for different price factors are determined for the subject area. These trends are then used to identify and test a range of inflation rates on the capital cost estimates of the alternatives. Third, different interest rate assumptions are tested for their impact on borrowing proposals and associated debt service requirements. The determination of the sensitivity of the revenue forecasts to changes in the key input assumptions (e.g., personal income, population, inflation and interest rates) will help establish the level of confidence in the forecasts. (The procedures for conducting sensitivity analyses are described in Section 3.4.)

### 3.3.3 Projecting Operating Deficit Funding Requirements

#### Introduction

Funding requirements to cover annual operating deficits are calculated by estimating operating and maintenance (o&m) costs for a given year and subtracting projected fare revenue. Because fare revenue projection is discussed in Section 3.2, this section focuses on the estimation of o&m costs. The section summarizes the basic approaches to cost estimation, discusses the strategic implications of the analysis results, and describes the interrelationship between capital and operating costs.

#### Summary of Approaches to Cost Projection[9]

A number of o&m cost estimation approaches are available, representing a range of data requirements and providing projections with different degrees of specificity. Five general approaches are described briefly in this section: resource build-up, cost allocation, trend projection, temporal variation, and regression analysis. In some cases, selecting the most appropriate methodology for estimating o&m costs will be influenced by the time horizon and the operating scenario for which the projections are to be made.

The time horizon will influence the level of detail that will be possible in projecting o&m costs. For short time horizons (of one to three years), a high level of precision is possible, because operating plans, capital improvements, labor contracts, and supply costs are likely to be well-established. As the time horizon for projections grows longer, there will be uncertainty about many cost factors, and detailed projections could be inaccurate.

Expectations with respect to future operations will probably be the most important factor in projecting future o&m costs. Possible future operating scenarios would include continuation of the status quo, major service re-design (including service expansion, contraction, or privatization), and implementation of capital projects (such as new vehicles, new facilities, or the introduction of new modes). It is possible to project o&m

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9 For further details on the different cost modeling approaches, please refer to the following reports:

- Price Waterhouse. Fully Allocated Cost Analysis Guidelines for Public Transit Providers, for USDOT/UMTA, November 1986.
- Simpson & Curtin. Bus Route Costing Procedures: A Review, for USDOT/UMTA, May 1981.
- Simpson & Curtin and Abrams-Cherwony & Associates. Bus Route Costing Procedures: Final Report, April 1984.
- UMTA. Procedures and Technical Methods for Transit Project Planning (Draft), September 1986.

costs for a stable system using simple techniques and still provide reasonably accurate estimates. If the system is changing over the course of the time horizon for cost projections, more detailed estimating models may be appropriate.

The class of approaches called "resource build-up" or "causal factors" models provides the most detailed estimates of o&m costs. Projections are made by estimating actual quantities of items required to provide the established level of service (such as operators, fuel, tires, etc.) and multiplying by the expected unit costs of labor and material. At its most detailed level, the resource build-up method is, in effect, like preparing an operating budget for the years for which projections are made. It provides the most accurate costs estimates and is the methodology recommended by UMTA. On the down side, this method is more time-consuming and data-intensive than other approaches, and the increase in accuracy is dependent upon having reliable base data and projections.

A second class of cost models are "cost allocation" (or "aggregate cost" or "unit cost") models. This type of model is based on the allocation of systemwide costs to a number of factors. In the standard three-variable model, all o&m costs are assigned to one of three factors (i.e., vehicle hours, vehicle miles, and peak vehicles) based on the closest causal relationship. The aggregate cost in each category is divided by the quantity of that category (number of vehicle miles, vehicle hours, or peak vehicles) to produce a unit cost. Given the unit costs per factor, systemwide o&m costs can be allocated to specific routes or groups of routes. It is a very simple model to calibrate and apply, but its ability to project future costs is quite limited.

An even more aggregate method for projecting o&m costs is the "trend projection" approach. This method does not attempt to break down costs into components or unit costs, but, rather, projects changes based on aggregate trends. Future o&m costs are estimated based on overall inflation and past years' cost changes compared to inflation. This method is only appropriate for very stable future operating scenarios. For changes in operations, the resource build-up methodology can be used to supplement this approach, by projecting the expected cost increase or decrease from the change and adding this to the overall trend projection of total costs.

Another set of cost models is called "peak/base" or "temporal variation" models. These models are enhancements of the basic cost allocation model and are designed to put more emphasis on accuracy in estimating operator labor costs. Because actual operator costs are based on the union labor contract and the scheduling of drivers, the relationship between the cost of service and level of service is quite complex. Given that operator wage cost is usually a large portion of total o&m costs, it is appropriate to give special attention to its estimation. The temporal variation class of models notes that service costs vary by time of day and attempts to improve the allocation of these costs without actually producing a driver schedule.

The statistical technique of "regression analysis" may also be used to estimate costs. This method typically uses a time series of data on total o&m costs and variables that influence costs (vehicle hours, operator wage rate, etc.), producing an equation that summarizes the relationship. The regression approach provides a more formal model than the trend projection method, but it is also limited to small changes in future

operations. If major changes are projected, the trends that are expected based on past years may no longer be appropriate.

The five general methods summarized above represent a continuum of possible techniques -- from very detailed (resource build-up and temporal variation) to general (cost allocation, regression analysis, and trend projection). While the more detailed models may bring more accuracy, the data and time required to use these approaches may not make them practical in all situations. Of course, it is possible to combine parts of the different approaches, e.g., using one of the more complex methods to improve accuracy for the portions of o&m costs that are most significant or projected to have major changes, while using simpler methods to estimate other costs.

A final consideration in choosing the most appropriate technique is whether the model is predictive or descriptive. All of the methods can be considered descriptive in that they describe past or current relationships between certain variables and o&m costs. However, only resource build-up (and to some extent temporal variation) models establish causal links between costs and variables that are strong enough to have true predictive value. The other model categories may be used to project future costs, but only under the assumption that past conditions will continue into the future.

No matter how accurately costs have been projected using one of the above methods, there will still be uncertainty associated with the estimate. A sensitivity analysis should be performed to determine the degree of uncertainty and how it might affect the results. (The procedures for performing sensitivity analyses are described in Section 3.4.)

Results of Analysis

The results of the o&m cost projection are combined with results of the revenue projection (as described in Section 3.2) to estimate future operating deficits. Based on the sensitivity analysis of cost and revenue projections (see Section 3.4), a range of possible futures is established for the operating deficit. Two general outcomes are possible: 1) o&m costs could be approximately equal to projected total revenue, indicating adequate funding, or 2) costs could be considerably higher than revenue, indicating inadequate funding.

If funding appears to be adequate and only very small operating deficits are projected into the future, further sensitivity analysis may be appropriate. Cost and revenue assumptions should be explored to indicate the level of potential error and the steps that could be taken in the event of less favorable outcomes. The factors that are critical to the revenue and cost projections should be documented and monitored closely for indications of change.

The more likely result is that funding will be projected as inadequate in future years, with costs exceeding available revenue. Three general strategies should be considered to bring future costs and revenues into balance -- improvements in productivity, re-structuring of capital/operating plans, and consideration of alternative funding sources. These strategies would reduce costs, increase revenue, or both. All three are appropriate

for detailed consideration, but the system's political and operating environment may limit the options available.

Productivity improvements would include all strategies that could reduce costs without major changes in service. The sensitivity analysis might indicate areas where changes in productivity would have a large impact on o&m costs. The resource build-up approach would provide the most information on the effects of productivity improvements. The contracting of services to private providers should also be considered as a means of reducing cost without service changes. If private companies can operate some service or perform maintenance at lower cost, total o&m costs can be reduced. Other examples of productivity improvements include service rationalization, labor contract changes (to allow part-time labor, for example), and improved management techniques.

A second strategy for reducing future operating deficits is to re-structure operating and capital plans. This strategy includes service reductions, which may be required if it is not possible to reduce costs or increase revenues in other ways. However, it should be noted that service reductions produce lower revenues in addition to lower cost, so the impact on the operating deficit is not as great as the cost reduction might indicate. The impact of the capital program on the operating deficit is also important, as is discussed below.

The third strategy for reducing the operating deficit is to provide sources of additional revenue for the transit system. The identification and evaluation of alternative revenue sources is discussed in other sections of this study.

### 3.3.3 The Interrelationship Between Capital and Operating Costs

As mentioned above, an important issue that should be considered in projecting costs is the impact of the capital program on o&m costs. Some capital expenditures (e.g., the implementation of a new service mode) will increase o&m costs. Other expenditures (e.g., vehicle rehabilitation) may produce higher o&m costs in the short term, but will produce cost reductions over the longer term. Finally, other expenditures (e.g., purchase of articulated buses) can produce immediate o&m cost savings. Certain types of capital expenditures can thus be justified on the basis of reducing -- or limiting the future growth of -- o&m expenses. Such activities include the acquisition of new vehicles, the rehabilitation of track, the construction of improved maintenance facilities, the installation of new communications equipment, and the computerization of data analysis and scheduling (of vehicles and operators). Conversely, the deferral of such actions can have a serious negative impact on o&m costs, and this must be weighed against the capital costs savings associated with their deferral. Clearly, the schedule for implementing capital projects can have a major effect on the timing of o&m cost changes. While not all capital projects are intended to reduce o&m costs, the nature of expected impacts can serve as an important input to evaluating the worth of alternative projects.

The process of determining the o&m cost impact of capital expenditures involves two basic steps: 1) identifying the likely areas of impact; and 2) quantifying the nature of the impact. The o&m cost categories that can be significantly affected by capital investments

include labor, materials, energy and rents/leases among others. On the other hand, certain types of expenditures can improve overall system efficiency or productivity -- and thus reduce average o&m costs -- while not directly reducing any particular operating cost items (e.g., eliminating any labor positions). For example, a new vehicle monitoring system may have a positive impact on vehicle running time, thereby improving efficiency, but not enough of an impact to lower personnel requirements.

In any event, the interrelationship between capital and operating costs is complex. While certain types of capital expenses have a direct connection with specific o&m costs categories, most capital improvements affect a variety of operating areas, making it difficult to isolate individual relationships, Establishing a link between capital and operating costs can thus be infeasibile in many cases, especially early in the development and evaluation of alternative capital investments.

In this light, the process of quantifying o&m cost impacts of capital investments can best be accomplished by considering overall system o&m cost changes. While the marginal impact on o&m costs resulting from a capital expenditure would be most useful in evaluating capital investments alternatives, data on average cost changes is often all that is available. The estimate of average annual o&m cost changes should ideally reflect a discounted time stream of projected changes over the expected life of the capital project. However, this estimate should be compared to a future year no-build "base" condition (i.e., assuming that the planned project is not implemented), rather than to the current year's. The projected cost savings thus represent future year o&m cost increases that would be avoided as opposed to savings in current year costs.

The estimation of o&m cost impacts can be used in the process of evaluating alternative projects or identifying expenditures that should be given priority over others. However, it must be kept in mind that o&m cost savings cannot constitute the sole -- or often even primary -- criterion for evaluating projects. Beyond the aforementioned difficulties inherent in linking capital and operating costs, the fact is that many capital expenditures are not designed with the intention of reducing o&m costs. In a 1986 review of capital projects being considered by one large transit agency, for instance, it was determined that approximately three-fourths of the total candidate project expenditures were being justified for reasons other than o&m cost savings (e.g., for such factors as improved safety or reliability) Furthermore, just over half of the proposed expenditures were deemed to have any direct o&m cost impact at all, whether or not that impact was used as justification. Thus, while the type and timing of capital investments can have a strong impact on o&m costs, the nature of this impact should not be overemphasized in assessing the relative benefits of alternative projects.

## 3.4 PERFORMING SENSITIVITY ANALYSES

### 3.4.1 Introduction

Since uncertainty is present in any analysis, it is important to recognize the degree of uncertainty of the various elements of the analysis. Financial forecasts are highly dependent upon estimated parameter values, the structure and logic of the model employed, and the assumptions made about exogenous variables. Sensitivity analysis is a

process through which the likely ranges of uncertainty of the key elements of the model are tested. Sensitivity analysis has two major purposes:

- to test a range of assumptions about the future behavior of critical input variables and gain an understanding of how changes in critical input assumptions affect the forecast of future costs and revenues, and

- to test the model itself, to ensure that it will not give unreasonable forecasts when reasonable variable assumptions are used.

This section of the Financial Planning Guide discusses the use of sensitivity analysis in forecasting capital requirements, revenue requirements, and operating expenses. Generally, sensitivity analysis contains four steps:

- identify the elements of the model that are uncertain and should be tested for sensitivity (e.g., interest rates, inflation rates),

- define the range of uncertainty (e.g., conservative and optimistic scenarios),

- apply the model for each of the alternative scenarios, and

- review the results of the model in respect to 1) effect of changes in major variables on changes in results, and 2) reasonableness of the results based on knowledge of the real system.

It is important to perform sensitivity analyses for each major component of the financial forecasting process. This approach to testing the sources of uncertainty in the model provides a basis for understanding the effects of changes in major variables on the projections to be made with the model, and accordingly can be used to develop a rationale for placing bounds on the appropriate range of scenarios to be considered.

### 3.4.2 Identify the Variables to be Tested

The first step in conducting a sensitivity analysis is to identify the key variables for which alternative assumptions should be tested. The selection of these variables should consider:

- magnitude of impact: Certain variables should be tested because they have a potentially significant impact on the financial forecast. In forecasting fare revenue, for example, it may be important to test the sensitivity of the model with respect to assumptions regarding elasticities and inflation.

- uncertainty of estimation: Frequently, a value for a variable must be selected based on the result of another forecasting model, a knowledgeable source, or an informed best guess. In such cases, it is wise to test a reasonable range of values for that variable. If the variable has a significant effect on model output, it may be worthwhile to further refine the estimate for that variable.

- logic of the model: The model should be constructed to include parameters and key input elements which define the relationships between the independent and dependent variables. Changes in these variables can be used to test the reasonableness of the model's logic. Unexpected changes in the results of the model may signal the need to reevaluate the design of the model.

The key variables that should be tested in the sensitivity analyses for projecting capital financing requirements and operating deficits are discussed below.

**Sensitivity Analysis in Projecting Capital Financing Requirements**

There are several variables that should be considered in sensitivity analyses when projecting capital costs. These variables include:

- inflation rate: Inflation affects the cost of construction, labor, and materials. A change in one percentage point can have significant cost implications over time.

- construction and capital acquisition schedules: The construction and capital acquisition schedules determine the timing of cash outflows, and analyses of accelerated or protracted implementation schedules can demonstrate the cost impacts of the alternatives.

- interest rate: The cost of capital to pay for construction is always significant, and is subject to market fluctuations.

- government subsidies: A range of government support scenarios should be tested to determine if a project would be feasible if government funding ceased, or was substantially reduced.

- service parameters: Variations in parameters such as service type (e.g., light rail, bus-way, or standard bus service), level (e.g., headways, service hours), and operational environment (contracted-out or provided by the public authority) can influence the timing and amount of government capital expenditure.

**Sensitivity Analysis in Projecting Operating Deficits**

Projections of operating deficits depend upon the calculation of revenues and of operating and maintenance costs for the system. Some of the key variables for these sensitivity analyses include:

- service parameters: The amount and type of service to be provided has a major impact on operating cost structure and projected costs.

- ridership: Passenger demand affects every phase of financial forecasting. Sensitivity tests of ridership indicate the specific financial effects of changes in public use of transit.

- fare elasticity: The uncertainty associated with fare elasticities depends on the effectiveness and frequency with which they are measured for a specific transit system. If elasticities developed by other transit systems or researchers are to be employed in the projections, it is essential to test a reasonable range of elasticities, given that local market conditions can easily invalidate the choice of a single elasticity value when chosen from an external source.

- government operating subsidies: Changes in -- and uncertainty surrounding -- government funding programs explicitly create the need to assess alternative scenarios.

- tax-based revenue: Dedicated tax-based sources of revenue may vary depending on consumer behavior patterns and/or tax-base changes (such as population or unemployment). The impact of such changes on transit funding should be thoroughly explored.

- other non-fare revenue sources: Public-private partnerships, donated services, and bond issues should be tested in the model. Interest rates and the general business climate affect the willingness of businesses to enter into agreements, as well as the cost and ability of an agency to use bonds for financing a project.

- labor parameters: Wage rates, labor productivity, work rule changes, and options to contract out services may all have significant impacts on operating costs.

- inflation and interest rates: As with capital costs, these two variables can significantly affect costs in the later years of any forecast.

### 3.4.3 Define Variable Ranges

Once the need for conducting a sensitivity analysis of the key elements has been identified, the first step is to define a likely range of values for each variable. The results of each of the cost projection analyses will provide a stream of future costs, based on various assumptions about the future. These assumptions represent a "most likely" scenario for various factors (including service levels, wage rate, fuel cost, economic indicators, productivity rate, etc.). Surrounding the "most likely" estimate for each factor is a range of possible future outcomes. This range will include outcomes that are "more pessimistic" and "more optimistic" than the base scenario, i.e., resulting in higher or lower projections of future costs.

The selected range should be based upon an informed opinion of the possible future values of each variable. Generally, the ranges of the sensitivity analysis should be narrower for the near term than for the longer term because the degree of uncertainty of future values increases the further out in time the projections are made. For example, the range of uncertainty for sales tax revenues will be narrow for the upcoming year because sales tax revenue projections are dependant upon structural changes in the economy that can be detected. However, the further out in time the projection is made, the less information is available about future changes in the economy that would impact sales tax revenues. Thus, the further out years would have wider ranges in the sensitivity analysis. Figure 3-7 illustrates how the range of the sensitivity analysis increases for future years. The variable ranges should be reasonable; extreme values based on theories of possible yet unlikely events such as total disasters, windfalls, or other extreme speculation should be avoided. Selection of a variable range is often based on historical values. For example, past interest and inflation rates are well documented and analyzed; the forecast range could thus stay within the bounds of historical inflation and interest rate growth rates.

Variable ranges can also be based on "expert opinion". An expert or panel of experts could either select an appropriate range based on their experience or could use historical information in setting ranges. For example, while interest rates may have increased rapidly in the fourth quarter of the previous year, experts may agree that the causes of that rise will not occur in the time horizon of a particular model. Interest rate tests in the model would therefore reflect a more moderate growth rate than those in the previous year. Such an exercise is particularly important if the resulting projections are to receive public review.

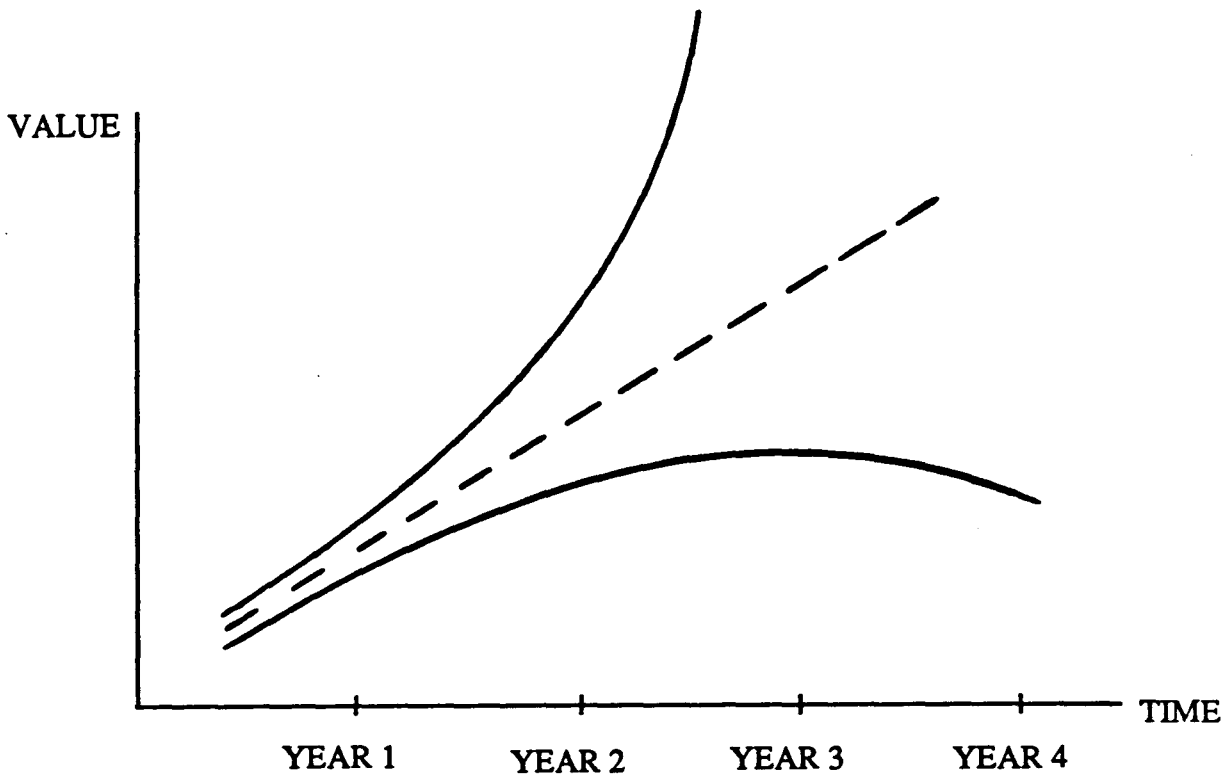
Finally, variable ranges can be defined using forecasts provided by informed sources such as the government (e.g., the Congressional Budget Office, the Commerce Department, and local government), financial institutions (e.g., banks, investment banking firms, and brokers), economic forecasting firms (e.g., the Brookings Institute), and private organizations. In whatever manner the variables are defined, however, it is important that variable assumptions are consistent. For example, a model scenario that forecasts transit fuel costs rising at fifty percent and actual farebox revenue declining due to lower automobile fuel prices is obviously inconsistent. A consistent set of assumptions ensures that each sensitivity test of the model is at least based on a possible scenario.

### 3.4.4 Apply the Model

The sensitivity test involves repeating a forecasting exercise or analysis with several alternative assumptions about the values of specific parameters. It is important that the variables selected and the number of tests conducted are sufficient for testing the range of possible scenarios and the model's capabilities. However, it is not cost-effective to conduct tests that do not provide any new or valuable information; thus, the alternative assumptions should be chosen carefully.

A sensitivity analysis can generally meet these requirements by testing one high value and one low value for each of the variables tested. The mid-range should be represented

FIGURE 3-7: RANGE OF SENSITIVITY ANALYSIS OVER TIME



by the best estimate used in the original model projection. For example, if the Congressional Budget Office predicts a CPI of 325.2 and the Office of Management and Budget predicts 320.3, the sensitivity analysis can be conducted using one or both of these values for the mid-range and values slightly higher (e.g., 328) and lower (e.g., 317) for the high and low values of the range. However, if either of the projections is relatively high or low, it may be used as the high or low value in the range for the sensitivity analysis. It is important to remember that the values selected for the sensitivity analysis should reflect realistic future scenarios given the uncertainty of forecast values.

Furthermore, only one variable should initially be tested at a time. Once the behavior of the model is well-understood, reasonable combinations of variables should be selected to test the sensitivity of concurrent changes in the variables. Also, if a change in one variable -- e.g., transit fuel price -- would logically follow another variable change -- e.g., auto fuel price -- then the concomitant change to auto fuel price should be made.

### 3.4.5 Analyze the Results

Sensitivity tests of model runs should demonstrate: 1) the effect of alternative assumptions about a variable on the results obtained from the model; and 2) the reliability of the model in responding to changes in the key inputs.

If the change in an input variable changes the output of the model significantly, it is a sign that the model heavily weights the influence of that assumption. If the variable change does not significantly change the results, there is little need to spend additional time to accurately pinpoint its future value. For example, it may become apparent that, even though fuel prices may range by +/- 25%, their effect on total o&m costs may be +/- 2. Thus, the assumptions made for fuel costs are not critical to the outcome. Changes in other factors may have a more profound impact on total costs. Assumptions regarding these critical factors should be re-examined to assure that estimates of their future value are as accurate as possible. If further study can improve these estimates and reduce the range of possible future outcomes, a much better estimate of costs is possible. If a large degree of uncertainty remains with respect to the critical factors, total cost estimates will be uncertain.

In some cases, a sensitivity test may produce unexpected results. For example, if given an increase in population a model predicts a decrease in sales tax revenues, this indicates that the model is capable of giving counter-intuitive results. It is important to then investigate why the model gave such results. If there is no logical, defensible reason for the production of counter-intuitive model output, the model must be examined carefully to uncover the source of the unreasonable results; it may be necessary, following this examination, to restructure the model.

# CHAPTER 4: FINANCIAL PLAN DEVELOPMENT

This chapter describes the procedures, requirements, and assumptions involved in developing a financial plan. The emphasis is on identification and development of financing strategies and new sources of revenue. Included in the chapter are discussions of analyzing financial capacity, developing "pay-as-you-go", debt financing and privatization strategies, and selecting and evaluating new sources of revenue.

## 4.1 ANALYZING FINANCIAL CAPACITY

This section describes the analysis of financial capacity, in terms of assessment of financial condition and financial capability; the latter essentially represents the analysis of cash flows.

### 4.1.1 Assessment of Financial Condition

The assessment of financial condition considers a variety of factors that may affect the transit agency's ability to operate and maintain its current system, while also making any additional capital investments that may be needed. The major factors that should be considered fall under three principal categories: 1) the economic vitality of the region, 2) the transit operations, and 3) the historical fiscal burden of transit expenditures on the region. Table 4-1 presents examples of typical financial condition and capability measures. Historical data will form the basis of this assessment. The economic vitality measures provide an indication of the general economic health of the subject community. The transit operations measures track trends in farebox recovery, ridership, costs, revenues, and working capital. The fiscal burden measures establish the degree to which transit expenditures in the region are growing or declining relative to available sources of revenue, the efficiency with which debt is handled, and the capacity of the area to issue more debt. The trend lines of local revenues should be compared with the trend lines of transit expenditures to determine relative growth or decline in each.

In addition to these specific indicators, the assessment of financial condition should consider factors such as the direction of local transportation and land development policy issues and the region's willingness to continue supporting transit. Transportation policy issues, for instance, relate to goals and objectives regarding the establishment of a particular farebox recovery ratio, the deficit as a percentage of a dedicated revenue source, or perhaps levels of private sector participation in financing. Development issues may relate to regional goals to spur new development in general or perhaps

## TABLE 4-1: TYPICAL INDICATORS OF FINANCIAL CONDITION AND CAPABILITY

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### MEASURES OF ECONOMIC VITALITY

- appraised value of real property
- number of building permits issued
- number of business licenses issued
- value of retail sales
- personal income per capita
- bond ratings (Moody's or Standard and Poor's)

### MEASURES OF TRANSIT OPERATIONS

- annual ridership
- operating and maintenance costs
- capital costs
- farebox revenues
- non-fare revenues
- farebox recovery ratio
- total funds available

### MEASURES OF FISCAL BURDEN OF TRANSIT EXPENDITURES

- personal income per transit operating deficit assistance and total subsidy
- earnings per transit operating assistance and total subsidy
- taxable property values per transit operating deficit assistance and total subsidy
- total operating expenditures per transit operating deficit and total subsidy
- total annual expenditures per total annual transit subsidy
- long-term debt as percent of total assets, e.g., real property assessed value or value of transit assets
- long-term debt per capita
- debt service as percent of revenue
- coverage ratio

to concentrate new development in certain specific locations. The assessment of such policy-related factors is accomplished primarily through interviews with key public officials and policy-makers and review of key policy statements.

State and local commitments are of concern in that they can affect the transit agency's ability to develop new revenue sources and financing strategies. Many sources/strategies require public approval -- either directly through public referendum or indirectly, through influencing public actions such as by lobbying officials to pass an ordinance or by voicing strong opposition at public hearings. Thus, it is important to assess the public's willingness to approve new funding measures, while also assessing likely equity impacts of financing alternatives on different groups. These factors include some of the types of measures shown in Table 4-1, and they also include more qualitative judgements, based on specific historical measures and on market research (e.g., public opinion polls to indicate potential support for new taxes or major bond issues).

Continuation of support for transit can be analyzed in part by examining the transit agency's funding trends over time and by comparing these to similar-sized transit systems nationwide. For example, in comparing the sources of Boston's MBTA's revenue in 1979 (prior to a system funding "crisis") to 1986, the magnitude of the increase of State participation is apparent:

| | 1979 | 1986 |
|---|---|---|
| Operating Revenue | 27% | 25% |
| Federal | 8% | 5% |
| State | 36% | 50% |
| Local | 29% | 20% |

The high degree of State participation is also reflected in national data, as State financing was 20 percentage points higher for the MBTA than for other large transit properties in 1983 and has increased considerably since then.

The review of data on state and local funding should also summarize the issues that have caused any past funding crises and the solutions that resulted -- as well as solutions that were proposed but not implemented. Any past failures will provide lessons for today. In Massachusetts, for example, the reluctance of the State to provide any taxing authority to cities or districts is a recurring theme and is likely to be an important issue to be considered in any new financing proposal for the MBTA. Finally, the historical context and the current financing mix should provide the basis for analyzing the likelihood of revenue sources being maintained at their current levels.

Breakdowns of current transit revenue by income group and by member city and town (if applicable) can also illustrate the degree of equity of current funding mechanisms, while providing a baseline for comparison to alternative financing strategies. For example, a 1981 study estimating the incidence of taxes supporting the MBTA indicate that lower income families and inner cities of the MBTA region pay a large

percentage of their income to support the MBTA; see Table 4-2. Although it may be considered desirable to balance tax burdens somewhat, any financing alternative that would result in a major shift in incidence (i.e., to achieve such a balance) is likely to have social and political acceptance ramifications.

Finally, depending on the types of funding sources to be used, it may be necessary to assess the financial condition of any private sector funding partners. This assessment would consider their management practices, amount of financial leverage and profitability. Ratio analysis is typically used in these instances, and annual reports, budgets and other financial statements of the subject companies are reviewed. The Securities and Exchange Commission would have other useful information for those firms that are publicly traded.

### 4.1.2 Assessment of Financial Capability

#### 4.1.2.1 Introduction

The assessment of financial capability, or cash flow analysis, compares current and projected estimates of pledged revenues to operating and maintenance and capital costs. As discussed in Chapter 3, there are five cash flow "streams" that must be included in the analysis:

- farebox revenue
- operating and maintenance costs
- capital costs
- sources of funds for operating deficits
- sources of funds for capital requirements

The cash flow analysis supports the determination of the transit system's ability to cover both 1) capital and operating requirements associated with continuation of the "baseline" system, and 2) marginal cost increases associated with major capital investments or system restructuring. The analysis reveals the extent of the revenue shortfall in either case; of course, if insufficient revenues are indicated in the baseline analysis, it is unlikely that major capital projects would be considered. Figure 4-1 is an example of a graphic depiction of a capital cash flow analysis.

The magnitude of the shortfall will dictate to a large extent the financing strategy that should be considered: "pay-as-you go," borrow, or lease (this choice is discussed later in this section; the selection of financing strategies and the selection and evaluation of new individual revenue sources one discussed in Sections 4.2-4.4.)

It should be noted that the age of the transit agency will influence the financial analysis process. On one hand, a new authority may not yet have a dedicated stream of revenues in place and will rely on the financial planning process when it selects and defines its desirable source of revenue. This process will be the first of many steps to determine the limits of the authority's financial capacity, the feasibility of the dedicated (and other) revenue sources to support this capacity and, accordingly,

**TABLE 4-2: EXAMPLE OF TAX INCIDENCE STUDY**

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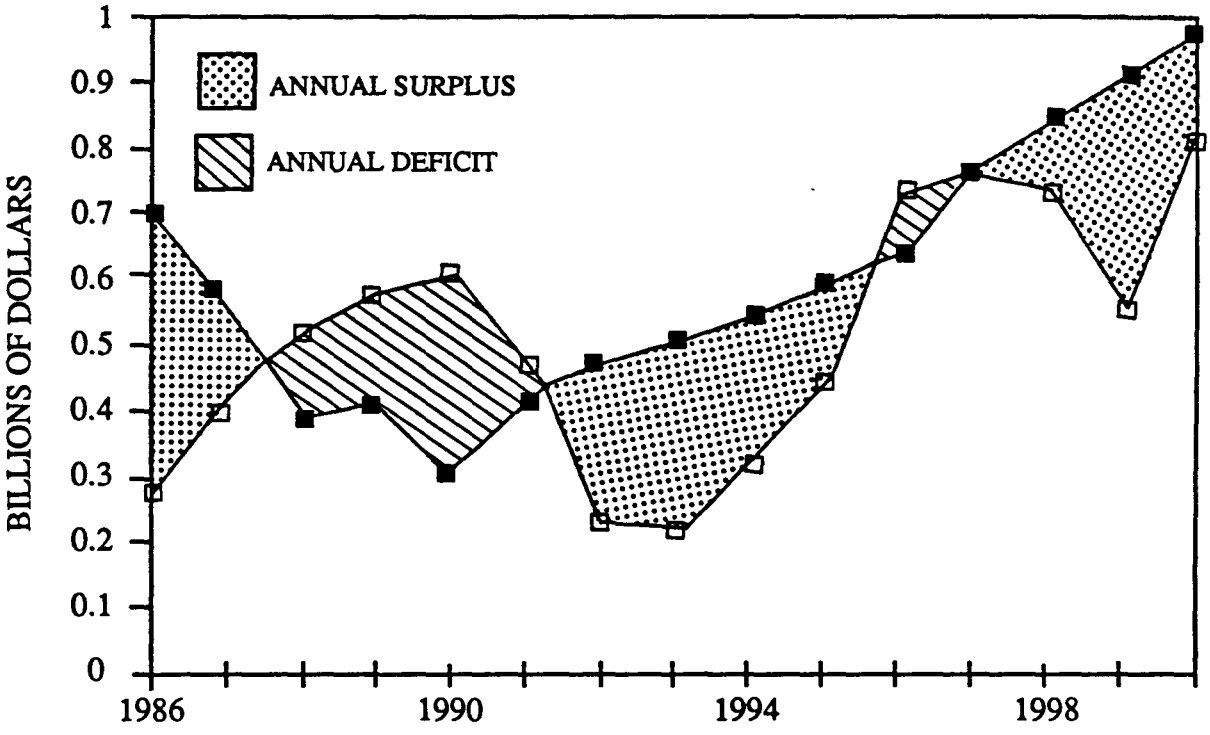
Income Group Breakdown

| Household Income | Subsidy Cost Divided by Income | Subsidy & Fare Cost Divided by Income |
|---|---|---|
| Less than $6,000 | .016 | .031 |
| $6,000 - $15,000 | .017 | .027 |
| $15,000 - $25,000 | .016 | .022 |
| Over $25,000 | .013 | .016 |

Regional Breakdown

| Region | Local Assessment Divided by Income |
|---|---|
| Boston | .021 |
| Inner 13 Cities | .010 |
| South Shore | .005 |
| Southwest | .003 |
| West | .003 |
| Northwest | .004 |
| North Shore | .004 |

## FIGURE 4-1: CAPITAL CASH FLOW ANALYSIS




■ Capital funds available from all Federal, State and local sources.

□ Capital requirements for all rail and bus projects.

This figure reflects:

a) Agency's own operating revenue estimates
b) Agency's estimates of state and local capital support
c) Agency's estimates of capital requirements
d) Levels of Federal funding consistent with the the President's proposed budget and transit program
- UMTA "New Start" funding limited to amount appropriated in FY 1984-86
- No Federal operating subsidies after FY 1986
- Federal capital allocations for FY 1987 and beyond consistent with the Administration's Urban Mobility Block Grant Proposal

its ability to operate, build and enhance the infrastructure of its system. At this point in the process, newly created authorities enjoy clean slates and myriad possibilities (subject to legal and political limits of course).

On the other hand, older transit agencies use the financial planning process to determine the extent to which they will be able to expand, extend or refurbish their systems. With a primary source of revenues (typically, a dedicated tax source or other revenue stream) in place, and, probably, little likelihood of changing the rate (e.g., tax rate) at which it is imposed, these agencies find themselves working in a far more limited world where the costs of operating the existing system within defined fare structures places a great demand on the financial resources. They will have to work more diligently to develop new sources of revenues, which will primarily be smaller, of shorter duration and with more specific applications (e.g., an incremental tax used to subsidize the construction of a particular station) than their primary revenue source. Fortunately, however, these older systems should find the financial planning effort a more precise process, as the inputs will be based on stronger, more empirical data.

#### 4.1.2.2 The Financial Planning Model

The first step in carrying out the cash flow analysis is the development of an appropriate financial analysis tool. Today, such tools generally take the form of computerized financial planning models. Depending on the size of the transit system and the complexity of its finances, the model can either be developed using existing software or developed from scratch. While it may sound trivial, a financial planning model should be clear, flexible and complete, not all of which are easily achievable in application. The results of these models will be reviewed and/or utilized by a wide audience, some -- or perhaps most -- of which will not have the relevant experience or expertise in understanding the assumptions or conclusions, and will have to balance the results with their respective political, social or economic agendas. As will be touched upon later, the model must allow for the flexibility to change inputs and assumptions easily and accurately, so that a range of financing alternatives can be examined and sensitivity tests can be made.

To grasp the full impact of the financial planning model, the designers and users must work with it -- thoroughly testing, changing and questioning both it and its results. Altering various input parameters independently and in combination may bring to light some surprising tendencies and results that may not have been readily apparent form the outset. Finally, these models should cover their subject and purpose completely. Incomplete models, or those that are not thoroughly tested, will not only yield erroneous results, but decisions based on these results may engender severe financial repercussions. Therefore, it is important to test the reasonableness and validity of the model as well as the sensitivity of the parameters and variables.

The first step in the development of the model should be the establishment of a set of assumptions and inputs. Barring external restrictions, this set should contain all of the information from which the forecasted results in the balance of the model are calculated. Frequently, this has not been the case, as inputs tend to come from a wide variety of sources, and information in the development of those estimates is often not available at

the outset of the financial modeling process. Moreover, to the extent possible, the year-by-year entry of numbers should be avoided in favor of formulas that are used to calculate figures for the later years based on inputs for the first year or two.

The inputs and assumptions may include some or all of the following types of information:

- Economic Information
  - inflation (i.e., overall, construction, labor, materials, etc.)
    - generally, for the whole model
    - specifically, per item as necessary
  - real growth
  - population and employment growth

- Financial Information
  - debt rates
    - real debt rates (without inflation)
    - nominal debt rates (with inflation)
    - taxable
    - tax-exempt
    - long-term
    - short-term
  - term
  - timing (point in year of issuance)
  - issuance costs
  - debt service reserve fund requirements
  - other reserve fund requirements
  - reinvestment rate generally or specifically
  - issuance restrictions

- Revenues
  - primary source
  - fare
  - ridership
  - ridership growth
  - ridership elasticity
  - federal grants
    - operating
    - capital
  - state grants
  - local grants
  - charters
  - advertising, concessions, etc.

- Expenses
  - operations
    - labor
    - materials
    - fuel
    - utilities
    - replacements and renovations
    - special programs
    - administration
    - other
  - capital
    - right-of-way
    - rail
    - vehicles
    - shops
    - stations

- Sensitivity Factors
  - inflation
  - real growth
  - primary tax source
  - ridership
  - grants - generally or specifically
  - operations - generally or specifically
  - capital - generally or specifically

Creating a base table for all of the assumptions instead of entering values on year-by-year basis minimizes the amount of work associated with the development of the model, and more importantly, facilitates changing inputs as assumptions and/or estimates change. This will insure accuracy when changes are made; for, if the change has to be made in only one place, there is little risk of overlooking subsequent areas where further analyses or financial output parameters may be interrelated. This centralization of input parameters and economic assumptions will also provide for ease of access insofar as the working space will be limited to only a selected segment of the model. For ease of understanding, the model should be structured in modular fashion, with separate tables for such key system financial elements as revenues, operating costs, capital costs and financing, and with the results combined into a summary table.

An example of a financial planning model for a large transit agency is shown in Tables 4-3(a-h). Table 4-3(a) presents the summary results of the agency's cash flow analysis, including the sources and uses of funds, the available funds, and the ending cash balance for each year in the analysis. Table 4-3(b) summarizes the transit operations budget information (i.e., revenues and expenses) and fiscal burden ratios. These ratios are key indicators of financial capability, and should help guide the transit agency in future decision-making. Table 4-3(c) shows the revenues, and net financing requirements associated with the capital program. Note that a decision has already been made to issue debt to finance these requirements. Tables 4-3(d,e, and f) present the input parameters

# TABLE 4-3 (a-h): EXAMPLE OF FINANCIAL PLANNING MODEL

## (a) Summary Results

Date: 25-Jan-87

| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| BEGINNING CASH | 223.7 | 169.2 | 100.4 | 56.5 | 67.1 | 75.3 | 84.4 | 89.1 | 95.0 | 86.4 |
| SOURCES OF FUNDS | | | | | | | | | | |
| Sales Tax Revenue | 165.0 | 176.7 | 191.1 | 206.7 | 223.6 | 241.2 | 259.7 | 278.8 | 298.7 | 319.2 |
| Farebox Revenues | 27.9 | 33.5 | 35.7 | 39.7 | 44.1 | 49.0 | 54.5 | 60.7 | 64.4 | 89.5 |
| Interest Income | 12.7 | 9.0 | 7.0 | 6.4 | 8.6 | 10.8 | 14.2 | 17.2 | 19.1 | 17.8 |
| Joint Development | 0.0 | 7.3 | 9.7 | 10.5 | 10.5 | 11.1 | 12.3 | 12.5 | 13.1 | 0.9 |
| Grants | 19.0 | 23.9 | 33.3 | 19.6 | 14.5 | 15.6 | 12.6 | 13.1 | 13.6 | 14.2 |
| Miscellaneous | 2.7 | 2.2 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 |
| Total Funds Available | 451.0 | 421.8 | 380.7 | 343.0 | 372.1 | 406.8 | 441.7 | 475.6 | 508.2 | 532.4 |
| USES OF FUNDS | | | | | | | | | | |
| Operating Expenses: | | | | | | | | | | |
| Transit System O & M | 103.0 | 106.8 | 111.1 | 115.5 | 120.5 | 136.7 | 142.6 | 154.7 | 166.1 | 215.7 |
| Mobility Impaired Program | 7.5 | 8.2 | 9.1 | 9.4 | 9.8 | 10.2 | 11.9 | 12.4 | 12.9 | 13.4 |
| Administration | 15.8 | 16.3 | 17.0 | 17.7 | 18.4 | 20.4 | 21.2 | 22.1 | 24.4 | 23.9 |
| Capital Requirements: | | | | | | | | | | |
| Bus Vehicles | 13.9 | 8.8 | 14.4 | 16.0 | 5.4 | 13.5 | 14.9 | 16.0 | 13.2 | 15.8 |
| Bus Transit Facilities | 37.3 | 24.4 | 16.8 | 10.4 | 4.7 | 4.6 | 4.8 | 16.8 | 18.1 | 11.6 |
| Transit System Improvements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.4 | 13.3 | 13.8 | 21.5 | 22.4 |
| Rail Transit Facilities: | 77.1 | 129.9 | 163.7 | 155.1 | 222.8 | 234.4 | 291.9 | 312.0 | 327.0 | 217.8 |
| Renewals & Replacements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| Other | 1.6 | 1.1 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 |
| Total Uses of Funds | 256.3 | 295.6 | 332.6 | 324.8 | 382.1 | 426.8 | 501.1 | 548.5 | 583.9 | 522.( |
| FUNDS AVAILABLE BEFORE FINANCING | 194.6 | 126.2 | 48.1 | 18.2 | (10.1) | (19.9) | (59.4) | (72.9) | (75.7) | 9.( |
| DEBT FINANCING | | | | | | | | | | |
| Short Term Financing Proceeds | | | | | | | | | | |
| Long Term Financing Proceeds | 0.0 | 0.0 | 37.8 | 68.6 | 103.5 | 134.6 | 196.6 | 237.6 | 255.8 | 186.8 |
| Debt Service Requirements | 25.4 | 25.8 | 29.4 | 19.7 | 18.1 | 30.3 | 48.1 | 69.8 | 93.7 | 112.5 |
| Net Effect of Financing | (25.4) | (25.8) | 8.4 | 48.9 | 85.4 | 104.3 | 148.5 | 167.9 | 162.1 | 74. |
| ENDING CASH BALANCE | 169.2 | 100.4 | 56.5 | 67.1 | 75.3 | 84.4 | 89.1 | 95.0 | 86.4 | 84.0 |
| Times Interest Covered: | | | | | | | | | | |
| Gross Sales Tax: | 6.5 | 6.9 | 6.5 | 10.5 | 12.4 | 8.0 | 5.5 | 4.1 | 3.3 | 2. |
| Sales Tax Avail. for Cap.: | 3.3 | 3.5 | 3.3 | 5.3 | 6.2 | 4.1 | 2.8 | 2.1 | 1.7 | 1.5 |
| Cash Flow Coverage: | | | | | | | | | | |
| Outstanding Long Term Debt: | 0.0 | 0.0 | 42.3 | 119.1 | 234.4 | 383.6 | 600.8 | 862.0 | 1,140.7 | 1,338. |

## TABLE 4-3 (b): Transit Operations

Constant Dollars (1985): 1.0
(Yes=0; No=1)

Date: 25-Jan-87

| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| **REVENUES** | | | | | | | | | | |
| Passenger Revenue | 27.9 | 33.5 | 35.7 | 39.7 | 44.1 | 49.0 | 54.5 | 60.7 | 64.4 | 89.5 |
| Other Revenues: | | | | | | | | | | |
| Charter | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Parking | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Advertising | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| "Summary" Other Revenues | 2.7 | 2.2 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 |
| TOTAL TRANSPORTATION REVENUES | 30.6 | 35.6 | 39.1 | 43.3 | 47.8 | 52.8 | 58.5 | 64.8 | 68.7 | 94.0 |
| Non-Operating Revenue | 0.0 | 0.0 | 7.4 | 7.1 | 7.4 | 7.7 | 8.0 | 8.3 | 8.6 | 8.9 |
| TOTAL OPNS & NON-OPNS REVENUES | 30.6 | 35.6 | 46.5 | 50.3 | 55.2 | 60.4 | 66.4 | 73.1 | 77.3 | 102.9 |
| **EXPENSES** | | | | | | | | | | |
| Direct Operating & Maintenance Costs: | | | | | | | | | | |
| Bus | 103.0 | 106.8 | 111.1 | 115.5 | 120.5 | 136.7 | 142.6 | 154.7 | 166.1 | 215.7 |
| Rail | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rail Start-up | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL TRANSIT O & M COSTS | 103.0 | 106.8 | 111.1 | 115.5 | 120.5 | 136.7 | 142.6 | 154.7 | 166.1 | 215.7 |
| Mobility Impaired Program | 7.5 | 8.2 | 9.1 | 9.4 | 9.8 | 10.2 | 11.9 | 12.4 | 12.9 | 13.4 |
| Gen. & Administrative Costs | 15.8 | 16.3 | 17.0 | 17.7 | 18.4 | 20.4 | 21.2 | 22.1 | 24.4 | 23.9 |
| TOTAL OPNS & NON-OPNS EXPENSES | 126.4 | 131.3 | 137.2 | 142.6 | 148.7 | 167.3 | 175.7 | 189.2 | 203.4 | 253.0 |
| EXCESS OF REVENUES/EXPENSES | (95.8) | (95.7) | (90.7) | (92.3) | (93.5) | (106.8) | (109.3) | (116.1) | (126.1) | (150.1) |
| Sales Tax Available for Operations | 82.5 | 88.4 | 95.6 | 103.4 | 111.8 | 120.6 | 129.8 | 139.4 | 149.3 | 159.6 |
| SURPLUS/DEFICIT IN OPERATIONS (after sales tax) | (13.3) | (7.3) | 4.9 | 11.1 | 18.2 | 13.8 | 20.6 | 23.3 | 23.3 | 9.5 |
| Accumulated tax | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **RATIOS** | | | | | | | | | | |
| Farebox Recovery Ratio: | | | | | | | | | | |
| Total Opns & Non-Opns Expenses | 22.06% | 25.48% | 26.03% | 27.85% | 29.68% | 29.27% | 31.02% | 32.07% | 31.66% | 35.38% |
| Total Transit O & M Costs | 27.06% | 31.33% | 32.14% | 34.39% | 36.62% | 35.82% | 38.23% | 39.22% | 38.77% | 41.49% |
| Percent of Total Sales Tax Used for: | | | | | | | | | | |
| Total Opns & Non-Opns Expenses | 58.07% | 54.16% | 47.45% | 44.65% | 41.84% | 44.29% | 42.08% | 41.64% | 42.21% | 47.01% |
| Percent of Allowable Sales Tax Used for: | | | | | | | | | | |
| Total Opns & Non-Opns Expenses | 116.14% | 108.31% | 94.90% | 89.31% | 83.68% | 88.58% | 84.16% | 83.29% | 84.42% | 94.03% |

# TABLE 4-3 (c): Capital Program

Constant Dollars (1985): 1.0
(Yes=0; No=1)

Date: 25-Jan-87

| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| **REVENUES** | | | | | | | | | | |
| Sales Tax Revenues: | | | | | | | | | | |
| Dedicated to Capital | 82.5 | 88.4 | 95.6 | 103.4 | 111.8 | 120.6 | 129.8 | 139.4 | 149.3 | 159.6 |
| Remaining from Operations | 0.0 | 0.0 | 4.9 | 11.1 | 18.2 | 13.8 | 20.6 | 23.3 | 23.3 | 9.5 |
| Investment Income | 12.7 | 9.0 | 7.0 | 6.4 | 8.6 | 10.8 | 14.2 | 17.2 | 19.1 | 17.8 |
| TOTAL NON-OPERATING REVENUES | 95.2 | 97.4 | 107.4 | 120.8 | 138.6 | 145.2 | 164.6 | 179.9 | 191.7 | 186.9 |
| Federal Grants: | | | | | | | | | | |
| Section 9 Funds | 11.1 | 14.2 | 23.5 | 19.6 | 12.5 | 12.5 | 12.6 | 13.1 | 13.6 | 14.2 |
| Less:Amount used for Subsidy | 0.0 | 0.0 | (7.4) | (7.1) | (7.4) | (7.7) | (8.0) | (8.3) | (8.6) | (8.9 |
| Section 9 Available for Capital | 11.1 | 14.2 | 16.1 | 12.5 | 5.1 | 4.8 | 4.6 | 4.8 | 5.0 | 5.2 |
| Section 3 Funds | 7.9 | 9.7 | 9.9 | 0.0 | 2.0 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL FED FUNDS FOR CAPITAL | 19.0 | 23.9 | 26.0 | 12.5 | 7.1 | 7.9 | 4.6 | 4.8 | 5.0 | 5.2 |
| State Grants | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Local Grants | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL GRANT FUNDS | 19.0 | 23.9 | 26.0 | 12.5 | 7.1 | 7.9 | 4.6 | 4.8 | 5.0 | 5.2 |
| Joint Development Funds/Credits: | | | | | | | | | | |
| Negotiated Investments | 0.0 | 7.3 | 8.2 | 8.8 | 8.8 | 9.2 | 9.9 | 10.1 | 10.5 | 0.3 |
| Air Rights | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | 0.6 | 0.6 | 0.( |
| Connector Fees | 0.0 | 0.0 | 1.6 | 1.7 | 1.7 | 1.8 | 1.9 | 1.9 | 2.0 | 0.( |
| Public Increment Tax Districts | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.( |
| TOTAL JOINT DEVELOPMENT | 0.0 | 7.3 | 9.7 | 10.5 | 10.5 | 11.1 | 12.3 | 12.5 | 13.1 | 0.( |
| TOTAL CAPITAL REVENUES/CREDITS | 114.2 | 128.6 | 143.2 | 143.8 | 156.3 | 164.2 | 181.6 | 197.3 | 209.8 | 193.( |
| **EXPENDITURES** | | | | | | | | | | |
| Bus System Expenditures: | | | | | | | | | | |
| Vehicles | 13.9 | 8.8 | 14.4 | 16.0 | 5.4 | 13.5 | 14.9 | 16.0 | 13.2 | 15.8 |
| Bus Transit Facilities | 37.3 | 24.4 | 16.8 | 10.4 | 4.7 | 4.6 | 4.8 | 16.8 | 18.1 | 11. |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.4 | 13.3 | 13.8 | 21.5 | 22. |
| TOTAL BUS FACILITIES | 51.2 | 33.2 | 31.2 | 26.4 | 10.1 | 24.5 | 32.9 | 46.6 | 52.8 | 49.8 |
| Rail System Expenditures: | | | | | | | | | | |
| Rail Capital | 77.1 | 129.9 | 163.7 | 155.1 | 222.8 | 234.4 | 291.9 | 312.0 | 327.0 | 217. |
| TOTAL RAIL FACILITIES | 77.1 | 129.9 | 163.7 | 155.1 | 222.8 | 234.4 | 291.9 | 312.0 | 327.0 | 217.8 |
| Other Capital (i.e. Office) | 1.6 | 1.1 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0. |
| Support Costs | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0. |
| Renewal & Replacements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| TOTAL CAPITAL EXPENDITURES | 130.0 | 164.3 | 195.4 | 182.1 | 233.4 | 259.5 | 325.4 | 359.3 | 380.5 | 269. |
| SURPLUS/(DEFICIT) | (15.8) | (35.7) | (52.3) | (38.4) | (77.1) | (95.3) | (143.8) | (162.0) | (170.7) | (76.8) |
| Beginning Cash | 223.7 | 182.5 | 121.0 | 77.2 | 87.7 | 96.0 | 105.0 | 109.7 | 115.6 | 107.^ |
| Net Financing Requirement | 0.0 | 0.0 | 37.8 | 68.6 | 103.5 | 134.6 | 196.6 | 237.6 | 255.8 | 186. |
| Debt Service | (25.4) | (25.8) | (29.4) | (19.7) | (18.1) | (30.3) | (48.1) | (69.8) | (93.7) | (112. |
| Ending Balance | 182.5 | 121.0 | 77.2 | 87.7 | 96.0 | 105.0 | 109.7 | 115.6 | 107.0 | 104.6 |

# TABLE 4-3 (d): Input Parameters - Operations

Date: 25-Jan-87

| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| **FAREBOX REVENUE:** | | | | | | | | | | |
| If farebox revenue is NOT to be computed from ridership and averag fare, input constant 1985 dollar farebox revenue here. If it is, enter 0.00's and GO TO TRANSOPNS. | | | | | | | | | | |
| Farebox Revenue: | 26.6 | 30.7 | 31.5 | 33.7 | 36.0 | 38.4 | 41.1 | 44.0 | 44.9 | 60.0 |
| **OTHER TRANSIT REVENUES:** | | | | | | | | | | |
| Enter the other transit revenues according to the categories below in 1985 $'s and 0.0 in the "Summary" line. If they are not to be segregated by category, enter the values in the "Summary" line. | | | | | | | | | | |
| Charter | | | | | | | | | | |
| Parking | | | | | | | | | | |
| Advertising | | | | | | | | | | |
| Other | | | | | | | | | | |
| "Summary" | 2.6 | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Total Other Transit Revenues | 2.6 | 2.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| **FEDERAL OPERATING SUBSIDY:** | | | | | | | | | | |
| Enter the Federal Operating Subsidy in 1985 $'s. | | | | | | | | | | |
| Federal Operating Subsidy | 0.0 | 0.0 | 6.5 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| **TRANSIT OPERATING & MAINTENANCE COSTS:** | | | | | | | | | | |
| Enter the Transit Operating & Maintenance Costs in the correct Spaces below in 1985 $'s. | | | | | | | | | | |
| Bus O & M | 98.3 | 98.0 | 98.0 | 98.0 | 98.3 | 107.2 | 107.5 | 112.2 | 115.8 | 144.6 |
| Rail O & M | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rail Start-up operations | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Enter the percentages of labor in the above categories for purposes of an incremental inflation factor above CPI. | | | | | | | | | | |
| Bus O & M Labor % | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Rail O & M Labor % | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Rail Start-up Labor % | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Enter the percentages of energy in the above categories for purposes of an incremental inflation factor above CPI. | | | | | | | | | | |
| Bus O & M Utilities % | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Rail O & M Utilities % | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Rail Start-up Utilities % | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

## TABLE 4-3 (d): (continued)

Financial Planning Model
Input Parameters-OPERATIONS CONT'D

Date: 25-Jan-87

| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| MOBILITY IMPAIRED PROGRAM: Enter the Mobility Impaired Program Costs in 1985 $'s. | | | | | | | | | | |
| Mobility Impaired Program | 7.2 | 7.5 | 8.0 | 8.0 | 8.0 | 8.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| GEN. & ADMINISTRATIVE EXPENSES: Enter the G & A Expenses in 1985 $'s. | | | | | | | | | | |
| Gen. & Admin. Expenses | 15.1 | 15.0 | 15.0 | 15.0 | 15.0 | 16.0 | 16.0 | 16.0 | 17.0 | 16.0 |

## TABLE 4-3 (e): Input Parameters - Other

Date: 25-Jan-87

| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| **GRANT RECEIPTS:** | | | | | | | | | | |
| Enter the estimated grant receipts according to the categories below in 1985 $'s. | | | | | | | | | | |
| Section 9 Grants | 10.6 | 13.0 | 20.7 | 16.6 | 10.2 | 9.8 | 9.5 | 9.5 | 9.5 | 9.5 |
| Section 3 Grants | 7.5 | 8.9 | 8.7 | 0.0 | 1.6 | 2.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| State Grants | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Local Grants | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **JOINT DEVELOPMENT:** | | | | | | | | | | |
| Enter the joint development funds expected according to the categories below in 1985 $'s. | | | | | | | | | | |
| Negotiated Investments | 0.0 | 6.7 | 7.2 | 7.5 | 7.2 | 7.2 | 7.5 | 7.3 | 7.3 | 0.2 |
| Air Rights | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | 0.4 | 0.4 | 0.4 |
| Connector Fees | 0.0 | 0.0 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 0.0 |
| Public Inc. Tax Districts | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **CAPITAL:** | | | | | | | | | | |
| Enter the Capital expenditures for the categories below in 1985 $'s. | | | | | | | | | | |
| Bus System Expenditures: | | | | | | | | | | |
| Vehicles | 13.3 | 8.1 | 12.7 | 13.6 | 4.4 | 10.6 | 11.2 | 11.6 | 9.2 | 10.6 |
| Bus Transit Facilities | 35.6 | 22.4 | 14.8 | 8.8 | 3.8 | 3.6 | 3.6 | 12.2 | 12.6 | 7.8 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 10.0 | 10.0 | 15.0 | 15.0 |
| Rail System Expenditures: | | | | | | | | | | |
| Rail Capital | 73.6 | 119.0 | 144.0 | 131.0 | 181.0 | 183.0 | 219.0 | 224.0 | 223.0 | 146.0 |
| Rail start-up capital | 0.0 | 0.2 | 0.4 | 0.6 | 0.7 | 0.8 | 1.1 | 2.2 | 5.0 | 0.0 |
| Other Capital (i.e. Office) | 1.5 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Support Costs | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewal & Replacements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 |
| Enter the percentage of construction subject to incremental inflation below: | | | | | | | | | | |
| Construction subject to Infl: | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

## TABLE 4-3 (f): Input Parameters - Financing and Initial Balances

Date: 25-Jan-87

**FINANCING PARAMETERS**

NEW DEBT:

| | | |
|---|---|---|
| Bond Rate | 7.50% | |
| Term | 30.0 | |
| Interest Only (Yrs.) | 2.0 | |
| Issue Costs | 2.00% | (% of principal) |
| Debt Svc. Factor | 0.0864 | (Computed) |
| Timing | 1.0 | (Point in yr. when issued) |
| Reinvestment Rate | 6.00% | |

**INITIAL BALANCES**

| | |
|---|---|
| Beginning Cash (1987 $'s) | 223.7 |
| Sales Tax (1985 $'s) | 157.4 |
| % of Tax to Operations | 50.00% |
| Tax restricted to operations? (Yes=1; No=0) | 1 |
| Excess tax avail. for capital? (Yes=1; No=0) | 1 |

## TABLE 4-3 (g): Inflation Assumptions

Constant Dollars (1985): 1.0
(Yes=0; No=1)

Date: 25-Jan-87

| | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **INPUT PARAMETERS** | | | | | | | | | | | |
| Sales Tax Revenues: | | | | | | | | | | | |
| Real Growth | 0.00% | 0.00% | 3.00% | 4.00% | 4.00% | 4.00% | 3.75% | 3.50% | 3.25% | 3.00% | 2.75% |
| Inflation | 0.00% | 4.80% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% | 4.00% |
| Nominal Growth | | | 7.1% | 8.2% | 8.2% | 8.2% | 7.9% | 7.6% | 7.4% | 7.1% | 6.9% |
| Costs: | | | | | | | | | | | |
| Incremental Inflation: | | | | | | | | | | | |
| (Yes=1; No=0) | | | | | | | | | | | |
| 1 Labor | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% | 0.50% |
| 1 Utilities | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% |
| 1 Construction | 0.25% | 0.25% | 0.25% | 0.25% | 0.25% | 0.25% | 0.25% | 0.25% | 0.25% | 0.25% | 0.25% |
| **COMPUTED VALUES** | | | | | | | | | | | |
| Sales Tax | | 1.05 | 1.12 | 1.21 | 1.31 | 1.42 | 1.53 | 1.65 | 1.77 | 1.90 | 2.03 |
| Labor | | 1.06 | 1.11 | 1.16 | 1.21 | 1.26 | 1.32 | 1.38 | 1.44 | 1.51 | 1.58 |
| Utilities | | 1.07 | 1.12 | 1.18 | 1.24 | 1.30 | 1.37 | 1.44 | 1.51 | 1.58 | 1.66 |
| Construction | | 1.05 | 1.10 | 1.14 | 1.19 | 1.24 | 1.30 | 1.35 | 1.41 | 1.47 | 1.53 |
| All Other (Incl. Farebox Revenues) | | 1.05 | 1.09 | 1.13 | 1.18 | 1.23 | 1.28 | 1.33 | 1.38 | 1.43 | 1.49 |

## TABLE 4-3 (h): Reserves and Debt Financing

Date: 25-Jan-87

| O & M RESERVE | | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Capital and O&M Reserve Req. | | 55.2 | 61.0 | 56.5 | 67.1 | 75.3 | 84.4 | 89.1 | 95.0 | 86.4 | 84.0 |
| Funds Available less Debt Service | | 169.2 | 100.4 | 18.7 | (1.6) | (28.2) | (50.2) | (107.5) | (142.7) | (169.5) | (102.9 |
| Net Financing Requirement | | 0.0 | 0.0 | 37.8 | 68.6 | 103.5 | 134.6 | 196.6 | 237.6 | 255.8 | 186.8 |
| **FINANCING PARAMETERS** | | | | | | | | | | | |
| **NEW DEBT:** | | | | | | | | | | | |
| Bond Rate | 7.50% | | | | | | | | | | |
| Term | 30 | | | | | | | | | | |
| Interest Only (Yrs.) | 2 | | | | | | | | | | |
| Issue Costs | 2.00% | | | | | | | | | | |
| Debt Svc. Factor | 8.6405% | | | | | | | | | | |
| Timing | 1.00 | | | | | | | | | | |
| Reinvestment Rate | 6.00% | | | | | | | | | | |
| | | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 199( |
| Bonds Required: | | 0.000 | 0.000 | 42.300 | 76.820 | 115.780 | 150.600 | 220.020 | 265.925 | 286.305 | 209.070 |
| Financing Costs | | 0.0 | 0.0 | 0.8 | 1.5 | 2.3 | 3.0 | 4.4 | 5.3 | 5.7 | 4. |
| Debt Svc. Reserve | | 0.0 | 0.0 | 3.7 | 6.6 | 10.0 | 13.0 | 19.0 | 23.0 | 24.7 | 18. |
| Net Proceeds | | 0.0 | 0.0 | 37.8 | 68.6 | 103.5 | 134.6 | 196.6 | 237.6 | 255.8 | 186.8 |
| Principal Outstanding | | 0.0 | 0.0 | 42.3 | 119.1 | 234.4 | 383.6 | 600.8 | 862.0 | 1,140.7 | 1,338. |
| One Year's Interest Only | | 0.0 | 0.0 | 3.2 | 5.8 | 8.7 | 11.3 | 16.5 | 19.9 | 21.5 | 15. |
| One Year's P & I | | 0.0 | 0.0 | 3.7 | 6.6 | 10.0 | 13.0 | 19.0 | 23.0 | 24.7 | 18. |
| **EXISTING DEBT:** | | | | | | | | | | | |
| Variable Rate | 6.00% | | | | | | | | | | |
| Principal Payments | | 20.0 | 21.6 | 23.3 | 25.1 | | | | | | |
| Debt Service | | 25.4 | 25.8 | 26.2 | 10.8 | | | | | | |
| RESERVE BALANCE | | 15.8 | 15.8 | 15.8 | (15.8) | | | | | | |
| **ADDITIONAL BONDS TEST:** | | | | | | | | | | | |
| Minimum Coverage Ratio | 1.0 | | | | | | | | | | |
| Pledged Funds (Gross Tax) | | 165.9 | 177.6 | 192.3 | 207.3 | 224.8 | 243.2 | 262.8 | 283.4 | 304.7 | 326. |
| Pledged Funds (Net Tax) | | 83.4 | 89.3 | 96.7 | 104.0 | 113.0 | 122.6 | 133.0 | 143.9 | 155.3 | 166. |
| Debt Service Requirements | | 25.4 | 25.8 | 29.4 | 19.7 | 18.1 | 30.3 | 48.1 | 69.8 | 93.7 | 112.5 |
| Coverage Ratio (Gross Tax) | | 6.5 | 6.9 | 6.5 | 10.5 | 12.4 | 8.0 | 5.5 | 4.1 | 3.3 | 2. |
| Remaining Debt Capacity (Gross) | | 1,626.1 | 1,621.5 | 1,716.0 | 1,996.9 | 2,190.0 | 2,251.4 | 2,258.5 | 2,234.4 | 2,194.6 | 2,224. |
| Coverage Ratio (Net Tax) | | 3.3 | 3.5 | 3.3 | 5.3 | 6.2 | 4.1 | 2.8 | 2.1 | 1.7 | 1.5 |
| Remaining Debt Capacity (Net) | | 671.6 | 666.9 | 693.5 | 891.0 | 993.9 | 957.6 | 862.5 | 731.7 | 581.0 | 496. |

for the model. Table 4-3(g) shows the inflation assumptions used in the model (sensitivity tests on this model are shown in Table 4-4). Finally, Table 4-3(h) summarizes the information related to debt financing for the agency in question. Obviously, many of the line items will be different in other agencies' models. Nevertheless, this example shows the types of input and output information that should be included.

In any model or forecasting exercise, caution and pragmatism should prevail in attempting to avoid overestimating the accuracy with which the future can be predicted. The last decade underscored this point. Ten years ago, economic forecasters would not have predicted the 20 percent prime rate of the early 1980's, while, five years ago, the same forecasters would not have been likely to predict the precipitous drop in inflation of the mid-1980's. Therefore, the key lesson is to avoid forecasting with an unwarranted degree of certainty what inflation or real growth will be beyond the first few years. Instead, conservative estimates of the same will serve the purpose, with the results of changes tested during the sensitivity analyses. Real growth will, typically, have the greatest impact on a system's feasibility since the taxes that support transit typically rely heavily on continued growth. Inflation will have a lesser impact, unless there is a marked disparity between the rates of inflation applicable to construction and those applicable to goods and services. Inflation will increase both revenues and expenses similarly, with the exception of the cost of borrowing, which is heavily dependent on the inflation rate.

#### 4.1.2.3 Evaluation of Cash Flows

With a model in place and projections available, a transit agency can begin consideration of its financial capabilities through an examination of the evaluation criteria established at the outset of the financial planning process. These criteria might include the following:

- ending cash and/or fund balances
- operating and/or capital reserves
- net financing requirements
- gross coverage ratios for debt
- net coverage ratios for debt
- farebox recovery ratios
- absolute debt ceiling limitation
- other objectives that may be locally or legislatively (i.e., state) mandated.
- cost of capital

Insufficiencies in the targeted criteria should become immediately apparent in the results of the financial planning model. At this point, the transit agency can evaluate its options to address the shortfall in funds available, overuse of debt, failure to comply with legislative mandates or whatever else may have led to the violation of the established financial criteria.

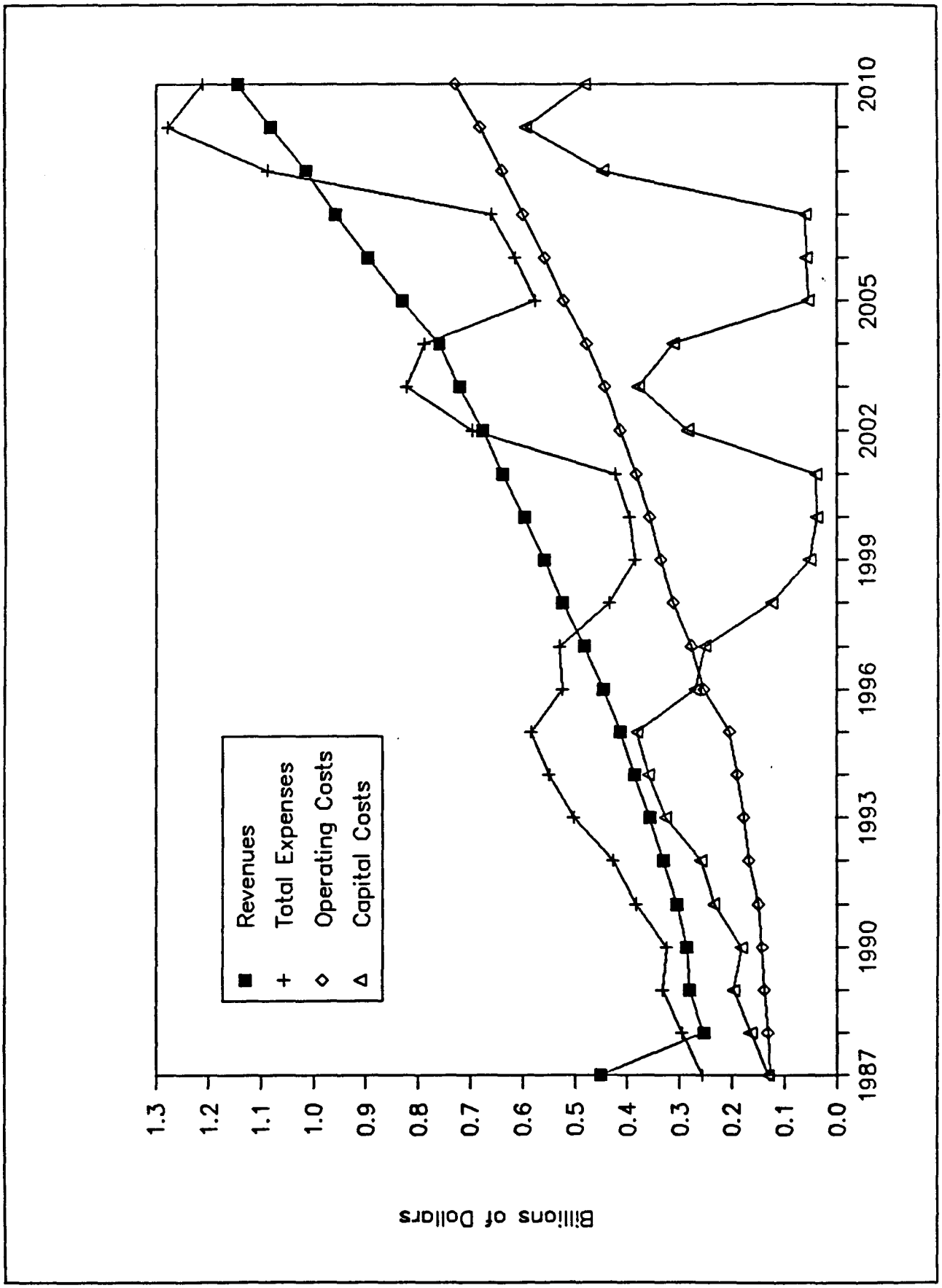
The first item to check is the annual "results of operations." This figure represents the system's ability to cover operating and capital costs and, where applicable, debt service requirements on outstanding bonds with revenues received and/or generated during the year in question.

Insofar as the annual results of operations are positive throughout the period covered by the financial planning model, and the system maintains a cash balance sufficient to cover regular operating and capital requirements, the transit agency exhibits sound financial capability and need not explore a new financing strategy. Whenever possible, the system should attempt to meet expenses with revenues received in the current year. This is the pay-as-you-go approach, as introduced in Chapter 2. Pay-as-you-go may be possible for smaller, less capital-intensive bus systems. Unfortunately, the capital costs of modern bus, and, even more so, rail systems are so great and concentrated in so short a period of time that, during construction and other such capital intensive periods, systems must generally develop a financing strategy involving the issuance of debt or the use of private sector financing to meet current expenditures inclusive of the capital program. The issuance of debt spreads the cost of the capital components of the transit system over the useful life of those components. Figures 4-2 - 4 show the impact of bonding on cash flows for a large transit agency.

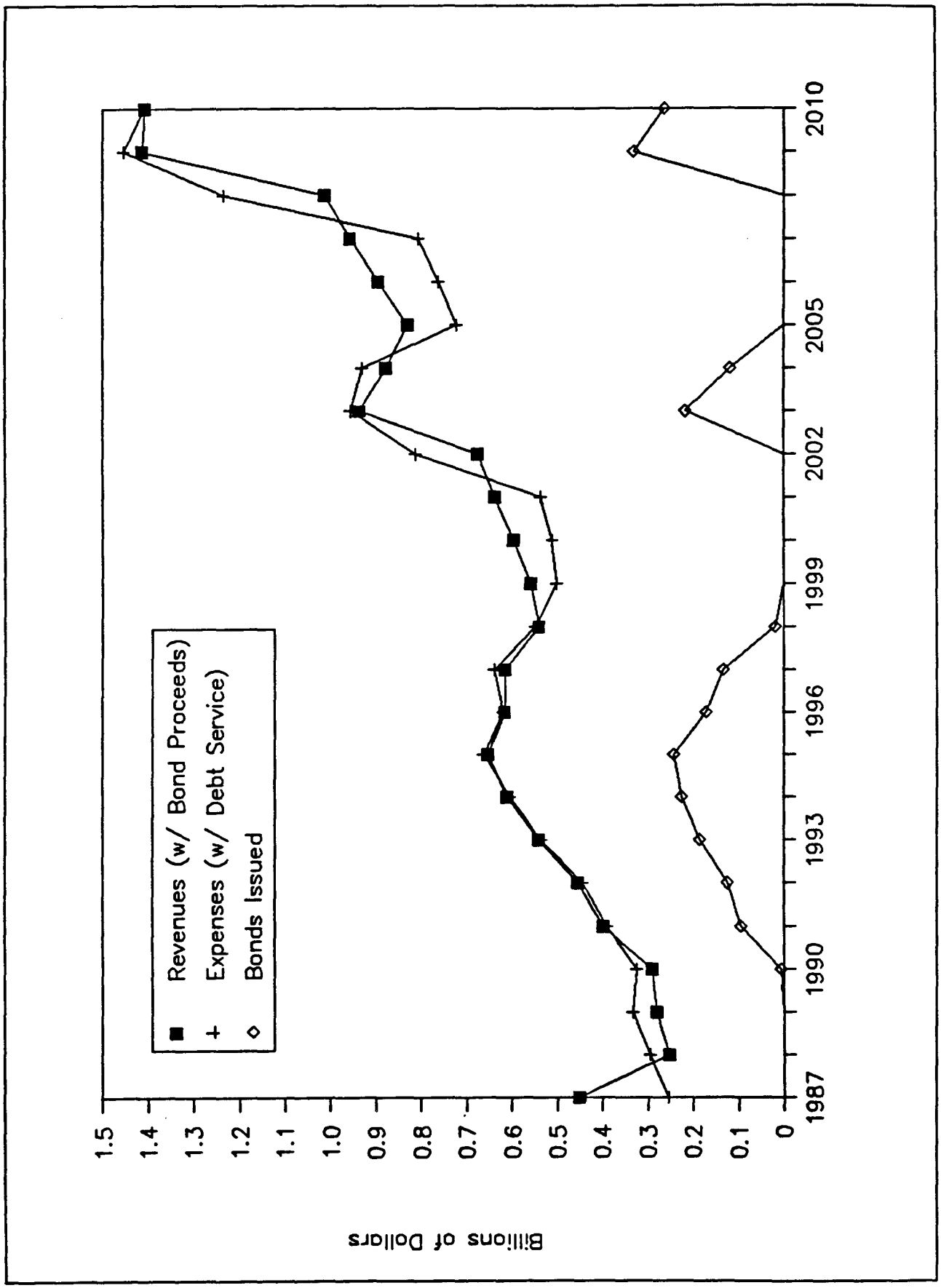
The large rail systems currently under construction and/or renovation all face immediate capital requirements far in excess of their current funding capabilities. In addition to applying to UMTA and other state and local governmental organizations for assistance in the financing of their capital budgets, transit agencies have entered the municipal, and, lately, the corporate bond markets, in search of additional capital. (The different types of bonds are discussed in Section 4.2.) As suggested above, the issuance of debt serves to spread the cost of capital improvements over a longer period of time, bringing the cost of such capital within the financial wherewithal of the issuing authority. If the model projects operating deficits only in the years of intensive construction, with the annual results of operations once again becoming positive upon completion of construction, the bond market may offer that system the solution it needs. If, however, the model projects continuing operating deficits, the agency's debt will not be well received by a market skeptical of the agency's ability to meet the required repayment schedule. Such a system must therefore raise revenues from other stable sources before it can consider entering the bond market; the selection and evaluation of alternative revenue sources is discussed in Section 4.3.

A bond's repayment schedule typically requires a principal and interest payment equal to approximately 10 percent of the par (i.e., face value) amount of the bonds issued. This figure will vary depending on the revenue stream that the authority pledges to the repayment of the principal, the financial condition of the issuing authority and the condition of the market at the time of issuance. (The 10 percent figure would apply if the bonds had a 9 percent coupon rate and a term of 30 years.) The repayment of a bond must be factored into the system's operating expenses, and the financial planning model values re-computed to determine the effect of debt repayment requirements on the annual results of operations. The process of computing the debt service requirements and rerunning the financial planning model to determine whether additional debt need be issued is an iterative one that must be repeated until additional iterations indicate that enough debt has been issued to cover the annual operating and capital budgets. As is discussed in Chapter 5, the investors in the bond markets will examine the agency's financial statements, published in the Official Statement (i.e., prospectus), to judge its financial capability, and, hence, the likelihood of their being repaid on time.

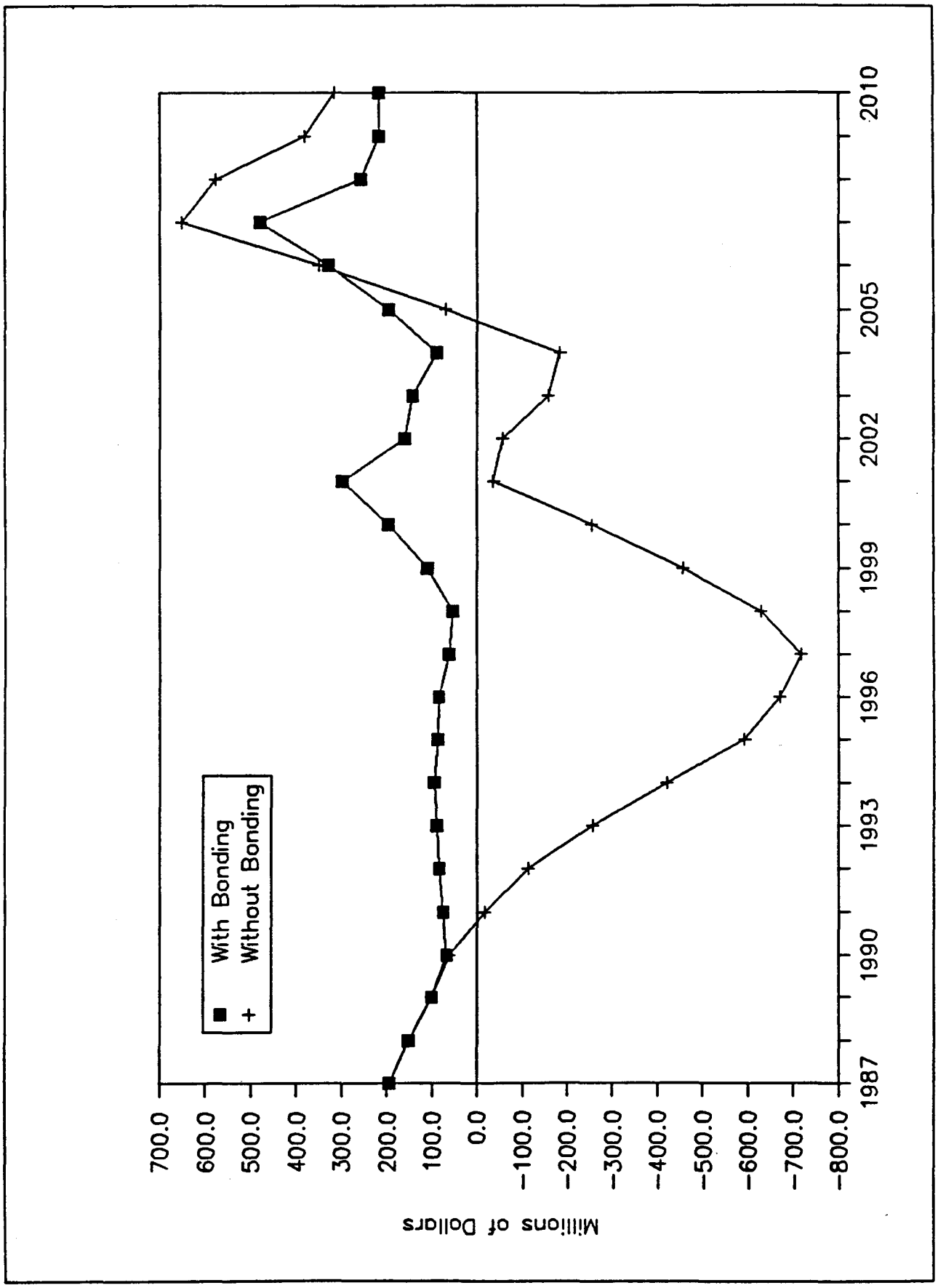
**FIGURE 4-2: REVENUES vs. EXPENSES - BEFORE BONDING**



## FIGURE 4-3: REVENUES vs. EXPENSES - AFTER BONDING



## FIGURE 4-4: COMPARISON OF ENDING BALANCES



To illustrate adequate financial capability, an agency wishing to construct a capital project requiring bonding must demonstrate that its bonds will be well-received by the financial markets. In studying an agency's debt, the bond market will review a wide variety of factors; among the most important factors are security of the bonds and the debt service coverage ratio. Security is that which the bonding authority has pledged as collateral for the repayment of the bonds. The coverage ratio is a measure of the ability of historical, current and/or future revenues to meet debt service requirements.

When issuing debt, an agency must pledge a stream of revenues to the repayment of the bonds. These pledged revenues represent the collateral that provides the bondholder with a reasonable degree of certainty that bonds will indeed be repaid in accordance with the debt service schedule announced upon their issuance. The largest systems around the country have primarily relied on the sales tax to both fund the operation of their systems and secure their bonds. Whatever revenue source is used, it should be a stable, guaranteed source of funds extending over the life of the bonds. So, while any type of tax or source of revenues could theoretically be used, the bond markets generally view the revenues generated by any but a sales, income, property, or motor fuel tax (or the guarantee of a state or the Federal government, as is used by New York City, Boston and Washington, D.C.) as too uncertain and will not accept those other sources as security for a bond issuance. There are exceptions, of course. Bonds backed by such sources as tax increment financing (in San Francisco), utility service tax revenues (in Miami), and farebox receipts (in New York City) have been successfully issued for transit uses; bond security issues are discussed further in Sections 4.2 and 5.1.

The financial model should also include a calculation of the debt service coverage ratio. The coverage ratio indicates the sufficiency of the issuer's revenue -- defined differently by different issuers -- to meet debt service, and is calculated by dividing revenues available to pay debt service by debt service. For example, a coverage ratio of 1.0 means that revenues are exactly equal to debt service. A coverage ratio of 1.0 does not bode well for an issuer; a slight recession that erodes its revenue stream would render it incapable of completely meeting its debt service requirements. The market expects coverage ratios greater than one by a margin large enough to insure that, within reason, should the economic fortunes of the issuer turn sour there will still be enough revenue to meet debt service requirements. As might be expected, more stable sources of revenue require lower coverage ratios to garner market interest than do less stable sources.[1] The source of revenues used to calculate this ratio varies from issuer to issuer. The ratios may be based on historical, current or future revenues. Also, they may be limited only to those revenues pledged as security for the bonds (a gross coverage ratio), or they may include

1 "Additional bonds tests" included among the convenants associated with the issuance of revenue bonds (bonds whose security is the lien on a stream of revenues, as opposed to the general obligation bond, which is secured by the full faith and credit of the issuer) protect bondholders by banning the issuance of additional bonds that would lower the coverage ratio below a certain pre-determined rate. If this were not the case, bondholders who bought bonds from an issuer because of the high coverage ratio might find that ten years hence, for example, that coverage ratio had been dangerously deteriorated by the subsequent issuance of additional debt.

revenues from all sources available to the issuer net of operating expenses (a net coverage ratio).

The different coverage ratios focus on different aspects of a system's finances. Historical coverage ratios conservatively calculate the ratio only on the basis of known quantities -- revenues from, typically, the preceding fiscal year or portion thereof, and debt service requirements. Prospective coverage ratios calculate the ratio using projections of the system's revenues -- projections preferably generated by a well-known and respected private forecasting firm. Historical ratios offer the benefit of conservatism at the expense of ignoring future trends that may or may not work to the benefit of bondholders. Prospective ratios offer the opposite. A historical ratio carries more weight than a prospective ratio of the same magnitude, so the market is receptive to lower historical coverage ratios than prospective ratios. Some bond convenants require that additional bonds maintain both certain historical and prospective levels -- typically 1.5 and 2.0, respectively. This combination affords the bondholder the most security and should be followed in determining a system's financial capability.

A gross coverage ratio is based only on the pledged revenues, while a net coverage ratio considers all of the system's revenues less its operating expenses. The net coverage ratio more accurately measures the system's financial capability. A gross coverage ratio ignores the impact that revenues from non-pledged sources and the ongoing cost of operating the system have on debt repayment. While agencies usually agree, when issuing bonds, to give debt service payments priority over all other expenses, and therefore, technically only the pledged revenues are relevant to calculations of the ability to make timely repayment of debt, the reality is that a system that is not healthy enough to cover both debt service and operating expenses does not possess sufficient financial capability. Typically, the bond markets require that the pledged revenues in the year immediately preceding the issuance of debt be equal to approximately 1.5 times the annual debt service in the future.

Debt issuance limitations may further prevent agencies from issuing the debt necessary to meet capital needs, which, in turn, undermine the system's financial capability. Frequently, the legislation that authorizes the creation of a transit agency defines its responsibilities and grants it much of the same legal authority enjoyed by other public entities, while also limiting the extent to which it can exercise those powers. Of particular concern in the consideration of financial capability are the limits placed on the issuance of debt. Typically, the amount of debt outstanding is constrained to a particular amount of outstanding indebtedness. For instance, borrowing may be limited such that total debt in any year may not exceed a certain defined percentage -- perhaps 15 percent -- of assessed property values. In some agencies, such a limitation may be overturned by their governing boards. Others face greater legislative difficulties which may prove quite intractable. Where these limits on outstanding indebtedness are too low, the financial capability suffers due to a system's inability to make the necessary capital investment due to current deficits and its further inability to spread its capital costs out through the issuance of debt. So, while the debt markets may be quite receptive to further issuances of debt by such an agency and quite confident of its financial capability otherwise, limits on the amount of allowable outstanding indebtedness impair its financial capability.

#### 4.1.2.4 Evaluation of Sensitivity of Model Parameters

As mentioned above, recent history suggests that financial modeling more than a few years into the future is fraught with uncertainty. Therefore, a crucial step in the evaluation of cash flows is the measurement of the financial planning model's results' sensitivity to changes in the most important estimates and financial parameters used in the development of the model -- i.e., sensitivity analysis. While a project may be considered financially capable under the current assumptions, the question of how that capability will change as the base assumptions change -- and they most likely will -- remains. Responsible financial planning demands that an agency proceed with a complete understanding of the uncertainties of its financial plan and the pitfalls it may encounter, despite the fact that the agency may have no control over either.

Unfortunately, uncertainty underlines most input assumptions. As explained in Chapter 3, construction estimates are invariably prone to upward revision. Assumptions regarding inflation have proven consistent only in their inconsistency and attempts to predict economic growth have proved equally futile. Nevertheless, despite these uncertainties, financial planners must make reasonable, conservative estimates of future inflation and growth based on long-term trends, rely on construction estimates from engineers, and determine the financial capability of the system based on those figures -- all the while keeping in mind the uncertainties that plague the process. Therefore, the financial model should be revisited, worst case assumptions employed and the new results studied with and eye toward evaluating the financial ramifications of a weaker than expected economy or overly optimistic construction and/or operating estimates.

Sensitivity analysis is the all too often overlooked culmination of a responsible financial planning process. As explained in Chapter 3, sensitivity analyses should be performed on the important variables (inflation, growth, ridership, grant sources, operating costs and construction costs) separately and in tandem to determine the sensitivity of the financial capability with respect to each.

Actually, inflation does not have as great an effect on the bottom line as might be expected. Unless it effects one of the major factors involved in the financial planning model to a greater degree than another, e.g., increasing construction estimates at a greater rate than sales tax revenues, inflationary effects balance themselves -- with the large exception of those instances in which financial circumstances require the issuance of debt. Unfortunately, if inflation jumps from 4 percent to 8 percent, which is certainly not unreasonable, the cost of borrowing does not increase by only four more points, it leaps by almost 50 percent. For instance, in the case of $100 million borrowed for 30 years at a rate 4 points higher than inflation, an increase in inflation from 4 percent to 8 percent would increase annual debt service from $8.8 million to $12.4 million. Thus, inflation can severely diminish the financial capability of a system.

One of the most powerful effects revealed in these sensitivity analyses is the compounding of an initially minor problem. While a small change in the first year does not adversely affect the bottom line significantly in that year, ten years of lower revenues add up quickly and a healthy balance ten years hence may disappear. For instance, the failure of a tax base to grow in real terms as rapidly as expected can have a tremendous

impacts on the system's balances because of the compounding of the problem. If real growth was projected to be 3 percent, but turns out to be only 2 percent, revenues in the first year will be approximately 1 percent lower, but, even worse, by the tenth year revenues will be 12 percent lower. When the cumulative effect of a lower ending fund balance of one year contributing to an even lower funding balance in the next year is considered, the significance of the problem becomes obvious.

Recent budget pressures have made future Federal grants uncertain. Indeed, transit agencies cannot count on them as they did in the past. When planning for Federal grants, it should be assumed they will be available at levels far lower than in the past, and the possibility of their complete elimination should be considered. While this may be an extreme case, it is important to realize just how dependent most systems are on Federal funding.

As explained in Chapter 3, estimates for construction have proven notoriously inaccurate in the past, virtually always on the low side. Perhaps due to optimism, failure to consider all eventualities or changes in the design as political forces reshape the system, these figures quite frequently fall far short of the actual cost upon completion of construction. Again, though, financial planners themselves are generally not in the position to predict how these numbers will change. The planner must recognize the possibility that these estimates will prove inaccurate and demonstrate how such inaccuracies will alter the financial capability of the system in question.

As the farebox seldom provides the bulk of a system's revenues, the failure of ridership to grow as expected will not have as great an effect on the ending balance and coverage ratios as, for example, the failure of tax revenue growth to occur. However, estimates of future ridership are difficult to accurately generate and thus prone to wider swings than estimates of growth of non-fare revenue. Therefore, while errors in the estimation of ridership will probably not have the effect that errors in the estimation of real growth will, the possibility of exaggerated estimates, particularly for new start systems, requires that the sensitivity of the system's finances to variations in the system's ridership be examined closely. Table 4-4 shows an example of a sensitivity analysis of real growth (in sales tax revenues). Sensitivity analysis in general is discussed in greater detail in Chapter 3.

### 4.1.3. Identifying the Need for Alternative Revenue Sources

As indicated earlier, in determining a system's overall financial capacity, an agency must demonstrate that it has a stable stream of revenues to meet its financing requirements (i.e., to pledge as security for necessary bond issuances or to cover ongoing pay-as-you-go payments). Where that is not the case, the agency must find additional revenues elsewhere.

A new agency undertaking a major capital program should strongly consider one of the broad-based taxes that produces the largest revenue streams, i.e., sales, property, or income. Few transit agencies in this country can fund major fund capital improvements without one of those taxes. The costs are simply beyond the financial capabilities of the

# TABLE 4-4: EXAMPLE OF SENSITIVITY ANALYSIS

Financial Planning Model
Sensitivity Analysis - Base Case Growth

| SOURCES OF FUNDS | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BEGINNING CASH | 223.7 | 169.2 | 100.4 | 56.5 | 67.1 | 75.3 | 84.4 | 89.1 | 95.0 | 86.4 | 84.0 |
| Sales Tax Revenue | 165.0 | 176.7 | 191.1 | 206.7 | 223.6 | 241.2 | 259.7 | 278.8 | 298.7 | 319.2 | 340.2 |
| Farebox Revenues | 27.9 | 33.5 | 35.7 | 39.7 | 44.1 | 49.0 | 54.5 | 60.7 | 64.4 | 89.5 | 103.6 |
| Interest Income | 12.7 | 9.0 | 7.0 | 6.4 | 8.6 | 10.8 | 14.2 | 17.2 | 19.1 | 17.8 | 16.8 |
| Joint Development | 0.0 | 7.3 | 9.7 | 10.5 | 10.5 | 11.1 | 12.3 | 12.5 | 13.1 | 0.9 | 2.6 |
| Grants | 19.0 | 23.9 | 33.3 | 19.6 | 14.5 | 15.6 | 12.6 | 13.1 | 13.6 | 14.2 | 14.7 |
| Miscellaneous | 2.7 | 2.2 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 | 4.7 |
| Total Funds Available | 451.0 | 421.8 | 380.7 | 343.0 | 372.1 | 406.8 | 441.7 | 475.6 | 508.2 | 532.4 | 566.7 |
| **USES OF FUNDS** | | | | | | | | | | | |
| Operating Expenses: | | | | | | | | | | | |
| Transit System O & M | 103.0 | 106.8 | 111.1 | 115.5 | 120.5 | 136.7 | 142.6 | 154.7 | 166.1 | 215.7 | 237.7 |
| Mobility Impaired Program | 7.5 | 8.2 | 9.1 | 9.4 | 9.8 | 10.2 | 11.9 | 12.4 | 12.9 | 13.4 | 14.0 |
| Administration | 15.8 | 16.3 | 17.0 | 17.7 | 18.4 | 20.4 | 21.2 | 22.1 | 24.4 | 23.9 | 24.8 |
| Total Operating Expenses | 126.4 | 131.3 | 137.2 | 142.6 | 148.7 | 167.3 | 175.7 | 189.2 | 203.4 | 253.0 | 276.4 |
| FUNDS AVAILABLE FOR CAPITAL | 324.6 | 290.4 | 243.5 | 200.3 | 223.4 | 239.5 | 266.0 | 286.3 | 304.8 | 279.4 | 290.2 |
| **CAPITAL REQUIREMENTS** | | | | | | | | | | | |
| Bus Vehicles | 13.9 | 8.8 | 14.4 | 16.0 | 5.4 | 13.5 | 14.9 | 16.0 | 13.2 | 15.8 | 16.6 |
| Bus Transit Facilities | 37.3 | 24.4 | 16.8 | 10.4 | 4.7 | 4.6 | 4.8 | 16.8 | 18.1 | 11.6 | 12.3 |
| Transit System Improvements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.4 | 13.3 | 13.8 | 21.5 | 22.4 | 23.3 |
| Rail Transit Facilities: | 77.1 | 129.9 | 163.7 | 155.1 | 222.8 | 234.4 | 291.9 | 312.0 | 327.0 | 217.8 | 197.0 |
| Renewals & Replacements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 1.6 |
| Other | 1.6 | 1.1 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 |
| Total Capital Requirements | 130.0 | 164.3 | 195.4 | 182.1 | 233.4 | 259.5 | 325.4 | 359.3 | 380.5 | 269.8 | 251.5 |
| FUNDS AVAILABLE BEFORE FINANCING | 194.6 | 126.2 | 48.1 | 18.2 | (10.1) | (19.9) | (59.4) | (72.9) | (75.7) | 9.6 | 38.8 |
| **DEBT FINANCING** | | | | | | | | | | | |
| Long Term Financing Proceeds | 0.0 | 0.0 | 37.8 | 68.6 | 103.5 | 134.6 | 196.6 | 237.6 | 255.8 | 186.8 | 150.4 |
| Debt Service Requirements | 25.4 | 25.8 | 29.4 | 19.7 | 18.1 | 30.3 | 48.1 | 69.8 | 93.7 | 112.5 | 128.3 |
| Net Effect of Financing | (25.4) | (25.8) | 8.4 | 48.9 | 85.4 | 104.3 | 148.5 | 167.9 | 162.1 | 74.4 | 22.1 |
| ENDING CASH BALANCE | 169.2 | 100.4 | 56.5 | 67.1 | 75.3 | 84.4 | 89.1 | 95.0 | 86.4 | 84.0 | 60.9 |
| Times Interest Covered: | | | | | | | | | | | |
| Gross Sales Tax: | 6.5 | 6.9 | 6.5 | 10.5 | 12.4 | 8.0 | 5.5 | 4.1 | 3.3 | 2.9 | 2.7 |
| Sales Tax Avail. for Cap.: | 3.3 | 3.5 | 3.3 | 5.3 | 6.2 | 4.1 | 2.8 | 2.1 | 1.7 | 1.5 | 1.4 |
| Cash Flow Coverage: | | | | | | | | | | | |
| Outstanding Long Term Debt: | 0.0 | 0.0 | 42.3 | 119.1 | 234.4 | 383.6 | 600.8 | 862.0 | 1,140.7 | 1,338.5 | 1,491.6 |

## TABLE 4-4: (continued)

Financial Planning Model
Sensitivity Analysis - Base Case Gr

| SOURCES OF FUNDS | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BEGINNING CASH | 60.9 | 53.5 | 91.6 | 157.0 | 235.9 | 147.5 | 142.8 | 89.7 | 164.5 | 263.0 | 377.0 |
| Sales Tax Revenue | 362.7 | 386.6 | 412.2 | 439.4 | 468.4 | 499.3 | 532.2 | 567.4 | 604.8 | 644.7 | 687.3 |
| Farebox Revenues | 126.6 | 134.1 | 142.0 | 150.3 | 159.1 | 168.4 | 178.2 | 213.8 | 233.4 | 245.7 | 258.6 |
| Interest Income | 12.7 | 12.5 | 15.6 | 20.0 | 22.2 | 26.5 | 22.4 | 18.6 | 23.8 | 30.1 | 33.3 |
| Joint Development | 2.4 | 3.2 | 3.3 | 3.4 | 3.6 | 3.7 | 3.1 | 3.6 | 3.8 | 3.9 | 5.5 |
| Grants | 15.3 | 15.9 | 16.6 | 17.2 | 17.9 | 18.6 | 19.4 | 20.2 | 21.0 | 21.8 | 22.7 |
| Miscellaneous | 4.8 | 6.7 | 7.0 | 7.3 | 7.5 | 7.9 | 8.2 | 8.5 | 8.8 | 9.2 | 9.6 |
| Total Funds Available | 585.5 | 612.5 | 688.3 | 794.5 | 914.7 | 871.9 | 906.2 | 921.7 | 1,060.0 | 1,218.5 | 1,393.9 |
| **USES OF FUNDS** | | | | | | | | | | | |
| Operating Expenses: | | | | | | | | | | | |
| Transit System O & M | 270.7 | 290.6 | 312.2 | 335.7 | 360.5 | 388.1 | 417.7 | 460.9 | 493.7 | 528.4 | 566.5 |
| Mobility Impaired Program | 14.5 | 15.1 | 15.7 | 16.3 | 18.9 | 19.6 | 20.4 | 21.2 | 22.1 | 25.3 | 26.3 |
| Administration | 25.8 | 28.5 | 29.7 | 30.9 | 34.0 | 35.3 | 38.8 | 40.3 | 42.0 | 45.9 | 47.8 |
| Total Operating Expenses | 311.1 | 334.2 | 357.5 | 382.9 | 413.3 | 443.0 | 476.9 | 522.5 | 557.7 | 599.6 | 640.5 |
| FUNDS AVAILABLE FOR CAPITAL | 274.4 | 278.3 | 330.8 | 411.6 | 501.3 | 428.9 | 429.3 | 399.2 | 502.2 | 618.9 | 753.4 |
| **CAPITAL REQUIREMENTS** | | | | | | | | | | | |
| Bus Vehicles | 17.4 | 18.3 | 19.2 | 20.1 | 21.3 | 22.4 | 23.5 | 24.6 | 25.8 | 27.1 | 28.4 |
| Bus Transit Facilities | 12.9 | 13.4 | 14.1 | 14.9 | 15.7 | 16.5 | 17.1 | 18.0 | 19.0 | 20.0 | 21.0 |
| Transit System Improvements | 24.2 | 16.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rail Transit Facilities: | 66.1 | 0.0 | 0.0 | 0.0 | 239.7 | 331.7 | 259.3 | 0.0 | 0.0 | 0.0 | 384.5 |
| Renewals & Replacements | 1.6 | 1.7 | 3.5 | 3.6 | 5.7 | 7.9 | 10.2 | 10.6 | 11.0 | 11.5 | 11.9 |
| Other | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.1 | 1.1 | 1.1 | 1.2 |
| Total Capital Requirements | 123.1 | 51.0 | 37.7 | 39.6 | 283.3 | 379.4 | 311.1 | 54.4 | 57.0 | 59.7 | 447.1 |
| FUNDS AVAILABLE BEFORE FINANCING | 151.3 | 227.3 | 293.1 | 372.0 | 218.0 | 49.5 | 118.2 | 344.8 | 445.3 | 559.2 | 306.4 |
| **DEBT FINANCING** | | | | | | | | | | | |
| Long Term Financing Proceeds | 35.9 | 0.0 | 0.0 | 0.0 | 71.6 | 257.0 | 148.5 | 0.0 | 0.0 | 0.0 | 116.2 |
| Debt Service Requirements | 133.7 | 135.7 | 136.1 | 136.1 | 142.1 | 163.7 | 177.1 | 180.4 | 182.3 | 182.3 | 192.0 |
| Net Effect of Financing | (97.9) | (135.7) | (136.1) | (136.1) | (70.6) | 93.3 | (28.6) | (180.4) | (182.3) | (182.3) | (75.8) |
| ENDING CASH BALANCE | 53.5 | 91.6 | 157.0 | 235.9 | 147.5 | 142.8 | 89.7 | 164.5 | 263.0 | 377.0 | 230.6 |
| Times Interest Covered: | | | | | | | | | | | |
| Gross Sales Tax: | 2.8 | 2.9 | 3.1 | 3.3 | 3.4 | 3.1 | 3.1 | 3.2 | 3.4 | 3.6 | 3.6 |
| Sales Tax Avail. for Cap.: | 1.4 | 1.5 | 1.6 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.7 | 1.8 | 1.9 |
| Cash Flow Coverage: | | | | | | | | | | | |
| Outstanding Long Term Debt: | 1,512.9 | 1,490.7 | 1,466.4 | 1,440.2 | 1,492.2 | 1,749.6 | 1,882.4 | 1,843.3 | 1,799.3 | 1,752.0 | 1,831.1 |

## TABLE 4-4: (continued)

Financial Planning Model
Sensitivity Analysis - Growth One-Half Point Lower

| SOURCES OF FUNDS | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BEGINNING CASH | 223.7 | 169.2 | 99.5 | 57.3 | 68.2 | 76.7 | 86.2 | 91.4 | 97.8 | 89.8 | 88.0 |
| Sales Tax Revenue | 165.0 | 175.8 | 189.3 | 203.7 | 219.3 | 235.5 | 252.3 | 269.6 | 287.3 | 305.6 | 324.1 |
| Farebox Revenues | 27.9 | 33.5 | 35.7 | 39.7 | 44.1 | 49.0 | 54.5 | 60.7 | 64.4 | 89.5 | 103.6 |
| Interest Income | 12.7 | 9.0 | 7.1 | 6.6 | 8.9 | 11.3 | 14.8 | 18.0 | 20.1 | 19.1 | 18.4 |
| Joint Development | 0.0 | 7.3 | 9.7 | 10.5 | 10.5 | 11.1 | 12.3 | 12.5 | 13.1 | 0.9 | 2.6 |
| Grants | 19.0 | 23.9 | 33.3 | 19.6 | 14.5 | 15.6 | 12.6 | 13.1 | 13.6 | 14.2 | 14.7 |
| Miscellaneous | 2.7 | 2.2 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 | 4.7 |
| Total Funds Available | 451.0 | 420.9 | 378.1 | 340.9 | 369.2 | 402.9 | 436.7 | 469.4 | 500.7 | 523.5 | 556.2 |
| **USES OF FUNDS** | | | | | | | | | | | |
| Operating Expenses: | | | | | | | | | | | |
| Transit System O & M | 103.0 | 106.8 | 111.1 | 115.5 | 120.5 | 136.7 | 142.6 | 154.7 | 166.1 | 215.7 | 237.7 |
| Mobility Impaired Program | 7.5 | 8.2 | 9.1 | 9.4 | 9.8 | 10.2 | 11.9 | 12.4 | 12.9 | 13.4 | 14.0 |
| Administration | 15.8 | 16.3 | 17.0 | 17.7 | 18.4 | 20.4 | 21.2 | 22.1 | 24.4 | 23.9 | 24.8 |
| Total Operating Expenses | 126.4 | 131.3 | 137.2 | 142.6 | 148.7 | 167.3 | 175.7 | 189.2 | 203.4 | 253.0 | 276.4 |
| FUNDS AVAILABLE FOR CAPITAL | 324.6 | 289.5 | 240.9 | 198.3 | 220.5 | 235.7 | 261.0 | 280.2 | 297.3 | 270.5 | 279.8 |
| **CAPITAL REQUIREMENTS** | | | | | | | | | | | |
| Bus Vehicles | 13.9 | 8.8 | 14.4 | 16.0 | 5.4 | 13.5 | 14.9 | 16.0 | 13.2 | 15.8 | 16.6 |
| Bus Transit Facilities | 37.3 | 24.4 | 16.8 | 10.4 | 4.7 | 4.6 | 4.8 | 16.8 | 18.1 | 11.6 | 12.3 |
| Transit System Improvements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.4 | 13.3 | 13.8 | 21.5 | 22.4 | 23.3 |
| Rail Transit Facilities: | 77.1 | 129.9 | 163.7 | 155.1 | 222.8 | 234.4 | 291.9 | 312.0 | 327.0 | 217.8 | 197.0 |
| Renewals & Replacements | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 1.6 |
| Other | 1.6 | 1.1 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 |
| Total Capital Requirements | 130.0 | 164.3 | 195.4 | 182.1 | 233.4 | 259.5 | 325.4 | 359.3 | 380.5 | 269.8 | 251.5 |
| FUNDS AVAILABLE BEFORE FINANCING | 194.6 | 125.3 | 45.5 | 16.2 | (12.9) | (23.8) | (64.4) | (79.1) | (83.2) | 0.7 | 28.3 |
| **DEBT FINANCING** | | | | | | | | | | | |
| Long Term Financing Proceeds | 0.0 | 0.0 | 41.4 | 72.4 | 108.9 | 142.1 | 206.6 | 250.5 | 272.1 | 207.0 | 175.1 |
| Debt Service Requirements | 25.4 | 25.8 | 29.7 | 20.4 | 19.2 | 32.1 | 50.8 | 73.6 | 99.1 | 119.7 | 137.9 |
| Net Effect of Financing | (25.4) | (25.8) | 11.8 | 52.0 | 89.7 | 110.0 | 155.8 | 176.9 | 173.0 | 87.3 | 37.3 |
| ENDING CASH BALANCE | 169.2 | 99.5 | 57.3 | 68.2 | 76.7 | 86.2 | 91.4 | 97.8 | 89.8 | 88.0 | 65.6 |
| Times Interest Covered: | | | | | | | | | | | |
| Gross Sales Tax: | 6.5 | 6.9 | 6.4 | 10.0 | 11.5 | 7.4 | 5.0 | 3.7 | 3.0 | 2.6 | 2.4 |
| Sales Tax Avail. for Cap.: | 3.3 | 3.4 | 3.2 | 5.0 | 5.8 | 3.7 | 2.5 | 1.9 | 1.5 | 1.3 | 1.2 |
| Cash Flow Coverage: | | | | | | | | | | | |
| Outstanding Long Term Debt: | 0.0 | 0.0 | 46.4 | 127.4 | 248.7 | 406.3 | 634.5 | 909.8 | 1,206.3 | 1,426.1 | 1,605.9 |

## TABLE 4-4: (continued)

Financial Planning Model
Sensitivity Analysis - Growth One-Ha

| SOURCES OF FUNDS | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BEGINNING CASH | 65.6 | 58.9 | 64.9 | 89.8 | 129.8 | 156.8 | 153.4 | 101.6 | 105.4 | 119.2 | 208.2 |
| Sales Tax Revenue | 343.9 | 364.8 | 386.9 | 410.5 | 435.4 | 461.9 | 490.0 | 519.8 | 551.4 | 584.9 | 620.5 |
| Farebox Revenues | 126.6 | 134.1 | 142.0 | 150.3 | 159.1 | 168.4 | 178.2 | 213.8 | 233.4 | 245.7 | 258.6 |
| Interest Income | 14.7 | 12.7 | 13.6 | 15.8 | 26.3 | 31.4 | 28.2 | 20.6 | 21.2 | 27.1 | 44.0 |
| Joint Development | 2.4 | 3.2 | 3.3 | 3.4 | 3.6 | 3.7 | 3.1 | 3.6 | 3.8 | 3.9 | 5.5 |
| Grants | 15.3 | 15.9 | 16.6 | 17.2 | 17.9 | 18.6 | 19.4 | 20.2 | 21.0 | 21.8 | 22.7 |
| Miscellaneous | 4.8 | 6.7 | 7.0 | 7.3 | 7.5 | 7.9 | 8.2 | 8.5 | 8.8 | 9.2 | 9.6 |
| Total Funds Available | 573.3 | 596.3 | 634.4 | 694.3 | 779.7 | 848.7 | 880.3 | 888.0 | 944.9 | 1,011.8 | 1,169.0 |
| **USES OF FUNDS** | | | | | | | | | | | |
| Operating Expenses: | | | | | | | | | | | |
| Transit System O & M | 270.7 | 290.6 | 312.2 | 335.7 | 360.5 | 388.1 | 417.7 | 460.9 | 493.7 | 528.4 | 566.5 |
| Mobility Impaired Program | 14.5 | 15.1 | 15.7 | 16.3 | 18.9 | 19.6 | 20.4 | 21.2 | 22.1 | 25.3 | 26.3 |
| Administration | 25.8 | 28.5 | 29.7 | 30.9 | 34.0 | 35.3 | 38.8 | 40.3 | 42.0 | 45.9 | 47.8 |
| Total Operating Expenses | 311.1 | 334.2 | 357.5 | 382.9 | 413.3 | 443.0 | 476.9 | 522.5 | 557.7 | 599.6 | 640.5 |
| FUNDS AVAILABLE FOR CAPITAL | 262.3 | 262.1 | 276.8 | 311.4 | 366.4 | 405.7 | 403.5 | 365.5 | 387.2 | 412.2 | 528.5 |
| **CAPITAL REQUIREMENTS** | | | | | | | | | | | |
| Bus Vehicles | 17.4 | 18.3 | 19.2 | 20.1 | 21.3 | 22.4 | 23.5 | 24.6 | 25.8 | 27.1 | 28.4 |
| Bus Transit Facilities | 12.9 | 13.4 | 14.1 | 14.9 | 15.7 | 16.5 | 17.1 | 18.0 | 19.0 | 20.0 | 21.0 |
| Transit System Improvements | 24.2 | 16.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rail Transit Facilities: | 66.1 | 0.0 | 0.0 | 0.0 | 239.7 | 331.7 | 259.3 | 0.0 | 0.0 | 0.0 | 384.5 |
| Renewals & Replacements | 1.6 | 1.7 | 3.5 | 3.6 | 5.7 | 7.9 | 10.2 | 10.6 | 11.0 | 11.5 | 11.9 |
| Other | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.1 | 1.1 | 1.1 | 1.2 |
| Total Capital Requirements | 123.1 | 51.0 | 37.7 | 39.6 | 283.3 | 379.4 | 311.1 | 54.4 | 57.0 | 59.7 | 447.1 |
| FUNDS AVAILABLE BEFORE FINANCING | 139.2 | 211.1 | 239.1 | 271.8 | 83.1 | 26.3 | 92.4 | 311.2 | 330.2 | 352.5 | 81.5 |
| **DEBT FINANCING** | | | | | | | | | | | |
| Long Term Financing Proceeds | 65.8 | 2.2 | 0.0 | 7.9 | 244.3 | 324.9 | 229.5 | 20.4 | 19.6 | 94.6 | 444.1 |
| Debt Service Requirements | 146.0 | 148.5 | 149.3 | 150.0 | 170.5 | 197.9 | 220.2 | 226.1 | 230.7 | 238.9 | 276.4 |
| Net Effect of Financing | (80.2) | (146.2) | (149.3) | (142.1) | 73.8 | 127.1 | 9.2 | (205.7) | (211.1) | (144.3) | 167.7 |
| ENDING CASH BALANCE | 58.9 | 64.9 | 89.8 | 129.8 | 156.8 | 153.4 | 101.6 | 105.4 | 119.2 | 208.2 | 249.2 |
| Times Interest Covered: | | | | | | | | | | | |
| Gross Sales Tax: | 2.4 | 2.5 | 2.7 | 2.8 | 2.6 | 2.4 | 2.3 | 2.4 | 2.5 | 2.5 | 2.3 |
| Sales Tax Avail. for Cap.: | 1.2 | 1.3 | 1.4 | 1.4 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.2 |
| Cash Flow Coverage: | | | | | | | | | | | |
| Outstanding Long Term Debt: | 1,659.4 | 1,638.1 | 1,611.7 | 1,592.1 | 1,834.9 | 2,165.5 | 2,383.7 | 2,360.9 | 2,330.9 | 2,380.6 | 2,817.0 |

typical transit agency. The financial planning model will indicate the amount of funds needed annually to insure that fund balances, coverage ratios and other key financial indicators are maintained in a financially sound manner. Fortunately, the detailed records kept regarding the historical bases of these taxes enable economic forecasters to predict with reasonable accuracy the revenues from these stable sources, and therefore, determine the levels at which the taxes will have to be applied.

Systems with more modest requirements or older system with one of the four most prolific taxes already in place -- and imposed to the "politically acceptable" limit -- may wish to consider other revenue sources, i.e., other types of taxes, benefit-sharing techniques, or use of property rights. Particularly when constructing a new station or an addition to a rail line that will benefit a well-defined portion of the community -- perhaps a new development -- the agency should consider special assessments or incremental taxes that attempt to recover some of the costs of construction from the principal beneficiaries (e.g., the property owners or developers). (These sources are discussed in Chapters 2 and 3, and in Section 4.3)

Other sources of revenue are limited. Obviously, an agency may wish to consider fare increases. However, this generally meets with stiff political opposition, which severely limits it as a viable option.

Alternative to generating additional revenues, an agency may have to consider cost-cutting procedures or rescheduling construction to defer expenses. Recently, as it has experienced tighter budgetary restraints, UMTA has encouraged agencies to look toward greater private sector involvement for savings. As described in Section 4.2, "privatization" promises reduced expenses through the greater efficiencies of the private sector,i.e., when construction and operations are freed from the political and legal restrictions imposed on public agencies. Another private sector initiative, the leasing of vehicles or facilities from private entities to transit agencies exploits private entities' ability to avail themselves of tax savings through the use of depreciation benefits unavailable to tax-exempt public agencies. When structured properly, both the transit agency and the private entity share in these benefits. (Leasing is also discussed in Section 4.2.) Both of these types of techniques (i.e., relying on the private sector) deserve consideration regardless of an agency's financial position. As a transit agency's capital and/or general financial needs become more pressing, private sector initiatives warrant even closer scrutiny.

Finally, when all other possibilites have been exhausted, the agency must reconsider is construction program. All too frequently, completed financial planning models have uncovered flaws in earlier models that show the agency's financial capability to be far less than originally estimated, forcing these agencies to rescale their initial, sometimes grandiose, plans. This is an unfortunate, but all too often necessary, measure. On other occasions, more realistic appraisals of an agency's financial state have required the lengthening of the construction process to postpone the issuance of debt and/or payment of construction and engineering contracts until further revenues become available.

The following sections discuss the selection and development of a financing strategy and alternative revenue sources in response to the revenue needs identified in the financial capacity analysis: Section 4.2 discusses financing strategies, i.e., issuing debt and

privatization, and 4.3 discusses new revenue sources. The financing strategy and alternative revenue sources represent key components, along with current revenue sources, of the system financial plan.

## 4.2 DEVELOPING A FINANCING STRATEGY

As indicated in the previous section, there are three general approaches through which a transit system may address its financing needs: pay-as-you go, issuance of debt, and privatization; issuance of debt may include vendor financing, leasing, or bonding. Depending on the magnitude and timing of the financial needs, an agency may find it appropriate to employ a combination of strategies. For instance, it may be advantageous to issue a bond to cover the major construction costs of a new rail line, while vendor financing or leasing may be a useful approach in procuring vehicles. In any event, once a strategy (or strategies) has been selected, it is necessary to ensure that there is sufficient revenue to support that strategy. This may involve developing new revenue sources, as is discussed in the next section.

Selecting a specific financing strategy requires a review of the system's cash flow and financing needs, coupled with an analysis of the relative benefits and costs of the candidate strategies. For instance, what vs the net present value of a private financing arrangement vs. the net present value of a bond. An agency should determine the most cost-effective approach for each major cost component. The alternative financing approaches are discussed below.

### 4.2.1 Pay-As-You-Go

As suggested in the previous section, a system should, whenever feasible, attempt to cover expenses with revenues received in the current year. Clearly, there is a significant cost advantage to an agency in avoiding debt service payments and other expenses associated with implementing financing arrangements.

The pay-as-you-go approach is obviously infeasible in any situation requiring a large infusion of capital up-front. It may be appropriate for funding certain short schedule projects, however, as long as there is sufficient annual revenue from a stable -- and predictable -- source such as a sales tax. Unfortunately, the capital-intensive nature of most major transit improvements requires the use of one of the other available financing strategies; these are discussed below.

### 4.2.2 Debt Financing

A transit system faced with the prospect of insufficient cash flow to cover capital as well as operating and maintenance expenses must typically incur debt, in some form, if its capital program is to proceed on a reasonable schedule. As discussed in Section 4.1, the analysis to determine the appropriate level and form of debt is complex and depends on a number of variables. This section discusses the three most common forms of debt: vendor financing, leasing and the issuance of bonds.

The three general debt forms, each of which offer its own advantages, must be reviewed with consideration of such factors as accounting and reporting of debt, public attitude towards debt form, approval process, cash flow, present value benefits and impact on entities outside of the transit system. Vendor financing, which is often limited to certain types of equipment, is typically provided to transit systems at a cost comparable to the corporation's cost of borrowing. This financing is accounted for as debt on a transit system's balance sheet, but in some jurisdictions may not require a referendum vote for approval, making the process quite expeditious. Lease financing has held a certain level of appeal because of its off-balance sheet status and its low cost of financing. Such a contract allows a corporation to own equipment and buildings, depreciate these assets for tax benefits, then lease the property to a transit system at a low cost. In addition, leasing contracts also usually do not require referendum approval. Finally, bond issuance is often the least costly debt form, particularly with the issuance of tax-exempt bonds. This debt structure can be cumbersome due to the complex requirements such as referendum approval, obtaining the authority to issue debt, preparation of legal documents and marketing and selling the debt. In addition, the use of bonds can limit the issuing entity's ability to issue additional debt in the future. Each of these characteristics must be understood, analyzed and reviewed with the goal of selecting the best form (or combination of forms) to meet the transit agency's financing needs.

#### 4.2.2.1 Vendor Financing

Vendor financing refers to financing offered to a transit system by an equipment vendor allowing advantageous payment terms for equipment sales and services. Vendor financing usually takes one of two forms: the vendor either accepts an extended payment schedule, or acts as a conduit for financing. In the first case, the corporate entity has deferred its receipt of sales revenue. In the second case, a financial institution finances the sale, but provides the funds through the vendor.

Prior to 1986, vendor financing was a major factor in the equipment purchase decision, since many equipment manufacturers offered attractive, below market financing rates. The low financing cost would reduce the "all-in-cost" of an equipment acquisition. However, many domestic companies protested that the low vendor financings represented unfair business practices, particularly those financings offered by foreign companies. To respond to these complaints, Congress passed legislation in 1986, prohibiting contractors from offering below market loans for vendor financings. As a result, current vendor financings are based solely on the credit of the contractor.

Since the interest rate for vendor financing is based on the credit rating of the contractor (the actual borrower), numerous debt guarantee structures have been designed to maximize the borrower's credit rating. Vendor financing by domestic companies is often provided through finance subsidiaries that are active borrowers in the capital market. The debt is often highly rated since it is secured by certain assets or corporate guarantees. Internationally, debt guarantee may have many forms. Depending on the ownership of a contractor, vendor debt can be guaranteed by a foreign government or by domicile banks. Guarantees in these forms usually provide very attractive borrowing rates.

A key benefit of vendor financing is its all-in-one process. The transaction is completed through one entity, i.e., such factors as equipment price, financing rate and prepayment schedule are all negotiated with the vendor. Vendor financing can be an important financing strategy for transit agencies. Of course, since it applies only to the procurement of vehicles or other equipment, it represents only one component of the overall financing plan for a major capital improvement.

#### 4.2.2.2 Leasing

Leasing has long been a method of providing for the use of assets without the requirements for a capital outlay. Over the past 25 years leasing has become increasingly popular for a number of reasons; among the key attractions have been that it generally provides 100 percent financing and enables transit systems to increase their overall debt-raising capabilities by offering cash flow benefits and flexibility, since leasing payments can be tailored to the specific needs of lessees. Recognizing the growing interest in leasing among transit agencies, UMTA has now made capital grants available for covering the cost of leasing. As mentioned in Chapter 1 of this Guide, Section 308 of the Federal Mass Transportation Act of 1987 has amended Section 9(j) of the UMT Act of 1964 by inserting the following wording:

"Grants for construction projects under this section shall also be available to finance the leasing of facilities and equipment for use in mass transportation service, subject to regulations limiting such grants to leasing arrangements which are more cost effective than acquisition or construction ... "

##### Types of Leasing

Leasing, although classified in many ways, is basically a commercial arrangement whereby an equipment owner (the lessor) conveys to the equipment user (the lessee) the right to use the equipment in return for the payment of specified rentals over an agreed upon period of time. Specific leasing definitions vary according to the tax treatment, accounting treatment, and actual form of leasing arrangement. For instance, from the perspective of the Internal Revenue Service, there are two basic types of leases: "true leases" and "conditional sale" arrangements. The former is the traditional rental lease arrangement oriented towards producing the tax benefits of ownership, depreciation, and, until recently, the investment tax credit[2] for the lessor. The lessor has traditionally passed along the tax benefits of ownership to the lessee through reduced lease rental payments. A conditional sale, on the other hand, is considered to be a sale rather than a rental arrangement, in that the lessee is considered to be the owner of the asset; the lessee "purchases" the asset through installment payments (principal plus interest).

Meanwhile, from an accounting perspective, the principal types of leasing arrangements are "capital (or finance) leases" and "operating leases". Although the dividing line is sometimes blurred, the legal rights of the lessor and lessee and the accounting and tax treatment may well depend on which side of the line a particular lease

2 The investment tax credit was eliminated in the Tax Reform Act of 1986.

contract falls. In a capital lease, similar to a conditional sale lease, the lessor transfers to the lessee substantially all the risks and rewards incident to ownership of an asset. Title may or may not eventually be transferred. In a capital lease, the rentals payable during the non-cancellable lease term are normally sufficient to enable the lessor to recover the capital cost of the equipment and, additionally, provide a return on funds invested.

An operating lease is similar to a true lease; the risks and rewards incident to ownership are not transferred by the lessor to the lessee. The term operating lease encompasses the short-term hire of equipment. Under an operating lease, the cost of a leased asset is not wholly recovered by the lessor out of the rentals receivable during the non-cancellable period, which is normally significantly shorter than the estimated useful life of the equipment. The lessor relies on the residual value of the equipment to recover the balance of the net investment and to earn a profit. The residual value is the worth of the leased asset at the expiration of the lease term. This value will be represented by the rentals receivable for any re-lease of the equipment and/or by the net proceeds following a sale. Normally, an operating lease is confined to those types of equipment with an established used or second-hand market -- and hence some value -- where the equipment user does not plan to use the asset for the whole of its working life, possibly anticipating technological changes. An operating lease covers a wide range of commercial activities, although for accounting purposes, the expression normally refers to any leasing arrangement which is not classified as a capital lease.

Finally, two specific leasing arrangements have been used in transit and other public financings; these are "certificate of participation" (COP) and "sale-leaseback" arrangements. COP's (also known as "equipment trust certificates") are used to finance equipment purchases (or lease-purchase agreements) by dividing the cost among many investors; in other words, each investor owns a percentage of a piece of equipment and leases that share back to the transit agency or city. In this way, a transit agency can finance its equipment needs through a trustee bank that would issue the debt, hold title to the equipment on behalf of the investors and lease the equipment to the agency. This allows the agency the opportunity to reduce the current year cost associated with new vehicle acquisition by allowing the cost to be allocated over several years. The terms of these leases are typically ten years, although they can be much longer -- as long as thirty years. Obviously, a key issue that must be addressed in establishing a COP program is the marketability of the shares to prospective investors. In the case of a COP financing by the Southern California Rapid Transit District, for instance, the projection of the market value of buses was sufficient to attract bond insurance with the provision of a requirement that bonds be redeemed in any year such that the ratio of asset market value to principal outstanding was always 125 percent or greater. Another option to strengthen the marketability of the collateral would be for the manufacturer of the buses to provide a guaranteed repurchase price for each year, thereby essentially guaranteeing the principal amount of the bonds. Clearly, for an issuer that is financially weak, this financing mechanism would be more viable for buses than for rail vehicles, as there will always be a greater market for used buses. In any event, however, because of the security provided by the security interest in the vehicles, the issuance of COP's would not be as problematic as would the issuance of general unsecured debt by an agency.

In a sale/leaseback agreement, private investors are recruited to buy all or part of certain transit equipment (or facilities); the investors then lease the equipment back to the transit agency.[3] The primary benefit to a transit agency would be the ability to raise capital, while simultaneously reducing assets and liability items. Until 1984, sale-leasebacks of municipal property offered the opportunity for municpal issuers to finance capital assets at effective interest costs at or below the costs associated with long-term tax-exempt debt. This low cost resulted from a combination of factors, including 1) the ability to attract private equity capital to reduce the amount of debt needed to finance a project, 2) the ability of a private owner to rapidly depreciate the property financed, and 3) the ability to finance the debt component at tax-exempt rates. However, in 1984, Congress passed the Deficit Reduction Act, which curtailed the tax breaks available to private investors who leased property or equipment to tax-exempt entities. The provisions of that Act made it illegal for investors to receive accelerated
depreciation benefits in conjunction with a municipal sale-leaseback utilizing tax-exempt bonds. This restriction has reduced the attractiveness of sale-leasebacks, particularly for municipal issuers that have the option of proceeding with a 100 percent tax-exempt financing as an alternative.

Thus, for a sale-leaseback transaction to be attractive to equity investors it would require a financing structure different from municipal sale-leasebacks completed prior to the 1984 Act. For instance, a sale-leaseback could be structured using either taxable financing in conjunction with accelerated depreciation or tax-exempt financing in conjunction with straight-line depreciation. If properly, structured, such an arrangement can still represent an attractive means of raising private debt and equity capital. Regardless of the type of arrangement an agency may wish to develop, it is important in structuring a leasing arrangement to clearly establish the tax treatment of the transaction. An IRS ruling that characterizes a lease differently from the intended structure could significantly affect the benefits of the arrangement. Thus, particularly in large scale, complex arrangements, it may be advisable to seek an advance ruling from the IRS.

## The Advantages of Leasing

Most leasing company descriptions contain a list of the advantages of leasing to prospective lessees. Only some of the benefits may apply in any particular circumstance, but they should all be taken into account when deciding whether or not leasing should be selected as the method to finance any specific equipment procurement. The primary advantages of leasing over other forms of financing can be summarized as follows.

- Leasing generally does not require approval of the region's voters. In contrast, issuance of bonds typically must be submitted to public referendum.

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3 As indicated in Chapter 2, another strategy that has been widely used by transit agencies -- safe harbor leasing -- is no longer legally permitted. Laws permitting safe harbor leasing have a "sunset" provision, allowing it only for equipment that was placed in service by 12/31/87 or that had been ordered by 3/31/83.

- Leasing allows transit agencies to leverage their capital budgets. For instance, with a given budget for equipment acquisition, an agency could conceivably acquire the use of five or more times as much equipment through leasing as it could purchase with the same budget for that year.

- Leasing can allow an agency to benefit from potential cost savings obtainable through competitively-selected development of facilities or provision of equipment.

- Leasing provides up to 100 percent of the cost of the equipment. In many cases no deposits or advance payments are required. There are exceptions, such as for a lease of very low cost equipment, for a lessee that is a borderline risk, or when there is a tax benefit arising from the lessee making a substantial initial rental. Clearly, any leasing arrangement that requires rentals to be paid in advance does not represent 100 percent financing. Nevertheless, leasing often does provide a higher percentage of financing than an equivalent installment credit arrangement.

- Leasing does not tie up valuable working capital or credit lines; a leasing arrangement preserves liquidity for other more appropriate uses.

- Leasing offers cash flow benefits. Rentals fixed at the inception of a lease assist expense budgeting and cash flow forecasting. The lease term is normally related to the useful life of the equipment.

- Leasing may be off balance sheet. Leasing is not borrowing and there may be no accounting requirement to show leased equipment and the corresponding liability to make future rental payments on the balance sheet of the lessee.

- Leasing may avoid loan covenants or capital investment restraints. Since leasing is not legally borrowing and so may circumvent restrictive loan covenants and capital budgeting constraints, lenders and head office financial controllers are now more aware of the leasing loophole.

- Leasing is straightforward. Leasing minimizes administrative costs and simplifies tax and accounting procedures. Asset depreciation normally becomes the lessor's responsibility. Documentation is simplified.

## Leasing Credit Procedures

Every type of financial institution and corporation establishes credit policies and procedures to be followed in approving lease credit applications. Policies and procedures may be rigidly defined and documented, or may be implicit and flexible. The degree of formality will depend on many factors, but mainly the type of business undertaken, the nature of the risks involved and the amount of credit to be granted.

The basic credit criteria to be taken into account in deciding whether or not to proceed with a credit application will depend to a large extent on the type and size of leasing agreements. Factors which may be included are:

- equipment details: The equipment may consist of a single item or multiplicity of similar and different items.

- the purpose for which the equipment is required: Will the equipment be additional or replacement equipment? Will it be used for diversification into a new area, for saving operating costs, for increasing productivity or for other purposes?

- the estimated delivered cost of the equipment and the total amount to be financed: Although a leasing arrangement can be provided for 100 percent of the equipment cost, the lessee may wish to minimize the rental amount by paying an initial rental, or the lessor may restrict the amount financed to reduce its credit exposure. The lessee and lessor need to clearly establish whether the leasing agreement is to cover installation costs and associated items.

- any special factors pertaining to the equipment: Are there subsidized export credit facilities available; does the supplier offer a cash discount; do government investment grants apply; are there any restrictions on use; are license fees payable?

- proposed term and structure: For how long is the arrangement required, and does the lessee have a particular payment profile or rental rate in mind?

- additional security: Is additional security available and, if so, what form does it take? For example, will it be possible to obtain governmental or bank guarantees?

- financial information: Audited financial statements including balance sheets, profit and loss accounts and supporting information should be provided.

- cash flow projections: Cash flow projections of the operation for which the equipment is required covering the whole of the proposed lease term.

- operating plans: A lessor may wish to receive details of operating strategies and plans.

In summary, leasing has become a widespread approach to financing equipment and facility procurement by public entities. Though leasing can take several alternative forms -- offering different types of benefits to both lessors and lessees -- the general approach offers several distinct advantages over other types of financing (e.g., issuance of bonds); these include the ability to secure financing without securing voter approval and the ability to leverage assets in a significant fashion.

### 4.2.2.3 Bond Financing

The third form of debt, widely used to finance major transit capital projects, is what is generally known as bond financing. Bond financing allows the issuing body to raise large amounts of capital and then spread repayment of the "loan" over time. Although "bonding" is typically used to refer to all forms of financing instruments, bonds are, in fact, long term debt obligations. Long term debt is issued for a term of five years or more; short term debt, on the other hand, is typically issued for a term of three years or less. Short-term obligations are generally referred to as notes. These two types of debt are discussed below.

#### Short-Term Debt

Short-term debt can be used to cover either operating or capital expenses. It is generally issued to meet temporary cash flow needs, i.e., due to either 1) revenue shortfalls caused by emergencies or delay in receipt of funds, or 2) the desire to begin capital projects in advance of the availability of long-term financing. The major types of short-term financing instruments are as follows.

Tax, Revenue, Grant and Bond Anticipation Notes (TANs, RANs, GANs, and BANs) - These are temporary borrowing instruments. Usually, notes are issued for a period of 12 months, though it is not uncommon for notes to be issued for periods of as short as 3 months or for as long as three years. TANs and RANs (also known as TRANs) are issued in anticipation of the collection of taxes or other expected revenues. These are borrowings to even out the cash flows caused by irregular flows of income. BANs are issued in anticipation of the sale of long-term bonds.

Tax-Exempt Commercial Paper - This short-term borrowing instrument is used for periods ranging from 30 to 270 days. Generally, tax exempt commercial paper has backstop commercial bank agreements, which can include an irrevocable letter of credit, a revolving credit agreement, or a line of credit.

#### Long-Term Debt

Bonds are generally classified according to their means of security, i.e., the source of funds used to repay the loan. Bonds issued by public bodies are basically of two forms: general obligation and revenue bonds. In the past five years (1982 - 1987), municipal entities have issued nearly $14 billion in bonds to finance transit projects. Of these bonds, 18 percent were general obligation bonds and 82 percent were revenue-related bonds.

While the two major categories of long-term debt are general obligation and revenue bonds, there are also other types of bonds that do not fall neatly within either of the categories; these are described below under a third category: hybrid and special bond securities. The different types of instruments are described below.

General Obligation Bonds - General obligation bonds are debt instruments, issued by public entities, that are secured by the issuer's unlimited taxing power. For smaller governmental jurisdictions, such as school districts and towns, the only available unlimited

taxing power is on property. For larger general obligation bond issuers, such as states and big cities, the tax revenues are more diverse and may include corporate and individual income taxes and property taxes. The security pledges for these larger issuers are sometimes referred to as being "full faith and credit" obligations.

In addition, certain general obligation bonds are secured not only by the issuer's general taxing powers to create revenues accumulated in the general fund, but also from certain identified fees, grants and special charges, which provide additional revenues from outside the general fund. Such bonds are known as being "double barreled" in security because of the dual nature of the revenue sources. Finally, not all general obligation bonds are secured by unlimited taxing powers. Some have pledged taxes that are limited as to revenue sources and maximum millage amounts. Such bonds are known as limited-tax general obligation bonds.

General obligation bonds issued by states and municipalities are beginning to increase in use when compared with revenue bonds, which had developed popularity in the 1970's. The major advantages of general obligation bonds over other types can be summarized as follows:

- the strong security pledge of the public entity generally produces the lowest interest rates,
- they tend to be simpler and have lower administration costs,
- they are well-suited to competitive sales, and
- the issuing agency avoids covenants that restrict future financing options

On the other hand, a body (e.g., a transit agency) wishing to issue a general obligation bond must have the legal authority and power to levy taxes. In many states, transit agencies do not have such power. Of course, this limitation can be overcome where the state or municipality issues bonds on the transit agency's behalf; this approach has been used in Massachusetts, for example, where the state backs bonds issued for use by the MBTA (in Boston). Other disadvantages to general obligation bonds are as follows:

- limits are often imposed by states on the amount of debt that can be issued by localities (e.g., the amount of debt as a percentage of the local property tax base), and
- some states require that local bonds be approved by a region's voters through a referendum.

Revenue Bonds - The second basic type of security structure is found in a revenue bond. Such bonds are issued for financings in which the bond issuers pledge to the bondholders revenues generated by the operating projects being financed. In transit financings, such revenues may include such sources as fares, income from a benefit-

sharing strategy (e.g., benefit assessment or tax increment financing district), or "service contracts".[4]

Revenue bond use increased in the mid-1970's due to taxpayer "revolts" in many states including California, New Jersey, Massachusetts, and Michigan. These resulted in various degrees of spending restraints as well as limitations on the types of taxes that could be levied for general obligation bonds. Revenue bond financing provides a convenient method of matching the capital cost of a facility to the ultimate user by amortizing the bond issue in annual installments over a period of years and paying debt service from user fees. The chief advantages of revenue bonds over other types of bonds are as follows:

- a revenue bond generally avoids the need for voter approval, thus reducing delays,
- it avoids encroachment on constitutional or statutory debt limitations,
- it facilitates financing that involves several municipal entities, and
- it can be used by agencies that lack taxing authority -- and that therefore cannot issue general obligation bonds.

The major disadvantages to revenue bonds are as follows:

- revenue bonds generally have higher interest rates, and often greater issuing costs as well, and
- the lack of mandated debt ceiling may allow an agency to overburden itself with debt.

Hybrid and Special Bond Securities - Though having certain characteristics of general obligation and revenue bonds, there are some municipal bonds that have more unique security structures. They include the following:

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4 The success of the New York MTA in the development and sale of $250 million Transit Facilities and Commuter Facilities Service Contract Bonds marked a milestone in investor and rating agency recognition of the role of a mass transit system in the social and economic life of a city. Those bonds are unique in several ways. First, they are the first revenue bonds ever issued by a public mass transit system without either the security of dedicated taxes or a direct backstop provided by another governmental entity. Second, because the bonds are payable only from service contract revenues between the MTA and the underlying government body, the debt does not inhibit the transit system's ability to use its internal resources for other purposes. Finally, since the service contract payment is subject to annual legislative appropriation, the debt is not an obligation of the underlying government and does not affect the ability of that government to issue general obligation debt for its own purposes within its credit limit. (MTA financing is discussed further in Appendix A).

- Insured Bonds - These are bonds that, in addition to being secured by the issuer's revenues, are also backed by insurance policies written by commercial casualty insurance companies. The insurance, usually structured as a surety insurance policy, provides prompt payment to the bondholders if a default should occur.

- Lease-Backed Bonds - Lease-backed bonds are usually structured as revenue-type bonds with annual rent payments. In some instances the rental payments may only come from earmarked tax revenues, or perhaps tolls. In other instances, the underlying lessee governmental unit is required to make annual appropriations from its general fund.

- Letter of Credit-Backed Bonds - Some municipal bonds, in addition to being secured by the issuer's cash flow revenues, are also backed by commercial bank letters of credit. In some instances, the letters of credit are irrevocable and, if necessary, can be used to pay the bondholders. In other instances, the issuers are required to maintain investment worthiness before the letters of credit can be drawn upon.

- Moral Obligation Bonds - A moral obligation bond is a security structure for state-issued bonds that indicates that if revenues are needed for paying bondholders, the state legislature involved is legally authorized, though not required, to make an appropriation out of general state-tax revenues.

- Municipal Utility District Revenue Bonds - These are bonds that are issued to finance the construction of water and sewer systems (although also transit facilities, in underdeveloped areas). The security is usually dependent on the commercial success of the specific development project involved, which can range from the sale of new homes to the renting of space in shopping centers and office buildings.

- Double-Barreled Bonds - As described above, a combination of general obligation and revenue bond structure. This instrument is backed first by revenues from the facility and second by a pledge of general taxing power.

Finally, there is another form of bond that should be mentioned here. Variable rate bonds are nominally long-term securities but have floating interest rates that change on a weekly or monthly basis. The interest rates are tied to various indices, such as Treasury bill rates, the weekly Bond Buyer Index, or combinations of these and other indices.

Obviously, there are many important considerations in designing and implementing a bond issue -- or any type of debt instrument for that matter. The myriad of legal, institutional, and financial issues involved dictate that the transit agency secure the assistance of an appropriate financial advisor and other professionals (e.g., bond counsel and underwriter). These professionals will assist the agency in structuring and then marketing the debt issue. The major steps and considerations involved in this process, including the selection of advisors, are discussed in Section 4.5: Implementing the Financing Plan.

### 4.2.3 Privatization

As has been mentioned throughout this Guide, several factors have, in recent years, combined to focus increasing attention on the "privatization" of transit facilities and services. The principal pressures have been spiralling costs, coupled with a tightening of the availability of Federal capital funds. To address these growing budgetary restraints, while also seeking to reduce the Federal government's role in supporting public services (e.g., transit), UMTA has stressed the consideration of private sector transit involvement as a means of both reducing operating and capital costs and securing new sources of revenue.

Private sector involvement in transit has been pursued in the following basic areas:

- investments or contributions,
- operations, and
- financing and/or ownership.

The first category includes a number of the alternative revenue sources (i.e., benefit-sharing and joint development arrangements); these are discussed in Section 4.3 and are not discussed further in this section. The second category includes contracting for service and the private provision of service (without public contract or subsidy); this is not a financing strategy per se, but rather a means of reducing costs. The third category includes some combination of design, financing, development, construction, ownership, and operation of a fixed guideway system or other facility. The latter two privatization approaches are discussed below.

#### 4.2.3.1 Private Operation

Rapidly rising operating costs, as well as shifting residential and development patterns have made it increasingly difficult to provide cost-effective transit service throughout each metropolitan area. These factors, coupled with the Federal Administration's ongoing push to reduce Federal operating assistance, have prompted transit agencies to study the feasibility -- and benefit -- of providing alternative lower cost forms of service in certain areas and/or to meet certain market needs.

The general approach to meeting these objectives is to contract with a private operator to provide service (1) within specific service areas (possibly replacing the existing fixed routes in those locations altogether, but more likely replacing fixed routes during off-peak hours) or (2) for special groups (i.e., the elderly and handicapped or commuters). The intent of this strategy is to reduce the transit agency's cost by (1) taking advantage of the typically lower operating costs of private operators, and (2) replacing the current service with a more efficient form of service (e.g., demand-responsive service in lower density areas or during periods of very low demand).

Contracting for service can take several other forms as well, including the following:

- a local government or transit authority can contract with a private provider to operate the entire transit system, including provision of equipment,

- the local government or transit authority can own all capital assets (i.e., facilities and equipment), and contract out management and operation (i.e., provide drivers and other personnel) of the transit system,

- the local government of transit authority can contract out management of the transit system or certain support services (e.g., vehicle maintenance, or ticket sales).

The extent to which operating deficits can be reduced through private contracting depends largely on the degree to which the private operator(s)' wage and fringe rates are lower than the public operator's. A private operator may also be able to achieve greater efficiency in scheduling drivers, due to less restrictive work rules. However, the extent of this advantage will depend largely on the mix of services involved (i.e., the types of service and percentage of service hours that are contracted out). Another factor that can contribute to lower private operator costs is the ability of these operators to use smaller, more fuel-efficient and, typically, lower maintenance vehicles (i.e., sedans or vans) than does the transit agency.

The nature of cost savings through contracting also depends on the extent of competition, if any, involved. Many privately-operated services -- most often in small urban and rural areas -- are not competitively bid. The costs in these situations may not be significantly lower than the public costs would be; in any event, costs will invariably be substantially lower in a competitive market.

It must be pointed out that there will also be certain new costs in a contracting situation. A private operator's contract will include a fee -- covering profit and overhead -- as well as other administrative costs, including the salaries of an administrator and possibly a dispatcher or field supervisor. The service administrator will represent a cost in addition to the transit agency's administrative costs for the program. In large systems in particular, there is typically no direct correlation between the reduction in direct costs (e.g., driver labor) and the reduction in overhead expenses. In fact, there will be certain additional indirect costs associated with contracting service; these include legal fees, marketing expenses, and the costs of monitoring the contractors' performance (i.e., in terms of maintaining acceptable service quality, verifying fare collection and reporting, etc.) Over time, overall transit agency administrative costs should decline slightly as a result of the reduction in direct service provision, but the extent and timing of such savings are impossible to predict. Thus, in estimating cost savings, it is important to make realistic assumptions concerning changes in administrative costs (i.e., probably a net increase in most contract situations) in modeling total costs.

While financial implications are clearly of utmost concern in assessing the benefits of contracting, policy issues must also be considered. For instance, it is important to maintain an acceptable quality of service and to insure that the major ridership groups continue to receive service that meets their basic needs (e.g., getting to and from work, medical appointments, etc.). This must be a key factor in developing both the service

design and the specific administrative arrangement (i.e., with regard to degree of control over the service provided).

Of course, while maintaining service quality is a legitimate concern, the major policy implication related to service contracting is the "13(c)" labor protection issue.[5] This issue has constituted by far the most significant barrier to such contracting to date. While a number of transit agencies have succeeded in contracting portions of service despite 13(c) labor objections, these cases have typically involved new service and thus have not resulted in the replacement of existing labor with private labor, thereby not violating the 13(c) provisions. In those isolated instances where privately-provided fixed-route service has replaced public service (i.e., in Phoenix and Norfolk), the routes involved have had such low levels of service that no public transit operators had to be laid off; the displaced operators were simply reassigned to other routes. In short, any attempt to realize cost savings through contracting out existing service will ultimately depend on a transit agency's ability to reduce its labor force through attrition; as long as Section 13(c) remains in force, the direct replacement of public workers with private workers will be extremely difficult, if not impossible.

The other basic form of private operation -- non-contract provision of service -- avoids most of the above concerns. In such an arrangement, there is no public subsidy involved; thus the transit agency need not be concerned with cost comparisons or policy issues such as labor protection. This approach may take the form of a private bus operator taking over a transit route that has been dropped or operating a commuter service, or perhaps a shuttle service sponsored by an activity center or major employer. Such arrangements may allow a transit agency to drop an unproductive route, or possibly to avoid expanding service to accommodate a new activity center. A "franchise fee" may or may not be charged in order to capture some of the excess revenue for the public benefit.

#### 4.2.3.2 Private Financing and/or Ownership

Private sector participation in terms of financing, construction, and possibly ownership of major capital improvements represents a fundamental shift in the approach to development and management of transit facilities and equipment. Over the last twenty-five years in particular, the vast bulk of capital funding for transit has been provided by the Federal government. The recent change in the Federal philosophy regarding funding for new fixed guideway construction -- i.e., to shift much of the burden to the states and localities -- has in turn led to the push for greater private participation.

However, while private funds have been committed -- either willingly (e.g., through negotiated investment) or unwillingly (e.g., through benefit assessment districts or impact fees) -- to provide partial financing for new regional transit systems or individual stations, the only examples (existing or proposed) of projects financed predominantly (and owned)

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5 Section 13(c) of the Urban Mass Transportation Act legally prevents any transit workers from losing their jobs through contracting of service, and thus represents a serious barrier to contracting.

by private entities are relatively small-scale transit lines (i.e., "people movers") primarily serving development areas -- and thus initiated by the developers. The Harbour Island People Mover in Tampa, FL, for example, was financed and constructed by a private subsidiary of the Harbour Island developer; this half-mile system was built to provide access between Tampa and the 177-acre Harbour Island Development. A similar project is underway outside of Dallas. The developers of Las Colinas, a planned community located between downtown Dallas and the Dallas/Ft. Worth Airport, are financing construction of a people mover system serving the site. The plan is for the system to be ultimately linked to Dallas' planned rail system. Other projects of a similar nature are being planned in numerous other locations. A privately-financed and managed project in Orlando, FL was proposed, but ultimately dropped due to local political opposition.

All of the existing and planned projects of this type share a key link. This link is the recognition on the part of developers that transit is crucial to the success of their development efforts -- to provide access and/or to relieve otherwise crippling traffic congestion.

An alternative initiative for privatization in the financing/ construction area is for a public jurisdiction (e.g., a transit agency) to solicit turnkey design, financing, construction, and management services for a major capital project. In such an arrangement, as was planned for Houston's Metro System Connector, the responsible public entity (e.g., Houston Metro) would guarantee a certain stream of revenues to secure long term debt, and would contract for operation of the system. This privatization approach has been utilized in Europe and Asia (e.g., in Hong Kong and in planned projects in Singapore, Bangkok, and two areas in England). However, the strategy has not yet been implemented in the U.S.

Some form of leveraged leasing is usually considered in public/private financing and ownership arrangements. In a leveraged lease, the transit agency would select the technology and the vendor or joint venture with whom a contract price and operating agreement would be negotiated (similar to the way a true or non-leveraged lease would be arranged). While in a regular lease the lessor would provide 100 percent of the capital from its own funds, in a leveraged lease the lessor's equity falls between 20-35 percent of the needed capital, with the remainder borrowed from investors (bondholders) or lenders (bank(s), insurance companies, etc.) on a non-recourse basis to the lessor (i.e., the loan would not be secured by the lessor's guarantee, assets or collateral). Instead, these leveraged funds would be secured by a lien on the project or equipment and by an assignment of lease rental payments. The cost of the non-recourse borrowing would depend on whether taxable or tax-exempt financing were available and on the credit quality of both the lessee and on the economic and legal strength of the revenue base from which the service fees are payable by the public agency. Even though the lessor is providing only 20-35 percent of the capital needed to finance the project, it can claim all tax benefits incidental to its ownership. The lessee's lease rental payments to the lessor would equal the lessor's debt payments to the project's lendors. The operating agreement should set forth the terms under which the operator must deliver transit service and the size and basis for making service fee payments, as well as other terms that are necessary to assure right of way, franchise licenses and permits, etc.

The primary perceived advantages to the public sector of privatization can be summarized as follows:

- cost and time savings, through "fast-track" implementation; this is achieved through generally more efficient private management approaches, coupled with possible reductions in government review requirements;

- alternative financing, in that private equity is used to fund much of the project and meaning that the debt incurred is not direct debt of the responsible public agency; and

- sharing or shifting of risk associated with construction costs and completion.

On the other hand, the nature of benefits to the private sector has changed dramatically over the past couple of years. Prior to the Tax Reform Act of 1986, one of the major attractions to private entities of ownership of "public" facilities was the ability to make use of tax-exempt financing. As is explained in Appendix C, the Act has eliminated this option for privately-owned transit facilities.[6] Remaining benefits to a private entity include the ability to depreciate the asset and reduce the corporation's tax liability (the calculation of these benefits is comparable to those achieved through leasing).

In summary, the various privatization approaches offer transit agencies the prospect of reducing costs while shifting much of the risk involved in construction of new facilities and/or operation of service. In capital project privatization, the use of private financing offers an additional advantage in relieving debt pressures on the public agency involved. On the other hand, both private contracting and private financing/ownership face considerable barriers: labor protection provisions in the former, and the elimination of considerable tax advantages to private entities in the latter. While both of these approaches deserve careful consideration, transit agencies and other public jurisdictions responsible for transit must be fully aware of these constraints (implementation of privatization strategies is discussed further in the next section). While privatization on a limited scale (e.g., contracting for specialized elderly and handicapped service, or limited scope developer-initiated capital projects) is certainly doable, "full" privatization (i.e., contracting out all services in a large system, or turn-key design/finance/build/management arrangements for major rail systems) would appear to be difficult to achieve at the present time. Instead, public/private partnerships are the most likely arrangements to develop in the coming years.

## 4.3 SELECTING AND EVALUATING NEW SOURCES OF REVENUE

As suggested earlier, once a financing strategy has been selected, it may be necessary to identify and develop new revenue sources to actually pay for that strategy. As indicated in Chapter 2, the basic procedures to be followed in developing revenue sources

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6 Certain projects (the aforementioned Houston project, and projects in Dallas, Austin, and the Dulles Airport Corridor, as well as the Ohio High Speed Rail Project) were "grandfathered" against this prohibition against tax exempt debt for privatized transit.

include 1) identify potential revenue sources, 2) define evaluation criteria, 3) screen alternatives on a preliminary basis, 4) analyze and evaluate alternatives, and 5) select the most promising and appropriate alternatives. The selection and evaluation of new sources of revenue is described in this section.

### 4.3.1 Identify Alternatives

The major alternative revenue sources (other than Federal, state, and local subsidies) fall into the following basic categories:

- taxes and user charges
- use of property and property rights
- benefit-sharing strategies

The individual sources typically included in these categories are listed in Table 4-5. As shown on this table, different sources have different areas of impact (i.e., some can be used in connection with both vehicles and fixed facilities, while some are generally applicable for fixed facilities only). In addition, some sources are useful for financing initial construction costs (e.g., cost-sharing to help pay for construction of a station, or sales tax to secure a bond for construction), while others are more appropriate for contributing to annual operating costs (e.g., leasing development rights). Thus, any financial plan for a new capital improvement will doubtless include a combination of sources. As indicated in Section 4.1, some types of revenue sources -- typically sales, property, motor fuel or income tax, but on occasion certain benefit-sharing strategies as well -- have been used to secure bonds. Thus, it is important to bear in mind that a decision to issue debt to cover major revenues needs by no means precludes the need to identify additional sources of revenue. Identifying the appropriate mix of financing strategy and revenues sources is clearly a key element in the selection and evaluation process.

### 4.3.2 Define Evaluation Criteria

A sound process of selecting new revenue sources requires, first of all, definition of evaluation criteria. A typical set of criteria for use in evaluating revenue sources is shown in Table 4-6. These criteria are described below in a general sense; the different categories of sources are then discussed within the context of these criteria.

The projected revenue yield is clearly a crucial criterion for evaluating alternative revenue sources. Yield has two basic components: the amount of revenue that can be produced and the timing, i.e., does the source produce a one-time amount or an annual revenue stream. The importance of the timing of each source will depend on the types of revenue needed (i.e., to cover up-front construction costs or to cover ongoing operating costs), as well as the nature of other funding sources.

Once the initial yield of an alternative is estimated (see Chapter 3 for a discussion of projecting yield), the primary financial consideration is how the revenue stream is likely to change over time. In analyzing the stability of a source, the key factor is its underlying dynamic (i.e., what forces will influence the revenue in future years). In order to be an

## TABLE 4-5: CLASSIFICATION OF TRANSIT REVENUE SOURCES

| | Objective | | Area of Impact | |
|---|---|---|---|---|
| Sources | Revenue Producing | Cost Saving | Rolling Stock | Fixed Facil. |
| **Taxes or User Charges** | | | | |
| Sales Tax | X | | X | X |
| Motor Fuel, Toll or Parking Tax | X | | X | X |
| Motor Vehicle Fees | X | | X | X |
| Payroll or Income Tax | X | | X | X |
| Utility Tax | X | | X | X |
| Property Tax | X | | X | X |
| Lottery | X | | X | X |
| **Use of Property and Property Rights** | | | | |
| Leasing/Selling Development Rights | X | | | X |
| Leasing/Selling Land or Facilities | X | | | X |
| **Benefit Sharing Strategies** | | | | |
| Special Benefit Assessment | X | | | X |
| Tax Increment Financing | X | | | X |
| Density Bonus | X | | | X |
| Cost-Sharing | X | or X | | X |
| Impact Fees | X | | | X |
| Connector Fees | X | or X | | X |

**TABLE 4-6: TYPICAL EVALUATION CRITERIA**

| Category | Criterion |
|---|---|
| financial issues | revenue yield<br>stability<br>marketability |
| political issues | public acceptance<br>equity<br>incentive effects |
| legal/regulatory issues | legality<br>regulatory authorization |
| administrative/<br>institutional issues | revenue collection mechanisms<br>monitoring mechanisms |

acceptable long- term source of funding, a revenue source must be stable in two ways. First, it must have the ability to grow over time to match the growth in expenses. Second, it must not be extremely volatile. A stable source of revenue will provide a relatively predictable yield over the years and will not have to be supplemented based on its inability to keep up with the growth in expenses.

For revenue sources to be used to secure debt, marketability is also an important factor. This refers to the ability of the debt issuing agency to elicit sufficient interest among investors; it is related to the return on investment, as well as the perceived security of the bond or other debt instrument (i.e., the "degree of risk" involved and who is assuming the risk). (This issue is discussed further in the next section.)

The public acceptance of a revenue source can be an important factor in determining whether it can actually be implemented. This factor is applicable specifically to taxes and user charges, which are often instituted through public referendum; however, it may also influence the feasibility of other types of sources/strategies. If such a source is not acceptable to the public, the evaluation based on other criteria essentially becomes an academic exercise. To some extent, other criteria (equity, incentive effects, etc.) influence its acceptability, as the public has some degree of "intuition" about whether a particular revenue source makes sense. Although it is possible to influence acceptability through persuasive arguments by political leaders, it is certainly more difficult if an opinion is widely and strongly held by the public.

Because of the importance of acceptability in determining whether certain sources should be pursued, some form of market research may be needed in order to evaluate it. Such research can take the form of a random survey or opinion poll of area residents or it can be undertaken through the use of "focus" (i.e., discussion) groups made up of area residents and perhaps business representatives; these groups discuss and evaluate alternative sources (e.g., various types of taxes).

The evaluation of the equity of each alternative consists primarily of addressing the question of who is paying for it. For instance, a tax or user charge should not place an excessive burden on certain groups, while other groups do not pay. This is important not only from a political perspective (a source that is "unfair" to some may make it unacceptable), but from an economic perspective -- i.e., that public funding should be based on people's ability to pay. Generally, the ability to pay relates to income, and the equity of an alternative is expressed in two forms -- horizontal equity and vertical equity. Horizontal equity is a measure of whether people of the same income pay the same amount. Vertical equity measures whether people with higher incomes pay more than people with lower incomes: "regressive"sources require a higher percentage of income from low income people than from high income people. A third type of equity may also be a concern regarding some alternatives -- regional equity (i.e., if a source draws from some geographic regions more than others).

Like public acceptance, equity -- as described above -- is primarily related to the evaluation of taxes and user charges. However, equity of a different type is a concern in evaluating benefit sharing strategies such as benefit assessment district financing. In this case, the equity issues relate to establishing the actual assessment, e.g., should there be a differential in private sector contributions based on the relative benefit of the transit improvement, and if so, how is the relative benefit determined? Such issues can be addressed through 1) a detailed review of the procedures employed in developing such strategies in other locations, 2) discussion/negotiation among the appropriate public agencies and private developers, and 3) analysis of the transportation impacts of current and planned development and the nature of potential benefits to the developers of transit improvements (see Chapter 3).

The final major "political" criterion is incentive effects of the source or strategy. Certain types of new revenue source are likely to influence the public's economic behavior by increasing the cost of certain items or activities (e.g., items subject to a new sales tax, or higher rents due to property owners' pass-through of fees). For instance, a new tax or tax increase on retail goods would tend to reduce consumption somewhat. It could also encourage people to make major purchases outside of the region or state in which the tax has been imposed. It is important to note what types of incentive effects could occur and how large an effect they might have. Also, it is useful to note whether the incentives promote or detract from general transportation policy or other stated public policies.

In addition to the political issues described above, key evaluation criteria related to implementing a new source or strategy are legality and regulatory authorization. Certain types of sources or techniques must be specifically authorized under existing legislation (e.g., local ordinance, transit agency enabling legislation, state tax code, or Federal tax code). If not currently permitted, it must be determined if the appropriate legislation can be passed or amended. In addition, those strategies that impose an assessment or fee on developers or property owners must be evaluated in terms of the likelihood of their being able to withstand legal challenges (i.e., from the developers and property owners). Such challenges have occurred, notably in relation to the use of impact fees (e.g., in San Francisco) and can be expected in many such instances. Finally, it is important to

determine the nature of incentives to encourage -- or require -- private participation (e.g., local ability to grant zoning variances such as floor area ratio density bonuses or parking reductions). Thus, evaluating alternative revenue sources or strategies may require extensive legal research and analysis.

The final category of evaluation criteria concerns the administrative and institutional feasibility of the individual sources, particularly the nature of revenue collection and monitoring mechanisms. Certain alternatives may require new collection mechanisms, while others may simply be incorporated into existing ones. The ease of administration must be analyzed to assess the ability of existing institutions and collection mechanisms to handle each source. If a revenue source requires new institutions or untested collection mechanisms, the difficulties and costs associated with these will make it a less satisfactory alternative. Finally, another issue involves the ability of the public sector to monitor -- and enforce -- the level of private involvement (e.g., the quality and progress on the construction, the quality of service operation, etc.), if applicable.

These are the major criteria that would typically be applied in evaluating new revenue sources, although not all criteria apply to every potential source. A summary of the general advantages and disadvantages of the individual revenue sources is presented below.

### 4.3.3 Alternative Revenue Sources

This section briefly discusses the basic types of "alternative" revenue sources that a transit agency might consider to supplement governmental subsidies or other current funding sources. The discussion highlights the primary advantages and disadvantages of the different sources; for more details, the reader should consult any of a number of studies discussing this topic (see the Bibliography).

#### Taxes or User Charges

This category includes sale tax, motor fuel tax (and other vehicle use taxes and fees), payroll or income tax, utility tax, property tax, and the lottery.[7] Where such sources are directly used to provide transit funding, they are typically major sources of transit revenue -- often the single largest source.

Taxes can be either dedicated to transit or allocated on a discretionary basis by state or local governments. Dedicated taxes are widely used by U.S. transit systems; over 80 percent of the largest system (500 or more vehicles) receive dedicated state and/or local tax revenue, with over 60 percent of these relying on a sales tax in particular. There are advantages and disadvantages of a dedicated source of funding compared to discretionary funding. On the one hand, a dedicated source provides a predictable amount of revenue to the transit system, which allows for a more far-sighted budgeting process. The transit system knows what its revenues will be and plans accordingly. With discretionary sources,

7 The lottery is not a tax or user charge per se, but is similar to a tax in the way that funds are distributed for transit uses and is therefore included in this category.

it is often difficult to predict future revenues. On the other hand, there is a fear that providing dedicated funding to an autonomous agency will reduce its accountability to the public. With discretionary funding, state and local governments can allocate the public's money as they see fit based on changing needs and performance.

However, in the identification and evaluation of alternatives, it is not generally necessary to distinguish between a dedicated tax and a tax increase to the state or local governments that is intended for transit funding. The distinction comes into play in considering the administrative and institutional mechanisms for implementing the tax and, to some extent, the public acceptance (i.e., it is possible that a tax might be acceptable in general but not if the funds are given directly to the transit agency). The individual taxes and user charges are discussed below.

Sales Tax - As indicated above, the sales tax is the most popular type of tax used to support transit in the U.S. Dedicated sales taxes to support transit were first adopted in Atlanta and Seattle in 1971. The strategy is now in use by roughly half of the largest transit systems in the country. In some of these areas, taxing authority is given directly to the transit district (e.g., Atlanta, Chicago, Denver). In others (e.g., Cleveland, Los Angeles, San Francisco, Seattle, St. Louis), the tax is collected by the city, county or region and allocated to transit with varying amounts of discretion.

Based on the experience of transit systems that use sales tax revenue, its growth stability is generally very good. The yield will increase as prices increase, and will thus keep pace with inflation. As a result, it is not necessary to change the tax rate every few years. However, the sales tax is somewhat volatile in that retail sales are greatly affected by the health of the local economy. When the economy is healthy, sales tax revenues increase by more than the increase in prices; the opposite is true during economic downturns. This is not a critical shortcoming, however, since transit service expenses are more likely to be increasing during a time of economic growth. The stability of excise taxes (e.g., alcohol or cigarette tax) is not as good, because these are applied as an amount per unit. Revenue grows only as consumption increases, not as prices rise.

Politically, the sale tax has been well-received by electorates otherwise unwilling to vote in taxes. The sales tax benefits from its "nibbling" impact as opposed to the semi-annual or annual impact of, say, the property tax. Detractors of the sales tax say that it is the most regressive of taxes. These concerns can be assuaged by exempting certain necessities, e.g., food, clothing and utilities. Some have also argued that subsidized transit fares recover this regressivity. In any event, concerns over equity apparently do not bother the general electorate too much; the arguments tend to be largely academic.

In terms of incentive effects, "leakage" of sales to areas with lower sales taxes may pose problems. Typically, the sales tax rate does not enter into consumers' minds when they make most purchases. However, on the purchase of cars, appliances or other expensive items, leakage may occur. Georgia partially overcomes this problem by imposing the sales tax on autos, which can easily amount to over $100 per auto, in the county in which the auto is registered. Also, some retailers slightly reduce their prices to restore their competitive position in the face of a new or increased sales tax. Leakage, of course, decreases with the physical size of the taxing jurisdiction.

The mechanisms for collecting a sales tax are very well-established in most states. Funds from any tax increase can be collected through existing sources and set aside in a separate account. On the other hand, expansion of the base to retail services and other untaxed items would require new mechanisms, which would not be as easy to implement.

Legally, the sales tax must receive at least local voter approval. Beyond that, it must overcome state imposed hurdles where states have not granted local jurisdictions the privilege of imposing local option taxes. However, recognizing the popularity of the sales tax, more and more states are allowing local jurisdictions this option. Because of these barriers transit agencies must allow a long lead time for implementation.

The ease with which the sales tax may be repealed affects the stability and marketability of debt secured by the sales tax. While most taxes that have recall provisions also require that any future decreases in the rate do not impair the payment of debt service requirements, the threat to the system posed by such a repeal hurts the marketability of such bonds.

Property Tax - The property tax also provides a strong and stable source of revenues. However, it is one which has enjoyed limited use. Paid only once or twice a year, it is a painful tax to area residents. In light of recent anti-property tax movements around the country, the potential for using this tax for transit does not appear bright.

Nevertheless, the property tax provides great stability over time. While it does not respond quickly to changing local economic conditions, it does closely track the area's income. This tax offers transit agencies in areas of strong growth a particularly strong source of revenue, as property values may increase faster than the local economy as a whole.

Concerns about the equity of this tax have also hindered its acceptance. Where personal property is concerned, this tax most definitely consumes a greater percentage of poorer families' income. However, the addition of commercial property into that equation tends to equalize the situations as commercial landowners have higher than average incomes. Recently, some states have added so called "circuit breaker" measures that limit the tax liability of lower income families. This in combination with public housing has made property taxes largely neutral on the question of regressivity. This tax faces legal considerations similar to that of the sales tax. It must garner, at least, local approval and, depending on arrangements made by the state, state approval as well.

Payroll and Income Taxes - Revenue from a payroll or income tax can also be used to support transit. For example, Portland, Oregon uses a corporate payroll tax and Cincinnati an employee income tax to provide portions of local transit subsidies. From an economic standpoint, these taxes offer an abundant and stable source of revenue. They will grow quite consistently with inflation and overall economic activity. Unfortunately, from a political standpoint, the rank only slightly ahead of property taxes in terms of voter acceptance.

A corporate payroll tax could be imposed on all employees within a transit district. Alternatively, an employee income tax could be levied on all individuals living or working in the service district. The payroll tax is more equitable than the other types of taxes because it is directly tied to income. It is good in terms of both horizontal and vertical equity. However, if self-employed workers are excluded from the base, the equity is decreased. With this exclusion, some upper income people would pay nothing. Also, any payroll tax fails at the highest income levels due to the presence of considerable non-wage income.

A payroll tax, by making labor more expensive, would provide an incentive to reduce the work force, which could increase unemployment in a region. If the tax is passed on to employees, the tax would reduce effective wage rates in the region. It is also possible that some businesses would relocate to areas where there is no payroll tax, although there is no indication of this effect in the Portland experience. To the extent they might occur, these are negative effects.

If the payroll tax were applied only to organizations with a certain number of employees, there would be additional distortions. Companies near the cutoff point would be sure to go below it if at all possible. Because of the arbitrary cutoff, companies producing similar products in similar locations would be subject to different costs.

The mechanisms for collecting taxes based on a percentage of payroll exist, but the payroll tax itself would be a new tax in most locations. This would present some difficulties in that new rules and procedures would be required. It may also be necessary to establish a new institutional entity to monitor compliance, or at least institute a major increase in the responsibilities of a state's department of revenue.

Vehicle Use Taxes and Fees - Revenue from taxes on motor fuel and from bridge or tunnel tolls are used to support transit in a number of locations (including Miami, Baltimore, and Detroit for fuel taxes; and New York and Philadelphia for tolls). Another potential vehicle use source of transit revenue is a tax on commercial parking, although such taxes do not appear to be an important part of any major system's funding. Other vehicle-related revenue sources include taxes on registration, title and/or licensing fees.

None of these sources can raise revenues on the order of one of the taxes discussed above, but they can raise significant sums; motor fuel taxes, in particular, can raise substantial amounts of revenue. Vehicle registration fees typically provide revenues about half as great as do fuel taxes. Tolls and parking fees lag much farther behind and can not provide a primary source of revenue, although they may represent useful supplemental revenue sources.

Vehicle-related taxes generally do not provide the stability that a broader tax does. Fuel tax collections have suffered through a number of cycles caused by events well beyond the control of local authorities. For instance, consumption dropped during the oil crises of the 70's and increased with the price decreases of the 80's. Registration fees and personal property taxes do not exhibit the wide swings that fuel taxes do because gas prices affect consumption to a greater degree than does ownership. To the extent that parking and toll taxes tax necessary trips, i.e., commuter travel versus recreational travel,

they too will not suffer the vicissitudes of the oil market in the way that fuel taxes do. None of taxes have an easy adjustment for inflation built in. Legislatures control their rates, and any attempt to raise them will meet with considerable voter disapproval.

Politically, these taxes have been considered the domain of the highway construction fund by and large, and thus have constituencies that will not easily allow them to flow into transit. Personal property taxes suffer from the same perception as real estate property taxes. Taxpayers prefer the less painful, more frequent payment of taxes.

Vehicle use taxes are not as broad-based as sales or income taxes, and they do not achieve good horizontal equity. Non-drivers would pay little or no tax, so that people in the same income group could easily pay vastly different amounts. In terms of vertical equity, the fuel tax is similar to the sales tax, but slightly more regressive overall.

To the extent that vehicle-use taxes would encourage people to drive less (while increasing carpools and transit ridership) the incentives are positive. However, if the effect of a tax on tolls and downtown parking reduces the number of trips to downtown areas, the effects are probably not positive.

The fuel tax presents no new administrative or institutional problems, unless it is a local option tax (where some accounting changes would be required). A toll tax would have well-established collection mechanisms, but keeping "tax" revenues separate from "toll" revenues could present some administrative difficulties.

A parking tax would require a new collection mechanism, but if it is applied to commercial parking only, it is institutionally feasible. On the other hand, to apply the tax to all off-street parking would require a major institutional and administrative effort to catalog and impute costs to all parking spaces. Taxes on parking meters or violations would also present major administrative difficulties.

Utility Tax - Revenue from utility taxes (e.g., on electricity, gas, water, and sewer) are typically based on rate of consumption, and a tax can be added to these fees for use in transit or other transportation purposes. A collection mechanism is already in place, as such a tax would be collected as part of utility bills. Taxes on transactions or profits may require new collection mechanisms or may be piggybacked onto existing fees or taxes.

There are currently only a few instances of transit operations receiving funds from utility taxes, although electric charges in particular formerly represented a significant source of revenue for systems (e.g., in New Orleans) that were then operated by the electric companies. One current example is in New York City, where transit is subsidized in part through surplus water and electric charges.

Lottery - Revenue from state lotteries represents another potential source of transit operating funds. A quarter of the states in the U.S. have lotteries of one kind or another, but their proceeds are used for funding transit in only two of these states (Pennsylvania and Arizona) A portion of existing lottery receipts could be allocated to transit agencies, or, perhaps more likely, a new lottery could be established, with some or all of the proceeds distributed to one or more transit agencies in the state. It may also be possible

to have a new lottery in a particular transit district only, with all proceeds going to the local transit agency.

The yield level of a new lottery is perhaps its greatest unknown. It is difficult to predict how well a new lottery would do. The degree of diversion from other lottery games is also unknown. However, lottery revenues should be relatively consistent from year to year, although they would not provide regular growth in revenues to keep pace with increased expenses.

The concept of equity is not as clear-cut for a "voluntary" source of revenue. It is more of a philosophical question than an economic question. A voluntary source is, in some ways, the most equitable in that it is paid by only those who choose to pay. On the other hand, a lottery is in some ways the least equitable source.

The only real incentive is to encourage gambling, based on a very small chance of getting rich. This is probably a negative effect, as many people would question whether the proper role of state -- or transit agency -- is to promote gambling. A new lottery game could be easily administered by the existing lottery system in states where they now exist.

**Use of Property and Property Rights**

Transit agencies can also generate revenue through the use of the property -- and air-surface and sub-surface property rights -- they own. The chief mechanisms in this category are leasing/selling development rights and leasing/selling existing facilities. These are described below.

Leasing/Selling Development Rights - In this approach, also frequently known as "joint development," the air rights over a station, yard or terminal -- or space inside an authority-owned structure -- are leased to a private developer who agrees to construct a building -- or establish commercial uses within the existing facility -- and pay the transit agency (or appropriate public entity) either an annual fixed rental or a rental based on a fixed percentage of gross lease income (received from building tenants) or gross sales (for commercial/retail developments). Joint development projects have included hotels, office space, and shopping areas built on or above transit agency owned property.

Wherever possible (i.e., based on cash flow needs), it is generally preferable to lease rather than sell development rights. This results in a steady stream of revenue for the term of the lease (typically 99 years) as opposed to a one-time payment. In either case, considerable amounts of revenue can be produced; these funds can be applied either to operating or capital needs. The Washington Metropolitan Transportation Authority (WMATA), for instance, received over $3 million in 1986 through leasing development rights, and expects the annual income to grow to as much as $12 million once its entire rail system is completed.

From a legal/institutional standpoint, joint development requires only that the transit agency have the authority to negotiate leases. However, in some locations the technique has been questioned on legal grounds -- by property owners -- over the powers of public entities to acquire through eminent domain subsurface and air rights associated with

condemned parcels of land. Regarding political acceptance issues, the public is sometimes concerned that the lease agreement benefits private developers more than the public sector. Such challenges and complaints notwithstanding, joint development is being used in a growing number of locations.

Leasing/Selling Land or Facilities - Some transit agencies may also have the potential to generate additional income through leasing or selling all or portions of their land holdings or facilities. This might involve, for instance, leasing a portion of a transit terminal to an inter-city bus or local private operator. Underused maintenance facilities and parking lots represent other possibilites.

The potential for generating new revenue in this fashion is limited. Obviously, the extent of underutilized space and the level of interest on the part of prospective lessees or buyers are key determining factors. However, another important consideration is the percentage of the initial cost of the facility that was borne by the transit agency; this is because the other funding sources (e.g., UMTA and the municipal government) may require the transit agency to turn over to them part of the sale or lease income.

Legally, a transit agency must have the authority (i.e., through its enabling legislation) to acquire and dispose of its unused facilities. There is unlikely to be public opposition to such transactions. Nevertheless, use of this technique has been rare.

Beyond leasing or selling facilities and development rights, another potential arrangement through which a transit agency may be able to generate income through its land holdings is to establish a subsidiary that would have the power and resources to develop agency-owned land directly. The subsidiary's profits would then be passed on to the transit agency as operating income. The major benefits of a separate development entity would be its ability to negotiate its own financing arrangements, to directly operate businesses on the land, and to generally improve the speed with which development activities could be accomplished. This type of arrangement would obviously require that the transit agency have the authority to establish such a subsidiary.

**Benefit Sharing Strategies**

The strategies within this category all generate revenue through "benefit sharing" or "value recapture" mechanisms; in other words, revenues are collected directly from the developers/property owners who stand to benefit from -- and/or create the need for -- a specific transit investment. The mechanisms involve either the assessment of special fees/charges or the negotiation of financing agreements, and are based on either 1) the increase in property value or other benefit that developers are expected to receive from improved transit access, or 2) the need to provide transit to serve the increased traffic that the development is expected to generate.

These strategies have generated considerable interest among transit agencies, and have proven to be valuable incremental contributors to the funding needs of new start projects in particular. Essentially, these techniques seek to utilize traditional municipal revenue sources -- i.e., land-based fees -- through a variety of special governmental

authorities and collection arrangements to create a credit or a source of cash flow that can be capitalized. The major strategies in this category are the following:

- special benefit assessment
- tax increment financing
- transit impact fee
- negotiated investment
- cost-sharing arrangement
- connector fees

These are described below.

Special Benefit Assessment - A special benefit assessment is essentially a tax levied on all private properties specifically benefiting from a particular transit improvement -- i.e., located within a "special benefit district." The assessments are either one-time or annual charges, and the revenues are used to repay bonds that have been issued to finance capital improvements, and/or to pay for on-going operating and maintenance expenses. The actual assessment rates are typically determined through a formula that considers the estimated value of the benefits to the affected properties and the level of funds needed to finance the improvement in question (see Chapter 3). Assessments can be calculated in a variety of ways, including lot size, appraised (assessed) value, front footage, distance from the improvement, office square footage, retail square footage or gross sales, or hotel square footage (or fee per person per night).

Since a district's taxing jurisdiction will be a relatively circumscribed area, this type of financing will produce substantially less revenue than many other forms of property tax-based sources. However, depending on the level of political acceptability as to the contribution of value being generated from the investment, special benefit assessment district financing can be a sound mechanism for financing modest portions of a transit system investment or offsetting operating and maintenance costs once the system is constructed.

However, the use of this strategy entails significant legal/regulatory requirements: typically, special state legislation authorizing the local establishment of assessment districts and granting the transit agency the authority to levy assessments. In addition, once the districts are authorized, it is essentially necessary to develop agreements among the private and public entities involved as to 1) the extent of the benefits to the property owners, and 2) the assessment rate. This process often proves difficult. Even once an assessment formula has been established, certain property owners are likely to protest the fairness of the assessment. In Los Angeles, for example, assessment districts were established to provide funds to finance the construction of its new rail system. However, due to strong opposition from affected property owners, the collection of assessments was deferred until after completion of the construction.

Benefit assessment financing has been successfully used for transit purposes in several locations, including Miami, Denver, and Portland. Thus, while the legal/institutional barriers can be substantial, it represents a potentially useful source of revenue, particularly for new transit capital investments.

Tax Increment Financing - Tax increment financing is another tax-based mechanism, related in this case to property taxes and the change in property values within a special district attributable to public improvements such as transit projects. A base-year assessed property value is established (frequently with an applied growth factor) for properties located within the designated tax increment financing district. All tax revenues based on that assessed value are treated like normal property tax revenues (city, school district, etc.). Meanwhile, all future tax revenues above the base level are designated for use in financing public improvements such as transit or utilities. The dedicated revenues can be used either to repay bonds or to pay for on-going costs.

Tax increment financing offers the potential for producing substantial revenues for a transit agency. The extent of these revenues depends on a number of factors, including the area's property tax rate, the amount of taxable property contained within the tax increment financing district, and the increase in property values that occurs above the base level.

Like benefit assessment districts, tax increment financing districts require state enabling legislation and then a local ordinance establishing the district. However, unlike the case with benefit assessments, the implementation of tax increment financing districts requires ad valorem taxing authority. Since transit agencies typically lack such authority, they can only access tax increment financing revenues through an inter-governmental agreement with an authorized entity (e.g., a redevelopment authority.)

The legal/regulatory hurdles notwithstanding, the major barrier to use of tax increment financing may be the opposition of other municipal tax recipients (i.e., schools, hospitals, fire and police departments) that rely heavily on property tax revenues. Their view is that they would lose income they would otherwise receive. On the other hand, this mechanism will not be subject to opposition from the property owners within the district; they pay only their regular property taxes, with no additional assessment or fee.

Thus, tax increment financing is a controversial technique, but one that can generate substantial amounts of revenue. However, to date, it has seen limited use for transit: examples of its use to repay bonds issued to finance capital improvements are in San Francisco and Beaverton, Oregon.

Impact Fees - An impact fee is a one-time charge imposed on new developments to compensate for their impacts on local transportation volumes. A fee is typically assessed on square footage of planned development, as specified in local planning, building, or zoning ordinances. In some cases, the granting of building or occupancy permits is made contingent on payment of the fee.

Impact fees can produce significant amounts of revenue, with the magnitude of revenues based on the level of the fee and the amount of new development coming on line in the affected area. However, the resulting revenues are typically less than in the above two benefit-sharing strategies, since impact fees are generally collected on a one-time basis rather than annually.

Impact fees technically require only a local ordinance to be implemented. However, where there is no state legislation that specifically facilitates the imposition of impact fees, experience suggests that their use is not likely to withstand legal challenges (i.e., from affected property owners/developers). In some states, courts have tended to rule against impact fee imposition unless the rationale for the fees, their assessment formula, and the plan for their disposition meet certain criteria. In particular, it must be demonstrated that 1) improvements are necessary -- and caused by the new development, 2) each developer is being charged a "fair share" of the cost of intended improvements, and 3) funds to be collected will be spent for the intended purpose and in close proximity to the new development. Because transit service -- unlike road improvements, parks, or low income housing -- does not always represent a highly visible capital improvement, developers are apt to express greater opposition to having to pay fees to fund transit than for other types of public service. Similarly, it may be difficult to prove that collected fees are being used "in close proximity" to the new development in funding transit service improvements.

Justification for using impact fees for transit cleared a major hurdle in October 1988, however, when the U.S. Supreme Court upheld the constitutionality of San Francisco's transit fee. The court found that "...it is both fair and legal for developers to support part of the additional burden that their projects place on public services." All new development in San Francisco is subject to a one-time fee of $5 per square foot, with the proceeds going into an escrow fund to cover transit expenses associated with serving the new development.

Density Bonus - A density bonus involves an agreement by a developer to contribute to a transit-related improvement in return for additional development rights or considerations (e.g., additional building height). The agreements are generally made in connection with a specific facility or cost item (e.g., construction of a rail station or transit center), and may consist of funds or in-kind contributions (e.g., rights-of-way on private land).

Density bonus arrangements have generated large sums for transit improvements. For instance, in New York City alone it is estimated that over $125 million has been committed by developers for improvements to transit stations. Because this strategy makes use of existing land use control (i.e., zoning authority) to negotiate with developers, it typically requires no specific state or local legislation for implementation.

Cost-Sharing Arrangements - A cost-sharing arrangement also involves an agreement by a developer to contribute to a particular transit improvement. Like a negotiated investment, the contribution can be in the form of funds, land, or actual construction. However, unlike negotiated investment, no special development considerations are granted. Rather, the developer agrees to contribute in the expectation of receiving greater benefits from the improvement (e.g., to gain direct access to a rail station). Because no specific legislation or legal authority is needed, there are no real institutional barriers to this strategy. However, securing developers' participation in such an arrangement -- i.e., convincing them of the benefits -- will be no easy task.

Connector Fees - Connector fees -- also know as "service charges" -- are fees assessed developers or owners of structures adjacent to major transportation facilities for making direct connections to those facilities (i.e., through "knockout" panels or joint plaza areas). These fees can take the form of a one-time payment or an annual lease -- akin to a lease for development rights. The ability to generate revenue in this fashion is clearly limited, but such fees can be useful as a supplemental source of funds.

### 4.3.4 Evaluate Revenue Sources

As indicated by the range of issues/criteria that must be considered, evaluating and selecting appropriate revenue sources is a complex task. While their use is expanding, most of the sources discussed here have seen rather limited application to transit improvements. Furthermore, the use of specific sources differs significantly from one setting to the next -- both in terms of intended area of impact (i.e., fixed facilities vs. vehicles and operating vs. capital support) and in level of financial support sought (and raised). In addition, the institutional and political situations tend to differ widely among the various locations. Finally, the ability to determine the feasibility and revenue potential of individual financing options is dependent on a number of interrelated issues, as discussed in the previous section.

Because the process of selecting revenue sources often takes place in parallel with the development of specific transit alternatives, there is typically a need for two stages of evaluation of financing alternatives: 1) a preliminary screening, and then 2) a full evaluation. The screening recognizes the fact that it is not possible to fully evaluate financing options -- and identify prospective financing plans -- until 1) details have been worked out on the individual service alternatives or improvements (especially costs and fare revenue projections, as well as locations of rights-of-way and stations, where applicable) and potential administrative/organizational arrangements (e.g., who will build, own, and operate the new service); and 2) the Federal, state and local regulatory environment (e.g., legal ability to implement certain approaches) has been fully explored. On the other hand, it is possible, based on research and experiences elsewhere, to develop a preliminary assessment of the general feasibility and relative potential revenue yield of the various sources. The financing alternatives should be evaluated on a preliminary basis according to their relative ranking on the various criteria. Due to the political/social/institutional nature of many of the criteria, this preliminary screening requires qualitative assessments of most of the criteria; as suggested above, these assessments are typically based on experience with different sources in other locations,[8] adjusted for the local situation and needs. Obviously, considerable "professional judgement" must be applied in developing these rankings due to the complexity of the issues. Table 4-7 shows an example of a preliminary rating of financing options in a transit development project.

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8 A number of studies (e.g., those done by the Rice Center) provide summaries of the national experience with alternative revenue sources. These studies are listed in the Bibliography.

At this stage, certain sources -- or perhaps even whole categories -- can be eliminated from further consideration. For instance, broad-based taxes and user charges may not be appropriate -- or may be politically impossible to implement -- for use in financing a capital improvement that is essentially necessitated by new private development. In the same vein, joint development opportunities may be limited in a capital improvement in a newly developed area, especially if the transit facilities will be constructed on privately-owned land. Other sources may be difficult to implement due to the lack of appropriate authorizing legislation (e.g., for benefit sharing strategies). However, these sources should simply be accorded low rankings on the legal/regulatory criteria, rather than eliminated from consideration. Such options may still prove to be feasible through passage of new legislation or local ordinances.

As the development of transit improvement alternatives proceeds, and details on costs and fare revenues become available, the revenue alternatives that have survived the preliminary screening can be evaluated, and the most appropriate techniques/sources selected for inclusion in the project financial plan. This evaluation process basically involves 1) conducting analyses of the ability of each revenue option to meet all or part of the revenue needs of each transit alternative; and 2) additional investigation of political, legal/ regulatory, and administrative/ institutional issues, as needed.

The financial analysis should typically include the following steps (assuming that the operating deficit and capital financing requirements have already been analyzed): 1) develop (or refine) revenue yield estimates for each revenue alternative; and 2) carry out the financial analysis, including sensitivity analysis, for each transit alternative. The development of revenue yield estimates is discussed in Chapter 3. The financial analysis involves rerunning the financial planning model (see Section 4.1).

The focus of this analysis is the capability of the projected annual revenue stream to cover all annual costs, while also retiring any debt instruments within a defined period of time. Here too, sensitivity analysis is a key aspect of the overall financial analysis: it is important to consider the impacts of a range of such factors as interest and inflation--as well as project timing--on the revenue estimates. Interest rates are especially crucial in analyzing the debt retirement timeframe and debt service requirements.

The results of the financial analysis will provide a direct input into the selection of an appropriate "package" of financing alternatives. As mentioned above, depending on the nature of the political, legal, and administrative issues associated with each option, it may be necessary to conduct additional analysis in these areas in order to complete the evaluation. The selection of revenue sources is then based on a combined assessment of all of these factors, although the different criteria must be weighted to reflect their importance. For instance, while yield is ultimately the most important factor, legal/regulatory issues must be accorded considerable weight; in some cases, legal barriers may prove to be insurmountable and thus grounds for eliminating a technique from further consideration. Administrative barriers (e.g., absence of established collection mechanisms), on the other hand, should be identified as such and be treated as

## TABLE 4-7: EVALUATION OF REVENUE SOURCES

| Revenue Source | Yield | Stability | Marketability | Public Accept. | Equity | Incentive Effects | Legal/ Reg. | Rev.Coll./ Monitor |
|---|---|---|---|---|---|---|---|---|
| **Taxes or User Charges** | | | | | | | | |
| Sales Tax | ■ | ■ | □ | □ | □ | □ | □ | ■ |
| Fuel/Toll/ Pkg. Tax | ■ | □ | ○ | ○ | □ | □ | □ | ■ |
| Vehicle Fees | ○ | ■ | NA | ○ | □ | ■ | ○ | ■ |
| Payroll/ Income Tax | ■ | ■ | ○ | ○ | ■ | ○ | ○ | ■ |
| Utility Tax | □ | ■ | ○ | □ | □ | ■ | ○ | ■ |
| Property Tax | ■ | ■ | □ | ○ | □ | ○ | ○ | ■ |
| Lottery | ■ | □ | NA | ■ | □ | ■ | ○ | ■ |
| **Use of Property** | | | | | | | | |
| Lsg/Sell. Devel. Rights | ○ | ■ | NA | ■ | ■ | ■ | ■ | □ |
| Lsg/Sell. Facilities | ○ | ■ | NA | ■ | ■ | ■ | □ | □ |
| **Benefit Sharing Strategies** | | | | | | | | |
| Ben. Assess. | □ | ■ | ○ | ■ | □ | □ | ○ | ○ |
| Tax Incr. Fin. | □ | ■ | ○ | ○ | □ | ■ | ○ | □ |
| Density Bonus | ○ | NA | NA | ■ | ■ | ■ | ■ | □ |
| Cost Sharing | ○ | NA | NA | ■ | ■ | ■ | ■ | □ |
| Impact Fees | □ | NA | ○ | ■ | □ | □ | ○ | ○ |
| Connector Fees | ○ | NA | NA | ■ | ■ | ■ | ■ | □ |

KEY: ■ = highest rating (e.g., highest yield, most equitable, or fewest legal barriers)
□ = middle rating
○ = lowest rating
NA = not applicable

a negative factor, but generally do not represent insurmountable obstacles. Once a set of revenue sources has been selected, it becomes a key element (i.e., in combination with a specific overall financing strategy) in the financial plan.

# CHAPTER 5: FINANCIAL PLAN IMPLEMENTATION

This chapter discusses the procedures to be followed in implementing the financial plan. Clearly, this process involves implementation of the individual revenue sources and financing strategies identified in the plan -- i.e., bond or lease, as well as other sources such as a new tax, benefit-sharing mechanism, and/or privatization strategy. The required procedures will differ for each source or technique, and will differ to some extent from one location to the next. The following discussion highlights the basic types of activities that may be necessary. However, particularly in the case of techniques involving significant legal issues (i.e., new taxes and benefit-sharing strategies), substantial additional research will be necessary to determine the specific procedures necessary for implementation.

## 5.1 DESIGNING AND IMPLEMENTING A DEBT ISSUE

The process of designing and implementing a debt issue consists of the following basic steps:

- establish debt policy,
- select advisors and other members of the financing team,
- structure the issue,
- develop required documents, and
- market the issue.

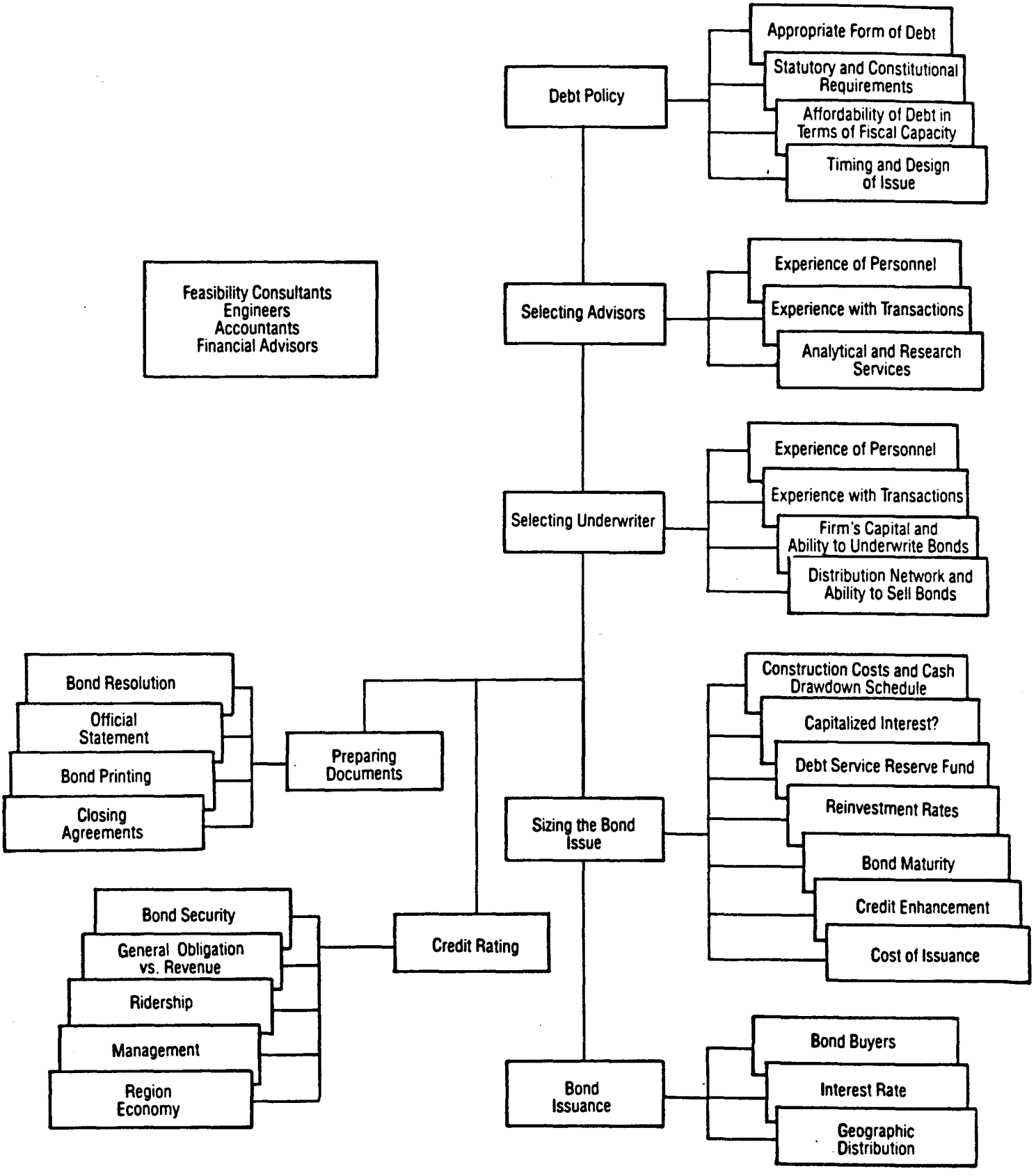
This process is summarized in Figure 5-1, and described below.

### 5.1.1 Establish Debt Policy

An important first step in issuing debt is the establishment of a formal debt policy. This policy should address the following concerns:

- the appropriate form of debt, including prudent use of the revenue,
- legal/regulatory requirements and restrictions on the local use of debt (e.g., maximum values of debt as percentage of assessed value or debt per capita),

## FIGURE 5-1: BOND ISSUANCE PROCEDURES



- the burden the debt places on the issuer (i.e., in terms of fiscal capacity), and

- timing and design of the issue so as to maximize the efficiency of borrowing (i.e., under different market conditions).

As explained in Section 4.1, the debt policy has a significant impact on the marketability of a debt issue, and thus strongly effects the issuer's financial capacity. For instance, a decision to issue debt with a coverage ratio of less than 1.5 is not likely to be well-received by the bond markets. The resulting inability to issue the needed bonds will clearly reduce the agency's financial capacity. Therefore, it is very important to address such concerns through the debt policy (e.g., to establish a minimum coverage ratio for the issuance of debt).

At the same time, it is important to recognize the legal limits on debt issuance and the affordability of the debt in terms of the burden the debt places on the issuing agency. Financial capacity measures such as debt per capita or debt as percentage of assessed property value indicate the extent of the current debt burden, and an agency may face statutory restrictions on these measures. For example, Montgomery and Prince George's Counties in Maryland each has a borrowing limit equal to 15 percent of assessed value; the actual status, as of 1987, was approximately 4 and 3 percent, respectively. Therefore, these two counties, each located within the Washington Metropolitan it Authority (WMATA) region, are not constrained from issuing additional debt, at least according to that particular measure and borrowing restriction. The debt policy should identify such restrictions, as well as the issuer's current status, and address any problems related to the fiscal burden associated with new debt issues.

### 5.1.2 Select Financing Team

The issuance of bonds typically requires skills and expertise not generally found on transit agency staffs. The following types of professionals/firms may be necessary:

- bond counsel
- financial advisor
- underwriter
- underwriter's counsel
- registrar/paying agent
- bond printer
- official statement printer

The selection of these advisors/firms and their roles can be summarized as follows; additional information on the particular roles is included in the subsequent discussion of the design/implementation process.

#### Bond Counsel

In theory, the Bond Counsel's (BC) primary role in a debt financing is to: (1) rule on the legality of a particular financing structure; (2) develop the legal documents that

describe the issuer's rights and obligations in the transaction; and (3) provide an opinion as to the tax-exempt nature of the obligation being offered (if, in fact, the issue is tax-exempt). In practice, however, BC's role encompasses participation in nearly every aspect of the issue from structuring to closing. For this reason, BC should be selected very early in the process to facilitate an orderly review of options. Working with the FA, BC can help the issuer select the financing structure that is best suited to the system's needs.

BC's compensation may take one of three forms: (1) a fixed amount, based on the anticipated level of services needed; (2) an hourly rate, typically with some estimate of the hours to be provided; and (3) a fee based on the size of the debt offering.

The fixed fee approach works best when a fairly simple transaction is anticipated. However, even the most straightforward financings can develop complications and some provision should be made for work outside the original scope of the contract. Any additional work should be subject to issuer approval and be performed at an hourly rate.

A second method is to compensate BC on an hourly rate - - either with or without maximum amounts for each phase of the project. This approach is most common when the specific limits of BC participation are not clear.

The final payment structure is related directly to the size of the debt being issued. In such cases, BC is paid on a per bond basis (e.g. $0.50 per $1,000 of debt sold). For most professional service providers this approach is not recommended, but some of BC's risk in the transaction is related to the volume of debt that is marketed. Because most BC firms do not like to work on a contingency basis, some provision needs to be made for payment in the event bonds are not issued.

A list of nationally recognized BCs can be found in the Directory of Municipal Bond Dealers of the United States, a publication prepared by **The Bond Buyer**. To identify BC firms that are experienced with specific types of debt, the issuer should consult others who have sold similar obligations. It may also be appropriate to develop a "Request for Qualifications" that asks each BC firm under consideration to describe their experience with the type of issue being planned.

Financial Advisor

The Financial Advisor (FA) should be selected at about the same time BC is chosen. These two firms need to work very closely to identify the full range of financing options available and to select an issue structure that meets both issuer and investor needs.

The FA's role in the issuance process is extensive. Cited below are some of the services the FA can provide:

- match the best available financing structure with the issuer's needs and resources;

- assist with the selection of all other professionals required to bring the issue successfully to market (including official statement and bond printers, paying agents/registrars, underwriters, and credit enhancers);

- prepare the necessary disclosure documents;

- evaluate the market benefits of credit enhancements;

- work with the issuer to develop effective rating agency presentations;

- conduct market information meetings to inform investors of the proposed issue;

- determine the appropriate method of sale; and

- coordinate the sale and delivery of the issue.

As with BC, the FA should be selected competitively and compensated according to the services provided. It is inappropriate to compensate the FA on a "per bond" basis. That method gives the FA an incentive to recommend a financing that is larger than may be necessary.

A list of FAs is provided in the Directory of Municipal Securities Dealers of the United States. This is not a complete list, however, and the issuer should compile its own list of prospective advisors. Other sources of information on firms that provide financial advisory services include other issuers, state government, and independent professional organizations.

## Underwriter

An underwriter or group of underwriters (known as an "underwriting syndicate" or "syndicate") is one or more investment or commercial banks that purchase the debt offering directly from the issuer. These institutions buy municipal issues either as investments for their own portfolios or as a product that their sales forces can reoffer to retail and institutional customers.

The municipal issuer must select an underwriter far enough in advance of the anticipated sale date to allow sufficient time for bonding origination. If the underwriter is a syndicate, the issuer's task is to choose a managing underwriter. In some instances, the issuer will appoint two or more managing underwriters. Reasons given by issuers for selecting co-managers include the rationale that they will provide wider distribution or will help guard against monopoly power in a single underwriting firm. If there are co-managers, the issuer will usually specify which manager is to be the lead underwriter (or senior underwriter). The lead underwriter has the ultimate responsibility for syndicate operations. In addition to organizing and managing the syndicate, the manager provides the origination services and negotiates the interest cost with the issuer.

A usual method in selecting an underwriter is for the issuer to solicit for underwriting proposals. Generally, the knowledge that an issuer is considering proposals is transmitted by word-of-mouth in the investment community. Additionally, issuers contact various investment bankers both directly and indirectly through use of the financial news media such as the Bond Buyer newspaper. The proposals requested are written, oral, or both. With written proposals, the issuer may or may not specify the exact information to be contained in the proposal. Typically, written proposals include, but are not limited to, the following information:

- description of the underwriting firm,
- resumes of key personnel,
- history of the firm's underwriting experience,
- list of services promised,
- summary of the firm's participation in recent municipal underwritings,
- exposition as to why the firm might have comparatively more experience in, or be comparatively better suited to, underwriting the type of issue at hand.

Oral presentations are similar in emphasis and content to written presentations. Finally, because the search process of seeking an underwriter is costly, it is not uncommon for an issuer to use the services of an underwriter repeatedly in subsequent bond issues.

The underwriter's role depends largely on the method of sale of the bond issue; this is discussed later in this section. If bonds are offered for competitive sale, the underwriter's role in the process is somewhat limited. The underwriter will review the terms and conditions of the formal "Notice of Sale" and structure a bid based on the credit quality of the issue, the maturity schedule, and the conditions in the market at that time. If chosen as the successful bidder, the underwriter will then work with the issuer, FA, BC, and registrar to coordinate the timely registration and delivery of the bonds.

An efficient "negotiated sale," on the other hand, requires the active participation of the underwriter in most phases of the transaction. In most cases, a negotiated sale is a give-and-take process in which the underwriter attempts to secure concessions that will make the securities more attractive to his firm's clients (the secondary market investor), while the issuer and FA balance these concessions against the issuer's objectives.

The underwriter's compensation when debt is sold competitively is built into the bid that is submitted. The desire to maximize profit potential is tempered by the desire to submit the lowest (best) bid. For a negotiated sale, underwriter's compensation -- known as "underwriter's spread" -- consists of the following components:

- Management Fee - The management fee is the amount set to compensate the investment bankers (part of the underwriting team) for their assistance in setting the issue structure, developing disclosure materials, reviewing the

legal documents, and coordinating the pricing of the issue with the underwriting firm's "desk." The management fee is eliminated when the debt is sold competitively. For negotiated sales, management fees in the range of $1-$5 per $1,000 of debt issued are common. Competitive selection of the underwriter with which the sale will be negotiated can result in significant savings in management fee.

- Take-Down - Take-down is the commission the underwriter's sale force is paid to remarket the securities. Generally, the take-down is lower for debt with short maturities and higher for longer maturities. This is a reflection of the greater effort usually required to sell longer term debt. Take-down can be virtually eliminated if an issuer can find an underwriter willing to purchase the entire issue for its own portfolio. This happens frequently with note issues that are sold to commercial banks. (The sale of an issue directly to an investor or group of investors is known as a "private placement.") The take-down is the largest component of underwriting spread. It typically is in the range of $8-$20 per $1,000 of debt issued - depending on market conditions, issue structure, and the credit quality of the debt.

- Underwriting Fee - The underwriting fee is the compensation paid to the underwriter's "desk" for setting the purchase price of the issue. These individuals judge the value of the securities under current market conditions and set the interest rates accordingly. The underwriting fee is also known as "underwriting risk" to refer to the market risk the underwriter is taking. However, because the underwriter will usually not commit to the purchase of an issue until it is sure that the debt can be successfully remarketed, the use of the word "risk" when describing this fee is not as common as it had once been. The underwriting fee is usually the smallest component of underwriting spread, ranging from $1-$3 per $1,000 of debt issued.

- Expenses - Expenses is a catch-all category used to cover costs the underwriter incurs in connection with the issuance. Such costs include: underwriter's counsel (described below); travel and entertainment expenses; fees paid to the Municipal Securities Rulemaking Board (2 cents/bond), the Public Securities Association (3 cents/bond), and the Committee on Uniform Securities Identification Procedures (CUSIP); and computer expenses. Because expenses may run as much as $1-$5 per $1,000 of debt, it is important for the issuer to carefully control this category and not simply assume that these are pass-through costs. It is appropriate to demand a strict accounting for each expense item.

## Underwriter's Counsel

Underwriter's Counsel (UC) is the legal representative chosen by the underwriter to protect its interests in a negotiated transaction. This role generally encompasses the following: (1) providing assurance that there has been full disclosure of all relevant information about the issuer and the debt being offered; (2) certifying that the issue is structured and issued in compliance with the securities laws of all states within which it

will be sold; and (3) drafting certain of the required legal documents (and to review those prepared by BC).

The documents prepared by UC in a negotiated transaction include the preliminary official statement (although this is often done by the FA), the bond purchase agreement, the syndicate agreement that specifies the rights and responsibilities of each member of the underwriting group, and the "Blue Sky" opinion that rules on compliance with state securities laws in each state where the bonds will be sold.

**Registrar/Paying Agent**

The Registrar/Paying Agent serves two purposes. The first is to receive funds from the issuer and make timely payments to the holders of the debt. The second is to keep the formal record of ownership of the outstanding securities.

Prior to the requirement that all municipal debt with a maturity of over one year be issued in fully registered form, the holders of municipal bonds were required to present their interest coupons and bonds to the paying agent in order to receive their money. Today, the registrar sends principal and interest checks directly to the owner of record on the appropriate payment dates. The Registrar/Paying Agent should be selected competitively on the basis of charges to the issuer for registration, transfer, and payment of each item.

**Bond Printer**

If physical certificates are to be used, it will be necessary for the issuer to select a firm to print the securities. A number of firms are available nationally to provide this service and competitive bids should be solicited for the contract. Because a new certificate is required each time ownership changes, the initial printing order should be a multiple of 2-3 times the minimum (i.e. the par value of the issue divided by $5,000).

It is possible to complete an issuance without physical certificates by using a book entry service. Under this approach, a clearinghouse records bond ownership on a master file and simply transfers the name on that record when the security changes hands.

**Official Statement Printer**

The official statement (OS) is the disclosure document used to market the issue. It contains detailed information about the issuer, its legal authority to issue the debt, the security behind the debt, and the limits on additional debt issuances. Most issuers now utilize in-house word processing systems for the text of the OS with a cover that is type-set by a printing firm. The issuer will contract for the reproduction and binding of as many copies of the OS as are needed for the marketing effort.

### 5.1.3 Structure the Issue

Structuring the bond -- or other debt -- issue entails 1) addressing legal issues, and 2) designing the issue. the issuing entity (e.g., the transit agency or municipality) should

work with its financial advisor and bond counsel in executing these tasks. Regarding legal issues, state statutes are usually very specific in describing the types of debt financings that transit agencies are authorized to undertake. At the outset of any financing, it is important for the issuer to identify and understand the full range of options available under applicable law; these laws may also include limits on the amount of debt (e.g., per capita or as a percentage of property values) that can be issued. A BC firm experienced in the issuer's state and familiar with transit projects is the best source of this information.

As described in Section 4.2, debt financing alternatives typically include vendor financing, leasing, revenue bonds and general obligation bonds. The issuer and its FA need to review each borrowing authorization to determine which is best suited to the project under consideration. This can be a difficult process, involving the evaluation of trade-offs between debt security and issue flexibility among other issues. The issuer should examine how each option compares to the others in the following areas, for example:

- Ease of Issuance: Is voter approval required? Is the issue subject to referendum? Is competitive sale required? How much advance notice of sale is required?

- Structural Flexibility: Is variable-rate debt permitted? Can term bonds be issued? How long can interest be capitalized? How long can principal be deferred?

- Security Characteristics: How strong is the credit pledge? Are credit enhancements allowed? What is the market for that type of debt? What is the benefit of credit enhancements?

The relative advantages and disadvantages of the different options were discussed in Section 4.2. Once a particular type of debt has been selected, the issuer and its advisors must structure the issue. The key design details and concerns that must be addressed in bonding include the following, while not all of these apply to other types of debt issues as stated, all of the general concerns must typically be addressed in any debt issuance:

- method of sale,
- size of the issue,
- bidding specifications,
- maturity schedule,
- security pledge, and
- redemption provisions.

These are discussed below.

Method of Sale

Municipal debt may be sold either competitively or through negotiation. If sold competitively, the issuer and its FA and BC will size and structure the issue, set the terms and conditions of sale, develop disclosure materials, secure ratings, and provide public

notice of the date and time of sale. On that date at the time specified, underwriters will submit sealed bids that represent their offers to buy the issue under the terms specified in the published advertisement of sale.

The FA and BC examine each bid received and determine which represents the lowest overall cost to the issuer. Assuming the bid is in compliance with the specific terms and conditions of sale, the issuer awards the debt to that low bidder. In this way, all underwriters in the market with an interest in the issue compete directly under equal conditions. This approach works very well for most general obligation offerings and other issues with characteristics that are easily understood by underwriters and the secondary market.

A negotiated transaction is the direct sale of the issue to an underwriter that has been chosen in advance of the offering. The issuer and its FA will work with the underwriter to set the terms and conditions of sale, maturity structure, and interest rates. This usually offers the best results in volatile markets and for complicated transactions.

The principal differences between negotiated and competitive sale concern the method of selecting and compensating the underwriter. Sale of the issue through sealed bids relies on competitive market conditions to secure the best available rates. The profit margin the underwriter builds into his bid must be weighed against his desire to purchase the issue. As noted below, a negotiated sale requires the issuer and its FA to control the underwriter's compensation.

A third marketing option lies in a combination of these two approaches to sell the issue. If it is determined that a negotiated sale is called for, the issuer may develop a formal "request for underwriting proposals" (RFP) and select its underwriter on that basis. The RFP approach is an effective means of identifying underwriters with specific experience with similar issues and gives the issuer greater control of costs. To control issuance costs for a negotiated sale, the issuer and FA must pay particular attention to: (1) the underwriter's spread; (2) the price the underwriter pays for the issuer; and (3) the interest rate proposed for each maturity.

## Size of the Issue

The agency, in conjunction with its FA, must determine how much money to borrow -- i.e., the total size of the bond issue. The simplest way to size a bond is to subtract from the total construction costs any grants or other available funds. In reality, however, the considerations for sizing are much more complex; the key factors include interest earnings available while bond proceeds are invested, capitalization of interest -- if desired -- the establishment of reserve funds, and the costs of issuing bonds. As a result, the final bond size is usually larger than construction cost less available funds.

A bond issue will have to provide monies to cover the expenses of construction, capitalized interest, debt service reserve funds, other reserve requirements and cost of issuing bonds. Construction costs should reflect the required payment to the contractor over a payment schedule prescribed by the construction contract, usually extending for a three year period. Since revenues (e.g., fares) resulting from new construction will

not commence until the completion of the project, the system must provide revenues during construction to cover interest expenses. Bond proceeds are usually used to provide for interest expense, and these monies are referred to as "capitalized interest." Additionally, bond proceeds are used to establish a debt service reserve fund which usually equals the maximum annual debt service. This reserve provides security for bondholders, since these monies can be used for debt service in the event that transit revenues are insufficient to pay debt service. Finally, the expenses associated with issuing bonds are typically paid from bond proceeds.

Earnings from the investment of such funds as construction and debt service reserves are used to reduce the bond size requirements. The construction funds are usually invested until expended for an average of two years. The debt service reserve fund, which is maintained for the life of the bond issue, is also available and can provide investment earnings. The earnings generated from these and other investments are used to offset some of the expense component.

An example of a bond sizing exercise is depicted graphically in Figure 5-2. Assuming the project's construction cost is $100 million, the additional costs included in the bond sizing would be $30 million for capitalized interest (for three years), roughly $11 million for the debt service reserve fund, and $2.5 million for the underwriter's gross spread and other issuance costs. The earnings from invested proceeds would normally reduce the bond sizing requirements by abut $17.5 million. The final bond size would thus be approximately $126 million (i.e., $143.5 million minus $17.5 million). As shown in the exhibit, the construction drawdown schedule would include a combination of bond proceeds and resulting investment interest earnings.[1]

In structuring the issue, the issuer must ensure that the debt service obligation resulting from the issue structure is compatible with the resources of the system and that any market (interest rate) risk associated with the structure is within acceptable limits. At the same time, every effort needs to be made to incorporate features into the structure that make the issue attractive to potential investors. The issuer and FA assume this responsibility for a competitive sale. The underwriter is also involved if the issue is to be negotiated.

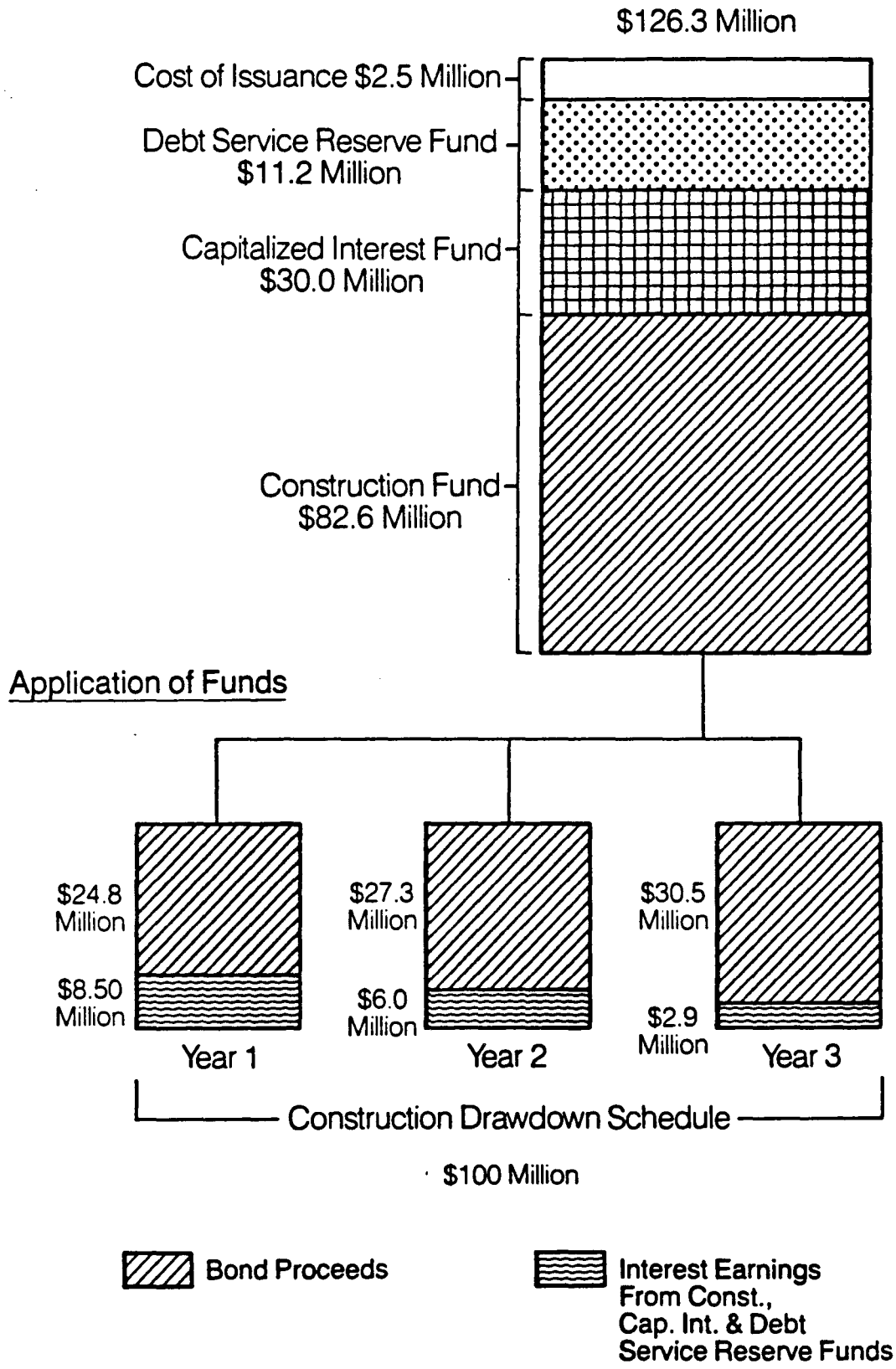
**Bidding Specifications**

For a competitive sale, the bidding specifications are delineated in the formal "Notice of Sale," a document prepared by BC and published (often in summary form) in newspapers to announce the planned offering. The Notice of Sale contains the following bidding specifications:

- the date, time, and place to submit bids,

1 Microcomputer software packages are available for sizing bonds. One example is BONDCALC, a package developed by the Government Finance Research Center. This package contains templates for use with Lotus 1-2-3.

## FIGURE 5-2: BOND SIZING AND APPLICATION OF FUNDS



- the limits, if any, on premium or discount bids,
- the form in which interest rates must be specified (e.g. multiples of 1/10 of 1 percent),
- the maximum spread between the highest and lowest interest rate, if any,
- the basis of award (how the "best" bid will be determined), and
- the timing of the award (when the issuer will formally make the award).

Maturity Structure

Within the limitations of resources available for debt service, a wide variety of maturity structures may be selected. The most common is known as a serial maturity structure, and calls for the annual redemption of a portion of the principal amount of the issue (along with the regular interest payment) over a number of years. The rate of annual redemption in a serial bond may vary, but the two major approaches are known as "level principal" and "level debt service."

A level principal structure calls for redemption of an equal amount of principal in each year. When combined with interest payments, this structure results in descending annual debt service payments over time. A level debt service structure has graduated principal payments that result in an equal annual debt service obligation when combined with interest.

Another debt structure that is sometimes employed is known as a term bond. In this structure, the bond is retired at its maturity -- or at specified interim dates. This approach is frequently used for large revenue-backed bond issues to attract specific investors. The benefits of term bonds depend upon both investor interest in this type of debt and the prevailing market interest rates. Issuers generally provide for redemption of term bonds by making regular contributions to a sinking fund.

Certain "innovative" debt options are designed to shorten the maturity structure of the issue. One means of doing this is to issue a variable interest rate obligation that gives an investor the option to redeem (put) the security back to the issuer on any interest rate adjustment date. Such securities are attractive because they give the investor a current market yield (the variable interest rate) and provide an opportunity to terminate the investment at regular intervals. The issuer benefits from reduced interest costs because rates are lower at the short end of the market. However, the issuer is subject to increased costs if interest rates rise, and must arrange for a letter of credit to provide funds in the event put options are exercised.

Variable-rate and put option structures can be very beneficial, but such techniques should be utilized only after detailed examination of all risks and costs. It is difficult to structure this type of issue for revenue-backed securities because most systems do not have sufficient resources to cover increased costs if interest rates rise. The issuer's overriding concern when selecting an issue structure must be to match the resulting debt

service obligation with the revenues the system will have available for that purpose over the life of the debt.

## Security Pledge

The security an issuer may pledge to an obligation is largely dictated by the authority granted in state statutes for that particular type of issue. For example, the law may allow revenue bond issuance without voter approval, but may specifically prohibit use of tax revenues to secure that debt.

Generally speaking, the most secure structure would include a pledge of system revenues and the unlimited taxing power of the issuing entity (a double barrel security). A security pledge might pledge only the revenues generated by the project being financing (this would be especially weak if the project were a discretionary use facility such as a transit service). In between these two examples are variations of each that include limited tax pledges, special tax pledges, and debt secured by special assessments.

If an issuer has the legal authority, it may investigate external credit enhancements to improve investor interest in the debt. Most common of these enhancements are letters of credit (LOCs) and bond insurance. LOCs are used primarily to back variable-rate debt that includes some type of put option. The LOC ensures that sufficient funds will be available on short notice to satisfy the puts.

Bond insurance guarantees the timely payment of principal and interest on fixed rate debt. The premium for bond insurance is expressed as a percentage of total debt service and usually ranges from 0.75 percent to 1.0 percent. If the insurer is rated, the insurance policy results in the assignment of Aaa (Moody's) or AAA (Standard & Poor's) ratings to the debt. However, because of the heavy supply of rated debt in the market at this time, investors have discounted the value of insurance and these obligations are priced more in line with A1 and A+ bonds. (Bonding Credit Rating is discussed below.)

## Redemption Provisions

Most issues with maturities of ten years or more include some provision for early redemption. This gives the issuer an opportunity to reduce outstanding principal and the annual debt service obligation by "calling" long term bonds. To protect the investor from these early calls, which typically begin after ten years, the issuer may specify payment of a "call premium." A call premium ranges from 1 to 3 percent of the par value of the bond. Therefore, the amount the investor will be paid if his bond is called will equal 101 to 103 percent of the security's face value (plus any interest accrued on the debt up to the call date). The optional call dates and call premiums must be specified in detail at the time the bonds are sold.

Because investors expect a slightly higher yield on callable bonds, call premiums should be set to reflect the issuer's reasonable expectation that the call will be utilized. Debt issued during periods of high interest rates usually carry call provisions to allow the issuer the option of refinancing when market conditions improve. The issuer and FA should set call provisions after consulting with the underwriter.

### 5.1.4 Develop Required Documents

The number and type of documents required to issue, deliver, and administer an issue depend on the type of debt, the structure, security pledge, and method of sale. Because many of these documents are unique to particular types of financings, this discussion will focus on those that are common to most tax-exempt issues.

**Bond Ordinance**

For most entities, debt may be issued only with the formal approval of its governing body. The Bond Ordinance, prepared by BC, usually describes the issue in fairly general terms to comply with this requirement and sets some limit on the amount of debt that may be issued.

**Bond Resolution**

Prepared by BC, the Bond Resolution describes the financing in detail. This documents includes:

- a description of the authority for issuance (including limits),
- a description of the issue size,
- a description of the purposes for which the debt is being issued,
- the final debt maturity schedule,
- the early redemption schedule and call premiums, and
- a description of the conditions under which additional debt may be issued.

In addition, the Bond Resolution describes all funds and accounts that have been created to administer bond proceeds, reserves, and debt service payments. In short, all of the rights and responsibilities of the issuer and the investor in connection with the issuance are described in the Bond Resolution.

**Trust Indenture**

The Trust Indenture contains much of the same information included in the Bond Resolution. The Trust Indenture is developed for transactions in which a Trustee is designated to hold construction funds, the debt service fund, and the debt service reserve fund. This document specifies the purposes for which monies in each fund may be used, the required flow of revenues from fund to fund, and the levels of reserves that must be maintained. The Trust Indenture is prepared by BC and reviewed by the Trustee's counsel.

### Preliminary Official Statement/Final Official Statement

The preliminary official statement (POS) is a document used to describe the issuer and the proposed issue to potential investors. For debt that is to be sold competitively, the POS is prepared by the FA and distributed to prospective underwriters. For negotiated sales, the POS may be prepared either by the FA or underwriter's counsel. In such cases the POS is used by the underwriter to market the issue to its investment clients. For most issues a POS will include sections on the issue being offered, the issuer's other outstanding debt, the economic characteristics of the issuer, and the financial performance of the issuer over recent years. The POS is updated to become the final official statement after the results of the sale are known.

### Legal Opinion

Written by BC, the legal opinion certifies to the underwriter and ultimate investor that the debt has been legally authorized and issued. This document also gives BC's opinion as to the tax-exempt nature of the debt. The legal opinion, provided when the bonds are delivered to the underwriter, is usually reproduced on each bond.

### Signature and Non-Litigation Certificate

This document, provided by the issuer, certifies that there is no litigation pending or threatened that challenges the legal authority of the issuer to sell the debt or calls into question the issuer's ability to generate the revenues pledged to debt redemption. In addition, the Signature and Non-Litigation Certificate certifies that the individuals signing the issue documents are legally authorized to do so by virtue of their positions as officers and/or employees of the issuing entity. This is a document provided to the underwriter at issue closing.

### Bond Purchase Agreement

Developed by underwriter's counsel, the Bond Purchase Agreement (BPA) spells out the terms of the sale. Included is the price the underwriter will pay for the debt, the interest rates assigned to each maturity, and any accrued interest on the debt from the "dated" date to the delivery date. The BPA will specify the date on which closing will take place and the method the underwriter will use to purchase the securities (cashier's check, Federal Funds, etc.). As issue structures become more complex, the number of documents required increases. When the transaction is complete, BC compiles all applicable documents to create an issue transcript. The transcript represents the formal record of the debt issuance.

## 5.1.5 Marketing the Issue

Once the bond issue has been structured, it must be "marketed." There are two basic activities involved in marketing:

- securing a credit rating, and

- marketing and advertising for prospective investors.

Security Credit Ratings

Bond ratings are independent appraisals of the credit quality of a particular issue (i.e., the quality of the bond and its credit risk). Most municipal credit ratings are assigned upon request (and for a fee) by either Moody's Investors Service (Moody's) or Standard & Poor's Corporation (S&P). (Neither of these firms is involved in either municipal underwriting or the provision of financial advisory services.) The most important factors considered in rating a bond are the issuer's current debt burden, financial strengths, and management capabilities, and the region's general economic conditions. Where revenue bonds are involved, the ability of the project in question to generate sufficient revenues is also considered. Of course, due to transit's historical inability to cover costs through fares, transit bonds are virtually never backed solely by operating revenues; New York's MTA represents the primary exception (see the case study in Appendix A).

Municipal investors use the ratings assigned by these firms to supplement their own credit analysis. Nearly all new municipal offerings of over $1 million request ratings from one or both of these agencies. The rating should be received within 10 to 14 days after the agencies receive all required information. The issuer should time its request so that the rating is known at least three days before the sale date.

Marketing and Advertising for Prospective Investors

The actual marketing of the issue begins with the decisions concerning the details on the type of debt to be offered. For instance, the specific maturity schedule makes the issue more attractive to some investors than to others. The interests of potential investors must be considered very early in the process of structuring an issue.

The primary marketing tool is the POS. This document should tell prospective investors everything they need to know to make an informed decision about the issue. In addition to a detailed description of the proposed offering, the POS contains credit, financial and economic information about the issuer. For revenue-backed debt, the POS also includes specific information about historical operating results and the rate structure.

Finally, in a competitive sale, advertisements for prospective investors must be placed in appropriate locations; these include The Bond Buyer, a national source of municipal bond information, and in local newspapers.

This section has summarized the process of designing and implementing a debt issue, with the emphasis on bonding. While the individual steps and concerns may vary somewhat from state to state -- and among different forms of debt -- the process as described here is generally consistent. The technical nature of the process necessitates that a transit agency or municipality planning to issue debt secure outside professional assistance (financial advisors, bond counsel, etc.) This discussion is intended to assist the issuing agency in understanding the process and the roles of these advisors.

## 5.2 IMPLEMENTING ALTERNATIVE REVENUE SOURCES AND PRIVATIZATION STRATEGIES

As discussed in Chapter 4, the alternative revenue sources carry with them a range of implementation requirements. These requirements include legal and regulatory (e.g., state legislative authorization and/or local establishment of special taxing districts), as well as institutional (e.g., negotiation between public and private entities) activities. Differences in existing legislation will clearly influence the level of difficulty inherent in implementing certain types of techniques from one location to the next; differences in the prevailing economic -- and development -- climate in different areas will affect the relative difficulty for other types.

Despite these differences, however, there is a series of basic steps that are typically followed, regardless of the particular revenue source or location; these steps can be summarized as follows:

- conduct market research - a) conduct surveys, focus groups, or public meetings to determine public attitude (e.g., likelihood of being able to implement the revenue source); b) carry out analysis of the likely impacts of the revenue source on the region (e.g., will people shop outside of the region to avoid a sales tax?);

- address legal/regulatory requirements - a) draft and introduce state legislation; b) draft local ordinances; or c) adopt zoning changes;

- carry out marketing/informational actions - hold meetings with -- and disseminate information to -- area residents, developers, business and community leaders; and

- establish collection mechanisms - a) develop payment schedules and methods (for joint development and benefit sharing strategies); b) develop means for collection of taxes or fees and distribution to the transit operator.

The remainder of this Chapter introduces the types of actions typically necessary to implement the individual revenue sources, although, as explained earlier, the specific requirements and procedures must be determined on a case-by-case basis.

### Taxes or User Charges

The actions needed to institute a new tax (e.g., sales tax or fuel tax) or increase the rate of an existing tax -- for transit purposes -- will depend on the nature of existing state and local taxes, the taxing power granted the transit agency, and the local tax (or anti-tax) climate. The following types of actions will be needed in most cases:

- determine the impact of the tax on the region and the likelihood of approval by the public,

- ensure that the transit agency (or another local jurisdiction) has the legal authority to impose the tax in question -- or to receive the revenues from an increase in a current tax rage,

- conduct public meetings and other marketing and informational activities to "sell" the tax to the public,

- gain public approval through a referendum (if legally required), and

- develop and institute a collection and distribution mechanism.

Use of Property and Property Rights

Assuming that a transit agency is authorized to lease or sell its property or property rights, the requirements for implementing joint development projects tend to be procedural in nature, rather than legal or regulatory -- and should thus be much easier to accomplish than those for taxes. The tasks that may be needed to execute joint development agreements include the following:

- gain official (e.g., city) and, perhaps, community approval (depending on the size and nature of the development) through public meetings,

- secure zoning changes (e.g., to allow more intensive development around transit stations),

- secure appraisal of the value of the property or development rights,

- request bids from developers, and

- select developer and negotiate terms of sale or lease.

Benefit Sharing Strategies

As discussed in Section 4.3, the nature of the requirements for implementing the different benefit sharing strategies varies considerably. For instance, the establishment of special benefit assessments, tax increment financing or impact fees can face significant legal/regulatory barriers, while the other techniques require only securing the participation of developers/property owners. (Of course, the latter is not necessarily easier to accomplish.) The actions that must typically be accomplished in instituting benefit-sharing strategies can be summarized as follows (by strategy):

special benefit assessment

- calculate likely benefits to property owners,

- ensure that there is (or introduce) state legislation authorizing the local establishment of assessment districts -- and granting the transit agency the authority to levy assessments,

- establish boundaries of the district,
- establish assessment formula (through agreements among private and public entities), and
- establish a collection mechanism.

tax increment financing

- ensure or introduce state enabling legislation,
- establish inter-governmental agreement with a jurisdiction having ad valorem taxing authority (e.g., a redevelopment authority),
- pass a local ordinance that establishes the boundaries of the district, and
- establish base-year assessed property value (through negotiations with other municipal tax recipients).

impact fees

- calculate likely benefits and impacts,
- ensure or introduce state enabling legislation (not required, but may help to withstand legal challenges),
- pass a local ordinance that establishes the fee area boundaries,
- establish the fee rate, and
- establish a collection mechanism.

negotiated investments

- establish basis for negotiation (e.g., density bonuses), and
- negotiate agreements with developers.

cost-sharing arrangements

- convince developers of benefits from transit investment, and
- negotiate agreements.

connector fees

- approach owners of property adjacent to stations, and

- negotiate annual lease or one-time payment.

**Privatization Strategies**

As discussed in Section 4.2, the implementation of privatization strategies may involve overcoming significant barriers (primarily Section 13(c) for contracting service, and the implications of the Tax Reform Act of 1986 for financing and ownership). The extent of these, as well as other, obstacles will depend largely on the scope and nature of the privatization effort. Obviously, the implementation requirements will be largely site-specific. Nevertheless, as with the techniques discussed above, there are certain generic steps that must be followed in almost any situation; these are summarized below.

contract operation of service

- identify the portion of service to be contracted out and the type of service to be provided (e.g., all late night service, to operate in a demand-responsive manner); this may involve a study, which identifies potential cost savings, designs the new service, etc.;

- establish an administrative framework for negotiating contracts and monitoring the contractor(s);

- develop and issue a request for proposals;

- select an operator(s) and negotiate contract(s); and

- market the new service.

private financing and/or ownership of transit facilities

- identify the desired transit option and location (i.e., through a feasibility study or alternatives analysis);

- study financing/ownership options; this would include these basic steps:

  - prepare a financial pro-form with operating cost and ridership projections for both public and private ownership scenarios to determine the prospective economics of each method; if privatization is attractive, then proceed with next steps; and

  - begin informal discussions with equipment/vehicle vendors and other private parties to determine the level of interest in participating; exploratory exchanges as to potential strategies for risk allocation and financing need to be initiated so that both public and private parties understand what is possible with privatization;

- develop and issue a request for proposals for private participants (i.e., generally, a consortium of firms to handle different aspects of the project);

- select firm(s) and negotiate contract(s); and

- develop and implement supplementary financing strategies and/or revenue sources.

## 5.3 CONCLUDING REMARKS

The Financial Planning Guide has summarized the various components of the transit financial planning process through discussions of 1) how financial planning fits into the overall transit planning process; 2) the specific procedures and methods that serve as inputs to financial planning; and 3) the issues and procedures involved in developing and implementing a financial plan. While many of the individual elements discussed in the Guide have been described in other reports, the Guide represents an effort to pull together all of the diverse aspects of transit financing planning in a single comprehensive document.

The Financial Planning Guide is designed to aid public agencies and interested private parties in the preparation of comprehensive and realistic financial plans--for new capital investments, recapitalization efforts, and the ongoing operation of existing services. As rising costs and reductions in public funding continue to place strong pressures on transit agency budgets, sound financial planning takes on ever greater importance. It is hoped that this Guide will prove helpful in meeting this challenge.

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## APPENDIX A: CASE STUDY OF THE FINANCING OF A MAJOR URBAN TRANSIT SYSTEM (NEW YORK METROPOLITAN TRANSPORTATION AUTHORITY)

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### Background

Public transit financing in the New York metropolitan area represents an impressive story. Although this story is unique in certain respects, individual elements have potential applicability to other areas of the country.

The planning, financing and operation of public transit in New York is the responsibility of the New York Metropolitan Transportation Authority ("MTA"), an agency of the State of New York ("State"), created in 1965 to assume operating responsibility for the Long Island Railroad and the New York, New Haven & Hartford Railroad. Deteriorating conditions of these two privately-owned railroads persuaded the State legislature that a public takeover and investment in new rolling stock could reverse these trends. State voters approved a $2.5 billion transportation bond issue (backed by the State's full faith and credit ) to fund improvements to mass transit in 1967. In 1968, the MTA (then known as the Metropolitan Commuter Transportation Authority) assumed control of the New York City Transportation Authority ("Transit Authority"), the Manhattan and Bronx Surface Transportation Operating Authority ("MaBSTOA") and the Triborough Bridge and Tunnel Authority ("TBTA"). The resulting organizational structure made the MTA the agency with overall responsibility for the New York City bus and subway system and large segments of the region's commuter rail network.

In 1981, the Legislature approved the Transportation Systems Assistance and Financing Act, which empowered the MTA to issue revenue bonds to provide partial funding of an ambitious $6 billion capital improvement program. This legislation simplified many of the approval steps required by the State and the City of New York ("City") for approving and financing capital projects, and created three bonding mechanisms for raising capital for the Transit Authority and MaBSTOA, including 1) special obligation bonds, notes and lease obligations secured by and made payable from Transit Authority and MaBSTOA operating revenues and subsidies, 2) service contract bonds, and 3) TBTA Revenue Bonds.

The capital program to be funded was originally (in 1981) contemplated as a $5.7 billion rehabilitation, modernization and expansion program, of which $4.86 billion was to be invested in the subway system and $840 million invested in the bus system and in management and related improvements. The program included the expenditure of nearly $1.6 billion (36 percent of the total) for 1,376 new and/or rehabilitated subway cars.

Although changes resulting from actual financial results and the level of Federal and State grant funding would ultimately affect the capital program's financing, the plan of financing involved the prospective use of a diverse mix of funding sources, including:

| | ($ Billion) | Percent |
|---|---|---|
| Federal UMTA fund | $1.933 | 33.8% |
| State cash grants | 0.107 | 1.9 |
| City of New York funds | 0.587 | 10.3 |
| Port Authority (NY/NJ) funds | 0.088 | 1.5 |
| MTA/TBTA Bond proceeds | 2.471 | 32.3 |
| Safe Harbor Lease Equity | 0.393 | 6.9 |
| Other | 0.132 | 2.3 |
| **TOTAL** | $5.711 | 100.0% |

From a financial planning perspective, this funding approach represented a dramatic departure from traditional practice, not only in New York but throughout the domestic public transit industry. Unlike most major urban transit systems which had relied extensively on the Federal grant-making process for a majority of the funding for capital improvements -- usually between 75-80 percent of the total -- the MTA program was dependent upon Federal and State grants for 35.7 percent of the total funding for the program and was looking to regional, local and private sources for 64.3 percent of the capital required. In addition to the capital program established for the New York City transit system (i.e., the subway and bus system), the MTA instituted a commuter system capital program. This program involved the purchase and rehabilitation of commuter vehicles, improvements to yards and shops, modernization of the signals, communications, electrification and power systems and other improvements. The total capital program for the commuter rail system as established in 1981 was $1.367 billion. Of this amount, the MTA anticipated that the program would be funded from the following sources:

| | ($ Billion) |
|---|---|
| Federal funds | $169 |
| State funds | 144 |
| Lease Equity | 200 |
| MTA/TBTA Bond proceeds | 954 |
| **TOTAL** | $1.367 |

A brief discussion of the non-Federal and non-State sources follows.

Under the then existing legal agreements that governed the use and operations of Transit Authority and MaBSTOA facilities, the City was required to fund system costs not provided from "other sources".

The Port Authority of New York and New Jersey was required, by virtue of its statutes, to provide up to $200 million annually for bus transit facilities in New York and New Jersey, of which $88 million was to be allocated to the Transit Authority.

Under the Economic Recovery Tax Act of 1981, as amended by the Tax Equity and Fiscal Responsibility Act of 1982, Congress enabled the MTA and other transit properties to make a safe harbor sale-leaseback of mass commuting vehicles to a taxable corporation.

Other funds raised for the capital program were expected to include awards from certain litigation and certain cash payments made by the State to secure Service Contract Bonds that were not used for debt service on such bonds.

The various debt financing instruments used by the MTA for both the New York transit system and the commuter rail system are described below.

Transit Facilities Revenue Bonds

Perhaps the most innovative and bold financing device created by the MTA was its Transit Facilities Revenue Bonds, known throughout the capital markets and the transit industry as "farebox revenue bonds". These bonds are special obligations of the MTA payable solely from the gross operating revenues of the New York City transit system (i.e., the portions operated by the Transit Authority and MaBSTOA) and all State, City and other operating subsidies (other than Federal subsidies), and are secured by a pledge of such revenues as well as by a pledge of other revenue (e.g., funds provided by the State for debt service on Service Contract Bonds, but not required therefore, proceeds from the sale or lease of transit facilities or property, etc.). The pledged revenues securing the Transit Facilities Revenue Bonds include the following: 1) fares derived from charges to the users of the transit system; 2) income from concessions and advertising; 3) fare subsidies (e.g., for the elderly, handicapped and school children) paid by the City and reimbursement from the City for transit police services; 4) State operating subsidies provided from a statewide transit operating assistance program that is distributed on a formula basis; 5) City operating assistance payments matching the State operating assistance payments; 6) a series of special taxes enacted by the State to help offset Transit Authority deficits including a 1/4 percent increase in the State sales tax, a 3/4 percent tax on the gross receipts of oil companies, a franchise tax on certain transportation and utility companies, a modified taxation method on oil company taxes extending the tax to subsidiaries and affiliates, and a "gains tax" imposed on sale of real estate in the City (which was subsequently and retroactively repealed); 7) TBTA operating surpluses (e.g., amounts remaining after payment of operating and debt service charges; and 8) income from MTA investments. This broad-based mix of revenues enabled the MTA to successfully offer its first series of Transit Facilities Revenue Bonds in 1981, a $250 million offering, and, despite widespread skepticism voiced from most sectors of the investment banking community, further enabled the MTA to get investment grade ratings (Baa/BBB+) from Moody's Investors Service and the Standard and Poor's Corporation.

The Transit Facilities Revenue Bonds include a rate convenant that also substantially and positively affected the credit quality of this financing mechanism. Under the terms of

the financing, the MTA is required to fix and adjust fares, rates, rentals and other charges to produce revenues together with other available funds sufficient to pay debt service, to maintain a debt service reserve fund (equal to maximum annual principal and interest) and to cover operating and maintenance expenses. The financing further requires that, should insufficient funds be available to meet debt service payments, fund the debt service reserve fund and pay operating and maintenance expenses, the MTA and the bond trustee may take action to require the Transit Authority and MaBSTOA to raise fares to levels sufficient to meet its financial obligations. In most communities, a rate covenant such as the one implemented on behalf of MTA's Transit Facilities Revenue Bond bondholders would be extremely difficult to base financial security on for the purposes of arranging indebtedness. Farebox elasticity becomes a crucial issue for the marketplace to examine and ample data exists around the country to demonstrate that, when fares are raised, patronage usually suffers. Clearly, one of the unique aspects of the MTA financing and of the role that public transit plays in the New York metropolitan area is the essentiality of transit service and the linkage between that essentiality of service and the "inelasticity" of the transit fares.

It is this essentiality of service that the ratings agencies most often cite in justifying the investment grade ratings assigned to these MTA bonds. In its July 21, 1986 credit analysis, Standard & Poor's noted: "It is estimated that only 16% of the work force entering Manhattan. . .each weekday. . . relies on private transportation. The remainder use some form of public transit, with better than 60% of total commuters travelling by subway. Therefore, regardless of the quality of service, the majority of the labor force. . . is forced, through lack of viable alternatives, to use the subway." To demonstrate this point, the MTA retained an independent consultant who is required to report to bondholders on the "Feasibility" of the farebox bond financing before each bond issue is approved. This study seeks to determine 1) whether sufficient revenues can be generated from the farebox to cover debt service and operating costs, 2) the appropriate levels at which such fares have to be established under a range of subsidy alternatives, 3) what the impact on the regional economy of varying levels of higher fares will be, and 4) the impact that system capital improvements will have on ridership and farebox revenue. One of the most interesting conclusions that these successive studies have reached is that "the higher fares necessary to cover...operating and projected debt service requirements, even in the event that all general operating subsidies are eliminated, are within the capacity of the City economy to pay". These forecast underlie the fact that the essentiality of the service makes providing a relatively high level of governmental subsidy to the transit system a political imperative.

**Transit Facilities Service Contract Bonds**

The second innovative credit structure designed and implemented by the MTA and its investment bankers and legal advisors was the Transit Facilities Service Contract Bonds. These bonds are special obligations of the MTA secured by and payable from the payments made to the MTA by the State pursuant to a Transit Service Contract, an agreement negotiated between MTA and the State. This contract provides that the MTA may issue bonds or notes so as to obligate up to $52 million annually for debt service on bonds secured by the Transit Service Contract Payments. Any unused balances from these appropriations may, until December 31, 1987, be used by the Authority for other

City transit or commuter rail capital projects. Unlike full faith and credit bonds (general obligation debt), the Transit Service Contract Bonds are secured by the State's absolute and unconditional obligation to make payments under the contract, subject only to the making of annual appropriations therefore by the State legislature. . .without any rights of set-off, recoupment or counter- claim which the State may have against the MTA." This type of credit is generally viewed as "moral obligation", in this instance an obligation of the State. The contract obligates the State to make its required payments subject to the willingness of the Legislature to make appropriations, but does not obligate the Legislature to make such appropriations. The Transit Service Contract is an "executory contract" to the extent that monies are available for the purposes provided in the contract. Since the obligations of the MTA that are secured by these contract payments are not debt of the State (notwithstanding the implied moral obligation of the State to meet its contracted payments), Transit Service Contract Bonds are rated below the State's general obligation rating.

Unlike the "farebox revenue bonds", the principal credit concern associated with the Transit Service Contract Bonds relates to the credit- worthiness of the State of New York as opposed to any financial, managerial or operating performance matters related to the MTA. The use of this type of credit structure is somewhat unique to public transit financing, although it is being utilized widely for a variety of other types of public infrastructure financing needs, notably for public buildings, correctional facilities and certain equipment. The key variable is the language associated with the contract between the borrower (e.g., the MTA) and the government contracting for the service (e.g., the State) and how bondholders are affected by nonappropriation and default. Of equal importance, particularly to the rating agencies, is the essentiality of the service being financed, since its relative importance in governments' allocation of resources may affect the governing body's (e.g., the State legislature's) willingness to make the necessary appropriations. In the case of the MTA's Transit Service Contract Bonds, this essentially of service, discussed above in the section on Transit Facilities Revenue Bonds, has been well established.

## APPENDIX B: OVERVIEW OF THE UMTA ADVANCE CONSTRUCTION PROGRAM

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### Introduction

Recently, the Surface Transportation and Uniform Relocation Assistance Act of 1987 was enacted, providing a reauthorization of highway trust fund financing for urban mass transit over the next five years. The Act contained a new element which will affect UMTA's capital grants policy: the inclusion of an "advance construction" provision for UMTA grantees.

Section 306 of the Act provides that "...a public transit project which, having proceeded through the processes required for a determination for eligibility for Federal assistance and upon being so approved by the Secretary of Transportation, may begin construction and incur expenses before the actual obligation of Federal funds. These expenses may be eligible for Federal contract payments, including interest earned and payable on debt issued to finance the approved project. Projects for which interest obligations will be eligible for Federal reimbursement include those benefiting from grants pursuant to UMTA's discretionary (Section 3) and formula block (Section 9) grants programs. Over the five-year funding period covered by the Act, Section 3 funding for bus improvements, rail modernization and "new start" systems is authorized to a level of $5.5 billion, while formula block grant authorizations total in excess of $10.5 billion."

The language of Section 306 of the Act largely mirrors the language authorizing advance construction and interest cost reimbursement available to State highway agency grantees of the Federal Highway Administration ("FHWA"). Section 306 is intended to allow Federal participation in interest costs incurred by a public transit system for the retirement of bonds, the proceeds of which were expended in the construction of transit projects. Pursuant to this program, several transit systems should be allowed to issue Federal reimbursement (grant) anticipation notes (tax-exempt) to provide a source of capital to "advance fund" elements of their projects with the principal and a portion of the interest costs of such securities repaid upon ultimate receipt of UMTA grants.

### The Public Transit Funding Environment

Over the past few years, the traditional partnership between the Federal government and state in funding public transit infrastructure has been subject to significant change. What has historically involved a capital cost sharing arrangement in which the Federal government provided up to 75 percent of the costs of projects will, as a result of efforts to reduce Federal budget deficits, necessitate a much larger burden of project financing to

be assumed by state and local governments, and by the private sector. In fact, UMTA grant funding for "new start" systems has begun to recognize the stability and reliability of non-Federal funding and tends to favor projects that demonstrate an ability and willingness to "overmatch" the statutory funding levels.

Although budgetary pressures will curtail expansion of UMTA's future funding, the agency will continue to distribute billions of grant dollars for a wide range of investments. Moreover, the number of communities that are seeking Federal financial support for their projects and programs continues to grow. A recently completed study of rail modernization needs suggested that the level of capital investment required to maintain and upgrade all existing rail facilities over the next 10 years will approach $18 billion. Even if rehabilitation is confined to only the more cost-effective projects, $10 billion would be required to achieve three-quarters of the benefits of restoring the entire system. Mature cities like New York, Philadelphia, Boston and Chicago are planning and implementing multi-billion dollar renewal and replacement programs intended to simply keep their systems in decent condition. Bus system investment demand is also expected to maintain its pace, with funding requirements over the next decade averaging nearly $1 billion a year. In addition, new initiatives for fixed guideway systems is a growth business, with major projects moving ahead in Atlanta, Baltimore, Denver, Los Angeles, San Francisco, Dallas, Houston, Phoenix, St. Louis and a host of other communities.

The scope of this demand will require that transit managers skillfully plan and implement these projects in a manner, that maximizes both Federal and non-Federal resources in a timely manner so that expensive delays can be avoided and public and investor confidence can be maintained. One of the major issues confronting transit planners and managers is the uncertainty of Federal assistance. Even under the new environment of a more equal Federal- local financing partnership, the ability of local decision-makers to plan for project implementation given the uncertainty of Federal scope and timing of grant contracting exposes these properties to inflation risks, contracting risks and cash disbursement uncertainties.

Through a more predictable funding commitment, transit properties can increase the efficiency of their transit planning. Through the contract authority (under Section 3) and the Section 9 formula grant programs extended under the Act, UMTA is able, subject to obligation limits and future appropriations, to make commitments to transit projects in a predictable, normalized manner.

**Advance Construction Authority: FHWA Program Model**

The authority for UMTA to provide advance construction financing and to reimburse Federally-approved projects for interest paid on debt issued on behalf of such projects was modeled after a successful contracting enhancement established in 1983 under the FHWA. This program has been utilized by a number of states which have, upon qualifying certain Interstate System projects for FHWA support, issued Federal Highway Reimbursement Anticipation (ACI) Notes. The purpose of these ACI notes is to "front-end" cash for states to initiate the early construction of approved Interstate projects. The ACI program allows states to undertake projects using their own funds in advance of receiving required obligation authority. FHWA approval of a project merely legally binds

FWHA to provide Federal funding, if as and when such funding becomes available. ACI projects cannot be approved unless future obligation authority can be forecasted from current authorizations. The FHWA will not approve projects requiring funding beyond the date of expiration of existing funding authorization legislation. Once an ACI project is approved by the FHWA, the state begins construction using its "own" funds and converts the project in a fiscal year following the expenditure when it has remaining unobligated contract authority. FHWA then reimburses the ACI expenditures on a repayment schedule that is no greater than 36 months. The state's "own" funds are the proceeds of tax-exempt notes issued in anticipation of receipt of the FHWA reimbursement. Interest costs incurred in advancing funds are an allowable Federal cost to the extent that the net interest component of the financing is equal to or less than the increase in highway construction costs. By implementing these financings, states such as Utah and Alabama were able to meet construction schedules, assured that they would have the cash to pay contractors in a timely manner.

**UMTA Funding Instruments**

Presently, UMTA awards capital grants through a commitment staging process involving several levels of approvals. A Letter of No Prejudice ("LONP") may be issued on projects that have completed environmental and other statutory requirements but are not yet approved by UMTA for funding. The LONP allows transit properties to undertake projects with their own funds without prejudicing their opportunity to later apply for and receive UMTA grants. Such grants, to the extent available, can be used to reimburse the property for cash outlays made previously, but cannot include any interest costs. Unlike FHWA projects, which have issued advance construction notes based on unobligated contract authority, LONPs do not provide properties any assurance of subsequent project approval by UMTA. An UMTA Letter of Intent ("LOI") expresses UMTA's intention to provide funding from its discretionary pool of capital for a project on a schedule reflecting the availability and appropriation of funds. The LOI is the mechanism used by UMTA to indicate its intent to provide funding for large multi-year projects, typically new starts, although it is occasionally used for rail modernization and some bus projects. Since UMTA cannot obligate funds in advance of appropriations, LOIs are not binding commitments. The final commitment instrument is a Full Funding Contract ("FFC"). The FFC is generally the grant contract mechanism used to implement the LOI. While the LOI is a one party document (UMTA issued), the FFC is executed by both UMTA and the grantee. FFC's establish maximum levels of Federal participation in a project and obligate the grantee to meet any "extraordinary" costs.

Recent experience and market analysis have resulted in a recognition that none of the past UMTA funding documents represent a bankable form of financing. The credit markets have generally not been willing to purchase debt securities backed by a pledge of funds to be received upon fulfillment of UMTA funding agreements, unless further secured by credit enhancements.

The goal of UMTA's new advance construction program is to provide advance construction authority, similar to that offered by FHWA, meet the needs of local transit properties, remain within the constraints of Federal policy, and still satisfy the demands of the capital markets.

## APPENDIX C: THE IMPACT OF THE TAX REFORM ACT OF 1986 ON THE FINANCING OF PUBLIC TRANSIT

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### Introduction

In August 1986, the U.S. Congress approved sweeping changes to the Federal tax code when it passed H.R. 3838, the Tax Reform Act of 1986. The subsequent Presidential execution of the law culminated three years of intensive debate and lobbying and brought about sweeping and significant changes to domestic tax policy. Chief among the reasons that propelled the bill to its passage was the enormous budgetary pressures on the Federal government to reduce the ever burgeoning budget deficit. In this context, tax reform, in addition to streamlining and rationalizing Federal tax policy, provided a politically acceptable method of increasing Federal tax revenues, principally through the elimination of certain deductions and "loopholes", without necessitating an increase in Federal tax rates. One area of tax policy which, while accounting for a modest level of the "draining" of tax revenues from the U.S. Treasury, received an enormous amount of attention and debate was the use by state and local governments -- and some private parties -- of municipal bonds, the interest income from which is exempt from Federal taxes. The Tax Reform Act completely reformulates the provisions of Section 103 of the Internal Revenue Code (the "Code") dealing with tax exempt bonds, partly in an effort to curb abuses that had occurred through the issuance of "industrial development bonds ("IDBs"), and partly to find ways to reduce taxpayer deductibility or income sheltering methods, thereby increasing taxable income. The Act also extensively altered the manner in which private corporations and individuals treat certain expenses and deductions.

### Public Transit Financing: Tax Exempt Debt Strategies

American public transit properties have tapped the capital markets in a variety of ways to finance both current operating and long term capital needs. Although the financing techniques and credit structures used by the public transit industry are multiple and varied, the actual funding strategies deployed by these agencies are relatively standard, depending upon the purpose of the financing. Essentially, five principal types of public transit debt financings have emerged: 1)long term financing of the local share of the costs of capital projects and long term fixed assets; 2) financing of long term capital projects and fixed assets through the issuance of grant revenue anticipation notes, which mature within three years of their date of issue and which are repaid from the cash proceeds of UMTA, state and local capital grants; 3) financing of either fixed asset capital or operating cash needs from the transfer of tax benefits associated with the ownership of mass commuting vehicles (rail cars or buses) through the use of "safe harbor leasing"; 4) short term financing of working capital cash flow shortfalls, occurring seasonally due to

the imbalance in the timing of cash receipts and disbursements, through the issuance of tax and or revenue anticipation notes which mature within one year of the date of their issuance; and 5) the use of a variety of financing strategies, most of which are still in planning stages, involving private sector ownership and financing, generally referred to as "privatization."

In respect to the issuance of securities (i.e., tax exempt long term bonds or short term notes), which has been the dominant method by which public transit properties have financed the local matching share of their capital program expenses, most properties have approached their financings with the dual goals of achieving the lowest possible interest rate on their bonds and notes and, where such funds are not immediately required for capital or operating purposes, investing the idle proceeds in the highest yielding U.S. government securities available. This spread between borrowing rate and investment rate is commonly called "arbitrage." In addition, many transit properties that have issued tax exempt securities to fund long term capital needs have reduced the size of these financings by funding the required capital outlays over a two to five year timeframe. Rather than necessarily bonding each year's spending through annual issuance, these properties have issued one large transaction and spent the proceeds as needed over the longer term. Unspent proceeds were then invested, for the most part in higher yielding instruments, producing the arbitrage benefit which in turn reduced the bonding requirements.

In respect to safe harbor leasing, transit properties have been able to utilize provisions of the Economic Recovery Tax Act of 1981 and the Tax Equity and Fiscal responsibility Act of 1982 to effectively "sell" the depreciation benefits associated with the ownership of mass commuting vehicles to private corporations, which can then deduct these depreciation levels from their income thereby creating a tax shelter. To take advantage of the provisions of this program, buses or rail cars had to be placed in service prior to January 1, 1988, or if binding contracts for their acquisition had been executed prior to April 1, 1983, they could be placed in service after December 31, 1987. Investors in these safe harbor leases could only purchase an interest in the non-Federal share of the cost of such vehicles. For the most part, properties have been able to generate cash equal to between 11-14 percent of the depreciable basis of a bus and between 18-22 percent of the depreciable basis of a rail car.

Recently, considerable attention has been focused on the potential for "privatizing" the ownership, financing and operations of public transit services and facilities. Although to date the majority of privatizing has occurred through the contracting by public transit agencies with private companies for bus service, maintenance, etc., there has been growing interest in the feasibility of private development, financing and operation of new rail starts. Several projects have been initiated to explore the potential of this strategy. Under the various financing approaches to privatization, private corporations could design, build, finance, own and operate transit facilities and "sell" transit services to the local transit agency. The local agency, utilizing farebox receipts, operating subsidies and any dedicated taxes available, would purchase these services by paying the owner/operator a fee which would cover operating expenses and the owner's cost of capital (through whatever methods of private financing are to be used). The owner would then be entitled to deduct deprecation and interest expenses for the project and calculate

these deductions in its return on investment. (Investment tax credits were available to private owners where such facilities were leased to taxable entities, but not to tax exempt entities. However, this tax credit was eliminated with the enactment of the Tax Reform Act, as is discussed more fully below.)

The general financing factors and conditions described above reflect the Pre-Tax Act environment for public transit agency bonding and capital funding. The balance of this section addresses the specific provisions of the Tax Reform Act that affect the general municipal bond marketplace and transit agency financing strategies in particular.

**Summary of Major Tax Reform Changes in the Municipal Bond Market**

The Tax Reform Act produced numerous changes in the structure of the tax exempt bond marketplace. The major provisions of change are summarized below.

First, the Act established a new test for tax exemption of interest on state and local bonds by replacing the present legal concept of IDBs with a more restrictive concept of "nonessential function bonds." Interest on nonessential bonds (meaning nonessential to the basic function of state and local government) is now taxable unless such obligations are characterized as "qualified bonds", as described in the Act. These functions are now known as "private activity bonds" and include IDBs, consumer loan bonds, student loan bonds and mortgage subsidy bonds. Private activity bonds also include tax increment bonds and bonds issued for the benefit of an organization exempt from Federal income tax under section 501(c)(3) (e.g., a non-profit hospital). The Act permits the issuance of private activity bonds on a tax exempt basis if they are issued for certain qualified purposes such as airport construction, solid waste disposal facilities or small issues of less than $1 million, among others. A number of previously permitted categories, including sports facilities, convention centers and pollution control facilities, were eliminated. Public transit facilities that are privately owned were also eliminated from receiving tax exempt treatment. The Act subjects most private activity bonds to a new state volume ceiling based on state populations. In 1987 this limit was $75 per capita (in each state), with a minimum ceiling of $250 million. After 1987 the per capita limit drops to $50 and the minimum ceiling drops to $150 million. The Act also subjects interest on private activity bonds to an alternative minimum tax and revises the depreciation rules applicable to bond financed property.

The Act subjects all traditional state and local government bonds, without regard to their purpose or size, to a requirement that any arbitrage profits be rebated to the U.S. Treasury. It further imposes new limitations on advance refundings, limits the permitted size of reserve funds investable at a yield above the interest cost (yield) on the bonds, and institutes a new reporting system to the IRS for issuers of municipal debt. Finally, the Act imposes for the first time a potential penalty on issuers who fail to comply with these provisions. That penalty may include a determination, retroactive to the date of issuance, that bond interest is taxable.

The balance of this discussion focuses in greater detail on the specific provisions of the Act and how they might affect public transit financing.

## Private Activity Bonds

The Act defines private activity based on the use of bond proceeds, namely whether the proceeds are used in a private trade or business or whether private loan financing is involved. A bond is a private activity bond if more than 10 percent of its proceeds are used in a private trade or business and 10 percent or more of the debt service is secured by payments from such property. This use test will have a direct impact on the financing of public transit facilities where such facilities are privately-owned or where such facilities are operated pursuant to a lease, management contract, incentive payment contract or related agreement with a private business. However, property used by a business may not be considered a private activity if the business is using the property as "a member of the general public." Traditional municipally financed and owned transit facilities are unaffected by these provisions. However, transit facilities that might be privately-owned will no longer be able to enjoy the lower cost benefits of tax exempt financing. Certain facilities or projects (Houston System Connector, Dallas Area Rapid Transit, Dulles Airport Corridor, Ohio High Speed Rail Project and Austin, TX) were "grandfathered" from this prohibition against tax exempt debt for privatized transit. In respect to transit operating contracts and tax exempt financing (e.g., where the facilities are publicly-owned but privately-operated), the Act directs the IRS to modify its guidelines to provide that management contracts will not be viewed as creating a private activity if 1) the term of the contract does not exceed 5 years, 2) compensation of the manager is not based on net profits and at least 50 percent of payments are on a fixed fee basis, and 3) the governmental owner of the facility has the option to cancel the contract without penalty at the end of any three-year period. These provisions permit transit properties contracting with private service providers some clear guidelines as to how such agreements can be structured to provide for tax exempt financing of improvements of the facilities used to provide the service.

The state volume ceiling on private activity bonds has imposed a new responsibility of state governments to police the issuance of these types of securities to assure compliance with the new law and to allocate amongst numerous competing interests the available financing capacity. The Act permits the amount of unused ceiling in any year to be carried forward for "Exempt Facility" bonds (i.e., covering 501(c)(3) debt, airports, docks wharfs, mass commuting facilities, water, sewer, solid waste [governmentally owned], multi-family housing, electricity, gas, district heating and hazardous waste facilities) for a period of up to three years.

Under prior law an Exempt Facility could be owned by a private party, as opposed to a governmental unit. Private ownership is no longer permitted for airports, ports and transit facilities, while the remaining exempt facilities may be privately-owned. Again, this places privatization of transit at a distinct financing disadvantage versus the privatization of other important public services.

## Federal Guarantees

The Act continues the prior rule preventing tax exempt indebtedness from being guaranteed by the U.S. or any Federal agency or instrumentality. This rule applies identically to governmental and private activity bonds.

## Internal Revenue Service Reporting

The Act requires that all issuers of tax exempt securities (governmental as well as private activity bonds) issued after January 1, 1987 report on the status of such obligations through the use of a prescribed IRS form. The Act also requires the holders of tax exempt bonds to report the amount of the tax exempt interest received on all tax exempt holdings commencing in the 1987 tax year.

## Arbitrage

The Act imposes an arbitrage rebate rule on the issuers of virtually all classes of tax exempt bonds. This rule requires rebate to the U.S. Treasury equal to the arbitrage earned from the investment of bond proceeds at a yield above the yield on the bonds. There are some exceptions associated with this rule, including 1) debt service funds earning less than $100,000 annually, 2) issues in which the entire proceeds are spent within six months, 3) proceeds invested in tax exempt obligations, and 4) student loan bonds.

Under prior law, issuers were granted a temporary period during which the proceeds of tax exempt obligations could be invested for an unlimited yield. For construction projects, this temporary period was three years (and in certain instances where project completion was expected to take place over a longer term, for up to five years). Many transit properties took advantage of these rules by marketing bonds to advance fund their capital program and to earn a positive spread on these bond funds prior to their disbursement. For short term note issues (e.g., revenue, grant or tax anticipation notes), issuers were granted a temporary period of up to thirteen months during which time they could earn arbitrage profits. Many transit properties took advantage of these financing opportunity to provide seasonal working capital by tapping the note markets and earning additional income to help offset operating losses.

The base for a rebate rule is that issuers should repay the Federal government the amounts earned in excess of the bond yield. Rebate payments are due at least once every five years. The rebate rule applies to earnings on the gross proceeds of tax exempt bonds, which include monies held in construction and debt service reserve funds. To comply with the rebate rule, issuers will have to establish and maintain elaborate accounting records that track both the disbursement of funds and the investment of proceeds (and earnings thereon). Prior to the rebate rule, issuers could commingle investment income with operating funds and not treat such commingled funds as bond proceeds (subject to arbitrage restriction and rebate). Fund segregation and accounting will now be required.

The Act defines the bond yield as the discount rate at which aggregate payments of debt service on the bonds have a present value equal to the price paid for the bonds by the bondholders. This means that the costs of issuance (e.g., underwriting fees, legal fees, printing, and rating agency fees) cannot be used to increase the basis for the yield calculation and therefore cannot be "recovered" from retained arbitrage earnings. (Bond insurance and credit enhancement fees may be calculated in the bond yield and recovered provided certain tests are met.)

Any investment of funds that are subject to the rebate rule and that are yield restricted must comply with the "market price" rule. This rule requires issuers to 1) purchase securities in an open market transaction at an "arm's length" price; 2) purchase Treasury securities-State and Local Government Series, known as "slugs"; 3) purchase bank certificates of deposit that are traded in an active secondary market; or 4) arrange an investment contract with a financial institution after having secured at least three bids for such contract.

As noted above, the arbitrage limitations pertaining to both long term fixed asset capital and short term working capital financings impose considerable constraints on issuers. One likely implication of these provisions is that projects will be financed more frequently rather than having a single, large issue take care of all three-to-five year needs. For large transit system infrastructure investments this is likely to be particularly true. However, certain exceptions to the arbitrage rule do offer modest legal arbitrage opportunities for major infrastructure issuers. The Act provides special relief for an issuer who spends all of its bond proceeds within six months of the date of issuance, except for the "minor portion" defined as the lesser of $100,000 or 5 percent of bond proceeds, in which case no arbitrage rebate is required. To the extent that the transit issuers cannot comply with these requirements, an unlikely event given the size and long lead time associated with most projects, these issuers will find their financing requirements increased by the incremental spread they could have earned over the bond yield had the new arbitrage rules not been in effect.

Transit properties have been frequent issuers of tax and revenue anticipation notes to provide temporary working capital and to produce incremental investment income to meet operating expenses. Prior to the passage of the Act, issuers were permitted to size a note offering based on the maximum cumulative cash flow deficit in any month and add to this the next month's operating expenses. The proceeds of any note issue so sized would be able to earn investment income at an unlimited yield for a temporary period not exceeding thirteen months. The rebate requirement does not apply to tax and revenue anticipation notes if all of the proceeds of the issue are spent within six months. This constraint poses considerable hardship for transit issuers. Several legal and financial advisors have suggested that this problem can be solved by having the issuer first spend all note proceeds before disbursing operating income; however, it is unclear whether this accounting treatment will work. Congress did grant a safe harbor from the rebate problem whereunder note proceeds and earnings thereon will be deemed spent within six months of the date of issuance if during this period the cumulative cash flow deficit has actually exceeded 90 percent of the size of the note issue. Thus, to retain arbitrage profits under the six month safe harbor, the size of the issue cannot exceed 110 percent of the cumulative cash flow deficit occurring during the six months after the notes are issued. The result of these regulations for smaller notes issues will be to produce less debt sourced cash to fund temporary operating shortfalls and to yield a reduced level of arbitrage income.

## Advance Refundings

Many transit and other governmental purpose issuers have taken advantage of lower interest rates to refund high coupon debt in improved market conditions. When such refundings occur in advance of the first call or redemption date this is called an advance refunding. The Act defines an advance refunding as any refunding in which the prior bonds are not redeemed within 90 days of the date the refunding bonds are issued. Under prior law an advance refunding was any issue in which the prior bonds were not repaid within 180 days. The Act imposes other new restrictions on the issuance of advance refunding bonds including: 1) bonds originally issued prior to January 1, 1986 may be advance refunded two times; 2) bonds originally issued after December 31, 1985 may be advance refunded only once; 3) the temporary period during which proceeds of advance refunding bonds may be invested at unlimited yields is 30 days after the date of issuance; and other technical provisions. These provisions will sharply limit opportunities for transit and other issuers to reduce their debt service payments or defease and restructure restrictive bond covenants through refundings in the future.

## APPENDIX D: FINANCIAL PLANNING FUNCTION SUMMARY SHEETS

Function: **Fare Policy**

| Major Tasks | Key Actors |
|---|---|
| • establish fare structure (by market segment, time of day, type of service)<br>• establish acceptable rate of increase over time | transit board (set policy), transit agency (recommend policy, provide information to board) |
| • estimate revenue and ridership impacts of alternative fare policies | transit agency |

Information Requirements/Inputs

- current and projected ridership
- fare revenue forecast
- revenue shortfall estimation (preliminary)
- elasticity measures

Information Products/Outputs

- fare structure

Direct Input to Other Functions

- fare revenue forecasting
- travel demand forecasting
- service planning

Techniques/Methods Used

- elasticity analysis (for revenue and ridership analysis)

Function: **Travel Demand Forecasting**

| Major Tasks | Key Actors |
|---|---|
| • assemble regional input data | MPO, transit agency |
| • develop input networks (transit and non-transit) | MPO, transit agency |
| • apply demand analysis technique(s) | MPO, transit agency, consultant |

Information Requirements/Inputs

- regional socioeconomic data and projections (e.g., population, no. households, h.h. size, income, employment, auto ownership, etc.)
- regional land use projections
- current regional travel patterns
- regional system of travel analysis zones
- initial service plan (i.e., level of transit service) and network details (i.e., relative location of routes) for each alternative system
- fare policy

Information Products/Outputs

- ridership forecasts for each alternative (regional) or for specific routes (in short range planning)
- demand characteristics (e.g., trip generation, trip distribution, mode choice, network assignment) for each alternative

Direct Input to Other Functions

- fare revenue forecasting
- o & m cost estimation
- capital cost estimation
- fare policy
- service planning
- assessment of non-user benefits

Techniques/Methods Used

- network models (e.g., UTPS, MINUTP) for long range and project planning
  - trip generation
  - trip distribution
  - mode choice
  - network assignment
- short range methods (e.g., judgement, trend analysis, surveys, regression models, elasticity analysis, cross-sectional analysis)

Function: **Service Planning**

| Major Tasks | Key Actors |
|---|---|
| • document current transit service characteristics (i.e., type, quantity, location, and level of service by route) | transit agency |
| • develop short range changes/ improvements to base system | transit agency |
| • define quantity and timing of new assets needed to maintain current services | transit agency |
| • develop long range service alternatives (systems analysis) | transit agency<br>MPO, consultant |
| • refine and evaluate alternatives (project planning) | transit agency<br>MPO, consultant |
| • develop service plan for preferred alternative (preliminary engineering and final design) | transit agency<br>MPO, consultant |

Information Requirements/Inputs

- nature of current service characteristics and "base" network
- demand estimation (i.e., future travel needs and patterns)
- fare policy

Information Products/Outputs

- specifications for service levels by mode, corridor, and/or route
- capital asset requirements
- maintenance requirements
- Transit Development Plan (TDP)
- future service alternatives and networks
- Environmental Impact Statement

Direct Input to Other Functions

- travel demand forecasting
- o & m cost estimation
- capital cost estimation
- construction and recapitalization planning

Techniques/Methods Used

- sketch planning
- network analysis modeling

Function: **Fare Revenue Forecasting**

| Major Tasks | Key Actors |
|---|---|
| • forecast revenues from farebox | transit agency |
| • perform sensitivity analysis (based on different demand forecasts) | transit agency |

Information Requirements/Inputs

- fare policy
- ridership broken out by fare category or average fare (from estimation of proportion of riders in each fare category)
- demand estimates

Information Products/Outputs

- projected farebox revenue (under different demand scenarios)

Direct Input to Other Functions

- cash flow analysis

Techniques/Methods Used

- trend analysis
- econometric models
- sensitivity analysis (test different demand estimates)

Function: **Non-fare Revenue Forecasting**

| Major Tasks | Key Actors |
|---|---|
| • forecast future revenue from existing funding sources (alternative scenarios, based on different availability assumptions) | transit agency, MPO, state DOT, UMTA, local government, consultant |
| • perform sensitivity analysis to test impact of changes in economic factors | |

Information Requirements/Inputs

- economic data (i.e., projected inflation and interest rates, as well as regional economic forecasts)
- assumptions regarding individual funding sources (i.e., stability, growth, reduction, etc.)
- past trends in funding
- assessment of non-user benefits

Information Products/Outputs

- range of projections of future non-fare revenue stream

Direct Input to Other Functions

- cash flow analysis

Techniques/Methods Used

- revenue forecasting techniques (technique used depends on revenue source, data availability, etc.)
  - professional judgement
  - trend analysis
  - simple regression analysis
  - econometric modeling

Function: **Assessment of Non-User Benefits**

| Major Tasks | Key Actors |
|---|---|
| • assemble regional socioeconomic data and projections (e.g., regarding population, income, employment, retail sales, rents, fuel consumption, property values) | MPO, consultant |
| • assemble regional land use information and projections (e.g., development patterns and locations of major trip generators) | MPO, consultant |
| • assemble regional traffic and environmental data and projections (e.g., regarding air pollution, energy consumption, noise) | MPO, consultant |
| • determine level of benefits to non-transit users in these areas:<br>- travel impacts<br>- environmental impacts<br>- economic/development impacts | MPO, transit agency, consultant |

Information Requirements/Inputs

- regional socioeconomic data and projections
- regional land use patterns and projections
- demand forecasts
- regional traffic data and projections
- regional environmental data and projections

Information Products/Outputs

- assessment of non-user benefits

Direct Input to Other Functions

- assessment of financial condition
- non-fare revenue forecasting

Techniques/Methods Used

- trend analysis
- regression analysis
- consult with urban/regional planning agencies
- consult with environmental agencies (state and local)

Function: **Assessment of Financial Condition**

| Major Tasks | Key Actors |
|---|---|
| • determine region's economic vitality | MPO, transit agency, consultant |
| • determine region's debt management | MPO, transit agency, consultant |
| • document "financial condition" of the region | MPO, transit agency, consultant |

Information Requirements/Inputs

- data on economic and land use projections
- data on region's economic vitality (e.g., real estate and business activity)
- data on region's debt management (e.g., measures of debt per capita, debt service as percent of revenue, debt as percent of total assets, and coverage ratio)
- assessment of non-user benefits

Information Products/Outputs

- documentation of region's financial condition

Direct Input to Other Functions

- non-fare revenue forecasting

Techniques/Methods Used

- trend analysis
- consult with urban/regional planning agencies
- consult with economists/financial institutions

Function: **Operating and Maintenance Cost Estimation**

| Major Tasks | Key Actors |
|---|---|
| • obtain current operating cost data, broken out by line items (i.e., from the detailed transit operating budget) | transit agency, MPO, consultant |
| • identify variable vs. fixed cost items | transit agency, MPO, consultant |
| • analyze the impact of the service plan (i.e., service changes) on the current cost structure | transit agency, MPO, consultant |
| • analyze the operating cost impact of the recapitalization program | transit agency, MPO, consultant |
| • develop cost model for each different mode (i.e., bus, rail, LRT) | transit agency, MPO, consultant |
| • develop annual cost estimates (based on service changes as well as inflation) | transit agency, MPO, consultant |
| • perform sensitivity analyses (e.g., for differential inflation rates for certain cost items) | transit agency, MPO, consultant |

Information Requirements/Inputs

- detailed transit operating budget
- service plan
- demand forecast
- recapitalization needs
- economic data and projections (i.e., inflation rates and historical inflation trends for individual items)

Information Products/Outputs

- range of operating cost projections

Direct Input to Other Functions

- cash flow analysis

Techniques/Methods Used

- cost models
  - cost allocation method (relates cost or resource requirement to a unit of service)
  - cost build-up method (estimates staffing, utility, and materials costs needed for a specific unit of service)

Function: **Construction and Recapitalization Planning**

| Major Tasks | Key Actors |
|---|---|
| • identify the capacity required of transit facilities to support projected service levels | MPO, transit agency, consultant |
| • identify facilities to be constructed and timing of construction phases | MPO, transit agency, consultant |
| • perform sensitivity analysis of schedule (to assess cost impacts of slippages in schedule and potential utility of an accelerated or expanded implementation schedule) | MPO, transit agency, consultant |
| • identify needs and schedule for rehabilitating and/or replacing existing rolling stock and other capital assets (different scenarios) | transit agency |

Information Requirements/Impacts

- service plan
- design of facilities
- capital assets inventory, including description of asset, year purchased, economic life of asset, purchase price, current market price, rehabilitation cost, and expected life of the asset after rehabilitation or replacement
- cash flow analysis

Information Products/Outputs

- definition of requirements and timing of facilities construction and replacement (includes changes necessitated by unplanned delays)
- definition of annual recapitalization needs and timing (under different replacement/rehabilitation scenarios)
- portion of Transportation Improvement Program

Direct Input to Other Functions

- capital cost estimation
- service planning

Techniques/Methods Used

- use of project management/scheduling software

Function: **Capital Cost Estimation**

| Major Tasks | Key Actors |
|---|---|
| • develop annual construction cost estimate | transit agency, MPO, consultant |
| • develop annual recapitalization cost estimate | transit agency, MPO, consultant |
| • estimate total annual capital costs (adjust for inflation and for real price increases) | transit agency, MPO, consultant |
| • estimate the impact on costs of the bid advertising and contract letting schedule | transit agency, MPO, consultant |
| • estimate impacts of construction delays on costs | transit agency, MPO, consultant |
| • estimate contingencies necessary to cover worst-case overruns or revenue shortfalls | transit agency, MPO, consultant |
| • perform sensitivity analyses (based on alternative inflation and interest rates and construction schedules) | transit agency, MPO, consultant |
| • assess potential for private financing, ownership, and operation | transit agency, MPO, consultant, private firms |

Information Requirements/Inputs

- construction and recapitalization plans
- economic data and projections (i.e., inflation, interest rates)
- service plan
- demand forecast

Information Products/Outputs

- range of annual capital cost projections
- opportunities for cost savings/potential for cost increases

Direct Input to Other Functions

- cash flow analysis

Techniques/Methods Used

- unit price and volume-based estimation
- trend analysis
- expense projection models (e.g., UBUCKS)
- bids and direct costing procedures

Function: **Cash Flow Analysis**

| Major Tasks | Key Actors |
|---|---|
| • perform analysis of cash flow needs and schedule<br>- cash flow requirements of continuing existing services and policies<br>- marginal cash flow requirements of major capital projects | transit agency, MPO, consultant |
| • estimate revenue shortfall (alternative estimates, based on different capital programs | transit agency, MPO, consultant |

Information Requirements/Inputs

- total projected revenue stream (fare and non-fare revenue forecasts)
- operating and maintenance cost estimates
- capital cost estimates

Information Products/Outputs

- annual cash flow projections
- estimates of annual revenues shortfall

Direct Input to Other Functions

- identification and analysis of new revenue sources
- development of financing alternatives (if no revenue shortfall)
- construction and recapitalization plans

Techniques/Methods Used

- trend analysis

Function: **Identification and Analysis of New Revenue Sources**

| Major Tasks | Key Actors |
|---|---|
| • identify new potential sources of revenue (for both operating and capital needs) if shortfall found in existing sources | MPO, transit agency, consultant |
| • define evaluation criteria (e.g., yield, stability, marketability, public acceptance, equity, incentive effects, legal/regulatory issues, and administrative issues) | MPO, transit agency, consultant |
| • screen alternatives on preliminary basis | MPO, transit agency, consultant |
| • identify non-user benefits and impacts on traffic of new development | |
| • develop assessment/impact fee formulas (if appropriate) | |
| • analyze and evaluate alternatives<br>- develop revenue yield estimates<br>- identify bonding requirements<br>- develop financial projection model<br>- carry out financial analysis, applying sensitivity analysis | MPO, transit agency, consultant |

Information Requirements/Inputs

- regional socioeconomic and economic trends and projections
- total projected revenue stream
- cash flow analysis/revenue shortfall estimation
- information on alternative revenue sources (i.e., in use by other transit agencies)
- past trends in transit appropriations by source
- projected debt service requirements for transit agency
- political willingness of the community to levy taxes (if required) or to approve bond referenda (i.e., from results of opinion polls)
- land use and real estate data and projections

Information Products/Outputs

- recommended sources of new revenue
- forecast of annual revenue (from all sources)
- identification of non-user benefits and impacts on vehicular traffic of new development

Function: **Identification and Analysis of New Revenue Sources** (continued)

Direct Input to Other Functions

- development of financing alternatives
- cash flow analysis

Techniques/Methods Used

- methods for evaluating impacts of new sources:
  - public focus groups and/or surveys of area residents
  - interviews with key state and local administrative officials and staff
  - estimation of tax incidence
  - projection of land use and economic conditions/trends
- revenue forecasting techniques (technique used depends on revenue source, data availability, etc.):
  - professional judgement
  - trend analysis
  - simple regression analysis
  - econometric modeling
- analysis of secular (constant rate of change over the long run) or cyclical (periodic change over the short run) nature of revenues
- sensitivity analysis (test impact of changes in inflation, interest rates, retail sales, employment growth, personal income, property values, auto ownership, etc.)
- development of agreements between public and private parties (e.g., developer and property owners) on financing arrangements and/or assessment/contribution formulas

Function: **Development of Financing Alternatives**

| Major Tasks | Key Actors |
|---|---|
| • develop financing alternatives for future capital and operating requirements | MPO, transit agency, consultants |

Information Requirements/Inputs

- cash flow analysis
- identification and analysis of new revenue sources and forecast of revenue
- annual debt service requirements (if applicable)

Information Products/Outputs

- detailed financing packages (identifying specific sources and uses of funds)

Direct Input to Other Functions

- assessment of financial feasibility

Techniques/Methods Used

- consult with financing professionals

Function: **Assessment of Financial Feasibility**

| Major Tasks | Key Actors |
|---|---|
| • produce measures of financial feasibility (e.g., operating ratio, operation deficit as percent of dedicated tax revenue, steps necessary to develop new sources of funds) | MPO, transit agency, consultants |
| • assess impact of funding needs on existing and new sources | MPO, transit agency, consultants |

Information Requirements/Inputs

- development of financing alternatives
- financial analysis

Information Products/Outputs

- assessment of financial feasibility of transit alternatives

Direct Input to Other Functions

- financial plan preparation and implementation

Techniques/Methods Used

- discussion among key parties (i.e., project staff and technical advisory committee)

Function: **Financial Plan Preparation and Implementation**

| Major Tasks | Key Actors |
|---|---|
| • integrate the analyses related to funding the capital investment and the operating deficit | MPO, transit agency, consultant |
| • carry out additional analysis to more fully describe the financing package | MPO, transit agency, consultant |
| • identify steps needed to secure financing for preferred alternative | MPO, transit agency, consultant |
| • develop information for UMTA rating system | MPO, transit agency, consultant |
| • identify and select financing professionals (i.e., financial advisor, underwriter, investment banker, etc.) | MPO, transit agency, consultant, financial advisor, underwriter |
| • prepare required financial and legal documentation | MPO, transit agency, consultant, financial advisor, underwriter |

Information Requirements/Inputs

- Draft Environmental Impact Statement

Information Products/Outputs

- Financial Plan

Direct Input to Other Functions

- none

Techniques/Methods Used

- consult with financing professionals

Financial planning guide for transit