

UC Berkeley

Earlier Faculty Research

Title

Policies and Practices For Cost-Effective Transit Investments: Recent Experiences in the United States

Permalink

<https://escholarship.org/uc/item/5k4801zp>

Author

Deakin, Elizabeth

Publication Date

2006-09-01



**Policies and Practices for Cost-Effective
Transit Investments: Recent Experiences in
the United States**

Elizabeth Deakin
Christopher Ferrell
Jonathan Mason
John Thomas

UCTC
No. 787

**The University of California
Transportation Center**

University of California
Berkeley, CA 94720

The University of California Transportation Center

The University of California Transportation Center (UCTC) is one of ten regional units mandated by Congress and established in Fall 1988 to support research, education, and training in surface transportation. The UC Center serves federal Region IX and is supported by matching grants from the U.S. Department of Transportation (Caltrans), and the University.

Based on the Berkeley Campus, UCTC draws upon existing capabilities and resources of the Institutes of Transportation Studies at Berkeley, Davis, Irvine, and Los Angeles; the Institute of Urban and

Regional Development at Berkeley; and several academic departments at the Berkeley, Davis, Irvine, and Los Angeles campuses. Faculty and students on other University of California campuses may participate in Center activities. Researchers at other universities within the region also have opportunities to collaborate with UC Faculty on selected studies.

UCTC's educational and research programs are focused on strategic planning for improving metropolitan accessibility, with emphasis on the special conditions in

Region IX. Particular attention is directed to strategies for using transportation as an instrument of economic development, while also accommodating to the region's persistent expansion and while maintaining and enhancing the quality of life there.

The Center distributes reports on its research in working papers, monographs, and in reprints of published articles. It also publishes *Access*, a magazine presenting summaries of selected studies. For a list of publications in print, write to the address below.



**University of California
Transportation Center**

2614 Dwight Way
Berkeley, CA 94704-1782
Tel: 510/642-4749
Fax: 510/643-5456

DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers Program, in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

Policies and Practices for Cost-Effective Transit Investments

Recent Experiences in the United States

Elizabeth Deakin, Christopher Ferrell, Jonathan Mason, and John Thomas

A structured survey of transit agency staff and interviews with agency executives and other local leaders were conducted in areas that have undertaken a major transit investment project in the past 5 years. The purpose was to identify methods and procedures used to evaluate and select projects and, in particular, to document how land use considerations are being incorporated into project decisions. Staff members responsible for 41 projects were contacted, and 28 completed the survey, discussing projects in 23 regions of the United States. Supplementary interviews were conducted for 10 of the regions. The study found that most agencies use federal guidance and regulations on the evaluation of transit investment as a starting point, but give equal weight in project design and selection to state and local policy objectives such as social equity, economic development, and fair-share distribution of projects among local communities. A number of transit agencies give priority to projects in jurisdictions with transit-supportive land use patterns or plans. The availability of public or private funding contributions is increasingly important in prioritizing projects. Increasingly, transit agencies are hiring staff to work with local governments on land use planning and on funding partnerships and are working with them to develop a shared understanding of the area's transit needs and related development objectives. Staff and political leaders deem these efforts at least as important as technical evaluations of cost-effectiveness.

Over the past several decades, a growing number of transit agencies have been investing in major new transit facilities. Common aims are to improve service quality, increase transit ridership, support downtown development and revitalization, curb sprawl, provide mobility to those without cars, reduce air pollution, and serve a variety of other social, economic, and environmental policies (1, 2). Most of the new transit projects have raised high expectations among supporters (3) but have alarmed others who doubt that transit can fulfill the promises some have claimed for it (4, 5). A large and still-growing body of research has analyzed the performance of both existing systems and new transit investments, focusing on the accuracy of ridership forecasts (6), costs (7, 8), the sources of deficits (9), the ability of transit to shape urban form (10–12), and transit's social, economic, and environmental effects (13, 14).

Although perspectives and specifics vary, most of this literature cautions that transit investments can and do fall short of their objectives unless supportive demographics, employment patterns, land use patterns and densities, and pricing incentives and disincentives are present. Responding to concerns about transit costs and benefits,

researchers have developed methods for evaluating transit productivity and cost-effectiveness as a function of project context and policy variables (15), searched for strategies to reduce public costs (16–18), and investigated the effects of alternative urban development patterns on transit provision and use (19, 20). Looking at land use around transit, some researchers have proposed joint development as both a cost-sharing and a market-building strategy (21), whereas others have espoused the establishment of transit-friendly environments whose creation would serve a multitude of social and economic objectives in addition to transit and, in some cases, require public subsidy (22, 23).

Federal criteria for the award of capital grants have also reflected a strong concern for cost-effectiveness and, increasingly, have encouraged transit agencies to engage in cost-sharing and market-building strategies. This is especially the case for federally assisted New Starts, which FTA defines as "major new fixed guideway transit systems or extensions to existing fixed guideway systems." Established in the 1970s to ensure that federal funds would be used in a prudent and effective manner, New Starts evaluation criteria have changed over the years to reflect shifting congressional concerns and interests as well as new knowledge from research and new ideas from professional practice.

Table 1 outlines the evolution of federal criteria for evaluating New Starts. By the early 1970s, applications for federal assistance for new capital projects had outstripped available funds, and federal transit officials began to search for ways to rank projects to support those providing the most benefit per dollar of investment. The first federal regulations on the topic, in 1976, called for new transit projects to be cost-effective and required them to be subjected to an analysis of alternatives, including a "low-capital" transportation system management (TSM) alternative. The 1978 Policy on Rail Transit elaborated the alternatives analysis requirement and added requirements for local financial commitments to the project and supportive local land use actions. In 1980, the alternatives analysis requirement was directly linked to the environmental impact statement process.

Through most of the 1980s, both research and political discourse focused on the high costs of transit. In 1984, the Statement of Policy on Major Urban Mass Transportation Capital Investments introduced a rating system for making comparisons among competing projects based on cost-effectiveness. The index compared the forecast incremental cost per new rider for the proposed project to a TSM alternative. Threshold values were established that projects had to pass in order to be considered for funding, and criteria for judging local financial commitment were set forth. The 1984 policy statement was codified into law through the Surface Transportation and Uniform Relocation Assistance Act of 1987, but 2 years later, a

TABLE 1 Evolution of Federal Evaluation Criteria for Transit New Starts

1976 - First federal policy statement on New Start evaluation criteria

- Introduced a process-oriented approach requiring projects to be subjected to an analysis of alternatives, including a Transportation System Management (TSM) alternative (no-capital and low-capital measures)
- Included a general requirement that projects be cost-effective

1978 - Policy on Rail Transit

- Reiterated the requirement for Alternatives Analysis
- Introduced requirements for local financial commitments to the project
- Introduced the concept of a multi-year contractual commitment of federal funds, with a maximum limit on federal participation
- Added requirements that local governments undertake supporting local land use actions

1980 - Alternatives Analysis requirement was directly linked to the Environmental Impact Statement process

1984 - Statement of Policy on Major Urban Mass Transportation Capital Investments

- Introduced a cost-effectiveness index for making comparisons between competing projects
- Compared incremental cost per new rider for the build alternative to cost for the TSM alternative
- Established threshold values projects had to pass to be considered for funding
- Criteria to judge local financial commitment were more specifically defined

1987 - 1984 Statement was codified into law in the Surface Transportation and Uniform Relocation Assistance Act

1989 - Notice of Proposed Rulemaking to formally implement Cost per New Rider Index was blocked by Congress (proposed rule withdrawn in 1993)

1991 - Intermodal Surface Transportation Efficiency Act (ISTEA)

- Expanded evaluation metrics by requiring that a project be "justified based on a comprehensive review of its mobility improvements, environmental benefits, cost-effectiveness, and operating efficiencies"
- FHWA/FTA planning regulations (1993) required a Major Investment Study (MIS) for all major transit and highway expansions be subjected to a prior inclusion in local transportation plans or programs
 - Integrated alternatives analysis of major transit investments into ongoing transportation planning process
 - Required Major Investment Studies be conducted on a multi-modal basis.

1994 - Executive Order 12893

- Required cost/benefit analysis of all proposed federal investments, and set out the parameters for such analysis
- Called for efficient management of infrastructure, focus on operation and maintenance, pricing to manage demand
- Encouraged private sector participation in investment and management of infrastructure
- Federal agencies directed to encourage state and local governments to implement planning and management approaches that support these principles

1994 - FTA New Starts Report to Congress (section 5309)

- First report in 1994, annual thereafter
- Several indices for each proposed project, rather than a single measure with a specific threshold
- Combination of factors to determine project merit consistent with ISTEA
 - Cost-effectiveness = cost per new transit trip
 - Mobility improvement = projected total number of hours of travel time saved per day by the project
 - Environmental benefits = EPA air quality classification of the city for ozone and CO
 - Operating efficiencies = estimated change in operating cost per passenger over entire system
- Local cost sharing, measured by
 - Proposed local share of project costs
 - Strength of the proposed capital financing plan
 - Stability and reliability of sources of operating deficit funding

1998 - present - TEA-21

- Adds land use factors to FTA New Starts evaluation

FTA issues revised guidance based on comments and reviews

1989 Notice of Proposed Rulemaking to formally implement the cost per new rider index was blocked by Congress. As the political climate changed again, the proposed initiative to use the rating system and the index threshold was withdrawn in 1993.

In 1991, the Intermodal Surface Transportation Efficiency Act of 1991 made substantial changes to transportation evaluation criteria, expanding the factors to be considered by requiring that the project be "justified, based on a comprehensive review of its mobility improvements, environmental benefits, cost-effectiveness, and operating efficiencies." The subsequent FHWA and FTA planning regulations (1993) required that all major transit as well as highway capacity expansions be subjected to a major investment study before inclusion in local transportation plans or transportation improvement programs. The regulations also integrated the requirement for an alternatives analysis of major transit investments into the ongoing transportation planning process and required that major investment studies be multimodal.

Concerns about the costs and benefits of federal programs led in 1994 to Executive Order 12893, which mandated a systematic analysis of the costs and benefits of all proposed federal investments and set out the parameters for such analysis. The executive order emphasized the efficient management of infrastructure, including a focus on the operation and maintenance of facilities, and supported the use of pricing to manage demand. Private sector participation in investment and in the management of infrastructure was also encouraged. Federal agencies were directed to urge state and local governments to implement planning and management approaches supporting these principles.

The evaluation criteria were altered again in the Transportation Equity Act for the 21st Century and subsequent rules. Responding to state and local government concerns about red tape, the major investment study requirement was cut back; other provisions called for the environmental review process to be streamlined. At the same time, new considerations were added to the project evaluation process, including

the cost of sprawl, infrastructure cost efficiencies because of compact land use, population density and current transit ridership in a corridor, and the applicant's technical capacity to undertake the project. Reflecting this mandate as well as research findings, FTA added six land use criteria to the New Starts evaluation process to give credit to areas with transit-supportive land uses and land use policies, existing and planned, in proposed investment corridors and station areas (Table 2).

Today, federal policy calls for a broad evaluation of transit investment projects, with cost-effectiveness measured along several dimensions. In addition to evaluating cost per ride and cost per mile, transit's broader mobility benefits, economic development effects, and effects on urban form and the environment are to be considered.

The availability of federal capital assistance has certainly been a factor in transit districts' investment choices. Although a few major expansion projects have been locally funded, many others would not have proceeded, at least in their present form, had federal dollars not been forthcoming. And, since federal funds depend, in part, on how well a proposed project does under FTA evaluation criteria, transit agencies generally attempt to respond affirmatively to the criteria in their policies and practices. The evaluation criteria thus serve the dual purpose of guiding federal decisions on the allocation of funds and of providing inducements for the reformation of transit agency policies, planning, and decision making.

The effects on transit agency practice are not necessarily straightforward, however. Seemingly simple metrics such as cost per ride and cost per mile can be calculated in a variety of ways, leading to considerable variation in practice; agencies seek methods and interpretations that are favorable to their projects. Furthermore, if federal rules are seen as onerous, unnecessarily complex, or unduly restrictive, agencies may seek ways to avoid compliance, comply minimally, or pursue changes to the rules through the political process. Reviewing transit agency responses to New Starts criteria thus may uncover diverse policies and practices that further the federal objectives, and also may reveal areas in which the criteria are problematic or not fully accepted.

Criteria calling for cost sharing and supportive land use policies are particularly interesting in this regard. Cost sharing for transit can take several forms, including state or local matches from general funds, earmarked sales or property taxes, benefit assessments, redevelopment district funds, and private-sector cash or in-kind contributions. The availability of these different types of cost sharing varies with state law, local economic conditions, and in many instances with local support for transit (e.g., when funds must be approved by voters). When significant levels of such funding are available, however, local interests may trump federal rules in project planning and decision processes. How federal and local objectives are balanced then comes into play.

TABLE 2 Outline of FTA New Starts Land Use Evaluation Criteria

1. EXISTING LAND USE	
•	Land use mix
•	Share of jobs located in central business district and employment centers served by project, and employment density within corridor
•	Existing high transit trip generators along project corridor
•	Existing pedestrian-friendly development
•	Existing station area parking supply and policies
2. CONTAINMENT OF SPRAWL	
•	Planned density and market trends for suburban and urban development
•	Growth management policies
3. TRANSIT-SUPPORTIVE CORRIDOR POLICIES	
•	Policies encouraging transit-friendly and transit-oriented development
•	Process for development of corridor and station area plans
•	Promotion of mixed land use and high density land use
•	Promotion of pedestrian-friendly design
•	Parking management
4. SUPPORTIVE ZONING REGULATIONS NEAR TRANSIT STATIONS	
•	Zoning ordinances that support increased development density in transit station areas (including recent accomplishments and initiatives to amend existing ordinances)
•	Zoning ordinances that enhance the transit-oriented character of station area development
•	Zoning allowances for reduced parking and traffic mitigation
5. TOOLS TO IMPLEMENT LAND USE POLICIES	
•	Tools and actions to promote transit-oriented development
•	Organizational participation in the development and planning process
•	Process for public and private sector involvement and corridor and station area planning
•	Level of jurisdictional endorsement for corridor and station area plans
6. PERFORMANCE OF LAND USE POLICIES	
•	Demonstrated cases of developments affected by transit-oriented policies
•	Joint development organizations, transportation management associations, tax increment financing and improvement districts, tax abatement programs, or downtown associations
•	Short-range and long-term development targets for the corridor
•	Station area development proposals and any joint development proposals received

NOTE: The criteria listed here were current at the time of the study; they since have been revised. Changes are modest, however.

With regard to land use, the question is often one of turf. For some transit agencies, policies for the coordination of transit investments and supportive land development are already largely in place, having emerged from the agency's efforts at joint development or as part of a regional growth management plan. Elsewhere, however, attempts to influence local land use through federal policies have been controversial, and regional agencies and transit operators have been reluctant to take steps that might be viewed as interference with local government's land use authority. Whether this is changing in response to the New Starts criteria and the planning movement for transit-oriented development is a question worth examining.

The primary objective of this study has been to examine the policies, methods, and procedures being used by transit agencies to evaluate and select projects and, in particular, to document how cost-sharing and land use considerations are being incorporated into project decisions. In addition, the study documents other factors transit agencies deem to be of critical importance in project selection, including state and local policy objectives such as social equity, economic development, fair-share distribution of projects among local communities, and the availability of public or private funding. Important changes to the planning process and to agency staffing and organization are identified and discussed.

RESEARCH APPROACH

To explore how transit agencies are prioritizing and selecting major transit system expansion projects, a structured survey was developed. The survey addressed the following topics:

1. Key methods and criteria used in evaluating proposed transit projects—cost-benefit analysis, cost-effectiveness analysis, scoring and ranking systems, ridership benchmarks, cost-sharing benchmarks, land use compatibility indices, and other; and the role of cost-benefit and cost-effectiveness analyses in the decision process;
2. Priority given to economic development objectives—service to major employment centers, service to major retail centers, service to other key trip generators such as airports and sports stadiums, and service to areas in need of economic development or redevelopment;
3. Priority given to social objectives—service to transit-dependent areas, service to low- and moderate-income areas, and service to the elderly, youth, and people with disabilities;
4. Priority given to environmental objectives—air quality, urban environment, and other;
5. Role of land use considerations—priority given to serving areas in which high levels of transit demand already exist versus serving developing areas, priority given to areas with transit-supportive land use plans and programs versus other areas, and role of community support for transit-supportive policies and projects;
6. Approaches to cost sharing with state and local governments and the private sector and implications of such funding for project development and prioritization;
7. Cooperative efforts undertaken with local governments or the private sector to help finance transit, build ridership, develop transit-supportive land use policies, and so forth; and
8. Changes in staffing and organization, if any, to work with local governments and the private sectors, and to carry out new types of project development and evaluation activities.

The survey was designed to be administered as a telephone interview with transit agency staff knowledgeable about project design

and selection practices. The agencies contacted were ones that had developed a major transit system expansion project—rail or bus—in the last 5 years and were identified through a literature review and an Internet search, as well as through the personal knowledge of the researchers. Specific persons to be surveyed at each transit agency were listed as the contact person for recent projects or were identified by telephoning the head of the planning, project development, or policy group at the agency to obtain the name of a person to contact.

Each prospective respondent was mailed a letter explaining the purpose of the survey and inviting him or her to participate. The interview guide (actually, the interview data recording form) was included to give the recipients a clear understanding of the kinds of information that were being sought, and also to allow the recipients time to prepare responses when they so desired. The letter explained that the plan was to identify the agencies that had participated in the survey, but not the individual respondents.

Each prospective respondent was phoned and an interview was requested. In some cases the initial contact person pointed to another member of the staff who was better equipped to answer the questions, and this process was repeated.

Interviews typically lasted 30 to 45 min and followed the general outline of the interview guide. Because open-ended questions were used throughout the interview, respondents could discuss their agency's experiences in some detail and were not bound to the questions and probes in the interview guide.

Some respondents chose to fax or mail written responses to the questions, using the interview guide that had been attached to the invitation letter. Some also forwarded reports and staff documents for review. In these cases the response was a phone call thanking the respondent for the materials sent and following up, as needed, on specific questions; the follow-up discussions typically focused on key issues facing the respondent's agency and project.

A total of 38 prospective respondents were contacted and 28 interviews completed, for a 74% response rate. Nonresponse was because of difficulty in contacting the prospective respondents rather than refusals to participate. Several of the interviews were with staff members from the same transit agency; when the agency had recently developed several projects, staff members from each project were interviewed. These interviews enabled the gauging of the consistency of responses from different members of the same agency (it was confirmed that the responses were indeed consistent) and also allowed consideration of how practices varied with the particularities of different projects.

The resulting sample represents the experiences of 21 transit agencies out of 28 agencies contacted, for an agency response rate of 75%. Table 3 lists the agencies that participated in the study. The agencies are located in different parts of the country and in metropolitan areas of different sizes and growth rates; they are organized in a variety of ways (state agency, special authority or district, regional agency, city agency.) Thus, the sample is reasonably representative of transit agencies engaged in major capital expansion projects in the United States.

To supplement the responses from transit agency staff, interviews were conducted with agency executives, elected officials, and other prominent representatives of 10 of the regions that had reported making special efforts to coordinate with local governments. These interviews enabled consideration of land use and finance issues in greater detail and especially to explore their political dimensions. The same general research approach used for staff was also used for interviews with elected officials, agency managers, and community

TABLE 3 Agencies Participating in Survey

Agency	Transit Project Area
Orange County Transportation Authority	Orange County, California
Metropolitan Transit Development Authority	San Diego, California
Regional Transit District	Denver, Colorado
Roaring Fork Valley Holding Authority	Pitkin County, Colorado
Connecticut DOT	Hartford, Connecticut
Greater Cleveland Regional Transit Authority	Cleveland, Ohio
Tri-County Commuter Rail	Ft. Lauderdale, Florida
TARC	Louisville, Kentucky
Washington Metropolitan Area Transit Authority	Washington, D.C., Metro Area
NJ Transit	Hudson and Bergen Counties, New Jersey
Charlotte DOT	Charlotte, North Carolina
Triangle Transit Authority	Raleigh, North Carolina
METRO	Portland, Oregon
Port Authority of Allegheny County	Pittsburgh, Pennsylvania
Memphis Area Transit Authority	Memphis, Tennessee
Metropolitan Transit Authority	Houston, Texas
Tidewater Regional Transit (Hampton Roads Transit)	Norfolk-Virginia Beach, Virginia
Central Puget Sound Regional Transit Authority	Seattle, Washington
Capital Metropolitan Transportation Authority	Austin, Texas
LYNX, Central Florida Regional Transportation Authority	Orlando, Florida
Southeastern Pennsylvania Transportation Authority	Philadelphia, Pennsylvania

Note: Some agencies sponsored multiple projects included in the study.

leaders, although in several cases the interviews were conducted in person rather than by telephone.

FINDINGS

Overall, most agencies use federal guidance and regulations on the evaluation of transit investment as a starting point, but give equal weight in project design and selection to state and local policy objectives such as social equity, economic development, and fair share distribution of projects among local communities. The availability of public or private funding contributions is increasingly important in prioritizing projects. Land use planning mostly remains a local government prerogative, but a number of transit agencies give priority to projects in jurisdictions with transit-supportive land use patterns or plans. Increasingly, transit agencies are hiring staff to work with local governments on land use planning and on funding partnerships, and are working with them to develop a shared understanding of the area's transit needs and related development objectives. Staff and political leaders deem these efforts at least as important as technical evaluations of cost-effectiveness. These findings are elaborated in the following sections.

Evaluation Approaches

Respondents reported using a variety of measures to evaluate proposed transit projects and set priorities, reflecting both federal directives and local mandates and interests. Further, they reported that in the last several years, they have expanded the set of factors they consider, reflecting changes in federal law and regulations as well as new initiatives undertaken locally. Ridership and cost measures called for by FTA are increasingly supplemented by evaluations of land use effects and effects on congestion, whereas priority setting increasingly accounts for cost sharing and cooperative efforts of local governments and the private sector.

All but one of the agencies surveyed had used cost-effectiveness measures in their project evaluations, and the one agency that did not do so had completed its evaluation before FTA's 1994 report on New Starts. Most agencies cited FTA requirements as a major impetus for cost-effectiveness calculations, although about half would have done such calculations in response to state rules or local policies.

In contrast, the executive order on cost-benefit analysis has had no visible effect. None of the agencies reporting in the sample is using cost-benefit measures to evaluate proposed transit investments. Several explained that the cost-effectiveness measures they were calculating appeared to serve the same purpose. One of the interview respondents elaborated that the reduction of evaluation material to a single number was not helpful in communicating with decision makers, who wanted to see the information that went into the calculation and weigh it themselves.

Most agencies reported that they use a two-part cost-effectiveness calculation, with capital costs evaluated with regard to construction cost per mile, and operating costs evaluated with regard to costs per passenger trip. Specifics of how the agencies defined the latter term varied considerably, however, with total cost per total trips served, total cost per new trip, operating cost per trip served, and operating cost per passenger mile among the metrics commonly used.

For several of the respondent agencies, state or local policies influenced how new services were evaluated. Forty percent of the respondent transit agencies surveyed said that state or regional agencies had mandated cost-effectiveness policies or ranked projects based on cost-effectiveness measures they applied during reviews. Roughly 40% of agencies also had internal staff policies or guidance documents with regard to cost-effectiveness policies.

For example, New Jersey Transit reported that transit service priorities had been established in a statewide transit plan developed in the late 1980s. As part of that study, all projects that had been previously proposed were evaluated for cost-effectiveness and then ranked in the plan, which served to guide transit investment in the state over the next 10 years. More recently, however,

the adherence to these rankings has weakened and projects such as the Trenton–Camden light rail transit (LRT) project have been approved on economic redevelopment grounds rather than strictly on cost-effectiveness measures.

In only one case was the selection of alignments and prioritization based on a regional land use plan. There was a direct linkage between the regional centers and town centers identified in Portland's regional land use plan and the alignments identified for the MAX LRT. The phases of the project were also identified by a consensus reached by the joint policy advisory committee on transportation and released as part of a federal priorities document sent to Oregon's congressional delegation. However, with the defeat of the bond measures needed to implement the alignment called for in Phase III, the process has changed. The decision was made to move ahead with a smaller segment of the North–South alignment. In part, the shift reflected a political reality; the residents of the city of Portland had voted in favor of the bond initiative whereas voters outside the city had not. Therefore, a smaller segment of the line within the city was seen as a logical choice. Additionally, the segment passed through neighborhoods with transit-supportive land use characteristics already in place.

Another point of consideration is the actual effect of cost-effectiveness criteria on decisions over specific transit services. In this light, cost-effectiveness was rarely the primary cause of decisions with regard to the specific projects, alignments, or technologies selected within planning processes. First, the context of the evaluation has to be considered. In a few cases the cost-effectiveness evaluation was only done as a result of the environmental effect statement requirements. In these cases, the use of cost-effectiveness measures was primarily to justify the project that had already been programmed into a regional transportation plan. Decisions on alignment and specific technology would have already been made for the project to receive commitments in a state or regional transportation improvement program.

Second, even within major investment studies, which presumably help select among options for a specific corridor, the effect of cost-effectiveness criteria was mixed. For example, bus rapid transit systems resulted in superior cost-effectiveness in a couple of cases yet were not the technology of choice. Despite their greater expense, the choice of LRT over busways for fixed guideway services was often cited as preferable because of the belief in its greater development-inducing potential. One agency, however, did state that it clearly preferred busways. In one case, the potential for LRT to act as a magnet for focusing future land use development was considered more important.

Especially when a large share of funding came from local sources such as property or sales taxes, the agencies reported using local criteria for project selection.

Economic Objectives

Virtually all respondents said that providing access to jobs is their primary economic objective. Providing service to all major job centers also was seen as the most realistic approach for attracting ridership, as well as being critical to obtaining public support. Relieving congestion along fast-growing corridors was also cited as an objective with significant economic content.

Transit agencies reported that considerable effort is being given to connecting large employment centers to the downtown. This has become a major factor in the design of new routes and also was listed as a factor in project evaluation. Medical centers, in partic-

ular, were identified as dense employment sites that were good markets for transit.

A number of transit agencies also reported planning service to trip generators with high off-peak travel, to increase ridership outside of commute hours. Two of the officials interviewed, noting that work and work-related trips are only about 20% of total trips, argued that transit needed to find ways to serve a higher share of the other 80% of trips, to make use of available capacity while requiring little further capital outlay.

Universities, sports arenas, convention centers, and entertainment facilities are other major trip generators that a number of transit agencies try to serve—especially when they are located in or near major job centers. When these facilities are located in central areas, they are seen as attractive off-peak generators to supplement existing commuter transit services to central areas. Several agencies prioritized serving universities and sports facilities near downtown, since their off-peak trips will nicely complement the peak-hour commuter trips to downtown, thus enhancing cost-effectiveness. The consistent successes of class-pass programs for university students were cited as another promising attraction for new projects serving central university campuses, important places of employment in their own right.

Airports and their surrounding areas are also increasingly significant employment centers in addition to long-distance travel hubs. Many transit agencies, if they did not already have rail service to the airport, expressed a high priority in planning such rail service. For example, Memphis has an airport extension in their long-range plan, and Denver is evaluating a commuter rail service to Denver International Airport.

Redevelopment areas were also given high consideration for new routes, but this was quite clearly secondary to accommodating prime economic development already taking place. As ridership was frequently a critical component of project priorities, potential ridership was critical for new starts in redeveloping areas. For the Camden–Trenton LRT project, redevelopment was the primary motivation.

Some differences among the respondent agencies appear to reflect broader economic conditions. Agencies in fast-growing regions emphasized extending service to new growth areas to help relieve congestion and provide additional means of transport, even though they also acknowledged that not all needs had been fully met in established areas. Transit agencies in regions where growth is slow put greater emphasis on economic development and revitalization.

Social Objectives

Most transit agencies said that they give high priority to social objectives, but they also tend to think of access to jobs as their chief social objective. Several agencies mentioned access to major employment centers and linking low-income areas to high employment centers in need of lower-wage workers. For example, Federal Express in Memphis wanted transit service out to its sorting plant by the airport to provide the low-wage, low-skilled workers it required.

Other social objectives such as mobility for the elderly, children, and the disabled were seen as desirable benefits of transit investment, but they rarely had much effect on project design, selection, or evaluation. No one reported that these objectives were strong motivations for their investment choices. Several respondents commented that mobility for the elderly, children, and the disabled would be produced by any well-planned transit system; they saw no need to target

these objectives in their planning work. Several respondents mentioned that their agency provided paratransit services to serve special needs of particular groups.

Environmental Objectives

Only three respondents cited specific environmental objectives either in planning or in project evaluation. Those who did mention environmental objectives noted that maintaining transit ridership levels was important if the area was to achieve air quality standards. Pressed, most others simply stated that transit was better for the environment than other modes.

Land Use Considerations

Virtually all agencies responded that they give high priority to projects serving areas with high potential for significant ridership, particularly those areas with land uses in place or planned that support transit use. Three-quarters of the agencies surveyed reported working with local governments to develop plans for transit-supportive land uses. However, only about half of the agencies actively sought planning changes from local government to provide for more transit-friendly land uses.

Reasons for not having an active land use effort varied. Some agencies simply noted that land use is a local responsibility and that the transit agency had little influence over it. Others reported a lack of staff trained in land use issues, or a lack of staff time to work on the topic.

Some agencies had firm policies conditioning service expansions on suitable land uses. For example, the Southeastern Pennsylvania Transit Authority in Philadelphia wants the development around stations and right-of-way built first, before they build the route; a "build it and we will come" policy. Other agencies look for transit-supportive plans. For example, Tidewater Regional Transit, Central Puget Sound Regional Transit Authority, and Capital Metro all reported they are actively engaged in developing transit overlay district zoning with their local government partners.

In San Diego, staff has found that efforts to encourage joint development on the Metropolitan Transit Development Board's (MTDB) property around LRT stations can be leveraged to promote transit-oriented development around stations on land that it does not own. One staff member attributed this to the widespread acceptance of the MTDB's "underlying philosophy" that "transit can help create livable neighborhoods and that livable neighborhoods support transit."

Cost Sharing

Half (50%) of the transit agencies surveyed said they gave high priority to projects serving jurisdictions that would provide financial support to transit. Three-quarters (75%) said they welcome public or private sector cost sharing when opportunities arise. Sports teams and universities were cited as often willing to participate in cost sharing.

In many cases, however, the agency is not the one to initiate the cost-sharing agreement. In fact, about 60% said they did not go out "looking" for cost sharing; instead, jurisdictions or firms requesting service offer to share costs in order to secure funding. Agreements

are struck on a case-by-case basis. There is rarely a formal policy or even a formal procedure for making the arrangements.

About 25% of the surveyed agencies reported that transit is viewed in their region as a public sector, subsidized service, and that the idea of cost sharing would be inconsistent with this tradition.

Welfare-to-work programs are one area in which cost sharing is occurring. For example, the Memphis Medical Center Extension Project receives welfare-to-work funds from local governments to fund bus operations.

Parking is another area for cost sharing. The Hampton Roads Regional Transit District mentioned that their preliminary system planning efforts included partnerships for shared parking and to share costs of the parking structures.

Local governments also have helped fund transit improvements when the transit project is needed to support local objectives. Both the Central Puget Sound Regional Transit Authority and the Southeast Pennsylvania Transportation Authority representatives reported they have agreements with locals for transportation facility cost sharing.

Cooperative Projects with Local Governments and the Private Sector

Nearly all agencies responded that they were willing to cooperate with local governments and the private sector on projects to improve transit ridership. Three-quarters of the agencies contacted reported having such arrangements.

Transit promotion and subsidy programs are by far the most common form of cooperative project. For example, the Port Authority of Allegheny County in Pittsburgh, Pennsylvania, works with other agencies and businesses to promote transit for sports events, parades, and during major construction activities. The Southeast Pennsylvania Transportation Authority and the Connecticut State Department of Transportation also reported employer transit pass and subsidy programs.

Projects to develop land uses that support transit use also are being developed by about a third of the agencies. For example, the Central Puget Sound Regional Transit Authority has entered into a partnership with a local housing nonprofit to rehabilitate old housing stocks near transit stops on its LINK LRT project. In Austin, Texas, a private-sector outreach program, the Transit Opportunity Partnership program, seeks employer commitments both to transit subsidies and to transit-supportive development projects. Through this program, employers in an office complex helped fund a grocery store, hoping to facilitate trip reduction and transit use.

Organizational Changes

Increasingly, transit agencies are changing their organizational structures to be better able to pursue supportive land use policies, joint development, and other public-private partnerships. More than half (56%) of all the agencies interviewed responded that they have assigned a special unit the responsibility for acting as liaison to local governments and the private sector, and about half reported that they had added staff trained in real estate, land use, public outreach, and economics to help carry out the new tasks they are taking on. Still others have hired consultants to help with these tasks.

The Denver Regional Transit District employs a senior-ranking transit-oriented design specialist. The mission of this assignment is to streamline the bureaucracy for developers who might otherwise

be frightened away from engaging in joint development. Similarly, Tri-Met in the Portland area and the Largo, Maryland, extension project of the Washington Metropolitan Area Transit Authority (WMATA) have staff working with local governments tasked to encourage transit-oriented development around stations. WMATA also employs a large division of more than 20 people dedicated to pursuing joint development opportunities.

The Port Authority of Allegheny County's LRT Stage 2 project has recently formed a business development group within the planning department itself. Their assignment includes the solicitation, review, and selection of proposals from the private sector for station area development.

Efforts to encourage public and private real estate development around stations and to increase local community involvement are the responsibility of the Central Puget Sound Regional Transit Authority's real estate department. This group plays a large role in community contacts, encouraging synergies among transit system development, community enhancement, and private development [see Bragado (24)].

For Hampton Roads Regional Transit's Norfolk, Virginia Beach LRT; Regional Transit Authority's (Louisville) South Central Corridor; and Central Puget Sound Regional Transit Authority's Sounder Commuter Rail Project, consultants have been hired to serve as community outreach personnel and local government facilitators. The regional transit authority in Louisville has hired a consultant to work directly with the county to develop planning and zoning changes for overlay districts to support the transit line.

Recognizing the importance of local government support for any land use efforts to succeed, several of the transit agencies are also adding public outreach staff and activities. For example, the Central Puget Sound Regional Transit Authority's LINK LRT project has endeavored to hold all project development meetings for the system jointly with local government staff. The Central Puget Sound Regional Transit Authority also has undertaken a program to fund the planning activities of local governments around station areas, through a cooperative process that is designed to build a strong working relationship between the transit agency staff and the local government staff and citizens.

CONCLUSIONS

Based on this survey of agencies developing new capital projects, the following has been concluded:

1. The federal guidelines on cost-effective transit shape and support, but do not control, transit agencies' New Starts planning. Transit agencies respond to the federal guidelines with regard to the cost-effectiveness of new capital investments, and as the guidelines have changed, so have the agencies' responses. However, most agencies report that they must balance federal rules and local objectives—hence they use the federal guidelines as indicators rather than as hard and fast rules.

2. Broader objectives beyond simple cost-benefit analysis increasingly matter. Most agencies give equal weight in project design and selection to state and local policy objectives such as social equity, economic development, and fair share distribution of projects among local communities. Transit agencies are responding to land use concerns in particular. As federal policy with regard to "New Starts" has shifted from a simple, austere cost-savings approach to multiple considerations of the benefits and costs of a proposed

project," the federal guidelines are increasingly supportive of progressive practice.

3. Many agencies are seeking supportive land uses around their transit projects. A number of transit agencies give priority to projects in jurisdictions with transit-supportive land use patterns or plans. A few insist on such land uses before proceeding; some actively work to develop appropriate land use plans and projects. Land uses that support both peak and off-peak transit uses are increasingly being considered.

4. Transit projects that have additional public or private financial or in-kind support are given priority. The availability of public or private funding contributions is increasingly important in prioritizing projects. Partnerships to promote transit use and to help deliver transit-oriented development also are credited when projects are evaluated locally.

5. Transit agencies are staffing up to carry out these new responsibilities. Increasingly, transit agencies are hiring staff with expertise in land use planning, real estate, project finance, and public outreach, and assigning them to work with local governments and the private sector.

6. Information sharing on innovative policies and planning supports a process of adaptive learning. Agencies were interested in learning the results of this survey, hoping to find some new ideas. A number reported that they had modeled a new program or policy after the successful efforts of other agencies.

7. Consensus building and shared capital (financial, social, and political) are increasingly recognized as crucial to implementing effective transit. The ability of the transit agency to share costs with local governments, private developers, private firms, and institutions distributes the financial burden and increases the shared stakes in the successful implementation of a transit project. Agency policy initiatives and staffing decisions reflect this recognition.

ACKNOWLEDGMENTS

This work grew out of projects on transit-land use interactions and transit project evaluation funded by FTA, the California Department of Transportation, the University of California Transportation Center, and the Bay Area Rapid Transit District.

REFERENCES

1. Black, A. The Recent Popularity of Light Rail Transit in North America. *Journal of Planning Education and Research*, Vol. 12, No. 3, 1993, pp. 150-159.
2. Euritt, M. A., M. A. Hoffman, and C. M. Walton. Conceptual Model of the Fixed-Guideway Decision Process. In *Transportation Research Record 1266*, TRB, National Research Council, Washington, D.C., 1990, pp. 52-162.
3. Lowe, M. *Shaping Cities*. In *State of the World* (L. Brown, ed.), Norton, New York, 1992.
4. Gomez-Ibanez, J.-A. *Transportation Policy as a Tool for Shaping Metropolitan Development*. Department of City and Regional Planning, Harvard University, Cambridge, Mass., 1978.
5. Gordon, P., and H. Richardson. Notes from Underground: The Failure of Urban Mass Transit. *Public Interest*, Vol. 94, 1990, pp. 77-86.
6. Pickrell, D. H. A Desire Named Streetcar: Fantasy and Fact in Rail Transit Planning. *Journal of the American Planning Association*, Vol. 58, No. 2, 1992, pp. 158-176.
7. Lee, D. Transit Cost and Performance Measurement. *Transportation*, Vol. 9, No. 2, 1989, pp. 47-70.
8. Viton, P. A. Once Again, the Costs of Urban Rapid Transit. *Transportation Research Part B: Methodological*, Vol. 27b, No. 5, 1993, pp. 401-412.

9. Jones, D. W. *Urban Transit Policy: An Economic and Political History*. Prentice Hall, Inc., Englewood Cliffs, N.J., 1985.
10. Pushkarev, B., and J. M. Zupan. *Public Transportation and Land Use Policy*. Indiana University Press, Bloomington, 1977.
11. Cervero, R. Light Rail Transit and Urban Development. *Journal of the American Planning Association*, Vol. 50, No. 4, 1984, pp. 133-147.
12. Giuliano, G. The Weakening Transportation-Land Use Connection. *Access*, University of California Transportation Center, Berkeley, 1995, pp. 3-11.
13. Pucher, J. Equity in Transit Finance: Distribution of Transit Subsidy Benefits and Costs Among Income Classes. *Journal of the American Planning Association*, Vol. 35, No. 4, 1981, pp. 541-556.
14. Harvey, G., and E. Deakin. Air Quality and Transportation Planning: An Assessment of Recent Developments. In *Transportation and Air Quality, Research Paper No. 5, Searching for Solutions: A Policy Discussion Series*. FHWA, U.S. Department of Transportation, 1992.
15. Benjamin, J., and K. Obeng. The Effect of Policy and Background Variables on Total Factor Productivity for Public Transit. *Transportation Research Part B: Methodological*, Vol. 24B, No. 1, 1990, pp. 1-14.
16. Fielding, G. *Effective Budgeting and Financing for Public Transit: Managing Public Transit Strategically*. Jossey-Bass, San Francisco, Calif., 1987.
17. Lave, C. A. (ed.) *Urban Transit: The Private Challenge to Public Transportation*. Pacific Institute for Public Policy Research, Ballinger Publishing Co., Cambridge, Mass., 1985.
18. Teal, R. Public Transit Service Contracting: A Status Report. *Transportation Quarterly*, Vol. 42, No. 2, 1988, pp. 181-207.
19. Knight, R. L., and L. Trygg. Evidence of Land Use Impacts of Rapid Transit Systems. *Transportation*, Vol. 6, No. 3, 1977, pp. 231-247.
20. Handy, S. Understanding Link Between Urban Form and Travel Behavior. Presented at the 74th Annual Meeting of the Transportation Research Board, Washington, D.C., Jan. 1995.
21. Callies, D. Value Capture Techniques: The State of the Art. *Transit Law Review*, Vol. 2, Summer, 1979, pp. 24-32.
22. Calthorpe, P. *The Next American Metropolis: Ecology, Community, and the American Dream*. Princeton Architectural Press, Princeton, N.J., 1993.
23. Bernick, M., and R. Cervero. *Transit Villages in the 21st Century*. McGraw-Hill, New York, 1997.
24. Bragado, N. S. Transit Joint Development in San Diego: Policies and Practices. In *Transportation Research Record: Journal of the Transportation Research Board*, No. 1669, TRB, National Research Council, Washington, D.C., 1999, pp. 22-29.

Any errors or omissions are solely the responsibility of the authors.

Publication of this paper sponsored by Committee on Public Transportation Planning and Development.