TRANSPORTATION RESEARCH

Number 406, April 1993

CIRCULAR

Transportation Planning, Programming, and Finance

Proceedings of a Conference

TRANSPORTATION RESEARCH BOARD / NATIONAL RESEARCH COUNCIL

TRANSPORTATION RESEARCH
CIRCULAR

Number 406, April 1993
ISSN 0097-8515

TRANSPORTATION PLANNING, PROGRAMMING, AND FINANCE

Proceedings of a Conference

Subscriber category
IA planning and administration

Transportation Research Board
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

TABLE OF CONTENTS

INTRODUCTION

Michael D. Meyer, Georgia Institute of Technology
Lance A. Neumann, Cambridge Systematics, Inc.

Future historians might one day point to the 1990's as the time when transportation planning and investment policies in the United States underwent a major transition. The Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act (ISTEA) one year later have become points of departure for this transition. In both cases, the legislation has set in motion efforts to redefine the purpose and structure of transportation planning and investment decision making. Five years ago, transportation officials were not much concerned with the conformance of transportation plans, programs, and projects to air quality plans. Now, this is a major concern in air quality nonattainment areas in the U.S. Two years ago, transportation planners had never heard of congestion or intermodal management systems. Now, transportation decisions are to be based on the products of such systems. Multimodal planning and programming were considered activities best taught in college classrooms, but not practiced in real decision making situations. Now, the terms multimodal and intermodal are used to describe the type of planning and programming that should be undertaken in states and urban regions.

With this backdrop of change that is occurring to transportation planning, the Transportation Research Board, in conjunction with the Federal Highway Administration, the Federal Transit Administration, and the Washington State Department of Transportation held a conference in Seattle whose primary purpose was to examine the major characteristics of multimodal planning and programming. The conference was the third major TRB conference of 1992 which had a focus on some aspect of the changing planning and institutional characteristics of transportation decision making in the 1990's. The first conference, "Moving Urban America", was held on May 6–8, 1992 and focussed on the general characteristics of the planning approach that would be developed in response to the Clean Air and ISTEA requirements. The second conference, "Transportation Data Needs", was held on May 27–29, 1992 and emphasized the different types of data and data collection techniques that were now necessary to support transportation planning. The third conference in Seattle was intended to be much more specific in its recommendations, with special efforts made to include new groups in the discussion whose participation was the direct result of the federal legislation (e.g., environmental groups, port authorities, freight movers, etc.). The conference had four major objectives: (1) review the emerging issues affecting planning and programming decisions, e.g., accommodating environmental criteria and implications of the recent clear air and wetlands requirements, (2) assess current and new approaches to programming and planning including institutional and technical aspects, (3) determine the steps required to address emerging issues, and (4) develop a research agenda.

The conference was organized in such a way as to provide for maximum interaction of participants. Sessions were structured around four major topics: multimodal planning, multimodal programming, finance, and institutional issues. A resource paper commissioned for each topic was presented in plenary session with critiques provided by some of the leading transportation officials in the country. After each plenary session, the conference participants were divided into groups and spent about two hours discussing questions for each topic that had been prepared apriori. Each of the breakout groups had the same questions, with emphasis given to developing specific recommendations and actions steps. The final session of the conference was devoted to the breakout group moderators presenting the consensus findings from the group discussions. In this way, it was hoped that every conference participant would have the opportunity to express his or her opinions and recommendations on topics of interest.

The conference attracted participants from transportation agencies, consultants, academic institutions, and private transportation firms. This cross section of transportation interests represents the makeup of transportation planning and programming as we will know it in the next decade. As such, the results of this conference should be considered as a good indicator of the needs and perceptions of the transportation profession as it heads toward the 21st century.

A special note of thanks is given to the Federal Highway Administration, the Federal Transit Administration, and the Washington State Department of Transportation. In particular, the conference steering committee would like to thank Duane Berentson of the Washington State Department of Transportation and his staff for supporting the conference. This support was instrumental in making the conference the success that it was.

WORKSHOP SUMMARIES

Thomas F. Humphrey, Massachusetts Institute of Technology

PLANNING

Introduction

The discussion in this breakout group was based upon the resource paper presented by Michael Meyer. To focus their discussion, a series of questions were framed by the group in order to identify key issues and specific action items. The following summarizes those questions and resulting action items.

Summary of Discussion and Major Conclusions

The questions discussed and suggested actions included the following.

1. Are there institutional barriers that prevent the development of consistent statewide and regional priorities, priority ranking criteria and performance measures? Actions are needed to:

- Analyze state funding allocation laws.
- Analyze state constitutional barriers (e.g., gas tax can only be spent on highways).
- Determine ways to deal with the large number of local governments that typically have purely local interests.
- Address problems in states which are mostly rural, where multimodal issues are not considered by state DOT "boards" that have a rural highway orientation.
- Address difficulties in raising matching funds.
- Substantially expand the involvement and communication with freight interests.

2. What steps need to be taken to permit effective multimodal planning and programming to be carried out, considering the multitude of agencies and groups that need to be involved? Are there institutional changes that should be implemented to make such planning and programming more effective? Action items should include the following:

- Give all (legitimate) appropriate actors (including transportation providers) a voice and seat at the decisionmaking table.
- Conduct regional workshops (continuous education programs).
- Create forums to draw out a full range of concerns/issues.
- Use existing forums to disseminate information.
- Make the process transparent, open, and easy to grasp all along the way.
- Educate staffs on the fundamentals of freight planning.
- Get people to buy into the process, up front.
- Link emission reduction potential of air quality funded projects to programming priorities.

3. What institutional changes, if any, should be considered to strengthen the links between land use decisions controlled by local governments and transportation investment decisions controlled by implementing agencies? Action items should include:

- State review of local land use decisions.
- Establish linkages between long-range transportation and land use plans.
- Require transportation implementing agency involvement in growth management planning and concurrency reviews.

4. How can consensus be built? Items to consider should include:

- Consensus building skills should become a part of professional education/continuing education programs.
- Identify the real issues/objections underlying different positions/perspectives.
- Get people to buy into the process up front.
- Get people around the table to deal with each other face to face.
- Consider the use of facilitators/mediators.
- First obtain consensus on policies and goals; consensus is then more likely to evolve regarding conclusions about alternatives.
- Study past practice to determine which ISTEA statewide planning and programming requirements were being previously practiced.
- Voting membership is changing on a number of MPO policy boards to include transit operators and in some cases state DOTs; bylaws are also changing.
- More citizen involvement must be included in the process. The private sector is becoming more interested in the MPO process, and should also be involved.
- Roles in congestion management systems are very unclear.

• Roles will evolve as true multimodal planning begins to occur.
• Roles will also change and evolve as State Implementation Plans are developed.

The discussion of the above questions led to the formulation of the following conclusions:

1. The recommendations from this conference will take time to implement over a number of years.

2. Great effort will be needed to re-invigorate the relationships between federal, state, regional and local planning efforts.

3. Multimodal planning must be driven by a vision that is transformed into goals and objectives. That vision must reflect community values, quality of life criteria, and an emphasis on providing mobility as a service to support communities.

4. In addressing problems of mobility, more consideration must be given to social and environmental concerns, as well as economic costs and benefits. Land use issues must be given an important priority.

5. Effective multimodal planning will require that traditional "adversaries" must establish new relationships. This must eventually bring to the table transportation, clean air, clean water, environmental and many other planning interests. This kind of new planning environment will also impact the role of the private sector in providing services and facilities. The need for the integration of planning activities will require that new kinds of collaborative programs be established that will serve a broader set of goals than have been traditionally addressed.

6. There is a need to carefully evaluate when, where and how freight and commodity planning is carried out in order to better integrate land use, congestion, and other broadly based planning programs.

Research Recommendations

The following research areas were recommended for consideration:

1. Develop a manual on best practices for reaching consensus on complex transportation issues.

Establish a federal clearinghouse for information related to ISTEA. Also, develop training or assistance to develop the skills needed to build consensus in coalitions. Incorporate this training to improve education and communications of issues and planning decisions for business and communities in order to generate more active and informed participation in the overall decisionmaking process.

2. Develop effective methods for rural area planning.

The needs of rural areas and the smaller urban areas must be addressed. An urban emphasis in developing regulations could unnecessarily impact or unduly burden rural areas.

3. Identify a means to get accurate freight movement data when shippers are concerned about privileged or proprietary information.

In addition to the obvious, we must broaden the approach for multimodal planning to define and broaden measures and criteria for evaluation of multimodal issues. This must include both passenger and freight issues.

4. We need to reexamine traditional definitions of trip types.

For example, the nature of travel of a few generations ago is different today. Today the traditional single home-to-work-trip is probably two to three trips. Rather than going from home to work, it could be home, to child care, to work; or work, to child care, to shopping, to home. Is that two trips? Is that three trips? How are these people counted? How are these trips modeled? What is it doing to the assessment of needs?

5. Examine the changing nature of demographics in society and incorporate these changes into planning and forecasting.

It is recommended that there should be a study of what are the most needed and the least-cost methods for effective data collection. We should review and disseminate information on additional techniques for travel data collection that tracks changing behavior. That is, we need to go beyond the conventional one time, single point OD type surveys and provide training and information on developing and monitoring trip diaries, travel panels, etc. It is important to try to identify better or automated means to track travel time and modal operational reliability for both the modeling input to planning and

for looking at alternatives as well as for the management systems for monitoring performance. We should define appropriate and useful measures of mobility.

6. Define reasonable, subjective and non-quantitative policy- or goal-oriented measures for multimodal evaluation and modal performance.

Instead of trying to quantify everything, there is a feeling that there needs to be a recognition that what we are trying to do is support policy-oriented programs. We need to determine how to develop subjective, admittedly subjective, and non-quantitative measures to relate what we are doing in our evaluations for recommendations to decisionmakers.

7. Inventory the analytical tools available for an analysis of multimodal issues.

We need to identify how to mix people and goods into analysis that is relevant for multimodal planning. We should improve market and customer research capabilities, examine peak hour pricing approaches and study parking policy options. We need to get a better handle on the effectiveness of transportation control measures and their performance. We also need to identify means for revenue sharing between jurisdictions; and how to integrate highway, transit (including HOV and ridesharing) truck, passenger, freight, rail, and air quality modeling into our planning processes. There is a whole host of things that are largely done quite independently. How can they be integrated? How can we better look at, interpret and utilize data?

8. Identify means to better monitor and forecast out-of-area travel for a given region.

This particularly applies to the smaller non-urban areas that are heavily impacted by seasonal freight movements or seasonal tourist movements. They may have a growth of five or ten times what they have on a normal daily basis on weekends, or during particular seasons. How can we provide assistance through research to better help them forecast and model those types of impacts?

9. Develop methods for more timely and accurate energy, VMT and ADT type information for modeling and performance measures.

We should evaluate current data collection methods for utility and assess the ability to eliminate some of the data collection going on to allow for new needs to be accommodated. It seems like we continually overlay what we are doing on top of everything else. We should reexamine what we are doing to see if we cannot eliminate some of the information we are collecting or consolidate data to provide more useful programs. There is also a need to look at vehicle characteristics and research. For example, we should look at the type, rates of replacement, energy and air quality aspects of fleet composition for major service providers; the availability and use of alternate fuels and who has access to these vehicles over time; etc. Since we are getting more into multimodal planning, we should learn more about and understand the rail point of view for freight situations and systems, including air and port connections. We should develop and distribute a handbook on goods movement as an educational effort.

10. Freight research initiatives.

We should educate local governments concerning freight movement needs. We also need to balance freight research between truck and rail movements. And we should identify examples of international successes with the integration of transportation, land use and urban design; areas suggested were Japan, Canada and France.

In addition to the preceding discussion of research needs, the following potential projects were also identified:

1. Develop models for creation of MPOs in new urbanized areas.

2. Develop methods on how to do transportation planning in multi-regional areas.

3. Identify public participation strategies.

4. Study regional governance models.

5. Monitor and report on institutional changes that are actually occurring.

6. Identify lessons learned from certification reviews.

7. Case study reviews: information about both success stories and interesting failures.

8. Develop a guide to sources of data, especially for goods movements.

FINANCE

Introduction

The transportation planning and programming process will be significantly affected by the requirements of ISTEA. The funding flexibility provided by the new legislation will require the formation of new partnerships and a much more extensive and complicated process for establishing priorities and making trade-offs among competing priorities.

Summary of Discussion and Major Conclusions

The transportation planning and programming process must now address a new set of issues and challenges. This discussion group summarized those issues and the recommended actions as follows.

The first of the several issues discussed focused on the difference between available funding and our expectations. As discussed throughout the conference, funding levels are flat or declining but very different and new program demands and new expectations have been forced upon us in transportation.

The next challenge is that state and local funding sources, in many cases, are not only inflexible but generally inadequate. In addition to the difficulty of using available funding sources, we also find that funding problems are essentially worsened by the constraints of fund dedication and the lack of flexibility that we have at the state and local level.

We are also finding that there is incompatibility between long-range planning and financial uncertainty.

Funds from the private sector are also difficult to obtain. Raising money has become a practical search for anything that we can put our hands on, rather than trying to make the choice of the most equitable or efficient source of funds.

As we are all aware, the designation of demonstration projects is something that has become a major drain on resources that seriously impinges upon the state or local cooperative efforts to fund the highest priority transport projects and programs. One can question whether the idea of having demonstration projects is at all compatible with the concept of ISTEA.

Continuing with these issues, we find that there are many new proposals for the mitigation of transportation and social cost problems. In fact, there are extreme pressures to fund non-transport activities out of traditionally transport sources. How we deal with this difficulty of mitigation when the climate of less than adequate funding is one of our major issues.

Finally, another major issue is that land use decisions are being made on the basis of transportation plans that are by and large unfundable.

The above issues were generally considered by the discussion groups to be of the highest importance. There were some additional observations which did not receive quite the same general support, but on the other hand, were considered to be quite important.

The first is that flexibility introduces more uncertainty and competition for funds that are available. Second is that the political follow-through at all levels of government on ISTEA provisions is uncertain and often unlikely. The third point is that opportunities for change come only at the margin, but expectations for expenditure changes are far greater. Those "revolutionary" changes are quite unlikely, however.

The next point is that the impacts of using alternative fuels threaten revenue sources. We also find that turf battles, which are very common, are also likely to be unproductive and we fear that this will take attention from financial priorities.

Prioritization and suballocation methods seem to require far more attention. Another interesting point that was discussed was that the use of more private sector finance introduces greater business cycle uncertainty in transportation, which can lessen the counter-cyclical capabilities that transportation is supposed to have in bringing about employment in times of recession.

Financial flexibility seems to work against the political stability of equal geographic and modal allocations of funds. While flexibility can be praised because it offers opportunities for gains, it also brings about change that is very difficult.

It appeared to several observers that cost allocation studies and their findings are increasingly needed to guide financial decisions. Yet, tax equity may fall by the wayside in the rush to support ever-increasing transportation demands.

Another area of concern is the impact of special interest groups, essentially producing funding decisions that may establish priorities through the courts. Court action on the part of various special interest groups is something that can make funding very questionable.

Research Recommendations

Based upon the above discussions and conclusions the following research recommendations were made.

1. Develop financial forecasting models.

We have rather limited information on the availability of models that can be used for forecasting such things

as general financial information. We do not have the tools and the education in the area of finance. ISTEA exposes a tremendous and also unfunded need for additional financial information and tools.

2. Private sector financing options.

The possible options available from private sector financing have so far proven disappointing and require far more attention to find out what is practical and what might work.

3. The need for more information.

Research is needed to identify ways to provide better, more immediate financial information that will realistically apprise politicians and stimulate action on their part.

4. Transportation and land use linkages.

The question of land use and transportation linkages is something that needs to be explored more fully to suggest revenue possibilities and cost reduction strategies using land use regulation.

5. Sharing best practices.

We need information on how financial markets work. We need to share the best financial plans developed by states or localities. Prototype financial plans would be very useful. The question of management systems and how they might better guide financial strategies might be summarized for best practices. We need to know more about the use of non-traditional tax mechanisms and the application of new revenue sources. It would be very useful to have more information on European financial practices and how those fit with land use decisions. Retrospective studies of innovative financing activities are rare, and these would be useful guides to offer either governments or private partners.

6. Citizen participation.

We need much more information about citizen participation techniques—what works best in the financial area.

7. Toll road financing.

Strategies concerning the institutional and financial use of toll roads and toll road funding need to be developed.

8. The use of market financing mechanisms.

The public needs to be much better informed about how pricing can work as an effective method for dealing with transportation issues.

PROGRAMMING

Introduction

The programming of transportation system improvements marks the point at which plans are turned into action. The new ISTEA requirements establish a critical need for more effective and consistent linkages between planning, programming and finance. Following is a summary of the programming breakout sessions.

Summary of Discussion and Major Conclusions

The programming sessions focused on the upcoming (and present) challenges facing transportation professionals; many of the challenges are a result of ISTEA. Those attending the programming sessions were very concerned about the ISTEA-mandated management systems, the development of new approaches to evaluate multimodal trade-offs (and priority setting), developing new ways to measure program effectiveness, CAAA impacts, and strengthening the linkages between programming, planning, and finance. Following is a summary of the discussion and major conclusions.

- **Management Systems**—There was some concern that ISTEA-mandated management systems might be very complex and, ultimately, of little use to the states. Some were concerned the FHWA might establish an extremely high set of expectations for the management systems and require these systems to actually select projects for the capital programs. The states see the need for the management systems and intend to use them as one more tool in the programming process. However, they should only guide resource allocation, not select projects. The attendees want the management systems unified within a regional information system using a common data source. They also see a need for a common definition of deficiencies (or minimum criteria) to achieve standardization. It should be noted that some view standard definitions as unnecessary and potentially harmful for those entities that use different definitions.
- **Multi-model Trade-offs and Priority Setting**—Session participants recognized the multimodal emphasis from the ISTEA, but are unable in most circumstances to evaluate the relative priority across

modal lines. There is a need for evaluation criteria that can apply across the modes to allow fair and equitable evaluation. Although most recognized the need for all modal agencies to "get along" over the near term, many transportation professionals will be facing difficult situations in the coming years that involve tough turf fights. The professional will require training in conflict resolution to help facilitate such discussions.

• **Linkages**—The group discussed the need and process for strengthening the links between programming and planning, and between programming and finance. Professionals are hungry for examples of successful processes, and the group suggests that FTA and FHWA provide a joint clearinghouse for reporting such successes. The group also recognized that there will be a strong need for improved financial forecasting techniques, and suggested the need for major training and education efforts to adapt to financial aspects of programming. The group was unanimous in pointing out that many of the barriers to planning and programming cooperation are institutional in nature.

• **Measuring Program Effectiveness**—The group interest in this area was intense. After all, professionals are being criticized from all quarters to change how they do business, but the professionals lack the tools to evaluate the effectiveness of the new programs they are developing. The group suggested research on identifying what the people and community want (ISTEA wants clean air, Mr./Ms. Citizen want a timely commute). The group concluded that it is essential to develop comprehensive, multimodal, measurable objectives and to develop ways to measure mobility. In addition, there are other non-transport, non-monetary impacts that should be studied and, ultimately, measured.

• **Clean Air**—Session participants also recognized the reality that air quality concerns will impact transportation programming for the foreseeable future. However, it is critical that these actions are monitored and evaluated to measure their effectiveness. There was a significant concern that air quality mandates will force a transit orientation at the expense of other goals, and many believe the transportation community shouldn't "hide" behind air quality goals at the expense of mobility gains. The group also thinks research is needed to examine the political acceptability of congestion pricing, the ultimate political tool in the battle to deal with congestion.

• **Other Issues**—There were also some miscellaneous concerns that did not fit neatly into the above topic areas. An information transfer should be developed to explore what works in transportation programming, not necessarily what's best. The group noted the lack of mention of the freight sector, and suggested inclusion of this important area in future discussions. The need to monitor the impact of transportation decisions on economic development and how private investment affects programming was also identified.

In summary, the transportation programmers at every level of government will face unprecedented changes in the application of their craft over the coming decade. New considerations abound from the ISTEA, and include the management systems, the ability to be multimodal, ways to become more coordinated with planning and finance activities, finding ways to measure the effectiveness of the new choices we will be making, and assessing the compatibility of clean air, ADA, and congestion mandates versus the priorities of the community.

The programming profession needs new tools, more and better data to support choices; they need more extensive training to stay current with the demands of their profession; and they need the patience of other disciplines and agencies to learn the dimensions of their changing profession.

Research Recommendations

Based upon the discussions of issues and action items summarized above, the following research initiatives were recommended:

1. Define Deficiency Criteria

A common definition of transportation system deficiencies should be established in order to standardize the criteria that are used within a state to define and evaluate the effectiveness of the various ISTEA-mandated management systems.

2. Develop Methods for Multimodal Trade-offs and Priority Setting

a. In developing analytical tools needed to make multimodal trade-offs and to set priorities among the modes, we need to develop evaluation criteria that can apply across the modes.
b. Training programs are necessary in order to establish experience in resolving conflicts that will occur in making multimodal trade-offs.
c. A monitoring process needs to be established to determine the effectiveness of the decisions made to trade off one modal improvement versus another.
d. Reliable data collection and analysis procedures must be established in order to quantify the effectiveness of multimodal trade-offs.

3. Develop Criteria to Strengthen Linkages Between Planning and Programming

Criteria need to be developed that will assist in measuring programming effectiveness; they must consider:

- Describing community-based priorities.
- Quantifiable, comprehensive, multimodal objectives.
- Measures of effectiveness.
- Measures of non-traditional impacts such as "non-user", "non-transport" and "non-monetary."

INSTITUTIONAL

Introduction

Since the early days of the transportation planning and programming process, some of the most difficult challenges have been raised by the need for the numerous actors to agree upon goals, objectives and actions to deal with transportation needs. Increasing federal requirements since 1962 have resulted in the necessity for those various public and private sector participants to work out their differences. This has been possible in some cases, but not so in many others. The new requirements of ISTEA create a whole new set of challenges and opportunities that were discussed at this conference, as summarized below.

Summary of Discussion and Major Conclusions

The roles and relationships among the various public agencies and their interaction with MPOs, citizens, and other groups varies throughout the country. Those roles have emerged over the years, as continuing federal requirements have called for increased participation and as new issues are included in the planning and programming process. The nature of formal, as well as informal, participation has seen an increase in citizen and MPO involvement in planning processes around the country.

The general consensus is that among most of the participants we are not seeing radical changes in roles occurring at this time. It is assumed that changing roles will evolve over time. We can also expect that there will be significant changes occurring as State Implementation Plans are actually developed. The roles of the various participants in congestion management are still unclear and probably will be until the first of such systems are actually developed.

The issues related to institutional barriers will continue to make the planning and programming process complex and difficult. There continues to be, for example, state constitutional barriers that prohibit the use of gas taxes on anything but highways. Another example concerns the priorities of local government, which are often purely local and parochial in nature. There continues to be the often conflicting interests and needs of rural areas and urban areas. This makes it very difficult to objectively evaluate multimodal trade-offs. For example, it is anticipated that when federal funds are available for agencies other than a State DOT, it will be difficult for other levels of government to raise the matching funds. Using another example, it was stated that freight transportation must be given a higher priority in all planning activities. Flexibility is needed to enable MPOs to have adequate authority to deal effectively with freight needs.

The group concluded that in order to permit effective multimodal planning and programming, all appropriate actors, including transportation providers and MPOs, must be given a legitimate voice in the decisionmaking process. An important action item in this regard is that regional workshops and continuing educational programs should be established to create forums that will draw out the full range of concerns and issues. It was observed that in some cases we are not effectively organized to do so. Better use of existing communications forums should be used for this purpose as well.

It was also concluded that professional staffs need to be trained concerning the fundamentals of freight planning. In addition, there is the need to link emission reduction for air quality improvements, to congestion management, to priority programming.

The next topic focused on the linkages between transportation and land use. A common theme that ran through the discussion was the need for more state involvement and state review relative to local land use decisions. The linkages between transportation and land use decisions do not necessarily have to be through state law. That would be difficult if not impossible to do. However, state administrative policies could help to establish those linkages. This could be done by requiring the state transportation implementing agency to become involved in growth management planning concurrency reviews. This would lead to more realistic land use forecasts for use in transportation planning. However, it should be noted that there was objection to the concept of too much state involvement in local land use decisions. Land use decisions have traditionally been made at the local level, and this still has many advantages.

The next issue discussed at the breakout session concerned consensus building. It was concluded that consensus building, negotiation, and mediation skills should become part of the professional education of transportation planners. These skills are necessary in order to identify the real issues and objections underlying different positions and perspectives. It could help people to buy into the process at the very beginning, and facilitate the ability to deal with issues face-to-face at the same table. To accomplish these objectives, we should consider including facilitators and mediators as an integral part of the decisionmaking process.

Research Recommendations

Based upon the discussions summarized above, the following research initiatives were recommended.

1. Information Sharing

We must develop better methods for sharing information. This could be accomplished by developing case studies to share and learn from success stories. Synthesis reports on the case studies should be widely distributed.

2. Develop a "Best-Practices" Manual

Based upon our many years of experience, it should be possible to develop a "best-practices" manual for creating MPOs in new urbanized areas.

3. Multi-Regional Planning

Research is needed on how to do transportation planning in multi-regional areas.

4. New Requirements for Citizen Participation

Although effective citizen participation programs are in place in many areas, research is needed to identify more effective public participation strategies in light of the new ISTEA requirements.

5. Monitor Institutional Changes

It is likely that institutional changes will occur as a result of ISTEA. Monitoring and reporting mechanisms need to be established to take advantage of those experiences.

6. State and MPO Planning Experiences

A study should be initiated concerning how State DOTs have (or have not) been able to successfully integrate MPO plans into state transportation plans and how citizen participation affected those actions.

7. Changes in Organization Responses to ISTEA

Research should be initiated to analyze how current institutional and organizational arrangements (say as of January 1993) were changed to deal with ISTEA.

KEYNOTE ADDRESSES

A PERSPECTIVE ON TRANSPORTATION PLANNING AND PROGRAMMING

Brian W. Clymer, Federal Transit Administration

I wanted to talk a little bit about what transportation planning is, and so I've confined my remarks to my simplistic view of what planning is all about as sort of my charge to you to begin this conference.

Planners play an important role, but sometimes that's a role that is misunderstood. I may be wrong on this, but I don't think that there are probably any urban planners in America today, either transportation or otherwise, who hold their office on the basis of a popular election. I think we can certainly accept as an axiom that only public officials who make real decisions in our country are those who are held accountable at the ballot box. And yet there's some kind of a continuing mythology that sees planners as somehow or other being the behind the scenes people who make the real decisions and somehow that's done in secret. Planners are not the decision makers, and obviously they never should be. They recommend, they have views and opinions, and I think it's probably safe to say we probably all know a planner or two who has had a few strongly held views and opinions.

But when you boil it all down, the people with the real accountability in public life hold their jobs by virtue of the ballot box. They are not planners. Planners provide assistance to these public officials. Planners provide the information that public officials need and hopefully use when they make their decisions. I think this is a pretty fundamental truth in my view, and yet it's one we tend to get very confused about all too often. Planners provide information for decision makers to use. Planning can be called good planning when the quality and the quantity of information that it provides is appropriate for the nature of the decision that's about to be made. You can have insufficient information, you can have inappropriate information, you can have irrelevant information, and it takes absolutely no genius at all to provide too much information. And yet each of these situations can be as bad as the other three. Each can result in a poorly made decision. The planner's responsibility ends though once the information has been assembled, distilled and presented. The work of the planner is measured by professional criteria and professional standards. The work of the decision maker as an elected official is measured by political standards, and I use that term in its very best and fundamental sense. Let me propose an analogy to explain what I think good transportation planning is all about. The analogy I will use is the purchase of a new automobile. You can walk into any showroom from coast to coast and the first salesman that you meet will be more than happy to sell you the first car you laid eyes on and tell you why that's exactly the right car for you. "Listen, you like that yellow sports car? I can put you in it right now." Well if you've got 20 or 30 big ones, then you can go right ahead and buy it. But if you are like most of us, when you get serious about buying a car, you do exactly that, you get serious, unless of course you're 16 years old and all you care is that it has 300 horsepower and it's red. But the first thing you decide is why you need the car at all, what it's going to be used for in other words. If you're going to use the car to haul firewood to market two or three times a week, you probably don't want a luxury sedan. If the car has to take three or four kids and sports equipment to games and practice all the time, then a snappy two seater probably isn't going to fit the demand either. If you do a lot of off-the-road driving up and down country hillsides, then chances are a convertible isn't what you're looking for. If the budget is going to be real tight the next couple of years, then you may want to look at compacts and economy models. You even have to see the whole question of purpose in a temporal dimension. Families get bigger, they get older, kids move out. The needs and purposes may change over the life of the car that you're thinking about buying. But you define your purpose and you narrow down your options and that's step number one.

Now it's decision time. You need some good solid information. You need a transportation planner in other words. When you're buying a car, maybe your planner turns out to be your brother-in-law Fred, or Charley the guy two houses down, or back issues of some automobile magazines in the local library, or maybe even all three. Maybe you even put in a call to Click and Clack, the Tappett Brothers on public radio. But in short, you see what you can do to find some basic information about makes and models of vehicles that satisfy the purpose you've identified. And even after you've defined your purpose, you still don't just walk in the showroom and let the salesman sell you something. You learn what you can about gas mileage, maintenance history, resale value, safety features, financing options and cost, the whole nine yards. In the end of course it's your decision because you're the decision maker. You can draw reasonable conclusions from the information that the planners have given you or you can forget about it and rely on pure intuition and then live with whatever choice

you happen to make. But the point I want to make in drawing this analogy is the relationship of good information to good decision making. A further point about transportation planning is that it really consists of that range of information a public official needs to make an informed decision about what kind of an investment is appropriate to achieve a particular purpose. The purpose has to be identified first though. What's the problem for which your proposed course of action is the most appropriate solution. In fact that's backwards and that's exactly what's wrong so often. We must never begin with the proposed solution, whether it's that yellow sports car in the showroom floor with the big price, or a new light rail line that also has a big price tag. We have to begin with the problem. You must know what the problem is you're trying to solve before you try to solve it. Anyone can look out the window in any big city and see a lot of traffic congestion and the effects of air pollution. No mayor has to hire a staff with a lot of people with fancy academic degrees to learn something that any 12 year old already knows.

But every mayor probably needs some professional assistance to understand precisely why there's congestion and precisely why there's air pollution. Is it because of too many work trips into the downtown? Is it because of too little road space or not enough rapid transit or is it something else that is the root cause of the problem; something that's hard to know without surveys, transit and traffic counts, inventories, and other professional diagnostic measurements.

Once we do know the problem though, then we can look at some options. But when looking for ways to solve a particular problem, it makes no sense whatsoever to assume that there's only one correct way to solve that problem. If we want to get the maximum bang from our transportation investment dollar, we have to assess a full range of reasonable options and we have to do it objectively. When we evaluate our options, we have to keep in mind that the information we deal with must be understandable and it has to be accurate. No attempts should be made to skew it in favor of one option or another. Most importantly, the information should speak to how well each of the options does in achieving the goals and objectives we set out to reach in the first place.

Now, as introduced, I am an accountant by profession. So I would like to deal with some facts and figures, but I also recognize that there are some public policy goals and objectives that are not so easy to quantify as others. You might call these quality of life issues. They can and must be addressed because they are a very real part of the picture. But keep in mind that elected decision makers don't need as much help from professionals and professional transportation planners when they're dealing with this non-quantitative side of things. In fact, maybe they don't need any help at all. Maybe this is something that they should reserve entirely for themselves. What they do need though are people who can tell them how much various options cost and what they are likely to accomplish in the ways that the professional is able to measure and determine.

It's difficult to make trade-offs between quantitative goals and qualitative ones. It's especially difficult to do when money is tight which I think it virtually always is. So money matters, even when the money comes from the government. But trade-offs have to happen and the relationship between quantitative and qualitative goals is a good analogy for the relationship between professional planning and ultimate political decision making.

We have to be careful about what information is presented to decision makers. But we also have to be careful how it is presented. Data should be scaled in a way that decision makers and citizens who may not be technical experts can understand. It's not enough to give a mayor, a board chair, or a county council person some esoteric evaluation criteria. There must also be a way of expressing important quantitative information in a way in which people can relate to and in a way that relates to the real world.

ISTEA has indeed changed the transportation planning in the United States. There are those who think that the only profound changes are about modal flexibility and planning emphasis and I disagree with that. In fact, I would say that perhaps the most profound new thing in the whole ISTEA is that it changes the relationships among the state DOTs, transit operators, MPOs and the people that ultimately employ them, our customers, the citizens. ISTEA calls for all relevant planning, programming, and implementing institutions to enter new and cooperative relationships. I know that in the last six months all of you have been busy doing just exactly that.

But while you're busy crafting all these new relationships, please recognize that ISTEA calls for explicit citizen involvement and private sector involvement at every step of the process that you're building. This isn't going to be easy and you are the ones that will have to figure out how to get this participation started and how to keep it going and how to make it work. But citizens and their organizations must be part of the evaluation of options and they must work with the professionals to determine what criteria to use and why. The challenge is yours.

These issues were struggled with several weeks ago when many of you gathered in Charlotte, North Carolina under the auspices of TRB to discuss implementing the

ISTEA. This meeting here in Seattle is really the "Dream Team" of transportation planners. It represents as far as I can tell the very first time that AASHTO, APTA, NARC, TRB and various representatives of the environmental community have gathered under one roof to discuss a common planning agenda.

The tasks at hand are not going to be easy because the problems we face don't lend themselves to easy solutions. As you deliberate the processes that we're going to use to face these issues, please keep in mind a few suggestions. Figure out the problem first and have some vision. There are lots of alternatives out there, find out which ones make sense. Don't be exclusively quantitative, but remember money does indeed matter. And finally, don't try to do it alone. Listen, listen to what people out there are saying. Thank you very much.

A NEW ERA IN TRANSPORTATION PLANNING AND DECISION MAKING

Thomas D. Larson, Federal Highway Administration

Early in my career I heard a speaker at Penn State, Dr. Eric Walker, who was the President of Penn State. He went on to become the first President of the National Academy of Engineering, and subsequently Vice President for Research for Alcoa. The thing that I remember the most about Eric Walker is the talk that he gave at two or three commencement addresses. He said the world is divided into three kinds of people. There are the undertakers, the people that do a job so poorly that it dies under them and has to be buried. Secondly there is the broad middle class of caretakers, and there are lots of those. As a matter of fact, whether we like it or not, most of us probably fall into the category of caretakers most of the time. We kind of move the dust balls around a little bit. Finally there are a few, just a very few, innovators that make all the difference.

Eric Walker in his speech talked about innovators and said that these are people who suffer a persistent itch, an irritation with the way things are, and they are never satisfied. They know that it can be better and they know that if they are just turned loose, they can make a difference.

I've never forgotten this little story by Eric Walker. I believe that we need innovators in America and the reason I'm so enthused about being here is because in this room, there are probably more transportation innovators than you could put together in any one setting or that have ever been together in the recent past. I know a very large number of you and I know that the innovation skills are here to make a difference in the future of this country.

It's appropriate that we are in Seattle. As I flew out on a Boeing 737 this afternoon, I thought about the aircraft industry here in Seattle. This industry has been innovative to a point of being world leaders and the leading edge of our export trade. In an industry that is clearly one of the most demanding in terms of technology in the whole world, the Boeing Company has in fact been a world leader that has allowed us to prosper as a nation in unique ways.

Not only has industry been innovative here, the City of Seattle, in its approach to transit and land use, has been uniquely innovative in the country. Under Duane Berentson, the State of Washington, and the Washington Department of Transportation have been innovative. You should know if you don't that Duane is the second ranking member of that club called the CAOs of the Departments of Transportation. I know personally the kind of innovation that Duane has brought to this department. He didn't come to this position as a career transportation person. He was Chairman of the House Legislative Body in Washington, Speaker of the House, and really had reached eminence in the political world before he transferred into this world of ours, the world of transportation. So he was innovative in terms of his career, and brought that innovative spirit to transportation.

Some of the fruits of that innovation are clearly evident and you will see them and experience them while you are here. They can be seen in the state legislation that ties transportation and land use together. Growth management legislation exists here in Washington. It is something that most of us talk about but can never bring to reality because we say it's impossible. Here they've made it a reality.

The thing that I think is most interesting though that Duane has done is to take the ISTEA legislation very, very seriously. He picked out some of his very best people and said you folks are going to be the ISTEA interpreters for us. He locked them up and threw away the key, from what he says, and they've been struggling to figure out all the nuances of this legislation and how it can work for Washington. That's exactly what the Congress and this Administration intended. This innovative legislation is a tool to be taken seriously and put into motion by people like Duane Berentson that believe that new things are possible.

This organization, this little group, that Duane has put together reports to the Washington DOT and they in turn report to a larger group, and as I look down the list of the people that are in there, it's the kind of group that we really need. I will repeat this two or three times before I finish my remarks tonight. The group includes the Association of Washington Cities, the Washington State Transit Association, the Governor's Office, the State Regional Planning Councils, the Washington Public Ports Association, the Association of Washington Counties, the Legislative Transportation Committee and, of course, the Washington Department of Transportation. That's the kind of interaction that ISTEA demands. I hope that you go away from here realizing that that's what this legislation is intended to do, bring new partners together.

In addition to the innovation that is evident here in Washington, I also want to address three other things. One is the challenge that I think is before us in this new legislation. Clearly we have a challenge that's very explicit, I believe, in that our citizens, our customers, expect more from us than we've been delivering. Secondly, I will focus briefly on what's happening in ISTEA. You will hear about it from other people, perhaps in better terms, but in that context I would like to talk about the National Highway System. I feel that if there's anything that is uniquely a federal responsibility it is the National Highway System, and I will focus on it in terms of our ongoing progress. Finally, I will close with what needs to be done, the immediate challenges before us.

The message, and I'm going to say it three different ways, is a message that the transportation system that we feel responsibility for clearly has more people concerned about it, more input, more output than most of us have been willing to admit to or have wanted to admit to. We have tended to focus on commuters. We've tended to think about the people that are the obvious users of our system and the ones that vote most vocally with either their votes or their voices. A few of us have talked about motor carriers and the different classes of motor carriers. A few others, too few, have talked about the shippers that are concerned with just-in-time delivery and a whole lot of other things. And, very few of us have considered that the transportation system has to deal with our unintended customers. We are now faced in very stark terms with our impact on air quality and with our impact on water quality. These are externalities, but they really aren't all that external to what we do at all.

In Washington they have faced up to the question of land values and how to manage growth, if you can at all. Clearly, what we do in the transportation system is land use. We've talked about that, but by and large, we've done very little about it. There is a pool of money and a very, very restricted pool of money, that's available for all public investments. There are many competing investment opportunities in schools, sewers, water systems, research, and other things. Consequently, we have to be concerned about all these things. Many states really like to think about traditional customers and too many of them stop right there. That just isn't good enough. It just isn't good enough for the world ahead of us.

I believe that there is a change in perspective that is required. The good news is that much of the country knows this and is operating under this new perspective, but there are still a few places that have not adopted it. I believe that they have simply got to make this shift. You can classify it as end product, customer criteria needs, public input and then you can talk about old and new. Let me say that the end product has too often been viewed as a highway facility in contrast to a service. There is a difference. The facility may not in fact provide the kind of service that is needed. The customer, we have tended in all of our standardized processes to think about is vehicles, whether 18 wheelers or passenger cars or whatever. We have tended to write our processes to focus on vehicles as being the customer. But, the vehicles aren't customers at all. It's the people and the people that use the systems, whether users or non-users, that really have to be considered.

The old paradigm, the old thinking, focused on an assessment of a limited set of alternatives. We tried very deliberately to constrain the agenda because we were afraid that if it got too big we wouldn't be able to deal with it. We also know that if you open up the process, it's going to be very difficult and very messy. We'll get a lot of ideas that we are not very comfortable with. That, however, is what we have to do. In Washington, Duane has set in motion urban and rural advisory groups that bring inputs to him from all sources. This is clearly the new perspective that we must adopt.

I can't leave you tonight without referring to one of my favorite authors, Kenneth Boulding. He says that the principal problem with our planning process has been very limited agendas. We have brought to decision makers a set of options that are so narrow that there's nothing really attractive. When you do that of course, you come up with bad decisions. If you have a narrow agenda that does not include something innovative that appeals to more people, then you've failed as planners. That's been one of our problems.

It seems to me that if you wanted to say it as concisely as you can, what people want is better mobility and—and the and is always kind of an open ended thing—they want mobility. If you read the San Francisco

Chronicle in their periodic surveys, congestion reduction is always right up at the top. People want congestion relief. Make no mistake about that. They would like to have a seamless transportation service, whatever that means to individuals. They would like to have minimized freight costs. But the "and" they also want is clean air. They have voted for that. We have the Clean Air Act Amendments. They want jobs. Wherever you pick up a paper, you find that jobs is a critical issue. "And" they want historic preservation, wetlands preserved and whatever. This list is about as long as you have room to write it. But as transportation people, it seems to me what we have to realize is that there is an expectation for improved mobility "and" and if we're going to be successful, we've got to define that "and" and work with a whole lot of people to make it clear.

That's a tough job and an awful lot of people that I talk to in the transportation world don't want to face up to it. I have had meetings with people who say that's not our job. We don't want to deal with those "ands". What we want to do is deal with what we are comfortable with. We don't like all this process. We want to build roads, that's what we're hired to do. We want to provide a transit system, that's what we're hired to do. Well, I'm telling you that's not good enough and if there's any group that can help go beyond the mobility and deal with those "ands", it's the group right here in this room. I can't really tell you what the balance is. The legislation, the ISTEA, raises the question of balance. And you as transportation planners, you're going to have to decide because there is no perfect answer. The world with nice neat answers is a world that was yesterday and it's not a world that we have available to us now.

Well, so much for the challenge. I think the challenge lays in being willing to accept the notion that transportation is more than just dealing with the mobility crisis that we have. It's much more than that and we have to be players in this broader arena.

My second focus is the progress in the ISTEA legislation. I believe that there has never been a time in my professional life when I've seen the kind of energy that we see now. This audience speaks to it. Here are people from all walks of transportation. There are chief executives, there are operational planners, a cross section of folks that would not have come together unless there had been new energy provided in the transportation world. Well that's happened. We have an awful lot of energy that has been unleashed by the ISTEA legislation.

Let me give you a few statistics and point out with these statistics some of the things that you face as transportation decisionmakers and planners. First of all, total obligations as of right now are about 71 percent of the $11.4 billion that's available. That's better than we did last year, even though this year we didn't really get started until December 18th. We have done very well. Some states are up in the 90 percent plus range in terms of obligating available funds. So that's sort of the good news. We have also done very well with carryover funds from the traditional programs. The percentages are very, very high, 84, 76 and so forth.

The legislation has created some new categories. You're aware of some of these. The Surface Transportation Program, Transportation Enhancement Program, and Congestion Integration and Air Quality Program. In these new categories we're doing relatively less well. For example, in the congestion clean air category, we're at 11 percent. In the enhancements category under STP, the Surface Transportation Program, we're at 12 percent. What that says to me is that there's a high level of uncertainty out there and people are waiting for direction and for guidance to decide how they ought to move forward.

Explaining the delays is very difficult to do. I think the delay is partly in EPA and DOT coming to agreement on the question of what metropolitan areas are going to have to do to be in compliance with the Clean Air Act. Some of the flexibility provisions have also delayed obligations. Flexibility can easily turn into frustration, and I think that's an adequate and a good way of characterizing it. But we have seen some progress there. Among highway categories $730 million has be involved in transfers, about $300 million of which has been moved to the Surface Transportation Program, the program with the most flexibility. Clearly this suggests that people want to use this flexibility. Regarding the temporary match waiver, there are eight states that have used the provisions of the temporary waiver for 472 projects involving $463 million. So this waiver opportunity has been used significantly. Just recently the credit for the non-federal share, the so-called soft match, has been requested. New Jersey has come in with a request for using soft match to do some of their projects.

The ISTEA legislation with its flexibility is starting to have an impact. Duane made the point in one of his writings, that several things are required for ISTEA to work. One is that the states and the MPOs have to get off the dime, and start working hard. He's doing that here. Another one of his specifications was that the federal government should not put unduly burdensome requirements on the states and MPOs. We're trying hard not to do that. We are writing guidance, we're not writing hard regulations. His third observation was that we had to have full funding but that is very much in question right now. If you've been following the dispute in the Congress, the House has come in with a number

that is substantially lower than we would like to see (lower than the President requested). There is now a dispute over whether or not to take that out of foreign aid. The Senate has yet to weigh in on this. I firmly believe that Duane is right on the mark. You can't underfund a new program and have it succeed. You have to buy winners. You have to have more money in order for people to feel that they're winning. If we don't see that in this Congress in the appropriations process, then a lot of what we have talked about in ISTEA as opportunity will in fact turn to frustration. We are at a decision point right at this very moment.

At this point I want to shift to something that I feel passionately about,the National Highway System. There are two ways to talk about the National Highway System. One is in terms of the social dimensions of our country, unity really, and the other is economics. One of my favorite readings of the last few months is Merrill Peterson's book on Thomas Jefferson and the New Nation. I think it's useful to go back and review some of the people that were here when this country got started. Peterson references Mr. Jefferson's speech to the 9th U.S. Congress in 1806 when he had pretty well started on a track of balancing the budget and the Louisiana Purchase. He also focused on a public works program, that he had worked on with Albert Galatin, the Secretary of the Treasury, $20 million for the entire United States. Jefferson said "roads and canals would knit the union together, facilitate defense, furnish avenues of trade, break down local prejudices and consolidate that union of sentiment so essential to the national politics". Well, I would suggest that if it was important back in 1806, it's doubly important today. We really ought to look at our transportation programs and at the National Highway System in particular as having this kind of a function, the knitting together of the union.

You could say we've had a union that's worked pretty well for a couple hundred years, so why do we need this. Well, let me insert a bit of a reality check here. There are 186 countries on this globe, in this global village, and of those 186, probably 20 have a natural unity. Sweden would be one, France would be another, Japan, where there's a unified ethnicity that keeps the country glued together. All the rest of those 186 are in fact in danger of flying apart and creating what the economists call flyspecastans—isn't that a neat word? These are a bunch of flyspecastans. And the whole world is going through a lot of turmoil as we're watching this happen.

Now I don't argue that transportation is the only force that keeps us together, but it's clearly communication, the 737 airplane that I flew out on, the National Highway System, these are things that do in fact create bonds. And as Mr. Jefferson said, they do in a very significant way affect the national polity in favor of union. We know the countries, it isn't only Yugoslavia that's dividing. We can look at our neighbor to the north, Canada, struggling with whether or not Quebec is going to stay in or not. In Spain, the Catalones are always debating whether they're going to stay in the Spanish union. I could go on. The Soviet Union, disunion is the most evident force. It seems to me that we ought to talk about the National Highway System very seriously as a force for union. I think that if we don't do that, we're not really looking at this thing as realistically as we should.

Let me switch to the economic side. The Interstate System is something that the Federal Highway Administration certainly feels very proud. It is a system that to a unique degree unites these United States of America. We know that this system is old. It was devised back in the 30's. The original map dates back to Franklin Roosevelt. The legislation was signed by President Eisenhower. One of its major defects is that it does not address the north south corridors that we know are going to be part of the North American Free Trade Agreement. We have to look towards a more complete system, the National Highway System, as President Bush presented it before the people that were in attendance when he announced the Administration's Bill in March 1991. The Interstate System as you know is pretty well complete, except for Boston. So what we need to do is develop a modern system that has more north-south identification, that relates better to ports, to border crossings, to airports, to a whole lot of things that were not really considered when the Interstate Highway System was laid out. So let me suggest that you have a very major role. We've made that part of our advanced guidance that was mailed out not too many weeks ago, to say that we expect as part of the statewide transportation planning process that you will identify those highways that are ultimately going to be part of this system. That system will ultimately carry about 70 percent of all commercial traffic and perhaps as much as 45 percent or thereabouts of all traffic. That system is absolutely central to the economic wellbeing of this country and to the social union of this country. It is important that you make it a central interest.

This is the time table for designation. The states and the MPOs will complete a functional reclassification by December 31 of this year. The states and MPOs will submit proposed NHS by April 30, 1993. FHWA will submit a report to Congress in December, 1993 and Congress will approve it by 1995. Let me say that there's an awful lot of time for mischief to happen here. This was a system that was not well regarded by some. We argued vigorously, the Administration, the President,

Sam Skinner at the time, for this to be included because it is in fact the glue that ties us together. It is the essential component that makes us different than a conglomeration of flyspecastans. We have got to have this system and we've got to pay for it. We've got to pay attention to it. It's in the legislation, but again, keep your eye on this and make sure that we do have a system that is approved in September of 1995.

Well, let me switch to my third topic which was what next, where are we going. I hope that I've communicated the notion that we have a new kind of landscape. We have an awful lot of things that have been turned on their head, and the only way that I know that we can succeed in the face of all the difficulties we face is by forming a very, very close set of working partnerships. The elements of a working partnership are hard to define. We know, however, that it depends on trust. It's a feeling that we can depend on each other in the kind of unusual circumstances that will come up as we go forward.

If I had to say what I would like to leave with you, that would probably be very close to the heart of my message. We have got to be willing to talk to each other openly and to form agreements and partnerships that will in fact get us through some of the difficult times that are ahead of us.

There's no use in my trying to kid you. There are some difficult times ahead. You all know that. One of my favorite cartoon strips, and I have to take a little bit of a shot at planning here, is this one from Calvin and Hobbs. "Cleaning my room will go a lot faster if we both work, right? So I will sit here and do all the tedious agonizing planning and organizing, you know making the tough calls and hard decisions, and you won't have to do any of that. All you do then is pick up what I tell you to okay? Hey, did I say to pick up me? No, as a matter of fact, I didn't. Get away from that trash can. I'm the organizer, hey!" Well, it seems to me that the world that we face is a pretty sophisticated world. We have sophisticated citizens. If we're not careful, we as a transportation planning group could find ourselves picked up and carried to a trash can and dropped. That's the challenge that we face. We have to be relevant. We have to understand this business of partnerships. We have to bring people in and really put our heart and soul into it. What I would like to see is, a group of people, (I don't know who they are, I haven't put names on them,) but I would like to see people coming together in the spirit of cooperation and true partnerships. People who know that we have legislation, a new mandate. People who know that transportation is important in our society, and are serious about the business of making sure that transportation planning works.

Well, the good news is that there are some states that jumped right out of the box and have done some very exciting things. I talked to Larry Dahms a while ago. Larry says that in San Francisco, the partnership that brings together a whole host of actors in the Bay Area that care about transportation is gaining momentum. They are facing tough decisions about how to use some of these new program monies and making them work. Here in Washington, as I've said, Duane and his people have provided leadership in the transportation land use connection. They have clearly put in place most of the legislation that is needed to take advantage of all the flexibility provisions in ISTEA. They have inputs from local and urban people that are allowing them to, rather than sitting around and wringing their hands, move forward very aggressively. In Maryland, they have a program for using enhancement money that is clearly an "out of the box" kind of a program. So, if you're feeling frustrated, let me suggest that you contact some of these leaders, some of these "out of the box folks". Or see Tony Kane and Kevin Heanue at FHWA. We try to keep track of what is going on and we can point you to success stories. There are a lot of success stories that are out there even at this time.

Well, let me close, even though my hour is not quite up, with a couple of things that I would like to leave with you as images. In almost every area that I know of, there are five-point interchanges. In Pennsylvania there are a bunch of them and they are always political hot spots because it's very difficult to know what to do with a five-point interchange. The Brits solved the problem by having rotaries. They kind of run around until something happens and that's how they deal with it. But in this country we have typically put a red light at this point. If you know much about traffic engineering, the typical cycle time doesn't give you any green time at all. You wind up with everybody basically sitting waiting for their two seconds worth of green time and you don't make a whole lot of progress. Traffic backs up.

We try, and I think the answer is to do something upstream. If you try to fix it at the five-point interchange it's impossible. You can't really deal with it. So what you try to do is move upstream and do something. You can divert the traffic upstream by putting some other roads in here, approximating a rotary actually. But you've got to do something because if you don't, the system will breakdown.

That's where we are I think with ISTEA. We have all these people, local government, transit operators, state MPOs and probably a few others, you could probably make a seven-point interchange out of this if we really wanted to. But I think that we have to work ourselves back upstream and find solutions so that we don't in fact

come to a gridlocked circumstance. So think about the ways in which, as you look at the statewide planning process, we get these potential gridlock components and don't let them come to gridlock. Focus on process, a process that allows partners to get involved, to find solutions before they come to a point of gridlock.

My last thought could be called the ISTEA elephant. Some of you may remember this poem, *The Blind Man and the Elephant*, from someplace back in your childhood. I will read just a little bit of it. "It was six men of Indostan, to learning much inclined, who went to see the elephant though all of them were blind, that each by observation might satisfy his mind. The first approached the elephant and happened to fall against his broad and sturdy side and at once began to bawl, God Bless me, but the elephant is very much like a wall." Well, it goes on but the last two verses of this rather long doggerel I think are useful. "And so these men of Indostan disputed loud and long, each in his own opinion exceedingly stiff and strong, though each was partly in the right and all were in the wrong. So often theologic wars or disputants utter ignorance of what each other means and prayed about an elephant not one of them has seen."

It seems to me that ISTEA is in fact kind of an elephant and we are struggling as partially blind men and women to define this thing. I would like us not to jump to conclusions. Just because you feel this tail, don't conclude that ISTEA is a rope. ISTEA is a very complex thing and it has to be defined with care and attention over some number of months. It's happening. The good news is that again people like Duane Berentson here in Washington, people like Hal Kasoff back in Maryland and Larry Dahms in San Francisco, and others are finding creative ways to define what this legislation can do to advance things in which you're interested. ISTEA has that potential. Don't settle on an ISTEA that is nothing more than a rope, when in fact is has so much potential.

If we use it creatively, you can help us move America into the next century and that's what it's all about. We want to be able to move America to jobs, to homes, to market, etc. That's the intention of the Surface Transportation Legislation.

TRANSPORTATION PLANNING AND DECISION MAKING: A LOCAL PERSPECTIVE

James Street, Seattle City Council

In addition to being a member of the City Council, I'm President of the Puget Sound Regional Council which is the planning agency, the MPO, for the four counties that circle Seattle. And I'm a member of the King County Growth Management Planning Council which is a group that's been brought together to develop for the first time in the history of the State of Washington county-wide policies that have to be consistent with all of the local comprehensive plans.

You've arrived in our city in what I consider, and I think most of the people who live in the State of Washington consider, to be revolutionary times. Revolutionary in terms of transportation planning, and certainly what's happened at the federal level has contributed in a major way, and also revolutionary, and perhaps even more revolutionary, in terms of growth management. We've had in the last several years legislation that has dramatically transformed the way we plan, the way we work together in this state, and I think it really does fit into sort of the revolutionary category.

I've had in my household in the last month several visitors from Russia who were here as part of an exchange program. And as I thought about preparing these remarks for this morning, I couldn't help comparing what they described in terms of the revolution and/or counter revolution going on in Russia and what may or may not evolve as we look at the revolutions going on in transportation planning, decision making, and growth management in Seattle and in the United States. After all, if you look at some of the things that happened there, you had perestroika and glasnost which had at the beginning a tremendous stimulus to creative spirit, thinking, hope, a belief that things would be different and would be approached differently. But you also had what I would call a half-baked revolution, one in which the leadership was tentative and not sure how far to go, one in which the institutional changes that occurred only went part of the way, one in which many of the old guard remain in power and share power with those that would aspire for major change, and therefore a bitter battle continues over who controls the decisions and on what direction funding will go. In other words, you did not sweep away with that revolution either the institutions or all the people that had made decisions in the past. And then you have forces pro-Soviet and anti-Soviet, and finally you have forces in terms of counter revolution and economic depression that tends to undercut the spirit and the optimism and the direction of that revolution.

Now what do we have here in Washington State? I don't think it's quite that grim as I think you will see, but I think it's interesting to see some of the things that are going on. First, in terms of glasnost and perestroika, as I mentioned, in 1990 and 1991, our state legislature, I think after a tremendous amount of very positive thinking and good politics, passed new growth management legislation. The origins of that legislation were in citizen action. Some of you may be aware that in the City of Seattle we had an initiative that basically established a cap on the size of buildings and on the amount of office development that could occur in our city each year. That was a reaction to the tremendous amount of growth and the very rapid change that was occurring in our city and people's reactions against that change. We also had several key suburban officials defeated in their elections, and in the state legislature, the Speaker of the House and several other elected folks down there, believed that they saw the winds of change. They believed that it was important to get out ahead of that change and to initiate positive affirmative reform in our state and they began the work that led eventually to this growth management legislation. It was helpful also that the Speaker of the House was interested in becoming Governor. He comes from a place other than the central metropolitan area and I think he was looking for a way to lead reform that would appeal to the people that lived in and around the City of Seattle and its suburbs.

So the basic building blocks of that reform are really I think quite positive and quite classic. The basic concept of urban boundaries, which is something that Oregon has had in place for many years, was adopted for the major growing areas of our state. The concept of concurrency, between infrastructure development and the growth and development in terms of land use, was a principal means by which we hoped to link in a mandatory way for the first time in our history land use and transportation so that they become coordinated and work together.

And then perhaps the most powerful of the various principles on which this growth management legislation is built is the concept of consistency. And while it seems too simple and fundamental in our state as I think the great majority of states of this country, there has never been until now a requirement that the City of Seattle's comprehensive plan be consistent with its neighbor next door, much less the county as a whole and the region. And this legislation requires the development of county-wide policies, followed by local comprehensive plans and consistency among all of those. So the County Council, after a tremendous intergovernmental exercise, passed county-wide policies. Many people who were not deeply involved are somewhat shocked by how aggressive the policies are and how ambitious they are in their attempt to implement the various principles that I previously indicated.

During the next 12 to 18 months, the local governments will continue to work on their comprehensive plans and then will go through basically an iterative process, coming back with those plans to the county level and saying are we consistent, are we not consistent, what changes need to be made, do changes need to be made at the county level or should the comprehensive plans of localities be brought into consistency.

The most powerful metaphor that represents the vision that we have in this city and in this region is captured by the concept of the urban village. It's a term that was coined by our mayor, Mayor Rice, as part of his proposals for the City of Seattle, but it really does capture the spirit of our overall planning exercise. The basic concept is that we want as many people as is possible within our region to live within a reasonably short distance of a vital, mixed, dynamic urban center that combines the qualities of vitality that you find with an urban center, and neighborhood, i.e., the sense of ownership and involvement of people that live there and work there together. We're trying for that in our city. It's the central theme of our city planning, and it's also a central theme of the county-wide and regional planning.

Also, we want people to live as close as possible to green space, to mountains, to lakes, to streams, to natural areas. And so what we've developed basically is a concept of multiple urban centers with as much of our growth as possible being concentrated in those centers served by rapid transit and then preserving our natural areas, our agricultural and forest lands, and open space between those centers. It's a classic planner's vision. So far we're still on the track, but the controversy is starting to come about.

On the transportation side, you're well aware of the many things that have happened. Part of it is happening because transportation is a vital part of our county-wide policies, but certainly ISTEA and the new apparent discretion that it gives to regions particularly to MPOs, is a very important factor. Within our state just several years ago, we had major new transportation funding legislation that established the basis for local option taxes to fund a new rapid transit plan involving high capacity transit. So there's an enormous amount of work going on right now to develop a proposal to put before our voters one year from now, the fall of 1993, that would involve about $6 to $10 billion to be spent between now and the year 2015 on a combination of high capacity transit, HOV lanes, diamond lanes, increased bus service, and various other amenities and transit service to go and support that overall system.

Inside the county-wide policies, I want to mention a few things that are emerging and which many people are very, very excited about. First at the county level, we recognize that the primary prioritizing mechanism for allocating total transportation dollars will be the Regional Transportation Improvement Program, the six-year TIP which is to be prepared, developed by the Puget Sound Regional Council in a collaborative effort with its own local governments as well as with the state and other agencies.

Secondly, the county-wide policies call for a program of consistent demand management strategies and we're specifically addressing things such as limits on parking supply and parking pricing.

Thirdly, we have striven mightily to combine and make consistent and concurrent our growth management planning and our transportation planning. The key being the urban centers which are basically the spine of a regional high capacity transit. An urban center needs to be a part of that regional network of centers and must be served by the high capacity system.

One of the most important concepts evolving, which is quite relevant to the thinking that's going on nationally, is how to address these issues and how they relate to levels of service. Our state law requires consistent level of service policies, but where we're not going so much to the traditional approach based on the amount of traffic and congestion on a given street. Instead our county-wide policies and our regional policies provide the basics. Our local city policies call for every jurisdiction to develop a series of mode split targets for all of its major activity centers within the region, basically establishing goals based on consistent criteria across the county for what proportion of the traffic will be served by means other than the single occupancy vehicle. It's a very powerful concept for us because up until this point, to the extent to which we thought about level of service at all (Seattle for example has no policies about level of service), we thought about the question—how can we control the effect of everything that's happening on this neighborhood, on this street, on this arterial. And as looked closer and closer, we realized that that's a hopeless battle. Most of the traffic being generated is generated somewhere entirely different and anything we do to control the situation on that street will be overpowered by what happens away from it.

So instead we're developing this concept of mode split. The whole thrust is, to determine what set of policies in this neighborhood, in this community, will contribute most effectively to the solution of the region's transportation problem. What can we contribute in terms of transit use, bicycle use, pedestrian activity, restrictions on parking, to the overall solutions of the overall regional problem. It's a much more practical and realistic and I think in the long term effective means of looking at the transportation problem. So that is the revolution and those are the things that I think involve the positive thrust. Now what is the substance of the counter revolution? Well certainly we have our counter revolutionaries. I'm discovering as I go out into the suburbs that there are actually pro-highway advocates in our region. And obviously coming from the central city, that's a major shock. I'm discovering that there are very serious and sincere advocates for sprawl. I was over in Belleview just a couple of days ago and one developer got up and said, sprawl is the American way and he was right. We have a major growing property rights movement within our state that intends to go to the legislature next spring and seek amendments to the growth management legislation to reverse the direction we're going. Have people in the rural areas that are outside that urban growth boundary that believe they've lost property rights. We have people in the City of Seattle that are worried about this urban centers concept because it may mean significant increases in density within the central city. So there's plenty of ground for counter revolution. We also have economic recession, and as you know, while the thrust for environmental protection and growth management occurs during times of growth, when growth stops and recession sets in, then the energy often is dissipated. And people start to worry understandably much more about jobs and how they can be protected at whatever expense. I think all of us in this room understand how crucial it is that we develop a long term vision for what we want our region to be, which we stick with whether it's good times or bad times. We cannot afford to constantly reverse course as the economy reverses course because we cannot guarantee what the outcome will be.

We also have half baked institutional change, or at least the potential for it. A great deal will depend on the spirit brought by you and people like you and people in positions to make decisions, not only elected officials but probably even more important the leaders of our bureaucracy at the state and local level. It's incredibly important what attitude and spirit they bring to this because there's a tremendous amount of turf involved. There's a tremendous amount of old way of doing things that is tied to this whole current situation and they have not been swept away. Our State Department of Transportation is still very powerful and absolutely central to the decisions we will be making. Our own Public Works Directors are concerned with preserving what little piece of that turf and pie they still have and they're very, very concerned about whether all this new

discretion and flexibility will drain resources away from fixing pot holes and keeping the streets repaired. And a fundamental question is whether or not the basic funding additions are there to basically grease the friction that will otherwise occur between the forces that want to keep things exactly the way they are because they would rather have the fears they have then fly to others they know not of, and those who don't understand, like me, do not understand all the specifics of fixing pot holes, but are quite excited about what we can do in terms of improving mobility. There are some other basic problems. One, no one has all the reins for making decisions in his or her hands.

There's ambiguity in ISTEA. And we're still trying to figure out what those various little key words in terms of cooperation, coordination, collaboration mean. As a decision maker in this region, I'm having an incredibly difficult time just finding out what are the total dollars being spent and who spends them and how do they relate to each other. We spent so much of our past focusing in on just a small piece of the total pie that it's almost impossible to find out what the total pie looks like.

We have inadequate criteria. I think all of you are struggling on this issue now. What criteria actually works for deciding whether to allocate dollars to preservation of the existing system or on the other hand to mobility? I have seen a number of papers already, but none tell you how to compare these apples and oranges in some rational compelling way, particularly when there's not enough money. And then within our own city and our own region, we have major problems with our regional transportation plan and it's partly institutional, it's partly the incredibly fragmented decision making. The voters are going to be given one vote on whether or not to do high capacity transit and some related issues. And yet they look at a problem that's much bigger, that involves highways and their local arterials, and they're going to have to put all of their energy, all of their protest, all of their dissatisfaction into that narrowly focused vote that does not in fact solve all their problems. And so as we try to make this decision we are really torn in many different directions trying to figure out how to put on the ballot something that actually has hope of appealing to 51 percent of our electorate. And personally I'm quite pessimistic at this time about whether or not we're going to do that. Part of the problem is the fragmented decision making structure. We can't put the whole pie in front of them so that they can see the full range of benefits that they might get through all of the spending that occurs in our region.

In the area of growth management, one of the fundamental institutional problems is that the basic way we pay for local government is a disincentive to cooperation. Every local jurisdiction recognizes that if they are not the urban center, the potential is for the jobs to be drained away and therefore the revenues and taxes to be drained away to some other location. And as much as we have raised our consciousness tremendously in this region regarding the importance of cooperation, that disincentive is lurking in the background in terms of whether we actually agree on the kinds of incentives for the urban centers that are necessary to make them successful. Everybody is for fiscal reform. The central cities believe that fiscal reform will mean that more of the region's resources are spent where the problems are and where the urban centers are and where the densities are and where the amenities are needed. And the suburbs believe that if all the jobs are going to be in the urban centers, then of course the urban centers are going to have to subsidize the services of the rural and the suburban areas. And both of them have logical arguments and no one has figured it out, so it's a major institutional problem.

So what is the answer? I would list three things that I think offer particular hope. One, we must have a strong regional vision and I think that's happening in this region, a growing recognition that the building block of our economy is not the City of Seattle, it's not the City of Redmond, it's not the County of King, it's at least a three or four county area that has tentacles that reach out into other parts of the region in Oregon, Canada, Eastern Washington, Idaho, and Montana, but it's a region that is the building block. It's on a regional basis that we must plan our transportation system and allocate our growth. Secondly, we have to realize that we must focus on the whole pie of funding. We started looking at the MPO level about what we had as discretionary decision making. It was very tempting, because we hadn't had it before, to focus all of our energy there. And very quickly, I and others realized that that's a big mistake. We're talking about a billion dollars being spent in our four county area each year and the amount that's a discretionary resource for decision making for the MPO is a very, very small fraction of that. We have to develop a decision making system that takes into account all the funds being spent.

And that leads to the third and last point. There is never going to be a day when any one entity, either the Department of Transportation or the City of Seattle, the MPO, our Metro has all of the decision making reins in one hand. It's not going to happen. And therefore the only way that we are going to make wise decisions is

through the fundamental process of collaboration, of sharing turf, of sharing space, of acknowledging other people's role, of including them in our process and of being included in theirs. That is a tremendous challenge. It's a lot simpler if you're a parent and you can simply tell your kid what to do, but we know we can't even do that with kids, much less with Departments of Transportation and vice versa. They can't tell us what to do. It's a far more complex political process involving far more important and difficult skills to achieve that concept of collaboration.

So that's the challenge to you. You're going to have to be more than planners. You're going to have to help elected officials see that. You're going to have to help yourselves see that and your colleagues. And only if that occurs, I think, do we have the prospect of caring for the revolution that we're involved in, of avoiding the collapse of it, the withdrawal, the retreat or the delay of the benefits of the reforms that have occurred at all levels. I look forward to working with all of you in the years ahead. Thank you very much.

SUMMARY OF RESOURCE PAPERS AND DISCUSSION

Thomas F. Humphrey, Massachusetts Institute of Technology

PLANNING

Summary of Paper

The purpose of this paper is to establish a point of departure for the conference discussion on multimodal transportation planning. Because of the few examples of such planning in the United States, the paper necessarily focuses on background and on normative perspectives of what multimodal planning should be. Given that any planning process should be structured to reflect local institutional and political characteristics, this paper will not offer the approach to multimodal planning. Instead, it will explore characteristics of such planning and hopefully begin the discussion of how we develop and use a multimodal perspective in planning and decisionmaking.

Ever since the early 1960s, when the federal government first institutionalized the 3C transportation planning process, the transportation profession has been struggling with how to structure a process that clearly considered investment trade-offs in a "balanced" manner. If we define "balanced" as being decisions being approached from the perspective of truly comparing alternative modal options, we have not succeeded.

The reason for such apparent difficulty in developing and applying a multimodal planning approach in support of transportation investment decisions lies in both the institutional and finance history of the profession. Probably of most importance were the limitations placed on, and incentives provided to, local decisionmaking as it related to federally funded transportation projects. Historically, the categorical nature of federal funding did not allow funds in one category (e.g., highways) to be used for another purpose (e.g., transit). In fact, the limited use of such substitution for Interstate highways which occurred in the mid-70s did not happen without significant political resistance from highway groups.

To some extent, this limitation in the use of federal funds has been eliminated by the recently passed Intermodal Surface Transportation Efficiency Act (ISTEA). However, even without the funding constraints found within the federal aid program, there are still several significant barriers associated with developing a true multimodal planning process. These include:

1. The traditional modal orientation of the major transportation actors in a typical urban area or state will likely provide great difficulty in adopting a multimodal perspective in decisionmaking (as evidenced by many highway agencies still providing the highway component to the TIP and the transit agency providing the transit element).

2. State or local constraints on the use of revenues for highway or transit purposes, rather than for "transportation" purposes, can be important limitations on the use of the new, "flexible" federal funds.

3. The planning process and the supporting analysis framework have never been approached from the perspective of generic transportation investments. Because much of the technical profession has, for years, been modeling highway and transit networks separately, multimodal analysis is very difficult to do.

4. A multimodal planning process must necessarily include concern for the movement and transfer of goods. For such concerns to be addressed in a meaningful way, representatives from concerned carriers and shippers must be part of the planning process. These groups have traditionally not be an active participant, and it could possibly take a concerted effort to bring them into the process.

The Changing Environment of Transportation Planning

There have been numerous conferences already this year that have highlighted the changing environment of planning, primarily caused by the Clean Air Act Amendments and the ISTEA. Both of these legislative initiatives have significantly changed the way we do business. Not only did the ISTEA mark the end of the Interstate Highway program begun in 1956, but it greatly loosened the institutional, financial, and thus political framework within which decisions on transportation investment had been made over the past 35 years. ISTEA now encourages states and localities to seek solutions to transportation problems appropriate to their needs and desires. It provides transportation funds to meet other societal goals, thus viewing transportation as a means of achieving some greater aim. It also encourages transportation decisions that are undertaken from a multimodal perspective, and better management and operational improvements of existing facilities.

The Clean Air Act Amendments also provide a strong basis for a changing transportation planning focus in those metropolitan areas in nonattainment of air quality goals.

There are several areas where the most significant impacts will occur:

• **Institutionalizing Flexibility**—It has been estimated that if state and local officials chose to do so, $103 billion of the $151 billion provided by ISTEA could be spent on transit. A new partnership among the state, MPO, local officials, transit officials and other major participants must be developed to examine the most effective way of institutionalizing this new flexibility.

• **Multimodal Transportation Planning**—The ISTEA requires, for the first time, that state departments of transportation develop a statewide multimodal transportation plan. These plans are not simply to be a document which examines highway, transit, rail, aviation, and port issues separately, but rather a process and a plan that looks at transportation as an integrated system, related to multiple societal goals, and, in particular, emphasizing efficient and productive people and goods transfer from one mode to another.

• **System Management**—The ISTEA requires state departments of transportation to develop management systems in six areas—congestion, pavements, bridges, safety, intermodal activities, and public transit. Congress is clearly telling transportation officials to develop the capability to better manage the transportation facilities and systems that currently exist.

• **Transportation Finance**—One of the major barriers to a true, multimodal transportation policy was the way transportation funds were allocated for highways or transit, with little opportunity for substitution. The ISTEA has changed all of that, and the CAAA implicitly requires that a different approach to funding decision be made in nonattainment areas.

Definitions

Before discussing the characteristics of multimodal planning, it is first important to establish some working definitions. The primary reason for this is that the terms "multimodal" and "intermodal" are being used interchangeably in policy discussions and debates, when in fact they are not the same.

For purposes of this discussion, the two terms will be defined as follows:

Multimodal Planning. A process of:

1. Defining a transportation problem in a generic way (that is, in a non-mode-specific manner);

2. Identifying more than one modal option to solve this problem; and

3. Evaluating these modal options in a manner that provides for an unbiased estimation of each mode's contribution, either individually or in combination, to solving the problem.

Intermodal Planning. A process of:

1. Identifying the key interactions between one or more modes of transportation where affecting the performance or use of one mode of transportation will affect another;

2. Defining strategies for improving the effectiveness of these modal interactions, and;

3. Evaluating the effectiveness of these strategies from the perspective of enhancing the overall performance of the system affected by the intermodal connections.

There are four scales of application for multimodal planning that should be of interest to the transportation profession. The first application is for **interstate transportation** strategies. Most recently these applications have included the consideration of new highway corridors serving entire regions of the country. The more traditional application of interstate transportation planning has been in the area of high-speed transportation studies which have looked at the options of high-speed rail, air travel, or freeway improvements. The federal legislative requirement for **statewide multimodal plans**, combined with a fairly aggressive trend over the past several years of increasing state involvement in public transportation, should provide an interesting opportunity for state-level multimodal planning activities. However, perhaps one of the most volatile environments for multimodal planning over the next two years will be the **metropolitan level**. The numerous modal options available in a metropolitan area, along with the interest groups that support each one will provide a strong political element to the normal planning process. In addition, the interrelationship between state level multimodal planning efforts and metropolitan level efforts needs to be developed, which will most likely create some concerns at both levels. The final level of multimodal planning activity is at the **corridor level**. This planning probably provides the most specific examples of problems associated with multimodal planning in that it is most related to problems of data bias, insufficient analytical tools, local politics, and funding constraints.

No matter at what level of application, the characteristics of multimodal planning should be the same. Two transportation planning studies that come close to what multimodal planning should be are discussed below.

Illustrations of Close-As-You-Get Multimodal Planning
The paper provides two examples of planning studies that exhibit characteristics of multimodal planning. Both studies are described briefly in the paper. They are:

1. **Maryland's Commuter Assistance Study**—The Maryland Department of Transportation completed a statewide commuter assistance study in 1990 which targeted 24 corridors in the state to identify transportation improvements "needed to ease commuter travel." As noted in the summary report, this effort was not intended to study simply one mode, but rather it was "a study of how best to move people given the varied nature of commuter problems statewide."

2. **I-15 Alternatives Analysis**—The I-15 corridor in Salt Lake City was designated in 1988 as one of the most urgent transportation problems facing the region. In response, state and local governments undertook an alternatives analysis which examined 12 alternatives, ranging from a no-build alternative to an extensive multimodal combination of transit and highway components.

Characteristics of Multimodal Planning
Multimodal transportation plans should clearly relate to the goals and problem definitions as defined previously. The elements of a plan should also be specific to the characteristics of the application and the financial capability of a state or region. Congress has specified several elements that must be considered in the development of state and MPO "intermodal" transportation plans, which are described in the paper. ISTEA outlines the 20 factors that must be considered in the transportation planning process. These factors include such things as the results of the management systems, energy goals, bicycle/pedestrian transportation, ports/airports access, metropolitan plans, connectivity between metropolitan areas, transportation system management, land use, innovative financing mechanisms, and the like.

For metropolitan planning, the ISTEA states that the long range plan shall "identify transportation facilities (including but not limited to major roadways, transit and intermodal and multimodal facilities) that should function as an integrated metropolitan transportation system, given emphasis to those facilities that serve important national and regional transportation functions. The ISTEA then lists 15 factors, similar to those for the States, that must be considered in the regional transportation planning process.

Looking at the list of considerations, it seems that Congress intends that true multimodal plans should include everything that could possibly relate to transportation. However, there are several characteristics and elements of such planning that merit attention. They are discussed in the paper, and include:

1. Policy Goals and Objectives;
2. Problem Definition;
3. The Criteria Used for Planning;
4. Analysis and Evaluation Tools;
5. Public Involvement;
6. Relationship Between Multimodals; and
7. Institutional Issues.

Conclusions
FHWA Administrator Tom Larson, at a recent conference on urban transportation, argued that the transportation profession is facing a "paradigm shift" and that what is needed is a new approach to doing things, in his terms, pliable paradigms.

In many ways, a multimodal perspective is a paradigm shift in the way we do planning. It will be a difficult step to take. However, it is a necessary step if we are to truly provide the most cost effective transportation investment to achieve the maximum levels of mobility in our States and urban areas.

Summary of Discussion and Major Conclusions

The first discussant was Duane Berentson. He complimented the author and the distinction that was made between multimodal and intermodal transportation. Washington State is in the process of developing a statewide transportation plan that includes all modes. Their emphasis is on moving people and goods, not on moving vehicles. So, for example, their planning includes an analysis of freight movement by highways and ferries in the Puget Sound area. They will be forced to look at system deficiencies, so that solutions may not be highway improvements alone. An expert review panel is looking over their shoulder as the plan is being developed. Also included are all three counties and the municipalities, as well as all the affected actors. In addition to incorporating an analysis of goods movement to balance freight modes, they are also including an analysis of the state growth management plan. A problem he anticipates is that since Congress has not provided the ISTEA funds promised, it will be difficult to implement many plans.

Scott Rutherford agreed with the author's conclusions. He reminded the audience that in the 1960s, we did start to do multimodal planning, but we stopped because of the constraints imposed by categorical grants. Consequently, our corporate memory may not remember this.

He stated that although some national guidance is needed, he is not in favor of prescriptive methods for doing so.

He is doing an NCHRP synthesis on this topic. He suggested that we need a "Manhattan" type project to develop new analysis techniques to help us understand impacts, benefits, etc. We also need a better modeling process, because what was started in 60s and 70s, was not funded in the 80s and 90s. We also need to extend analysis to land use and growth management techniques, and to develop evaluation methods, criteria and methods of effectiveness.

He then commented that multimodal mobility measures are not yet available. Although we may deal with highway and transit measures, they are analyzed separately.

He suggested that multimodal modeling must do four things:

- Provide traditional analysis;
- Establish measures of demand;
- Provide measures of the "means" to accomplish objectives; and
- Establish the choices that are available.

Larry Dahms commented that the paper covered many important issues. However, the objective of transportation planning cannot be to simply look at multimodal evaluation. Given current problems, especially, inadequate funds—our profession is in despair. We are viewed like economists; ISTEA can revitalize planning if we establish a broad, bold vision.

He felt the paper moved from one technical approach to just another technical approach. It is **not** the definition of a paradigm shift. It is true that the ISTEA mandate brings us to the management era; but to be responsible to societal goals we must go beyond just management. There is a need to shift from highway to transit funding. But there are many other choices as well. The distinction between intermodal and multimodal is appropriate, but we should move beyond multimodal to integration of transportation systems. Goals and objectives must be formulated to reflect community objectives—not necessarily multimodal objectives. Community involvement, air quality and business groups are not the only participants in the process; we must go well beyond them.

The paper's conclusions are good, but let us not limit our vision to simply go beyond incremental changes.

Audience Participation

The first participant asked how bicycle and pedestrian modes should be considered in planning. Dahms gave two examples in California. State dollars are earmarked for bicycle programs, and in the Bay Area, bike trail programs are funded. Further, in scoring projects for the TIP, their process does not give adequate weight to small projects. So, they put them at the top of the list.

A second observation was made:

"Come the revolution, you will all eat strawberries and cream." But, the question must be raised:

What if the customers do not like strawberries? We have heard many suggestions, but all the solutions discussed do **not** cover market solutions. In transportation, we do not use market solutions. For example, the toll for the Lincoln Tunnel is $4 roundtrip. The real cost is $30 to $50 in marginal short-run social costs. Proper pricing will deal with congestion.

A third participant commented that he sees a movement from engineering to more planning and management. His concern is that there are not enough professionals to do the job. It was noted that universities are attracting more students now than in recent years. It is believed that graduate programs are larger than ever throughout U.S., and that the interest in transportation as a career has been positively influenced by ISTEA. But, if there are dollar reductions, that could have a negative impact.

FINANCE

Summary of Paper

The purpose of this paper is to describe the need for strategic financial planning, which is mandated by both ISTEA and the Clean Air Act Amendments. We must undertake financial planning in order to:

- Improve resource allocation in the face of scarcity and competition;
- Expose the need for increased funding and new sources beyond federal appropriations;
- Commit to projects supporting conformance, preservation, and congestion management;
- Improve cooperative decisionmaking in the context of greater flexibility, new resource options; and
- Introduce budgetary, cash-flow, life-cycle disciplines in place of traditional methods.

ISTEA requires the following financial planning elements at the state level:

- Statewide Transportation Plan (STP) that is intermodal and covers both rural and urbanized areas

• Statewide Transportation Improvement Program (STIP) for which funding can reasonably be anticipated within the time period contemplated for completion of the project, and which is consistent with the STP and Metro TIPS.

ISTEA requires the following financial planning at the metropolitan level:

• (Metropolitan) Long-Range Plan (LRP), which includes a financial plan which reflects expected funding. It must emphasize preservation, efficiency and enhancement, and have a 20-year horizon.
• Metropolitan Transportation Improvement Program (TIP). This also requires a financial plan, with priority projects for each of 3 years. It must be consistent with the LRP.

The paper goes on to say that ISTEA and the CAAA introduce the need to balance congestion relief, air quality and financial feasibility by considering both conformity and concurrency.

A new kind of financial planning process that must be required and goes beyond accrual accounting includes:

• Forecast existing revenue and proceeds by funding source;
• Estimate funding requirements: capital, operating and maintenance—on a life-cycle basis;
• Analyze and manage cash flow;
• Identify and analyze new revenue sources;
• Develop financing alternatives and test their adequacy.

New methods must be developed that include forecasting, risk/uncertainty analysis, cash flow modeling, investment optimization, flow rates, tax base, participation rates, inflation, receivables, scheduling, etc.

New funding sources must also be identified, such as tolls, commingling federal aid and state funds with tolls, private investment and credit enhancement, local option taxes, and special districts and impact fees.

In developing financial planning approaches, the following key technical issues must be addressed:

• Longer time frame (life cycle);
• Resource availability;
• Coping with cross-modal/multimodal funding sources;
• Revenue uncertainty – sources, inflation, ceilings, diversion;
• Budget versus planning/program versus conformity cycle schedule;
• Resource commitments to conformity, preservation and management; and
• Capital/operating requirements mix, timing.

But in attempting to meet the challenges presented, we must establish a method to make the transition from existing to new ways of thinking. That must consider an already crowded change agenda. It must mesh with the reoriented planning/programming process and fit into the political process.

In conclusion, we must work to accomplish the following:

• Establish a new transparent and flexible planning and resource allocation process:
• Improve the recognition of real costs and shortfalls;
• Give increased attention to new resources, pricing and benefit assessment;
• Increase the pressure for funding stability to meet program commitments;
• Invite new players to participate in new forms of cooperation; and
• Establish a strategic perspective within life-cycle asset management.

Summary of Discussion and Major Conclusions

Suzanne Sale was the first discussant. She commented that although ISTEA and the CAAA create very complex requirements, the institutional complexities existing at the state and local government level are more difficult to deal with. Lockwood's discussion of the need for strategic financial planning represents an important tool to link planning, programming and budgeting. The process must meet all the federal requirements, but it must now be viewed as a credible process among state and local political leaders as well.

Sale went on to describe the ADOT process that has been developed. It formally integrates planning, programming and budgeting, and it is supported by a number of analytical tools and models. It allows for sophisticated forecasting and cash management, and the entire process is continually enhanced.

She outlined ADOT's assumptions that drive their financial plan:

• It is conservative, yet realistic;
• No growth is assumed by ADOT budget; and
• A balanced program results.

Models have been developed to optimize bond sales and include:

- Econometric analysis;
- Cash flow analysis;
- Bond optimization; and
- Risk analysis.

Two new enhancements are critical:

- Risk analysis; and
- Life cycle costs.

Risk analysis is used as an effective means to deal with uncertainty. It relies on probability analysis. She then discussed how they use risk analysis and life cycle cost analysis for freeway systems.

Ann Canby stated that ISTEA is here just in time. We need to develop realistic programs. We also need to become accountable for what we do. Perhaps we need to better define what needs to be accomplished, and we might want to measure what we do differently. This also means we need to measure the impacts of all other things states must do.

A transition to implementing the new requirements may require that we look at what we do differently, for example:

- What are we willing to pay for?
- What are we trying to achieve?
- Do we need a new approach?

We should look at today's way of doing things and decide on new ways. We should look to an investment strategy and not a political wish list. This may require that we stop thinking about categories of funding, but look at policy goals and objectives. For example, the cost of operating and managing transportation systems are greater than the cost of building new facilities. This must be factored into planning and programming decisions.

Tom Bradshaw stated that Arizona is the only state in the nation having an CAAA bond rating. Consequently, he can safely assume that Suzanne Sale's approach to financial management is very sound.

He agrees with Canby's statement that accountability and credibility are essential in dealing with elected officials and among all levels of government.

He commented that the financial responsibilities of states are more important then ever before. Transportation bonding is a very big, multi-billion dollar annual program. New revenue sources are being examined carefully. Toll road funding will probably increase and could become a cash cow for other transportation activities.

PROGRAMMING

Summary of Paper

This paper reviews the objectives and methods of transportation programming, and identifies directions which programming practice needs to move towards in order to function effectively in the present environment. Increased attention must be given to maintenance and preservation, demand management strategies, operational improvements, multimodal solutions and land use planning. Few public agencies have been able to develop integrated planning and programming methods which successfully consider these requirements.

The changing environment in which program decisions will be made during the next decade will require changes both in how the overall programming process is structured and in the data and technical methods used to support it. The following three programming objectives must be addressed to deal with a new set of issues and meet the challenges of the next decade.

- Resources must be allocated effectively to address policy objectives. Specific projects must be funded in the most cost-effective way possible.
- The programming process requires a consensus between engineers and planners in order to facilitate trade-offs. The process should not be judged by the end results alone, but by its ability to assist both technical and policy decisionmakers by presenting options and clarifying cost/benefit trade-offs among options.
- The process must support effective project delivery and be constructed in a way as to realize efficiencies by coordinating projects and scheduling of available resources.

The paper describes the following issues and challenges that must be addressed:

- Broad policy statements that are vague and conflicting should be backed-up by specific, non-conflicting strategies and objectives.
- An effective programming process depends on the support of a strong multimodal planning process.
- A systematic evaluation of alternatives must be undertaken within a sound technical framework.
- Uncertainties in schedules, budgets and funding sources are a fact of life.
- Programming must be recognized as being part of the political process which incorporates many institutional issues.

• Priority must be given to the appropriate selection, timing and extent of preservation and maintenance projects.

• Increased attention must be given to management, operational and multimodal solutions.

• The mission of the agency may have to be defined clearly to recognize that building new highway and transit systems is no longer its primary function. Transportation is increasingly tied to economic and environmental objectives.

• The requirements for congestion management, system management, pavement management, bridge management, transit, and intermodal programs require interagency, interjurisdictional and intermodal coordination.

• The ISTEA requirements for implementing several management systems have the potential for improving the technical basis for programming decisions.

The paper goes on to describe the complexity of the programming process currently underway. Although surveys of agency approaches found a diversity in the manner of doing so, there are certain elements and activities that are commonly found. They are described and include:

1. Key inputs, including policy, system conditions, plans and resources;
2. Program category structure;
3. Procedures for identifying needs and candidate projects;
4. Methods for evaluating projects and priority setting;
5. A process for program evaluation and making trade-offs;
6. A process for the final allocation of funds; and
7. A system for monitoring the progress of program implementation and the results of the program in terms of systems performance, costs and benefits.

A general framework is then established and discussed for developing a more effective programming process. The important elements are:

• Explicit linkage with policy objectives and system planning to ensure the program is responsive to the full range of policy objectives.

• A simplified overall program structure that can facilitate relating policy objectives to program categories (maintenance, preservation, improvement) and make it easier to integrate management systems into the programming process.

• Use of bridge, pavement and transit facility management systems to guide the maintenance and preservation program needs analysis, target funding analysis (i.e., trade-offs of different funding levels and facility conditions), project identification and evaluation, and program evaluation.

• Use of a broad range of transportation criteria together with congestion, safety and intermodal management systems to guide development and evaluation of service improvement programs.

• Explicit program evaluation and trade-off analysis examining the implications of alternative program funding levels.

• Program and system performance monitoring to establish better accountability for program decisions and to provide feedback to policymakers and an ongoing long-range system planning process.

The environment for programming is changing and traditional approaches to program decisionmaking must also change to confront the challenges of:

• A diverse and conflicting set of policy goals and objectives concerning mobility, economic growth and the environment.

• New and significant funding flexibility that removes a key barrier to considering a wide range of program choices and trade-offs.

• Increased emphasis on multi-jurisdictional and multimodal coordination.

To address these challenges the programming process will need to:

• Strengthen the ties to planning at all levels of government.

• Explicitly consider a wide range of program options and trade-offs including multimodal choices.

• Broaden the concept of need and the evaluation criteria used throughout the planning and programming process.

• Improve the accountability for program decisions by establishing a program and system performance monitoring function.

Accomplishing these objectives will require new institutional arrangements, programming procedures and technical support tools and data. The choices are complex, but the opportunities for innovation are tremendous and the profession must respond if effective resource allocation decisions are to be made in the future.

Summary of Discussion and Major Conclusions

Roger Schrantz complimented the authors on the excellent quality of the paper. He did feel, however, that the current requirement for multimodalism was not given enough attention and that the programming process must be strengthened to incorporate multimodal issues.

He went on to say that based upon his experience and because of what he has learned during this conference, he can heartily endorse the author's comment that "... an effective programming process depends on the support of a strong planning process"... Short- and long-range planning efforts are where much of the work of defining objectives, assessing alternatives, evaluating options, and defining consensus solutions to specific problems take place."

This suggests that the road (or bus or train or ferry) to multimodal programming leads from comprehensive multimodal planning. Meyer's paper commented that multimodal planning could be considered "a process and a plan that looks at transportation as an integrated system, related to multiple societal goals...emphasizing efficient and productive people and goods transfer from one mode to another." However, Meyer's paper and a recent NCHRP synthesis project found that you could count the number of real multimodal planning efforts on one hand, and have a few fingers left over.

He observed that the AASHTO SCOP Task Force on multimodalism found—that in general, multimodal planing in state DOTs is non-existent; that DOTs are not well organized for multimodal planning; that staff training for true multimodal planning is inadequate; that databases are unequal and generally inadequate; that customer identification and customer involvement are problematic; and that in spite of ISTEA, many categorical finance barriers still abound.

Schrantz agreed with co-chairmen Meyer and Neumann, that we need to jumpstart multimodalism. He suggested this conference call upon TRB, U.S. DOT, AASHTO SCOP, NARC and APTA, and any other organization of immediate interest, to promptly assemble a working group to define the steps needed for a workable multimodal planing model and practice in all its elements—organization, process, criteria, information, goals orientation, training for current staff, and very important, research and graduate training in our universities to help make multimodalism an ingrained reality in future decades.

Hank Dittmar presented an MPO perspective. He applauded the resource paper in its clear statements that the new challenge for programming has been posed by both the Clean Air Act Amendments of 1990 and ISTEA. He stated that we have entered a new era in transportation—the era of managing better with limited resources.

For forty years, the programming imperative has been set by the need to complete the Interstate Highway System. ISTEA now reinforces the new emphasis on efficiency by according priority in capital investment, ensuring system preservation, operational improvements and the efficient use of existing facilities. The resource paper is entirely consistent with the changed context for programming.

The San Francisco Bay Area MPO has been engaged in the redefinition of the programming process to incorporate ISTEA mandates. A new partnership has been established with CALTRANS and local transportation agencies. This includes the creation of an Ad Hoc Multimodal Committee of staff comprised of Caltrans, transit operators, public works organizations, congestion management agencies, air quality agencies, ports and airports to develop a process and criteria for programming. His experience in attempting to develop a new programming framework provided the opportunity to comment in-depth on the issues identified in the resource paper. He then went on to discuss his practical experience in dealing with each.

Carol Lavoritano provided the perspective of a transit operator in a large metropolitan area. She also praised the context and substance of the resource paper. She felt that transit programming must be considered as an integral part of multimodal programs in metropolitan areas. The programming process must be considered as an open, public process and an integral part of the political process. This makes it essential that highway and transit interests start to meet and to talk to each other. In most instances, this has not been the case in the past. The new requirements of ISTEA for cooperation and the flexibility for modal trade-offs will be controversial and present major challenges.

She observed that in her view both the highway and transit lobby groups are giving too much attention to IVHS, MagLev and other glamour projects. We have too many current basic needs to address, so we should not divert scarce resources to future possibilities. We need to keep things in balance.

Although ISTEA allows us to make modal trade-offs, it still presents a situation that is like dealing with apples and oranges. Although there is potential, we must first learn how to collaborate in order to squeeze the most effective programs out of limited resources.

Tom Humphrey complimented the authors on the development of a timely, substantive and accurate assessment of the current situation and future opportunities. He suggested that more emphasis could

be given to the following areas, covered relatively briefly in the paper.

The Role of Transportation Systems Operations
Transportation Systems Operations is defined as "the cooperative development and implementation of strategies to maximize the safe movement of people and goods by managing an integrated multimodal transportation system." TSO actions are designed to make the most efficient use of existing systems and they deal with issues of mobility, congestion, safety and the environment in urban and rural areas. They should include: measures to improve safety, incident management programs, traveller information systems, upgraded traffic signal systems, surveillance and control systems, demand management techniques, and improved commercial vehicle operations.

The benefits of TSO actions are enormous. But, we are not using them effectively. The major impediments that limit their consideration include funding, institutional barriers, a need to clarify the roles of the modes, and the need for more highly skilled technical people.

Role of Technology in Planning and Programming
IVHS is a comprehensive program that will eventually result in significant improvements in our transportation systems. But we cannot wait for the full deployment of only the most advanced technologies. We need to take advantage of technologies that are currently available, include them in our plans and then program their implementation. Generally speaking, they include: communications technology (such as traveller information systems), traffic control centers, traveller surveillance methods (for Incident Management), and incident management programs.

The Politics of Programming
Tom Bradshaw put it in stark terms the previous day: "It is a battlefield out there, folks."

No federal law is going to solve the need for more money and deal with the competition for funds between state-local government and among local jurisdictions. We may have a perfectly defined plan and program, but in the final analysis, the allocation of dollars is part of a political process. A perfect example of this phenomenon is ISTEA itself. It establishes specific guidelines on planning and programming, which we have been discussing for two days. But consider the number of specific, directed projects in that bill alone. There are hundreds of earmarked projects. The tendency on the part of Congress to designate projects and funding allocations in the appropriations process continues. In conclusion, Humphrey urged that we do not neglect our past experiences in dealing with these important topics. We can learn much, and hopefully, avoid repeating the same mistakes. He briefly summarized similar conferences that were held over the past nearly 20 years and related reports:

1974 Williamsburg Conference on Issues in Statewide Transportation Planning and Programming; 1975 Orlando Conference on Transportation Programming; 1979 Airlie House, Virginia, Second Conference on Statewide Planning and Programming; 1981 Synthesis Report #72: Transportation Needs and Financial Constraints; 1981 Synthesis #84: Evaluation Criteria and Priority Setting for State Highway Improvements; 1983 TRB Highway Programming Workshops in Washington, D.C. and Denver, Colorado.

The issues were very similar. Perhaps we should pause and see what lessons we can learn from the past.

Audience Participation

Several people commented during the following discussion period. The comments are summarized below.

Technicians often make the programming process too complicated. It must be simplified in order to allow citizens and state legislatures to better understand it. We need to develop better ways to communicate the process.

There is still much work to be done in establishing discussion and decision processes among state agencies, MPOs, citizens and other participants in the process.

A discussion of the potential use of congestion pricing as a planning and programming tool led to the conclusion that there is little, if any, potential support for congestion pricing in the U.S. It was suggested that since we do not use cost accounting methods in developing transportation programs, we have no data available to evaluate its potential value.

Discussion of the role of the MPO and how its priorities can become an effective part of the programming process concluded in the agreement that we must do a much more effective job of multimodal planning.

There was agreement on the major points made in the resource paper, with suggestions for some additional issues and priorities to be considered. This session can be summarized as follows:

- New federal requirements will have lasting impact on transportation programming issues over the next decade. However, financial realities at the state, regional and local levels are even more significant because of current fiscal constraints.

• Multimodal planning and programming efforts must be established and implemented in order to make the most effective uses of all resources in maintaining and operating transportation systems.

• Political realities require that collaboration occurs among agencies, the public and the private sector.

• Better, more effective, more understandable technical tools and procedures must be developed and used to establish a higher level of credibility between engineers, planners and policy/decisionmakers.

INSTITUTIONAL

Summary of Paper

The institutional questions and intergovernmental relations issues posed by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) are very formidable. They have the potential to:

• Reinvent metropolitan planning organizations (MPOs);

• Cause state departments of transportation (DOTs) to reformulate their planning processes and reach out well beyond their own resources within state government;

• Rebuild MPO planning capacities lost during the 1980s;

• Occasion another look at how non-metropolitan regional councils can fit in; and

• Dramatically reformulate relationships between MPOs and state DOTs.

These are not just technical issues. The governors and state legislatures have been written into this act, in addition to local political officials, local governments, transportation agencies, and many other "appropriate" agencies. At a number of points, renewed and expanded "involvement of the public" is called for.

The first hint we get that these are political issues comes from looking at the complex way many requirements are stated in the act. Boundaries are not set simply by census definitions, but are ultimately set by agreements between governors and local elected officials acting under a number of rules. Membership in the MPOs also is a matter of political negotiation within certain general guidelines. There is not just one type of MPO, but four types with different powers and means of funding. In addition, potential for mutual vetoes by the governor and MPO are built in. The bottom line from an institutional viewpoint is that ISTEA raises many more questions than it answers. The hope is that this part of our conference will help generate answers to some of these questions.

To accomplish this task, we first take a look at issues concerning metropolitan institutions, and then state institutions. Next we look at the relationships between the metropolitan and state transportation planning processes, and then relationships between the MPOs and states as institutions that reflect their diverse planning needs. Finally, we offer some brief conclusions about building planning capacities, developing productive partnerships, and avoiding the gridlock that could come about from the exercise of mutual vetoes.

Metropolitan Institutions

Metropolitan planning organizations (MPOs), recognized and certified by the U.S. Department of Transportation to meet the transportation planning requirements for continued federal highway and transit grants in metropolitan areas, have been around since the early 1960s. However, after every decennial census of population, new urbanized areas are recognized, existing areas grow beyond the 200,000 population mark that gives them extra planning responsibilities, and some urbanized areas grow together enough to require that their transportation plans be linked. In addition, for the first time, there are now air quality conditions that require amelioration through transportation measures applied across areas that sometimes are larger than the urbanized areas for which transportation plans have been prepared in the past. These factors occasion a new look at existing metropolitan transportation planning areas and planning organizations.

The paper goes on to examine the issues concerning:

• MPO boundaries, features of which vary considerably around the nation;

• MPO membership, which may remain unchanged, but could be altered by the governor or state legislature;

• MPO powers, which vary and will continue to vary depending upon size and political clout;

• MPO staffing, which began in the 1970s being attached to regional councils (75 percent), but which is no longer the case (44 percent);

• Interrelating multiple MPOs, which is the case in at least 13 MPOs which cover two or more states;

State Institutions

ISTEA will change state institutions in a number of ways. For example, it requires state transportation planning of a very broad type that considers such elements as energy conservation, land use and

development policies, environmental protection, and all modes of transportation. No more than a handful of states do such planning now.

ISTEA also requires the governors' involvement in transportation planning in a number of ways. For example, the governor must get involved in:

- Establishing the 20-year growth area around the existing urbanized area;
- Making a determination about whether the transportation planning area should remain smaller than the air quality planning area;
- Making a finding that multiple MPOs are needed in large complex regions;
- Requesting that some MPOs in smaller areas be designated as transportation management areas (TMAs);
- Redesignating MPOs to change their area of jurisdiction and membership;
- Coordinating multiple MPOs within in-state and multi-state metropolitan areas; and
- Approving MPO transportation improvement programs (TIPs).

It is clear, furthermore, that transportation increasingly is becoming a means to reaching larger objectives. Both metropolitan and statewide transportation planning place the state DOT in partnership with programs for spurring economic competitiveness and growth, protecting the environment, conserving energy, managing growth, and organizing local governments. This partnership involves the governor, the legislature, independent state transportation regulatory agencies, state regulators of air and water quality, state energy agencies, state growth management agencies, and perhaps interstate commissions concerned with river basins and economic development.

The Metropolitan and State Planning Processes

The ISTEA builds on the long-term tradition of the "3C" planning process for metropolitan areas. One way it does that is to legislate many requirements that had been required only by regulation, including plan content, planning process, TIPs, and project selection activity. At the metropolitan level, fifteen specific, legislatively mandated factors must be addressed in developing long-range plans. State planning requirements, adopted for the first time at the federal level, spell out twenty specific factors that states must consider.

The State planning process is modeled after the metropolitan process conceptually; it includes a different but related list of factors. The differences include both additional planning elements and the scope of state responsibilities. In the latter instance, the state must assume responsibility for non-metropolitan areas and issues potentially beyond the scope of MPO capability such as economic development and innovative financing approaches.

While the content of state and MPO plans is spelled out in specific terms, the process of integrating these plans is not. The state must address the content of MPO plans within its planning effort, but the nature and extent of integration is ambiguous. The process of integration resides in the operational meaning of terms such as "coordination," "consultation" and "cooperation." Initial guidance issued jointly by FHWA and FTA calls for full compliance with the metropolitan planning requirements in nonattainment areas by October 1, 1993, and in attainment areas by December 18, 1994. Statewide plans are required by January 1, 1995.

The paper continues by discussing the need to build and rebuild the planning capacity at the state and MPO levels; developing more effective planning for rural and small urban areas; and focusing on dealing with difficulties and inconsistencies in the planning process.

MPO Relationships with the State

ISTEA makes "appropriate state officials" members of the MPO policy board and requires the board to prepare and adopt plans for its region. Then, ISTEA goes on to say that the state shall develop a long-range transportation plan for **all areas** of the state and only needs to "consider" coordination with the MPO plans. In addition, state air quality officials can veto state and metropolitan transportation plans and projects. Water quality regulators also must regulate the runoff from urban transportation corridors, and wetlands regulators must regulate the location of transportation construction projects. It is unclear how this will work.

ISTEA is full of requirements to consult with, cooperate with, be in conformance with, comply with, and coordinate. Yet, when it comes right down to it, even the carefully drawn DOT definitions give no clear indication of how all this should work.

Conclusions

Three things are needed, institutionally speaking, to make a success of ISTEA:

1. Building a lot of new planning and decisionmaking capacity at both the regional and state levels;
2. Developing many new partnerships; and
3. Avoiding gridlock.

ISTEA clearly calls for a great deal of change in institutions and planing processes. Yet, battles already have broken out between the forces of "business as usual" and the forces of change. People are choosing sides. We are still waiting to see whether ISTEA will become the Planners Assistance Act of 1991 or the Lawyers Assistance Act of 1991. We hope it will be the former.

Summary of Discussion and Major Conclusions

Gloria Jeff was the first discussant. She observed that the institutional issues are structured around the current system—we are not dealing with a clean slate. The author proposed Regional Councils as the ideal institutional organizations for ISTEA. But, they have become less and less able to do the job. She also questioned why the federal government feels it must bring together the state agencies to deal with ISTEA.

We may need multiple agencies to deal with transportation and other programs. The MPOs have often not been able to do so, and making a transition from MPOs to Regional Councils does not necessarily solve our problems. She emphasized that investment decisions must be made by all elected officials, and that we need to establish an educational process to provide training in order to improve communication. The key to success is that we need to find ways for all of us to get along.

Ron Kirby commented that he doesn't think many of the concerns the authors raised are that serious. From a practitioner's view, he thinks we need to move ahead. He agrees with the observations concerning ISTEA. It does not prescribe an ideal, step-by-step process, but perhaps that is okay. He agrees with Gloria – we must just make it all work.

He believes the old processes and organizations can be modified to accommodate ISTEA. If we establish uniform technical processes, it will pull together the institutional issues.

He also believes all the various interest groups are working together more than ever before. Public involvement has been increased. The "battles" will be resolved because funds will otherwise be lost.

He praised U.S. DOT for the help and guidance being provided. He was confident that over the next year, there will be big improvements and greater reliability of funding.

The requirement to allocate flexible funding is starting to happen. He is quite optimistic about the formation of new positive institutional relationships.

The final discussant was Mr. Lesley White. In the Portland-Vancouver (Oregon-Washington) MPO, the kinds of organizational structures called for by ISTEA have been established. However, prior to their ability to establish the cooperation needed to get the job done, the MPO was irrelevant. That proved that it is essential to collaborate.

He talked about the need for cooperation and common goals. Stalemate is unacceptable. To accomplish this required a new process and education to help people feel part of the process. They clearly defined roles for those who set policy and those who impact/affect policy.

He also discussed the new Washington State concurrency law. The MPO says yes or no to all development, which must be consistent with land use plans.

CONCLUDING REMARKS

At the conclusion of the conference, co-chairmen Michael Meyer and Lance Neumann summarized some key conclusions.

Many of the observations, concerns, issues and suggestions for actions have been with us for decades. However, there are some significant new issues and challenges that we must address.

There are four new major challenges that the Clean Air Act Amendments and ISTEA have presented to the transportation profession that we are struggling with. All the conferences we have held this year and probably those that will be held next year, will recommend guidance and technical studies that are all going to be related in one way or another to these four issues.

The first one can be defined as performance-based planning. In the context of ISTEA, this is related to the management systems. In the comprehensive planning profession, there has been a strong trend towards performance-based planning. It requires that we do not just plan, but that we actually try to figure out what the desired performance level should be and then continue to monitor the results.

The second issue is related to the term "partnerships." We have been working with the business community, providing for citizen participation, and involving the environmental groups for many years. But the Clean Air Act Amendments and ISTEA now require that we institutionalize many things that were happening on an ad hoc basis. Whether that is good or bad depends on who you are; which MPO, or what state, or what is happening in that particular region. The new groups that are likely to be involved in transportation are numerous; we have discussed this extensively. How we deal with all these partners is very, very important.

An important group that has been neglected is the shippers; the private goods movement carriers. Transit needs also must be considered more carefully, more extensively, more formally. Some of these groups will not necessarily jump into the fray voluntarily. How we include them is going to be very critical so that the new required partnerships will become an integral part of the process.

The third area has many different facets to it. It is the need for the expansion of the scope of planning. ISTEA has required the states to have a statewide plan that interrelates with all metropolitan areas. There certainly are institutional issues involved. We must also expand the scope with regard to the externalities of transportation. The obvious example is air quality, and how to relate air quality with some of the more traditional congestion issues with which we have been dealing.

The fourth area that is different from what we have had to deal with before is in the finance area. Financing must be flexible, but competitive. Many have argued for years that there should be flexibility in transportation funding. Let the decisions be made on the basis of merit. We now have some of that flexibility and all of a sudden everyone is wringing their hands and saying, what do we do now? Flexibility opened the door to doing some very interesting things; but as soon as we open one door, suddenly there are other doors shut. We have to be very careful about which doors we are going to try to open because there are institutional issues, there are political issues, and there certainly are technical issues. So the "flexibility yet competitive" phrase really sums up very nicely the financial environment.

In conclusion, the four issues summarized above are really new challenges with which we will struggle. They are, to some extent, new issues in our field and they are the reason why we have conferences like this and why there will probably be many more conferences like this over the next several years.

RESOURCE PAPERS

THE FUTURE OF TRANSPORTATION PLANNING: JUMPSTARTING THE PUSH TOWARD MULTIMODALISM

Michael D. Meyer,
Transportation Research and Education Center,
Georgia Institute of Technology

INTRODUCTION

Ever since the early 1960s, when the federal government first institutionalized the 3C transportation planning process, the transportation profession has been struggling with how to structure a process that clearly considers investment tradeoffs in a "balanced" manner. If we define "balanced" as being decisions being approached from the perspective of truly comparing alternative modal options, we have not succeeded. The evidence to suggest otherwise is scant. For example, a recent General Accounting Office (GAO) report found that from 1976 to 1991, of approximately $11.5 billion of federal-aid urban funds invested by states and localities, only 2 percent had been used for transit projects.[1] In addition, and although not yet in final form, the preliminary results from an NCHRP Synthesis project focused on identifying good examples of multimodal planning have indicated that few such examples exist.[2]

Why has there been such apparent difficulty in developing and applying a multimodal planning approach in support of transportation investment decisions? The answer to this question lies in both the institutional and finance history of the profession. Probably of most importance were the limitations placed on, and incentives provided to, local decisionmaking as it related to federally funded transportation projects. Historically, the categorical nature of federal funding did not allow funds in one category (e.g., highways) to be used for another purpose (e.g., transit). In fact, the limited use of such substitution for Interstate highways which occured in the mid-70s did not happen without significant political resistance from highway groups. In addition, the local matching ratio required for federal funds influenced local decisionmaking. A 90 percent federal aid highway project was often perceived as bringing more federal aid into the region than a 50 percent federal aid transit project.

To some extent, this limitation in the use of federal funds has been eliminated by the recently passed Intermodal Surface Transportation Efficiency Act (ISTEA). However, even without the funding constraints found within the federal aid program, there are still several significant barriers associated with developing a true multimodal planning process. These include:

1. The traditional modal orientation of the major transportation actors in a typical urban area or state will likely provide great difficulty in adopting a multimodal perspective in decisionmaking (as evidenced by many highway agencies still providing the highway component to the TIP and the transit agency providing the transit element). This modal orientation, often found in agency mandates, is reinforced on a day-to-day basis by the activities of these agencies.

2. State or local constraints on the use of revenues for highway or transit purposes, rather than for "transportation" purposes, can be important limitations on the use of the new, "flexible" federal funds. Just as the federal laws restricted the use of funds to specific categories, so too state and local laws restrict the purposes for which state/local funds can be used. In most cases, state gas tax receipts can be used only for road improvements. There are only a few states that have transportation trust funds that allow the use of funds for any modal investment. However, as was noted by the former Secretary of Transportation for Maryland at the last transportation planning conference held in Boston, the levels of investments made in certain modes, because of political reasons, are most often similar to the levels of revenues generated by these modes. Thus, the existence of a transportation fund will not necessarily provide for a truly unbiased, multimodal, decisionmaking process.

3. The planning process and the supporting analysis framework have never been approached from the perspective of generic transportation investments. Because much of the technical profession has, for years, been modeling highway and transit networks separately, multimodal analysis is very difficult to do. In some cases, there are urban areas where the highway forecasts for a region are developed by the MPO using one model, while the transit agency is doing transit forecasts with another. The consistency of estimates between these two

[1] General Accounting Office, Transportation Infrastructure: Urban Transportation Planning Can Better Address Modal Trade-offs, April 1992.
[2] Conversation with Professor Scott Rutherford, University of Washington, April 1992

efforts is likely to be strained. Even when using the same modeling package there are serious questions as to how the separate modes are treated. For example, the treatment of buses in the highway network and relating the effects of highway congestion to transit performance are often handled differently from one area to another.

4. A multimodal planning process must include concern for the movement and transfer of goods. For such concerns to be addressed in a meaningful way, representatives from concerned carriers and shippers must be part of the planning process. These groups have traditionally not been active participants, and it could possibly take a concerted effort to bring them into the process.

Even though the record on multimodal planning is scarce, the importance of the topic has been noted in many recent conferences. An UMTA/APTA Workshop on Fixed Guideway Planning held in 1991 emphasized the need for multimodal planning at the level of corridor analyses.[3] Several months later, an FHWA-sponsored workshop on congestion management systems highlighted the need for a multimodal approach in developing such management systems in metropolitan areas.[4] And, of course, this conference is focused on multimodal planning and programming.

The purpose of this paper is to establish a point of departure for the conference discussion on multimodal transportation planning. Because of the few examples of such planning in the United States, the paper necessarily focusses on background and on normative perspectives of what multimodal planning should be. Given that any planning process should be structured to reflect local institutional and political characteristics, this paper will not offer the approach to multimodal planning. Instead, it will explore characteristics of such planning and hopefully begin the discussion of how we develop and use a multimodal perspective in planning and decisionmaking.

THE CHANGING ENVIRONMENT OF TRANSPORTATION PLANNING

There have been numerous conferences already this year that have highlighted the changing environment of planning, primarily caused by the Clean Air Act Amendments and the ISTEA. As I stated at the Charlotte conference on Moving Urban America, I believe that both legislative initiatives have signficantly changed the way we do business. Not only did the ISTEA mark the end of the Interstate Highway program begun in 1956, but it greatly loosened the institutional, financial, and thus political, framework within which decisions on transportation investment had been made over the past 35 years. Where federal funds once had to be spent only on projects that were eligible in specific program categories, now many of the funds can be used for any transportation project. Where the federal program was once designed to provide uniformity of transportation investment from one state to the next, a necessity for a program like the Interstate Highway System, the ISTEA now encourages states and localities to seek solutions to transportation problems appropriate to their needs and desires. Where the federal program historically emphasized transportation investment as an end in itself, the ISTEA provides transportation funds to meet other societal goals, thus viewing transportation as a means of achieving some greater aim. Where the federal program separated transportation investment into highway and transit pots of money, the ISTEA now encourages **transportation** decisions that are undertaken from a multimodal perspective. Lastly, the federal program once emphasized the construction of new facilities, now the ISTEA encourages better management and operational improvements of existing facilities with such things as incident management programs and the application of advanced technologies.

The Clean Air Act Amendments also provide a strong basis for a changing transportation planning focus in those metropolitan areas in nonattainment of air quality goals. There has been a long history of linkage between transportation planning/decisionmaking and air quality planning. However, never before has Congress made the linkage stronger. Certainly, the transportation portions of the CAAA will greatly influence the focus and scope of many transportation decisions during the next decade. With a stringent schedule of anticipated emission reductions from stationary and mobile source controls, a significant number of areas will have to consider, and possibly implement, transportation control measures (TCMs) to demonstrate attainment. In addition, because of concerns about both attainment **and** maintenance, Congress has supplemented or reinforced the SIP revision process with specific requirements for nonattainment areas to periodically assess and mitigate on a continuing basis increases in VMT, congestion, and vehicle trips.

---

[3] Meyer, M.D., Proceedings of a Conference on Fixed Guideway Planning, Urban Mass Transportation Administration/American Public Transit Association, Philadelphia, 1992.

[4] Meyer, M.D., Proceedings of a Workshop on Congestion Management Systems, Federal Highway Administration, Washington, D.C., 1992.

Importantly, the CAA reflects Congress's concern with past and anticipated growth in VMT and congestion as a primary cause of nonattainment. Congress viewed past failures to accurately predict/monitor these travel indicators as a main reason for overly optimistic attainment demonstrations following the 1970 and 1977 Clean Air Act Amendments. Regular determinations that transportation plans, programs, and projects conform to the state implementation plan (SIP) could be the greatest cause of change to how transportation agencies conduct their business.

What impact could the ISTEA and CAAA have on states and metropolitan areas? There are several areas where I think such impact will occur.

Institutionalizing Flexibility

It has been estimated that if state and local officials chose to do so, $103 billion of the $151 billion provided by ISTEA could be spent on transit. How will the decision of how to spend federal dollars be made in our metropolitan areas? What criteria will be used to determine the tradeoffs between different transportation alternatives? A new partnership among the state, MPO, local officials, transit officials and other major participants must be developed to examine the most effective way of institutionalizing this new flexibility.

Multimodal Transportation Planning

The ISTEA requires, for the first time, that state departments of transportation develop a statewide multimodal transportation plan. These plans are not simply to be a document which examines highway, transit, rail, aviation, and port issues separately, but rather a process and a plan that look at transportation as an integrated system, related to multiple societal goals, and, in particular, emphasizing efficient and productive people and goods transfer from one mode to another. This requirement will be a particular challenge to those states which have traditionally emphasized highway planning at the expense of other modes. The interrelationship between state level multimodal planning and that occurring in the metropolitan areas will be a big concern.

System Management

The ISTEA requires state departments of transportation to develop management systems in six areas: congestion, pavements, bridges, safety, intermodal activities, and public transit. It is too soon to say what many of these systems will look like. However, Congress is clearly telling transportation officials to develop the capability to better manage the transportation facilities and systems that currently exist. For congestion management systems, this will likely entail the consideration and implementation of regional incident management programs, coordinated traffic signal control systems, transit improvements, preferential lanes and/or other incentives for multi-occupant vehicles, and the like. For many highway agencies that have reputations for high quality freeway construction, the question becomes can they also become leaders in managing the road system that they have so effectively constructed?

Transportation Finance

As noted in my opening remarks, for years, one of the major barriers to a true, multimodal transportation policy was the way transportation funds were allocated for highways or transit, with little opportunity for substitution. The ISTEA has changed all of that, and the CAAA implicitly requires that a different approach to funding decisions be made in nonattainment areas. And yet, for states and metropolitan areas to take advantage of this new-found flexibility, they must also have similar financial flexibility for using their own funds.

The impact of this changing environment on planning will be primarily determined in each state and individual metropolitan area. New institutional relationships will likely occur in many urban areas. Lengthy debates will occur in other areas about what multimodal planning really means and how the different levels of application should be interrelated. In the end, however, the benefits of multimodal planning and decisionmaking will only occur when the profession and those responsible for decisionmaking view the ultimate objective of transportation investment as being one of providing mobility—no matter in what form.

DEFINITIONS

Before discussing the characteristics of multimodal planning, it is first important to establish some working definitions. The primary reason for this is that the terms "multimodal" and "intermodal" are being used interchangeably in policy discussions and debates, when in fact they are not the same. The most likely source of this confusion is Congress which declared in the ISTEA that "it is the policy of the United States to develop a National Intermodal Transportation System ...." and proceeded to define this system as including "all forms of transportation, in a unified, interconnected manner, including the transportation systems of the future...." The

components of this "Intermodal Transportation System" included a National Highway System, significant improvements in public transportation, improved access to ports and airports, with capability of being adapted to "intelligent vehicles". Others have defined "intermodal" in narrower terms. For example, the American Association of State Highway and Transportation Officials has established a Special Committee on Intermodal Issues that would focus on such matters as airside/groundside coordination at airports; freight movement such as containerization and interface requirements between ports, harbors, airports, railroads, and highways; and intermodal passenger movements. Some have focussed instead on "multimodal". In New Mexico, for example, multimodal is defined as the process of looking at all modes of transportation that affect the travel of people and goods in that state.[5]

For purposes of this discussion, the two terms will be defined as follows:

Multimodal planning
A process of:

1. defining a transportation problem in a generic way (that is, in a non-mode-specific manner);
2. identifying more than one modal option to solve this problem; and
3. evaluating these modal options in a manner that provides for an unbiased estimation of each mode's contribution, either individually or in combination, to solving the problem.

Intermodal planning
A process of:

1. identifying the key interactions between one or more modes of transportation where affecting the performance or use of one mode of transportation will affect another;
2. defining strategies for improving the effectiveness of these modal interactions, and;
3. evaluating the effectiveness of these strategies from the perspective of enhancing the overall performance of the system affected by the intermodal connections.

There are four scales of application for multimodal planning that should be of interest to the transportation profession. The first application is for **interstate transportation** strategies. Most recently these applications have included the consideration of new highway corridors serving entire regions of the country. The more traditional application of interstate transportation planning has been in the area of high speed transportation studies which have looked at the options of high speed rail, air travel, or freeway improvements.[6] The federal legislative requirement for **statewide multimodal plans**, combined with a fairly aggressive trend over the past several years of increasing state involvement in public transportation, should provide an interesting opportunity for state-level multimodal planning activities. Several states have shown some indication of moving toward a multimodal planning process (e.g., Washington, Maryland, Wisconsin, and New Mexico).[7] However, perhaps one of the most volatile environments for multimodal planning over the next two years will be the **metropolitan level**. The numerous modal options available in a metropolitan area, along with the interest groups that support each one will provide a strong political element to the normal planning process. In addition, the interrelationship between state level multimodal planning efforts and metropolitan level efforts needs to be developed which will most likely create some concerns at both levels. The final level of multimodal planning activity is at the **corridor level**. This planning probably provides the most specific examples of problems associated with multimodal planning in that it is most related to problems of data bias, insufficient analytical tools, local politics, and funding constraints.

No matter at what level of application, the characteristics of multimodal planning should be the same. Two transportation planning studies that come close to what multimodal planning should be are discussed below.

Illustrations of close-as-you-get multimodal planning
The following two examples are planning studies that exhibit characteristics of multimodal planning. Both studies are described only briefly. The description is not intended to delve into the details of each planning effort

---

[5] D. Kurth, et al, A Research Process for Developing a Statewide Multimodal Transportation Forecasting Model, Report No. FHWA-HPR-NM-91-07, Santa Fe, New Mexico, August 1991.

[6] See, for example, Cheslow, D., The Use of Intercity Multimodal Forecasting Models by the USA Department of Transportation, International Conference on Transport Research, June, 1973; Ellis, R.H. and J.C. Prokopy, Development of a Demand Forecasting Framework for Ten Intercity Corridors Within the United States, FRA, Final Report, July, 1973.

[7] See, for example, Kurth, D., Donnelly, R., Arens, B., Hamburg, J., and W. Davidson, A Research Process for Developing a Statewide Multimodal Transportation Forecasting Model, Final Report, Report No. FHWA-HPR-NM-91-07, August 1991; Newell, J.A. and T.L. Gotts, Michigan Statewide Transportation Modeling System: Michigan Goes Multimodal, Report No. Vol. XIII, Michigan DOT, July 1974.

or how the results influenced decisionmaking. Quite simply, the approach taken best illustrates important characteristics of multimodal planning.

Maryland's Commuter Assistance Study

The Maryland Department of Transportation completed a statewide commuter assistance study in 1990 which targeted 24 corridors in the state to identify transportation improvements "needed to ease commuter travel."[8] As noted in the summary report, this effort was not intended to study simply one mode, but rather it was "a study of how best to move people given the varied nature of commuter problems statewide". The menu of alternatives considered for each corridor included: express bus service, highway access control, roadway widening, shoulder bus lanes, exclusive bus roadways, high occupancy vehicle lanes, commuter rail, and light and heavy rail transit. The evaluation of the relevant alternatives for each corridor was undertaken from the perspective of its impact on the problem (i.e., its effect on future congestion levels as well as projected usage), its practicality (i.e., its compatibility with local plans, physical and environmental feasibility, and right-of-way opportunities), and cost. In order to illustrate the process adopted in this study, one corridor will be highlighted.

The Cecil/Hartford/White Marsh/Baltimore Corridor extends 40 miles northeast of Baltimore. It is a link in the Northeast Corridor between Baltimore and the Delaware/Maryland line, and includes a wide range of transportation options including road, rail, and bus service improvements. The evaluation of the alternatives for problem solution were based on the following measures:

- Screenline V/C ratios for low occupancy vehicle highway lanes at selected screenlines along the corridor.
- Percent of highway lane-miles operating at each level of service.
- Person miles traveled by mode, and transit ridership by mode.
- Percent of commuter miles by mode and level of service.
- Travel times by mode between selected points in the a.m. peak.
- Morning peak hour vehicle miles traveled for low occupancy vehicles.

Based on these and other criteria, the study recommended that five major actions be undertaken: enhance existing commuter transit service, develop high occupancy vehicle lanes, establish feeder bus service to existing rail services, expand existing rail service, and provide high capacity transit service in selected markets.

I-15 Alternatives Analysis

The I-15 corridor in Salt Lake City was designated in 1988 as one of the most urgent transportation problems facing the region. In response, state and local governments undertook an alternatives analysis which examined 12 alternatives, ranging from a no-build alternative to an extensive multimodal combination of transit and highway components. As noted in the report, the study:

> "compares the outcomes for each alternative and the intensity of highway and transit components within alternatives. While each alternative's highway and transit components are described and summarized individually, the analysis considered combined alternatives designed to address the total problem regardless of transportation mode. This approach helps the public and decision-makers make trade-offs between different levels of highway or transit investment"[9]

Over 50 performance and impact measures were developed for the alternatives. In the final evaluation of the alternatives, the discussion was divided into three major areas: improvements to I-15, transit improvements, and the combination of I-15 and transit system improvements. With regard to the last area, the study concluded that the highway-transit trade-offs were not as large as might have been expected. The addition of highway capacity did not seem to have any significant impact on projected transit ridership, and the addition of light rail transit did not reduce highway congestion significantly.

CHARACTERISTICS OF MULTIMODAL PLANNING

Multimodal transportation plans should clearly relate to the goals and problem definitions as defined previously. The elements of a plan should also be specific to the

---

[8] Maryland Department of Transportation, Maryland Statewide Commuter Assistance Study, Summary Report, 1990.

[9] U.S. Department of Transportation, Wasatch Front Regional Council of Governments and Utah Department of Transportation, Draft Environmental Impact Statement, I-15/State Street Corridor, Report FHWA-UT-EIS-90-02-D, 1990.

characteristics of the application and the financial capability of a state or region. Congress has specified several elements that must be considered in the development of state and MPO "intermodal" transportation plans. The relevant section of the law is as follows:

Statewide Planning

"The State shall develop transportation plans and programs for all areas of the State. Such plans and programs shall provide for development of transportation facilities (including pedestrian walkways and bicycle transportation facilities) which will function as an intermodal State transportation system...Each State shall undertake a continuous transportation planning process which shall, at a minimum, consider the following:

The ISTEA then outlines the 20 factors that must be considered in the transportation planning process. These factors include such things as the results of the management systems, energy goals, bicycle/pedestrian transportation, port/airport access, metropolitan plans, connectivity between metropolitan areas, transportation system management, land use, innovative financing mechanisms, and the like.

For metropolitan planning, the ISTEA states that the long range plan shall "identify transportation facilities (including but not limited to major roadways, transit and intermodal and multimodal facilities) that should function as an integrated metropolitan transportation system, giving emphasis to those facilities that serve important national and regional transportation functions. The ISTEA then lists 15 factors, similar to those for the States, that must be considered in the regional transportation planning process.

Looking at the list of considerations, it seems that Congress intends that true multimodal plans should include everything that could possibly relate to transportation. However, there are several characteristics and elements of such planning that merit attention. These are discussed below.

Policy Goals and Objectives

The purpose of any planning effort is to inform decisionmakers. Therefore, it is very important that the planning process is informed on what the goals and objectives are. With regard to multimodal planning, it becomes extremely important that these goals and objectives be formulated to reflect a multimodal perspective. If the overall policy goal is fashioned in such a way as to bias the planning in one direction or another, it would be no surprise if the results of the effort were not multimodal in nature. Defining these goals and objectives in a multimodal perspective is something that should not be difficult. However, it requires transportation professionals and decisionmakers to ask themselves, when they formulate such goals if they could be construed as pushing the likely decision in a particular direction.

Problem Definition

The definition of the problem, similar to goals and objectives, is a very important part of multimodal planning that could present biases toward one mode. For example, for years, the perspective of the transportation profession was to improve the vehicle-carrying capacity of our highways. As long as we focused on vehicular throughput, we ignored the perspective of providing mobility without single occupant cars. The perspective shifts from a supply oriented approach toward planning to a demand management one. The problem definition process will become even more important over the next two years as nonattainment areas must identify transportation means of reducing mobile emissions, and the likely impact of alternative measures on air quality.

Criteria

The criteria used for planning, and in particular for evaluation, become critical elements of multimodal planning. Similar to the point made in "problem definition", if the criteria for evaluation focus on the performance of one mode, then the solutions will necessarily focus on that mode. An example from current practice could well illustrate this point. There is a great deal of interest in the profession to develop some form of "index" to measure the performance of the transportation system. In particular, research is currently underway to develop a congestion index that will presumably allow planners to monitor over time changes in system performance. I would submit that we should not be focusing on a congestion index, but rather a mobility index. If we are truly interested in mobility, then the measures of success of our transportation program should reflect this objective. Reducing congestion does not necessarily increase mobility.

Analysis and Evaluation Tools

Having the technical tools to analyze and evaluate the tradeoffs among multimodal alternatives is very important, and yet is seriously lacking. I have no doubt that existing models and approaches can be "adjusted" to come up with some estimate of likely impact. However, until we have the technical tools and approaches needed to provide some level of sophistication in such an analysis, the multimodal planning process could well be mired in strong disagreements over suspected biases in

technique. One opportunity for transportation agencies to develop a multimodal approach to planning is found in the ISTEA requirement for six management systems. My fear is that each will be developed independently of the other, with little interaction. At the very least, a common database could begin the process of providing the needed interaction among the systems.

Public Involvement

The ISTEA places a great deal of emphasis on public involvement. With different groups now likely to be involved in transportation planning, serious attention must be given to how these non-traditional groups are to be brought into the process. With regard to multimodal planning, the most important "new" groups are likely to be the business community and those groups concerned with air quality. How to implement many of the transportation measures likely to be required under the Clean Air Act will necessarily focus a great deal of attention on those groups, e.g., major employers, that must be involved in order for the measure to be successful. In particular, given the interrelationship between State and metropolitan multimodal planning efforts, how do we develop a **meaningful** public involvement process that encompasses both efforts?

Relationship Between Multimodals

Given the requirement for States and metropolitan areas to undertake multimodal planning, there is likely to be a period of time when the interrelationship between the planning efforts is uncertain. This could, in the next several years, create a transition period where the plans themselves might be inconsistent. Clearly, there needs to be some coordination among the different groups involved in developing multimodal plans. However, the timing of such activities, the linkage between projects, the important relationship to the State Transportation Improvement Program and the MPO Transportation Improvement Program, the interaction with required transportation control measures, the consistency of analysis assumptions, and the often different political constituencies that influence planning efforts at both the State and regional levels, are all elements that will influence how effective the multimodal planning effort is.

Institutional Issues

Another session at this conference will be addressing institutional issues, so I will not dwell on this topic. However, it needs to be mentioned because without the institutional framework to support multimodal planning and decisionmaking, such efforts will be unsuccessful. One of the few examples of a reorganization of an agency around a multimodal perspective occurred at the Los Angeles County Transportation Commission. The agency divided the County into regions and formed teams consisting of individuals with expertise on TDM, traffic engineering, transit, and public involvement. The transition to this format has not been accomplished easily. There needed to be serious decisions made about personnel, reporting relationships, training, and ultimate decisionmaking responsibility. In most cases, an institutional structure conducive to multimodal planning will not be easy to implement.

CONCLUSIONS

FHWA Administrator Tom Larson, at a recent conference on urban transportation, argued that the transportation profession is facing a "paradigm shift" and that what is needed is a new approach to doing things, in his terms, pliable paradigms. Specifically, he said,

> "Clearly, our "old paradigm" driven definition of one transportation goal, to complete the Interstate, influenced our perceptions in many ways. The focus on the engineering challenge of putting such an immense set of facilities in place contributed to the dominance of civil engineers in investment decisions. By defining the products in terms of construction, the opportunity for feedback on the social, economic, and environmental contribution of the facilities was limited. Assessments of alternative investments was limited to traditional engineering criteria. The focus on issues related to the facilities themselves distanced the designers and planners from the multiplicity of what we now consider relevant interests, even as the System matured. The highway community continued to follow the old paradigm, pursuing the provision of an even more pervasive system, providing facilities for the majority of vehicles and assuming that this was in the public interest."

In many ways, a multimodal perspective is a paradigm shift in the way we do planning. It will be a difficult step to take. However, I think it is a necessary step if we are to truly provide the most cost effective transportation investment to achieve the maximum levels of mobility in our States and urban areas.

BEYOND WISH LISTS: FINANCIAL PLANNING FOR TRANSPORTATION

Stephen C. Lockwood and
Germaine G. Williams, FHWA

INTRODUCTION: THE NEED FOR FINANCIAL PLANNING

The nineties is a time of expanding options versus constrained resources and tough tradeoffs in surface transportation. In response, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Clean Air Act Amendments of 1990 (CAAA) are introducing major changes in planning and programming at both the MPO and State levels. Taken together, they are evolving towards a new planning and programming process, one which is objective-driven, performance-based, life-cycle oriented, management-intensive, and which produces a prioritized, scheduled improvement program developed in an iterative fashion on a multi-jurisdictional basis. If the legislation did not specifically require financial planning, it would still be needed to meet the demands of such a process.

But, until recently, "transportation financial planning" has been an oxymoron. Plans were little more than wish lists. Transportation Improvement Programs (TIPs) have typically included any good project—often with vague schedules, fuzzy priorities, and a total cost bearing little relation to available financial resources. Few states and fewer MPOs undertook systematic financial planning. Categorical programs and formula suballocation minimized the need for project evaluation. Financial strategies were confined to guessing future appropriations and identifying "gaps." Minimal attention was given to cash flow management, risk and uncertainty were ignored, and alternative financial resources remained unexplored.

Today a more "strategic" approach to financial planning is called for, one that confronts the reality of limited resources, examines alternative courses of action, and incorporates a systematic linkage between planning, programming and budgeting processes. Only then can rational allocation of scarce resources be assured and systematic expansion of the resource base justified.

The ISTEA provides the basic outline for such a financial planning process. Taken seriously, this response will require introducing a new financial discipline into planning and programming at both the State and metropolitan level including development of new methods and procedures. Furthermore, it will require some important changes in institutional relationships—improving cooperative decision-making to capitalize on the greater flexibility and new resource options which are promised. The key requirements of this new process will, at a minimum, include:

- more demonstrably justifiable resource allocation in the face of increased competition for limited funds—including explicit prioritization of projects;
- accommodation of mandated commitments to attaining and maintaining quantifiable standards in system conditions and performance, augmenting facilities concurrent with land use, and conforming with air quality standards;
- meeting legal requirements for time-certainty in project scheduling for both concurrency and conformity;
- introduction of asset management process requirements combining investment cost-effectiveness with budgetary and cash flow analysis in a life cycle cost perspective; and
- exploration of innovative financing to expand financial resources beyond conventional approaches through new sources of revenue, public and private.

These changes imply a new type of transportation planning and programming; they also put financial planning squarely in the center of a restructured planning/programming process.

The paper begins by citing the specific financial planning requirements of ISTEA. It suggests that the implications of these requirements must be understood within the broader context of transportation and environmental planning and programming as established by both ISTEA and CAAA, including the requirements for management systems and conformity determination. The need for concurrent land use and transportation planning to allow for financial assessments is also considered.

The paper then identifies the technical and policy issues that must be resolved as well as challenges associated with implementing a financial planning process. Finally, the paper concludes with an identification of the likely implications of financial planning for transportation planning and programming.

STATE AND MPO FINANCIAL PLANNING REQUIREMENTS AND GUIDANCE

The ISTEA Sections 1024, 1025, and 3012 provide the specific requirements for financial planning at the MPO and State levels. The initial guidance issued by The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) implementing the financial planning provisions of the legislation is limited and general in order to allow States and metropolitan areas as much flexibility as possible.

MPO Level

The ISTEA states that the **Long Range Plans (LRPs)** required of MPOs must have a 20-year horizon and reflect expected funding. They must include a financial plan that "demonstrates how the long-range plan can be implemented, [and] indicates resources from public and private sources that are reasonably expected to be made available to carry out the plan..."

The FHWA/FTA guidance on the financial component of the Long Range Transportation Plan describes the essential components of such financial plans as follows:

- The financial plan should compare the annual revenue from existing and proposed funding sources that are dedicated to transportation uses to the annual costs of constructing, maintaining, and operating the transportation system over the period of the long-range plan.
- All cost and revenue projections should be based on the best available data and trends.
- The annual revenue by existing revenue source (at the local, State, and Federal level) dedicated to transportation projects should be calculated and any shortfalls identified.
- Proposed new revenues or revenue sources to cover shortfalls should be identified.
- Existing and proposed revenues should cover all forecasted capital, operating, and maintenance costs.

Furthermore, in addition to financial feasibility, the legislation encourages the identification of alternative and supplementary funding sources through its requirement that the plan recommend "any innovative financing techniques to finance needed projects and programs, including such techniques as value capture, tolls, and congestion pricing."

The ISTEA states that Metropolitan **Transportation Improvement Programs (TIPs)** must be consistent with the MPO's LRP and include all Federal-aid projects since inclusion in the TIP is a prerequisite to funding under Title 23 and the Federal Transit Act. However, a TIP, which may be the MPO's total capital improvement program for surface transportation, **can** include other non-Federal projects—and probably will—since the "3 C" planning and programming tradition in most metropolitan areas goes well beyond projects that receive Federal aid. The projects for which Federal funding is anticipated can be separately identified to meet Federal-aid requirements.

The TIP must identify a priority list of projects to be carried out in each 3-year period after initial adoption and can only include projects for which "funding can reasonably be anticipated to be available ... within the time period contemplated for completion of the project." The TIP must also recommend innovative financing with requirements similar to those for the LRP.

Guidance relating to the requirement that MPO TIPs be financially constrained has been limited to stating that "In order to demonstrate that funding can reasonably be expected to be available, the projects for each year should be grouped by the proposed funding categories."

State Level

The legislative requirements for **Statewide Transportation Plans (STPs)** are considerably less specific than those for MPO LRPs. The ISTEA does not explicitly call for a STP financial plan. Indeed, State planning is scoped at a very broad and general level, as not only intermodal and multimodal but also intersectoral, i.e., including both public and private transportation plans, covering a broad range of areas that impinge on or are impinged on by transportation matters both urban and rural.

The legislative requirements for consideration of finance at the **Statewide Transportation Improvement Program (STIP)** level are also very general. Quoting from ISTEA, the State TIP must include projects which are "consistent with the long-range plan developed ... for the State, which are consistent with the metropolitan transportation improvement program, and ... shall also reflect the priorities for programming and expenditures of funds, including transportation enhancements."

While no specific financial planning requirements are introduced in the legislation, there is parallel language to TIP requirements regarding the reasonably anticipated project funding, i.e., "The program shall include a project, or an identified phase of a project, only if full funding can reasonably be anticipated to be available for such project within the time period contemplated for completion of the project."

The FHWA/FTA guidance for statewide planning financial elements has been limited to commenting on the need for the States and MPOs to work together in development of the metropolitan area TIPs "to ensure that the TIPs reflect available federal and state funding ..." Since the State TIP must be consistent with the MPO TIPS, it is difficult to imagine how MPO-level financial planning is to take place in an organized manner—i.e., collectively constrained by State constraints—or proceed in a timely fashion, unless the State carries out a financial planning process that parallels the MPO process.

RELATIONSHIP TO LAND USE AND ENVIRONMENTAL PLANNING

Together, the CAAA and ISTEA imply for transportation planning and programming a three-way balancing act among congestion relief, air quality, and financial feasibility. The financial planning activities required by ISTEA must be coordinated with the requirements for system planning and air quality planning.

Conformity

To begin with, for non-attainment areas—currently 80 of the 125 largest urbanized areas over 200,000 population (Transportation Management Areas)—a time-specific conformity of the metropolitan LRP and TIP in non-attainment areas to the states overall State Improvement Program (SIP) for air quality is required. This scheduling commitment introduces concrete, future, financial commitments as a constraint in financial planning at both the State and MPO levels.

Secondly, the conformity determination on the metropolitan LRP and the TIP required by the CAAA must be based on all regionally significant projects not just those that are federally funded or approved (even though the conformity finding is with regard to the Federal projects only). This provision of the legislation also generates a need for a program of projects that goes beyond those that must be included in the TIP as a prerequisite for Federal aid. In fact, identification of all the surface transportation projects planned in a given period is an underlying, if unrequired, necessity to carrying out the financial planning requirements of ISTEA and the conformity determinations required by the CAAA.

Concurrency

This need for comprehensiveness is even more compelling in those States and MPOs where either congestion management planning or growth management programs are tying transportation improvements more closely to land development. Some states have recognized this connection between the supply of infrastructure and new land use development explicitly through legislation that requires "concurrency" between the new development and availability of transportation facilities required to accommodate the resulting new travel demand and traffic. This trend will require closer attention to the identification of needs and careful scheduling of surface transportation projects, as well as a determination of the fiscal resources—including new sources—needed to accommodate planned development.

KEY POLICY ISSUES

The legislation and guidance relating to State and MPO financial planning issued to date raise several key issues that need to be addressed.

Available Funding

Definition of funding "reasonably anticipated to be available" at the State and MPO level is central to a determination of the type of financial planning appropriate to ISTEA. There is no specificity in the legislation or in FHWA guidance. The report of the Senate Committee on Environment and Public Works on ISTEA contained the following clarification: "Historical funding levels, existing bonding authority, existing state and local tax revenues, allocation of federal funds under the Surface Transportation Program, and other relevant factors may be used in determining whether funding can be reasonably anticipated." The intent appears to encompass capacity, trends and commitments.

Project versus Program Feasibility

Closely related to available funding is the issue of defining the appropriate basis for determination of financial reasonableness—the entire TIP, some portion of the TIP, or individual projects. The legislation is not specific on how this determination should be made, although the guidance on developing the MPO TIP does suggest that..."In order to demonstrate that funding can reasonably be expected to be available, the projects for each year should be grouped by the proposed funding categories." This guidance is consistent with the idea of making a determination of funding availability at the system level, (the TIP), rather than at the subsystem level, (some portion of the TIP). The previously cited Senate Committee report that states... "Nor must each project to have earmarked federal, state and local funds be identified in the TIP"...also implies a system-level approach.

A requirement for a determination of financial feasibility at the project level, some believe, would significantly impact on the ability of States and MPOs to implement their programs. Individual project determination of financial reasonableness might preclude the substitution of one highway project for another if the originally scheduled project were delayed for any of several reasons. A modest degree of overprogramming would reflect a realistic response to the reality of uncertainties in project development.

Allocation Process

How States use the flexibility provided by ISTEA to provide funding for sub-State jurisdictions may constitute another major "impedance" problem in moving ahead with ISTEA. Many States have relied on formulas and, frequently, "political" factors for sub-State allocation of resources. This approach is contrary to the spirit—if not the letter—of ISTEA and the FHWA guidance that has been developed. The requirement that the STIP and the TIPs conform with the long-range plans and the requirement to prioritize projects in TIPs will reduce the flexibility of key players by making explicit the current basis of resource allocation and exposing clearly the shortfalls in funding. Until states develop more explicit performance or efficiency-driven approaches to program development and resource allocation, based on long-range plans, this issue is likely to remain a focus of concern in both the federal/state and state/local planning dialogues.

Cooperation and Collaboration

Finally, there is the need for a cooperative (as distinct from a competitive) style—intrajurisdictionally, vertically and horizontally, and among modes and governmental entities.

Collaboration and reconciliation are needed to make the new planning/programming process work. Indeed, conformity with its Transportation Control Measure (TCM) emphasis and the multiple management systems that are part of ISTEA require state and local cooperation as a practical matter because the sources of funds for different components of the systems are at different jurisdictional levels. For example, funding for capital improvements may come from the State but a local government entity may be responsible for operations and maintenance. These programs cannot function without cooperation.

THE FINANCIAL PLANNING PROCESS

There are no existing complete "models" of the type of State and MPO financial planning implied by ISTEA, although a few jurisdictions—challenged by major and visible resource shortfalls have developed more comprehensive approaches. More typically, state and MPO planning activities have suffered from limited or unclear spans of control and lack of information about what funds will be available to implement plans. Of even greater significance is the current lack in the transportation planning arena of a meaningful relationship between metropolitan TIPs and plans, and between State and metropolitan planning and programming. As described above, ISTEA introduces new components and new relationships into the planning and programming. As part of the required process, FHWA/FTA guidance suggests a set of specific financial planning activities that are based on "rationalized best practice" from private sector conventions merged with ISTEA requirements. As indicated, the process is necessarily iterative, fitting the "demand" for investment (the proposed program) with the "supply" of resources (available applicable funds) in the short run and, in the long run, developing additional resource options. Both MPOs and States must conduct parallel financial planning activities with most of the same components. Close coordination is necessary since each supplies key inputs to the other.

Plan/Program Cost Estimation

The first step in the financial planning process is a preliminary estimate of costs for capital projects, operations and maintenance proposed in the plan and program. At the MPO level, TIP estimates may be at a greater level-of-detail than other components of the long-range plan. These costs must be merged to determine the multi-year time-stream of funding required. Implementation of TCMs and management systems may introduce long-term commitments to be factored into this process.

The six ISTEA management systems and the long-term/time-specific requirements of CAAA-related TCMs facing some non-attainment metropolitan areas imply a more strategic approach to transportation investment. Management systems will focus on the costs associated with operations and preservation which have not traditionally been a part of the transportation plan or program. Taken seriously, both systems introduce long-term commitments to system preservation or performance which may have legal or administrative priority over capital improvements.

Conformity commitments offer a special challenge, competing for resources with capital or operating improvements and requirements for pavement management or bridge management. These constraints—although developed at the metropolitan level—may operate to reduce the flexibility available to State legislatures, transportation boards, or commissions accustomed to greater discretion in resource allocation. This is an area where closer State/MPO coordination is clearly essential.

Resource Forecasts

The second step, which can be carried out concurrently with estimating investment needs, is forecasting potential revenue by funding source. Revenue forecasts will include anticipated funding from federal and state government as well as projected revenues from local taxes and fees and any private sources which may be introduced.

The increased funding flexibility offered by ISTEA—both programmatic and modal—will undoubtedly add more categories of resources to be considered simultaneously at both the State and local level. Forecasts will be needed for both the short-term horizon of the TIP and the 20-year planning period in the long-range plans. This information, needed for both the State and MPO planning and programming, must be a scheduled activity if major delays and uncertainties in the planning and programming process are to be avoided.

Adequacy Assessment

The third major activity is based on the results of the first two steps—identifying any funding shortfalls through a comparison of estimated costs for the proposed plan with estimated revenues. If projected long-term revenues fall short of the estimated cost of system development and operation, the State or metropolitan area has one of three options: modify the plan; develop new sources of revenue; or both. Since MPOs resources for several program areas will depend heavily on State-level decisionmaking, rationalizing this process is essential to smooth State/MPO financial planning. A clear schedule and definition of key information flow between the state and MPO planning process will be needed.

If projected long-term revenues are adequate to fund the proposed plan, the next step is the development of the TIPs and STIP. If the long-range plans show that resources are expected to be available for the entire systems as proposed but there is a short term drop in cash flow, it may be necessary to change the timing of projects in the TIPs and STIP. The essence of strategic financial planning is to complete the feedback between resource availability and the resource-constrained TIP representing the best use of funds in the short-run context with a parallel long-run linkage.

The output of the first iteration of the financial planning process and the decisions made on whether to reduce needs, increase revenues, or both, will then feed back into subsequent iterations each with a new set of cost estimates and revenue projections. Depending on the number of players in the process, the number of iterations needed to reach a consensus on needs and financing could be significant. This further illustrates the need for a carefully structured State\MPO cooperative approach.

Once a consensus is reached on the plan and the program, a final decision on resource allocation is the last step in the process.

Iteration

The tighter match between programs and plans and funding "reasonably expected to be available" required by ISTEA suggests the likelihood—if not the necessity—of an iterative financial planning process. Furthermore, the flexibility and reduced Federal-aid categories on the one hand and the implications of increased rigor in strategic allocation of resources for condition and performance objectives on the other, suggest the requirement for several cycles because of the need to match the project selection-based "demand" for financial resources with the "supply" that may be available from the revenue stream. For example, if after the cost of building, maintaining, and operating the projects prioritized through the planning process is calculated and the revenues are forecast, investment needs exceed forecast resources, either the list of planned projects needs to be modified or alternative options for funding the list of projects need to be identified.

The MPO-level financial planning requires input from the State and vice versa. Just as MPOs need an early indication of potential share of statewide funds and Federal apportionments, States will need an indication of resources generated at the local level such as transit fare box revenues or local option taxes.

KEY TECHNICAL ISSUES

In addition to the considerable challenge presented to institutional relations in developing effective financial planning, there are also technical problems regarding both the cost and revenue aspects.

Performance-Based Costs

Together ISTEA and the CAAA point towards the need to identify projects for funding that promise the most cost-effective use of the existing infrastructure, meet the performance standards for operations improvements, preservation, and congestion management, and make time-specific commitments to transportation investments which conform to the State air quality improvement plan. Estimating the life-cycle or performance-based cost implications of projects in this context introduces its own

technical complexities, especially the need to estimate and combine capital with operating and maintenance costs. There is no clear consensus regarding how these costs should be defined and what elements should be included such as costs of policing or contributions by the private sector. Furthermore, these costs are borne by different government entities from funding sources that may or may not be dedicated to surface transportation.

Coping with Uncertainty

Revenue estimation also offers difficulties. Federal funds are impacted by unpredictable obligation ceilings and State funds by varying appropriations. State/local transfers are affected by legislated allocation schemes. Dedicated local sales taxes are subject to variations in the local economy. Inflation, diversion and earmarking are all part of the financial landscape with which resource estimation must cope.

The new flexibility offered by cross-modal and multimodal funding sources while presenting new options, will also be a source of uncertainty. Restrictions on use of funds differ depending on source and there are different procedural requirements for funding among the modes, i.e., transit projects have a pre-funding commitment requirement that does not exist for highways. These inconsistencies will need to be addressed before serious intermodal financial planning can be done.

Alternative Sources of Revenue

An important aspect of financial planning is a review of alternative or supplementary revenue sources especially in the context of a financial planning approach that may more explicitly focus on the shortfall between needed investment and available revenues. A brief review of recent trends in highway revenue provided by different sources provides some insights into what the likely sources of new revenue may be.

Federal grants for highways as a share of total highway funding have been declining offset by an increasing local share with the States retaining over a 50-percent share. The relative proportion of total funding coming from different revenue sources such as gas taxes, tolls, and sales taxes has remained fairly constant. However, absolute revenue from some sources, which started from a relatively low base, has increased dramatically since 1985 while others have declined. Revenues from local option sales taxes increased significantly during this period, while bond issue proceeds went down about 12 percent.

Conventional transit revenues exhibit similar shares by level of government and a strong trend towards local options to supplement State and Federal shares.

The trend towards increased reliance on user and benefit fees at the State and local government level has continued into the nineties with States passing enabling legislation that empowers local governments and transit authorities to use local land use control and taxation authority including benefit assessment districts, value capture, impact fees and other local tax measures.

The growth in toll revenues, which increased 35 percent from 1985 to 1990, should be reinforced by the new toll and public/private partnership provisions in ISTEA. The ISTEA allows federal and state aid to be mixed with toll revenues on the non-Interstate elements of the Federal-aid highway system and thereby substantially increase the applicability of toll financing. Other provisions of ISTEA allow States to enter into franchise agreements with private road investor/developers and develop loan agreements that can tap an additional source of investment capital.

Budget constraints, changes in the national or State economies and fiscal reform is altering the financial landscape and turning attention to "innovative" sources at both the State and local level. Transit funding has been particularly aggressive with options considered including private equity, capital leasing, asset mining, and short-term debt financing in addition to the traditional pay-as-you-go approach that characterizes conventional highway finance.

Needed Financial Tools

Taking the long-term perspective implied in developing plans and programs, financial plans must be based on a strategic approach that recognizes uncertainty and which allows States to determine in a systematic fashion the costs and benefits of various financial strategies. Options requiring systematic review may include match waivers, privatization, bond financing, sales tax options, revolving funds and others. There is considerable room for the adaptation of technical methods to deal with the problems and opportunities presented. Methods and techniques required include:

- *Forecasting*—As revenue sources widen, forecasting techniques will need to be developed for each of them including: project revenues forecasts, (e.g., tolls, impact fees, fare box revenue); forecasts of revenue from broad-based highway user taxes, (e.g., gas taxes, motor vehicle registration fees), and general taxes earmarked for transportation use, (e.g., sales taxes, income taxes). New, more accurate, and robust approaches are needed.

• *Risk Analysis*—To deal explicitly with the uncertainty associated with any forecasting—revenue, economic or traffic—techniques such as risk assessment have recently been developed which systematically account for the range and likelihood of variation in the factors that go into a forecast.

• *Cash Flow Modeling*—Modeling the flow of funds at the project level allows an agency to forecast both needed and available resources to insure optimum use of funds and control fund balances. The FTA has sponsored methods development in this area that have been used by transit authorities in financial planning.

• *Investment Optimization*—Where revenue sources include investment instruments such as bonds, systematic review of constraints and objectives can be undertaken to determine the impacts of changes in interest rates, coverages ratios or key policies on the ability to finance needed projects.

• *Gaming*—In order to examine the alternative use of available revenues in a systematic fashion, a series of techniques can be combined to test the implications of alternative assumptions regarding cash flow rates, tax base shifts, participation rates, impacts of inflation, receivables, scheduling issues, etc.

This listing of methodologies that are needed for financial planning gives some idea of the effort that is going to be required; efforts to develop the needed tools have just begun.

CONCLUSIONS

Transportation planning institutions at both the metropolitan and state level are under pressure to make major changes. The agenda is crowded as key participants struggle to cope with a wide range of new programs and requirements. Resource limitations, however, will continue to be at the center of the planning and programming process. Meeting the requirements—much less the opportunities—presented by ISTEA in planning and programming will be substantially impacted by the degree to which State and MPOs are able to develop more rigorous, robust and responsive financial planning techniques. The process described above raises a series of policy and technical issues that need to be addressed.

At the same time, financial planning will bring key participants more directly into the planning and programming process according to the "golden rule," whether cities, counties, MPOs, private sector, or interest groups. Furthermore, the expanded eligibilities and flexibility of ISTEA, and the broader range of interests directly affected will place the entire process under greater scrutiny. There are going to be new opportunities—if not necessities—for negotiation, for tradeoffs, compromise and deal-making.

The meshing of process and participation towards effective allocation of resources will not happen overnight. Successive approximations may be expected along with appropriate local variations. There will be considerable opportunity for professional contributions in developing the needed procedures, methods and techniques.

THE CHANGING CONTEXT FOR PROGRAMMING

Lance A. Neumann and Frances D. Harrison,
Cambridge Systematics, Inc.;
Kumares Sinha, Purdue University

Transportation resource allocation decisions are becoming more difficult and complex. Resources are continuing to shrink while the set of problems to be addressed grows and diversifies. The list of concerns competing for transportation funding includes aging and decaying infrastructure, urban and suburban traffic congestion, improving traffic safety, balancing new growth with infrastructure to support it, strengthening the economy, providing rural accessibility, improving independence for disabled persons, achieving air quality standards, and reducing energy use. Recent legislation, for example, the 1990 Clean Air Act Amendments, is forcing stronger integration of some of these concerns into transportation decisions.

The nature of these current transportation problems has focussed increased attention on maintenance and preservation, demand management strategies, operational and efficiency improvements, multimodal solutions, and land-use controls. In many metropolitan areas, major expansion of highway capacity is no longer viewed as a viable solution and the mission of transportation agencies is shifting to the efficient operation of a multimodal system. As a result, there has been a shift in the types of improvements and strategies that must be reflected within transportation programming processes. Few agencies have been able to develop planning and programming methods which successfully integrate these varied concerns and solutions.

The funding side of the picture has become more complex as well—new kinds of special purpose finance mechanisms such as assessment districts, impact fees, and public/private partnerships are being developed. This is creating a greater degree of decentralization in funding; a situation in which there are a larger number of small pots of money which can be made available for specific purposes.

Finally, there is a growing concern for increased accountability and measuring performance. Questions about the appropriate mix of transportation solutions in different settings and the impact of expenditures on facility conditions or system service levels are forcing agencies to rethink how goals and objectives are defined and how results are communicated.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) responds to these trends. The Act dramatically increases flexibility in the use of federal transportation funds. Instead of directing what funds should be used for, it emphasizes the use of sound management approaches to resource allocation decisions, and consideration of the full range of solutions to solve problems. ISTEA provides strong incentives and opportunities for improvements in programming processes at the state, regional, and local levels.

Taking full advantage of ISTEA presents technical, institutional, and political challenges. On the technical side, there is a need for new methods to supplement the more traditional, engineering-oriented approaches to needs studies, project evaluation, and prioritization. While improvements in technical methods can play a strong support role in reshaping programming processes, fundamental changes in how resource allocation decisions are made will require strong leadership and revision of current roles and responsibilities, both within agencies and among different institutions which participate in transportation decisions. Political challenges will be presented by any changes which may upset the existing delicate balance of funding.

This paper reviews the objectives and methods of transportation programming, and identifies directions which programming practice needs to move towards in order to function effectively in the present environment.

Legislation

This section summarizes some of the recent legislative initiatives which affect the context for programming.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

The new ISTEA legislation makes fundamental changes in federal transportation planning requirements and funding programs. The Act emphasizes funding flexibility across modes and facilities, and stresses system management, performance and cost-effectiveness. It establishes a new set of broad federal funding categories, eliminating old programs including those for primary, secondary and urban systems (FAP, FAS, and FAUS). New requirements for statewide long- and short-range transportation planning were also established. These planning efforts must be coordinated with metropolitan area plans and must consider strategies for making the most efficient use of existing facilities, congestion management measures, transit enhancement, coordinated transportation-land use decisions and intermodal access.

ISTEA expands Metropolitan Planning Organizations' (MPOs) powers and responsibilities for selection of improvement projects. These new responsibilities will necessitate a reorientation of existing approaches to

development of Transportation Improvement Programs (TIPs). ISTEA requires that states, in cooperation with MPOs implement management systems for pavements, bridges, safety, congestion, public transit and intermodal facilities. Transportation Improvement Programs (TIPs) for urbanized areas can now only include those projects for which funding can reasonably be anticipated, and must also be consistent with State Implementation Plans (SIPs) for air quality. Urban areas which are not in attainment of air quality standards may not use federal funds "for any highway project that will result in a significant increase in carrying capacity for single occupant vehicles unless the project is part of an approved congestion management system."

ISTEA is expected to have significant impacts on programming practice at state and local levels of government. At a minimum, agencies which had aligned their own programming categories with federal funding programs must now revise their program to reflect the new federal program structure. This revision will leave a significant amount of room for development of new methods for allocating funds. More importantly, the new flexibility provided by the Act encourages programming decisions which best reflect state, regional, and local priorities. This implies a more important role for programming at the state, regional, and local levels. The Act also encourages consideration of a broad range of alternatives for addressing particular problems (including relatively low-cost, demand management measures) without giving preference a priori for particular types of actions. This in turn encourages local programming practices which allow for explicit trade-offs to be made among alternatives, instead of those which are based on narrowly defined categories which are modally aligned. The management system requirements reinforce the philosophy of strengthening local programming methods, and encourage systematic evaluation of conditions and needs, and consideration of life cycle costs and cost-effectiveness in the development of improvements. It should be noted, however, that while many state and local agencies have implemented pavement and bridge management systems, use of these systems to define needs and set priorities has been quite limited. Thus, a key challenge for the future will be to further integrate these systems in decisionmaking processes.

Clean Air Act Amendments of 1990

Amendments to the Federal Clean Air Act passed in 1990 are having major impacts on the transportation planning and project development processes in those areas which are not in attainment of air quality standards. Metropolitan areas which are in serious violation of air quality standards are required to implement transportation control measures in order to reduce vehicle miles of travel and congestion. The most significant provision of the 1990 Clean Air Act with respect to programming is strengthened requirements for conformity between the state implementation plan (SIP) for air quality, and the approval for federal funding of regional transportation plans, programs and projects (excluding maintenance and preservation actions). These activities must not cause new violations in standards to occur, increase the severity or existing violations, or delay attainment of standards or interim milestones which have been defined.

Prior to 1990, conformity was determined on a project basis. The SIP and transportation plan were in conformance as long as the SIP projects were contained in the transportation plan, and the transportation projects were taken into account as part of either the SIP base case or plan itself. The 1990 conformity provisions dramatically change this approach. Conformity must now be based on a demonstration that the total emissions from mobile sources, which would occur as a result of the combination of projects and programs in the transportation plan, are consistent with the emissions levels in the SIP. This determination is to be based on an air quality analysis of projects in the transportation plan. Transportation plans must be analyzed for conformity at least once every three years in order to comply with requirements for demonstration of "reasonable further progress" before the actual attainment deadline. In addition, if a project from a conforming transportation plan undergoes a significant change in scope, the plan must be re-analyzed to determine if the necessary emissions reductions would still be achieved.

At this date, final EPA guidelines regarding conformity have not yet been issued, and there is a considerable amount of debate about the details of conformity determination, the specific analytical methods and assumptions to be required, and the scope of application of the rules. Nevertheless, these new amendments, together with the transportation/air quality provisions of ISTEA, will necessitate much closer cooperation between transportation and air quality planning agencies and a broader evaluation of the impacts of transportation projects. They will also result in a much more aggressive approach to implementation of transportation control measures and more careful scrutiny of projects which increase road capacity or improve the convenience of single-occupant vehicle travel.

Growth Management Initiatives
Growth management legislation in some states is forcing a greater degree of coordination between landuse and transportation decisions than previously existed. Provisions may include:

- Requirements for consistency between land use plans and transportation plans and programs, which means that the expected growth in travel based on land use plans must be accommodated in an acceptable fashion by the transportation plan.
- Making approval of development projects contingent on the concurrent provision of necessary infrastructure to support this development.

These provisions necessitate an additional set of considerations to be accounted for in the programming of transportation improvements. They also imply a greater degree of inter-jurisdictional and interagency coordination and cooperation in planning and programming than has existed historically.

Other Legislation
A variety of other federal, state, and, in some cases, regional and local legislative and policy actions are also changing the factors which must be reflected in program decisions. These other initiatives include Americans with Disabilities Act provisions, wetlands and other environmental regulations, as well as facility siting provisions.

TRANSPORTATION PROGRAMMING IN THE '90s: KEY CHALLENGES

The changing environment in which program decisions will have to be made during the next decade will require changes both in how the overall programming process is structured and in the data and technical methods used to support it. This section summarizes three key objectives of programming and the issues and challenges which must be addressed to improve program decisionmaking.

Objectives of Programming

There are a number of key objectives for the programming process.

Effective Allocation of Resources to Address Policy Objectives
One of the major objectives of programming is to ensure that resources are allocated effectively. There are two aspects to this. First is the question of whether the various policy objectives and priorities which have been defined are being addressed. Given that the program is indeed responsive to policy, a second key issue is whether funds are being spent wisely: are the specific types of projects in the program the most cost-effective way of solving problems or meeting identified needs, and are the projects in the program justifiable from a benefit-cost standpoint?

Facilitating Trade-offs
While programming is sometimes viewed primarily as a technical exercise, it is in reality an effort which requires a consensus between engineers and planners on the one hand, and legislative or governmental bodies on the other. Therefore, a programming process should not be judged by its end results alone, but also by how the process itself is structured and by the information it provides for making key resource allocation decisions. An important objective of a programming process is to assist both technical and policy decisionmakers by presenting options and clarifying cost/benefit trade-offs among the various options.

Supporting Effective Project Delivery and Coordination
Assuming that the right allocation of funds is made, and the "best" projects are selected, there are two additional yardsticks by which a program can be measured. First is the extent to which the program is realistic in the sense that it can actually be delivered in the proposed timeframe and for the proposed budget. Second is whether the program is constructed in such a way as to realize efficiencies by coordinating projects and scheduling of available resources, or at least to not preclude achieving these efficiencies in project scheduling and contracting procedures.

Issues and Challenges

Given the key objectives for programming and the changes in the decisionmaking environment for transportation, a number of issues and challenges must be met. These include:

- **Vague and Conflicting Policies:** Translating policy into action presents a challenge where existing policy statements are vague and conflicting, which is all too frequently the case. This creates a situation in which any action can be interpreted as supporting policy or defeating it. Common examples of this are where broad policies to reduce congestion, increase motorist convenience, promote energy conservation, and improve air quality coexist without the qualifications necessary to provide meaningful guidance for programming. Not only

are there conflicts in policy at a single jurisdictional level; there frequently are even sharper differences among several different jurisdictions or agencies at different levels which may need to coordinate and cooperate on actions included in the program.

• **Lack of Integration with Planning:** An effective programming process depends in many ways on the support of a strong planning process. Long and short range planning efforts are where much of the work of defining specific objectives, assessing alternatives, evaluating options, eliciting participation from affected parties, and defining consensus solutions to problems takes place. They greatly assist programming by providing information that can be used to clarify program trade-offs and communicate the implications of different funding levels. Public involvement and consensus-building efforts done at the planning stage can also serve to screen out projects which are likely to be delayed, thereby improving the realism of the program. However, many long-range planning efforts have not resulted in clear guidance to programming decisions or are not updated frequently enough to provide ongoing direction to program decisions which are often on a one- or two-year cycle, consistent with an agency's budget cycle.

• **Lack of Emphasis on Systematic Evaluation:** Cost-effectiveness and efficiency have become more of an emphasis in recent years due to growing infrastructure needs and declining revenues. The only meaningful way to ensure efficiency and effectiveness is to consider different approaches to addressing needs and solving problems. However, structuring a programming process so that alternatives are explicitly examined and evaluated introduces a level of complexity which many agencies feel is unnecessary, too costly, or both. There are also technical and methodological questions to be overcome in the design of an evaluation framework which accounts for the full range of project impacts.

• **Uncertainty:** Uncertainties in schedules, budgets, and funding sources are a fact of life, and need to be anticipated in how programs are structured, presented and maintained. Unless these are explicitly planned for, the credibility and usefulness of the process can suffer. While these problems confront virtually every transportation agency, they have often been most acute at the regional and local levels and for transit.

• **Institutional Factors:** The lack of a carefully structured, coordinated process for developing and achieving consensus on improvements can make it impossible to produce realistic, implementable programs which are in line with available resources. Where programming is not recognized as a political process involving negotiation and compromise, credibility problems can arise which undermine the usefulness of the process.

• **Increased Importance of Preservation and Maintenance:** Increasing requirements for repair and rehabilitation of existing infrastructure are dominating the use of available transportation funds in many areas. Many states and cities are establishing policies of preserving existing facilities before new capacity is added. At the same time, questions are being asked about how much preservation and maintenance is really needed, and what are the implications of different expenditure levels. Pavement and bridge management systems are playing more important roles in addressing these questions and in assisting agencies to make effective decisions about the appropriate timing and extent of preservation projects.

• **Increased Emphasis on Management, Operational and Multimodal Solutions:** Over the past decade, a variety of new approaches to management of congestion and accommodating growth in travel demand have been tested. Some of these strategies, such as high-occupancy-vehicle lanes, park-and-ride lots, and ridesharing programs have been pursued aggressively in many areas, and have changed in status from experimental to routine, accepted practice. In addition, new types of solutions are now being developed, such as IVHS. However, integrated programming of funding for these types of solutions, more traditional highway improvements, and public transit system improvements has not occurred. Fund allocation decisions are typically divorced from comparisons of relative effectiveness of these different types of strategies for addressing congestion problems. In fact, planning is often done separately for each type of strategy. There are both institutional and technical problems to be overcome to achieve true multimodal planning and programming.

• **Need for a New Definition of Mission:** Building new highways or transit systems is no longer the primary mission of many transportation agencies. This represents a fundamental change and requires a new definition of mission. The new mission of transportation agencies is inevitably expressed in terms of a broad set of objectives which go beyond improved access and travel times. Transportation is increasingly tied to economic and environmental objectives. This trend means that traditional ways of evaluating and selecting transportation projects need to be re-examined and redesigned.

• **Interagency, Interjurisdictional, and Intermodal Coordination:** ISTEA strengthens the role played by Metropolitan Planning Organizations (MPOs) in transportation programming. The conformity requirements of the Clean Air Act Amendments force stronger interjurisdictional and interagency coordination on programming of transportation improvements. Shrinking resources for transportation and the nature of multimodal, management-oriented solutions create the

need for greater coordination as well. The requirements for congestion management and intermodal management systems will require a more comprehensive approach to programming improvements on the entire transportation system.

- **Integration of new management systems in programming:** ISTEA requires implementation of several management systems which have the potential to improve the technical basis for identification and programming of improvements. The challenge will be how to design these systems and use their results in a manner that works effectively within the framework of transportation decisionmaking processes.

OVERVIEW OF PROGRAMMING PROCESS AND METHODS

The programming process at any level of government or for any specific agency is defined by a complex set of factors including:

- Statutory requirements;
- Federal, state, regional and local funding programs and their eligibility requirements;
- Agency roles and coordination mechanisms;
- Formal and informal statements of policy; and
- Established long- and short-range planning processes.

As several surveys of transportation agencies over the years have found, there is a diversity of approaches to programming in different states, at different governmental levels, and for different modes. Nevertheless, there are certain elements or activities which are normally part of a programming process, or associated planning and project development processes. (See Figure 1.) These activities are briefly discussed next, along with some of the variations in approaches which are found in current practice. This discussion is intended to provide a framework for the later discussion of areas where the effectiveness of programming might be improved.

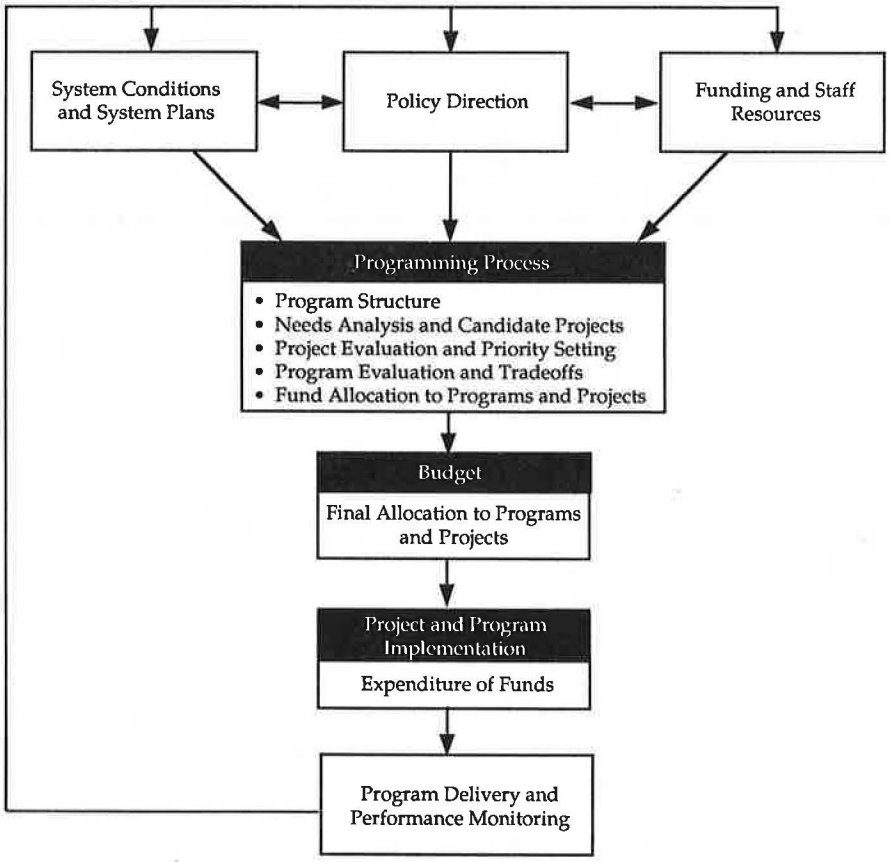

FIGURE 1 Overview of Programming Process.

Key Inputs: Policy, System Conditions/Plans, Resources

As shown in Figure 1, the key objective of the programming process is to combine information on system conditions and investment options (e.g. system plan), policy direction (e.g. preferences for specific objectives and performance goals) and resources (staff and funding) to define the most cost effective program for meeting the desired objectives. While simple in concept, the complexity of the transportation decisionmaking environment has resulted in wide variations in how, or indeed whether, this information is communicated to the programming process.

General statements of policy goals, as mentioned earlier, provide little direction for program decision and often conflict. The issue is not what general policy concerns are important, but what is the appropriate balance between conflicting policy objectives. As a practical matter, defining the right balance between multiple objectives generally requires a well-defined system planning process that translates broad concerns with mobility, economic growth, environment and social equity into specific transportation system strategies that can be evaluated. Multi-objective priority programming methods can reflect such plans, but not replace them.

Today it is typical for there to be no strong linkage between system planing and programming and many agencies simply do not maintain an ongoing system planning process. In such cases, programming criteria tend to be narrow (engineering and design standard oriented), and focused on existing (as opposed to future) needs. Recent practices in some agencies, however, have provided counter-examples. The Wisconsin Department of Transportation's Corridor 2020 effort produced a statewide system plan focusing on economic development goals. This, in turn, led to a plan that provides key guidance to WisDOT's major project program. Similarly, the New York MTA's systemwide assessment of rehabilitation and service requirements has shaped a series of five-year programs.

While ultimately budget and resource constraints will determine what is implemented, many programs have not been fiscally constrained or have addressed how projects and investment strategies should shift under varying resource assumptions. Again, ISTEA provisions will require more realistic plans and programs at state and regional levels and the new flexibility provisions will significantly increase pressure to examine the implications of shifting funds between modes, program categories and projects.

Finally, effective use of the required management systems—both the systems focusing on facilities and asset management (pavement, bridge and transit) and those with service objectives (congestion, safety, intermodal) reinforce the need for a comprehensive transportation system inventory. Such an inventory is a critical basis for a sound programming process and must:

- Be comprehensive and include all modes;
- Document current facility and equipment physical condition and system service levels and characteristics;
- Be updated periodically.

The rapid development of GIS technology offers an exciting and effective way to store and display such information and new technology for monitoring system operating conditions (both vehicle and facility related) and inspecting physical conditions offers the potential for very cost-effective data collection and updating.

Program Structure

Program categories are established for a number of purposes, most commonly: (1) to plan and track different sources of funds earmarked for particular purposes, and (2) to provide an intermediate level for fund allocation and priority-setting in between individual projects and the program as a whole. Establishment of program categories recognizes the constraints associated with allocation of certain funding sources. At the same time, it allows similar types of projects to be evaluated against each other. Lack of homogeneity in project types within a category complicates within-category project prioritization. From a decisionmaking standpoint, meaningful program categories assist in clarification of resource allocation trade-offs across different program elements for technical staff and policymakers.

Program categories have been established based on:

- Type of facility or mode (e.g. highway vs. bridge, track vs. signalization, highway vs. transit);
- Facility or service class (e.g. arterial vs. local access, express vs. local service);
- Objective of project (e.g. safety, congestion relief, efficiency); and
- Scale of project (e.g. maintenance, rehabilitation, reconstruction, capacity or service expansion);
- Funding source or matching ratio; and
- Department or administrative unit.

The manner in which categories are defined is an important choice in the design of a programming process. Categories based on type or objective of improvement facilitate understanding of the program. The amount of money to be invested in particular areas can be compared to expectations of what will be

achieved, and used as the basis for establishing broad priorities across categories and setting category funding levels along with objectives. Program categories which are clearly defined assist this process of priority-setting and trade-offs, whereas those which are complex and include a "grab bag" of diverse projects tend to confuse the process. By the same token, programs which have large numbers of categories make inter-category comparisons and trade-offs more difficult than those with relatively few categories. Categories which are based on funding programs must be modified whenever the funding programs are modified.

Subcategories can be defined to distinguish types of projects which represent different approaches to addressing needs, which rely on different funding sources or which require fundamentally different approaches to needs identification, evaluation and prioritization. Subcategories need not necessarily be used as fund allocation categories, but simply as logical program divisions for display of budgets, performance targets and activities.

The typical state has a mix of program categories reflecting different modes (highway, transit, other), federal funding categories (e.g. Interstate), types of facilities (bridge, general aviation airports, etc.), and objectives (preservation, safety, etc.). Some transit properties organize their capital program according to FTA grant applications. In both cases, it is often very difficult to relate program categories to specific agency objectives.

Identifying Needs and Candidate Projects

Most agencies have established procedures for identifying deficiencies, needs and candidate projects. This activity typically falls within the planning (rather than programming) function, but is the source of basic inputs to the programming process. Needs and project identification is done through a combination of methods:

- Facility inventory and inspections;
- Review of accident, traffic or ridership statistics, and vehicle or equipment breakdowns;
- Facility management systems;
- Sufficiency ratings or deficiency threshold criteria;
- Results of planning efforts; and
- Suggestions by engineers, planners and citizens.

Needs estimates have traditionally been based on existing physical and service/operating conditions compared to a set of design and service standards. Everything else remaining the same, the level of standards determines the expected needs. However, in most cases, the standards have not been developed on the basis of traveler preferences or economic feasibility. A logical approach would be to determine appropriate standards according to the public's willingness to pay. The advantage of such an approach is that it can be related to finance and taxation policies in a state, region, or local jurisdiction.

Current conditions are compared against standards to determine the near term need. Projected conditions under expected future traffic are used to estimated long term needs. Physical needs are then translated into dollar amounts within specific time periods. The procedure used in need estimation is generally a variation of a sufficiency rating approach, where the adequacy of a section of a facility is rated on a numerical scale in terms of certain attributes, such as structural adequacy, safety, and service.

The requirements of ISTEA cannot be accommodated by the traditional needs analysis. First, current and future transportation needs analysis must address all modes. Furthermore, attributes of a needs study must also explicitly include environmental impact. The proposed congestion management systems will play a critical role in making sure that non-highway modes and environmental concerns are carefully incorporated, particularly in metropolitan areas.

After needs are estimated, specific projects can be identified, taking into consideration input from citizens, interest groups, elected officials, and various agencies. Much of this input will be received through informal meetings and day-to-day contact with interested persons. Some agencies hold annual meetings for the purpose of obtaining public input on issues concerning all modes. The identified issues are then sent to the appropriate implementing agency for recommending candidate projects. Implementing agencies can be district offices of a state DOT, city councils or local transit operators. Candidate projects can then be classified by mode, program, and project type, so that funding decisions and project evaluation and selection can be made. Minnesota has used such a multimodal program development approach for more than a decade.

Project scoping, costing, and phasing activities also provide basic inputs to the programming process. Because these are typically continually changing, a dynamic process of adjusting the program to the latest project information, and adjusting project schedules based on the program takes place. In some instances, alternative projects for addressing a particular need or problem may be defined; however frequently only one option is developed.

Project Evaluation and Priority Setting

A key program development activity is to evaluate each candidate project to provide a basis for deciding which projects should be funded. There are a number of methods for project evaluation and prioritization, ranging from highly informal and qualitative to highly complex and technical. In some instances, priorities are set based on the judgement of elected officials and/or engineers. Many agencies develop project ranking methods which consider either the severity of the problem to be solved or the estimated benefit or impact of the candidate project. Some do a more formal cost-effectiveness or cost-benefit analysis. Optimization methods have also been used to assist in project selection, particularly for pavement and bridge preservation projects. Ranking or optimization methods can be geared towards individual categories of projects, or may allow for analysis and comparison of very different types of projects.

While a variety of project evaluation and priority setting methods have been used, the three described briefly below emphasize measuring a project's benefit or output as opposed to the severity of the problem (irrespective of the benefits from correcting it) or design standards.

Economic Analysis

While there are several approaches to economic analysis of projects, the accepted practice is to use the net present value method. In this method all costs and monetary benefits during a service life of a project are brought to the present worth. If the service lives of alternative projects are different, annualized cost in perpetuity can be used.

The cost should include both agency and user costs. Agency costs include construction, maintenance and operation costs, while user costs include travel time, vehicle operation and accident costs for highway projects. For transit projects, user costs may include fare, in-vehicle and out-of-vehicle travel time, and other out-of-pocket costs depending on the particular transit mode. Project costs at the planning and programming stage are mostly broad estimates. They should be developed on the basis of past records, and they should be expressed in terms of a range of values.

It is important to note that although the techniques of life cycle cost analysis have been in use for some time for planning and programming purposes, contract management procedures in the U.S. continue to use least initial cost approach in awarding contracts. Thus, there is a serious conflict between project evaluation concepts and project execution practices. Unless the contract management procedures are changed, much of the potential benefit of such analytical exercises as pavement, bridge, and transit facility management systems, will not be fully realized.

Facility Performance and Economic Analysis

The current practice of economic analysis of transportation facility alternatives does not take into account differences in facility performance. Facility performance may be represented by any one or by a combination of the major objectives of transportation investment analysis, such as physical condition, level of service, safety, and environmental impact. For example, the performance of highway pavement related strategies can be considered in terms of curves indicating pavement condition deterioration against time or some measure of demand. Different pavement related strategies will result in different performance curves. As any transportation project involves both agency and user costs, both perspectives should be considered in making investment decisions.

Procedures for incorporating pavement and bridge performance in economic analysis have been developed. Procedures for considering other performance measures over the service life of other types of facilities are necessary.

Cost–Effectiveness Analysis

Cost-effectiveness analysis allows a much broader evaluation framework than economic analysis, in that non-priceable as well as priceable items can be considered. However, the procedure is less structured. In this procedure, the performance of each project under each objective or criteria is identified and then a cost-effectiveness index is developed for each of the criteria. For example, if safety is a criterion, the cost-effectiveness index for safety can be the number of accidents reduced per dollar of investment or present worth of costs. For safety improvement projects, this index can be used to select desirable projects. When a set of projects is to be selected within a given budget, those projects are selected that can be collectively expected to yield the most accident reduction within the budget constraint. Table 1 provides a list of possible cost-effectiveness indices that can be considered in project evaluation. In a multi-criteria situation, an index of system effectiveness can be developed incorporating a number of impact criteria. Such an exercise will obviously involve some sort of weighting of the impact criteria.

TABLE 1 A LIST OF POSSIBLE COST-EFFECTIVENESS MEASURES

TRANSIT

- Increase in transit ridership per dollar of capital investment.
- Increase in ridership per dollar of additional operating cost.
- Total operating and capital cost per transit rider.
- Total capital and operating cost per seat mile and per passenger mile served.
- Decrease in average transit trip time (including wait time) per additional dollar of total additional cost.
- Increase in transit accessibility of jobs (based on network impedances) per dollar of additional cost.
- Increase in proportion of the population served at a given level of service (in terms of proximity of service and frequency) per dollar of additional cost.
- Total transportation cost per passenger mile (auto and transit).

HIGHWAY

- Increase in average vehicle speeds per dollar of capital investment.
- Decrease in total vehicle delay time due to congestion per dollar of capital investment.
- Increase in highway network accessibility to jobs per dollar of capital investment.
- Decrease in accidents, injuries, and fatalities per dollar of capital investment.
- Change in air pollution emissions per dollar of capital investment.
- Total capital and operating cost per passenger mile served.

Source: Joel Markowitz, "Transit Capital Planning in the San Francisco Bay Area", Transportation Research Record 1266, 1990.

Program Evaluation and Trade-offs

In addition to looking at the relative merits of individual projects, some agencies analyze the costs and benefits of the program as a whole under different assumptions about funding levels by program category. This type of analysis can assist resource allocation trade-offs and final funding decisions. Many agencies do not incorporate a formal program evaluation step into the programming process, but do track and report program accomplishments as part of the budget process.

The objective of program evaluation is to develop the most cost-effective mix of projects within a specific program category and to examine the implications of shifting funds between categories. Generally, the project priority setting and program development and evaluation steps must occur together to avoid the tendency to rank a set of predefined projects independent of the resource constraints and simply pick from the top of the list until funds are used up. Such an approach usually does not result in the best mix of projects.

In an era with a well-defined and rigid program structure with little flexibility to shift funds, the lack of attention to explicit program evaluation and examination of trade-offs between categories within a mode, between modes, and between jurisdictional levels was understandable. However, ISTEA has ushered in a new era where many complex choices will confront decisionmakers and can be funded. Explicit evaluation of program level trade-offs will be a key to defining the implications of these choices.

A number of analytic approaches are possible to support program evaluation and trade-offs. For example, economic analysis and optimization approaches have been developed for some facility management systems and capital improvement project applications. In other cases, a well structured multi-criteria (some quantitative and some qualitative) summary of program impacts will be the most practical and effective approach.

Whatever approach is used, evaluation criteria must directly reflect the policy directions established for transportation and the criteria used to define long-range system planning objectives. If multimodal solutions are to be fairly considered, evaluation criteria must be "mode neutral" (e.g. stress the movement of people and goods, not vehicles).

Fund Allocation

Figure 1 showed the final allocation of funds to programs and projects occurring after the program evaluation step to emphasize that in an era of increasing flexibility, project and program level trade-offs should be examined before final allocation decisions are made. In reality, some portion of the funds available are likely to be allocated to modes, program categories, and geographic regions at the start of the programming process. The more this occurs, the more difficult it will be to examine key trade-offs and establish true multimodal and multi-objective programs, but some predictability in funding levels and partitioning of the problem are also necessary.

Program and Performance Monitoring

Monitoring of the progress of program implementation and the results of the program in terms of system performance, costs, and benefits is an often overlooked but valuable aspect of programming. It provides an important feedback loop into both the technical assumptions made in the process and the policy decisions regarding priorities, strategies, and emphasis areas. A solid monitoring program can, over time, improve the effectiveness of the programming process and enhance its credibility. Again, however, the criteria used to monitor system performance should be directly related to the transportation policy goals of a particular region as defined in statute, policy plans, and system plans.

DEVELOPING A MORE EFFECTIVE PROGRAMMING PROCESS

Figure 2 defines a general framework for an improved programming process. The important elements of this framework are:

- Explicit linkage with policy objectives and system planning to provide guidance on the full range of policy objectives.
- A simplified overall program structure that can facilitate relating policy objectives to program categories (maintenance, preservation, improvement) and make it easier to integrate management systems into the programming process.
- Use of bridge, pavement, and transit facility management systems to guide the maintenance and preservation program needs analysis, target funding analysis (i.e., trade-offs of different funding levels and facility conditions), project identification and evaluation, and program evaluation.
- Use of a broad range of performance criteria together with congestion, safety, and intermodal management systems to guide development and evaluation of service improvement programs.
- Explicit program evaluation and trade-off analysis examining the implications of alternative program funding levels.
- Program and system performance monitoring to establish better accountability for program decisions and to provide feedback to policymakers and an ongoing long-range system planning process.

While the precise steps involved in the programming process will vary widely depending on institutional arrangements, funding sources, and agency procedures, the purpose of the framework is to define the key steps involved in making resource allocation decisions. Similarly, the division of activities shown in Figure 2 between planning and programming functions will also vary from agency to agency. The definition of an integrated set of planning and programming steps is the key issue discussed here.

A number of aspects of the general framework that can potentially lead to a more effective programming process are discussed below.

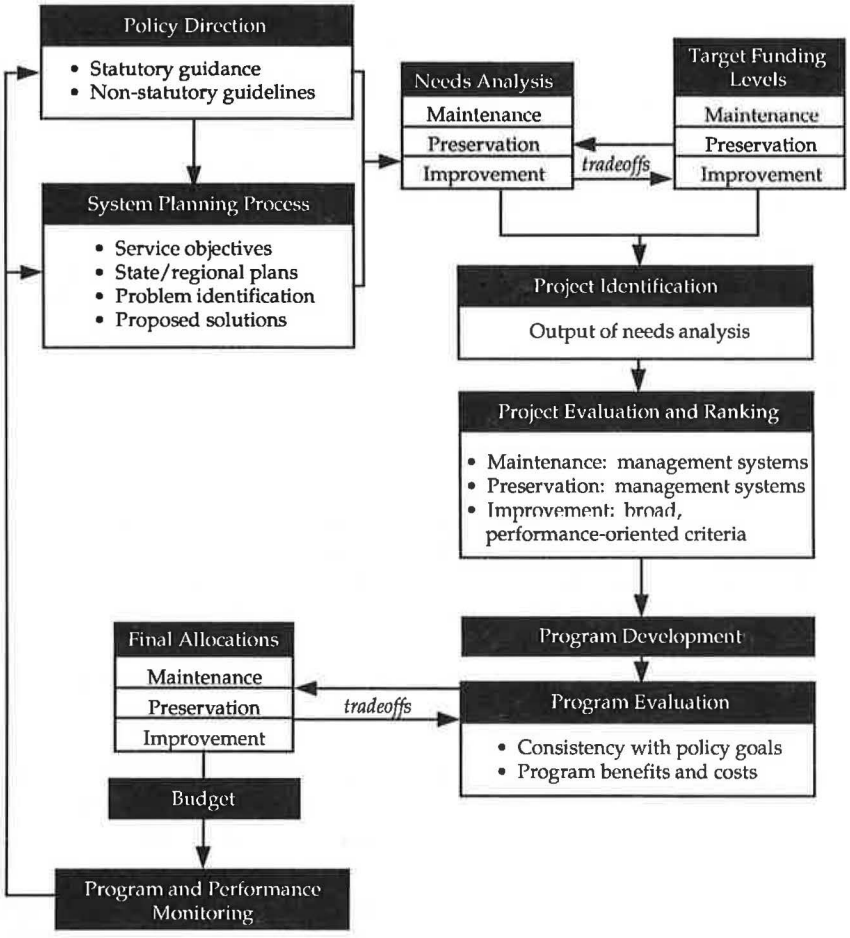

FIGURE 2 Proposed Programming Framework.

Translating Policy into Action

The first measure of effectiveness of a programming process is whether it results in implementation of projects or actions which adequately address stated policy objectives. The most common problem with existing programming processes in this respect is that it is difficult to determine whether they are responsive to policy or not. As noted earlier, policy statements are often too vague or conflicting to provide a basis for judging a program. In addition to well-defined policy objectives, there are a number of program design elements which can be used to assist the process of translating policy into action:

- Program structure and eligibility criteria which are aligned with policy objectives.
- Project evaluation methods which measure contribution to policy objectives.
- An explicit program evaluation step to measure how well the program as a whole is addressing policy. This step can be used to adjust funding allocations and project selections.
- Strong, clear linkages between planning efforts and the programming process. This means that recommended actions in planning efforts should be used as input to the programming process; and planning efforts should be structured, where possible, to provide inputs which are directly usable in programming. This is most easily achieved when there is consistency in the way projects are categorized, i.e., the definition of implementation timeframes and the criteria used for project evaluation.

Facilitating Trade-offs

The programming process should be designed to facilitate choices among different projects and different categories of projects. In order to do this, it is important to structure the process so that different options and funding levels are examined. The implications of different program options should be assessed and clearly communicated. In evaluation of program options, an attempt should be made to describe the full range of impacts which are of interest to decisionmakers. The definition and evaluation of options may need to occur

at several levels of detail to match with the concerns of different decisionmakers who are involved in the programming process.

An important aspect of facilitating trade-offs is to impose enough structure in the program to provide a framework for evaluating concrete alternatives, but not so much structure so as to close off important options. Rigid allocations to program categories and geographic areas, which are not based on an assessment of priorities and relative benefits of investments, tend to restrict the effectiveness of the programming process.

Supporting Effective Resource Allocation

One of the major reasons to have a systematic programming process is to encourage efficient and effective allocation of available resources. In an economic sense, resources are allocated efficiently when no additional benefits can be gained by spending them in a different way. Finding the most efficient solution to the resource allocation problem involves enumerating candidate projects, systematically describing each one in terms of its costs and benefits, and selecting the set of projects which maximize benefits within the established budget.

The choice of the "best" set of projects is very dependent on the level of resources available. As budget levels increase, new opportunities become available, which may be sufficiently cost-effective so as to replace lower-cost options which may have been selected under a smaller budget scenario. The best choice of projects under different budget levels could therefore be quite different in terms of scale and mix. This implies that programming processes which explicitly look at alternative budget scenarios for different categories have a better chance of effectively allocating resources than those which fix category budgets prior to defining and evaluating project candidates. It also implies that programming methods which involve simple ranking of a set of projects and selecting the highest ranked projects until the budget is used up will not necessarily result in the best use of available funds.

Supporting Effective Project Delivery and Coordination

Effective project delivery and coordination means making sure the program is in line with available resources and that the different projects in the program are coordinated with each other to achieve efficiencies. This requires strong financial planning, budgeting and project scheduling functions which are linked to the programming process. Specific considerations for developing these functions in support of effective program delivery and coordination are:

- Financial planning should include regular forecasting of revenues on an annual and monthly basis.
- The fiscal implications of different program options should be analyzed and taken into consideration in program decisions.
- Explicit coordination mechanisms between budget and programming processes should be established.
- Methods should be in place for capturing and communicating project status information in a sufficiently timely fashion to allow for program revisions as necessary to keep expenditures and revenues in balance.
- Interdepartmental and interagency coordination mechanisms should be established for the development and ongoing management of project schedules.
- A tiered approach to programming which includes short–, medium–, and long–range elements can help to reinforce important distinctions among projects in different stages of development and funding commitment.

Strengthening the Linkage Between Plans and Programs

As mentioned earlier, an effective and ongoing planning process is likely to be the most direct way to provide useful policy direction to program decisions. Vague policy statements or the ISTEA list of 15-20 factors to be addressed by state and regional planning, by themselves, provide no guidance. Meaningful guidance must address the appropriate balance between competing policy issues and concerns. There will be no one right answer, and the appropriate balance will vary from area to area and over time.

While the desirability of a strong linkage between planning and programming is apparent, making the linkage effective has often not been straightforward. Requirements that programs "be consistent" with plans or only contain projects included in plans may not be sufficient to provide this linkage. Barriers to a stronger tie between plans and programs include:

- **Timeframes**: Planning has tended to focus on the long term with only general concern for implementation staging, while programs focus on the near term.
- **Update Cycles**: Plans are often updated on an irregular basis while programs are constantly adjusted and updated, typically on the same cycle as the budget (generally annually or biennially).

• **Policy Issues and Evaluation Criteria**: There often is almost no consistency between the issues addressed and the evaluation criteria used in planning and programming.

• **Funding Constraints**: Plans are often not constrained by realistic funding levels while the programs developed by operating agencies invariably reflect budget constraints in the near term at least.

• **Organizational Responsibility**: Planning and programming functions are often carried out by different organizational units in an operating agency with an ill-defined interface. In metropolitan areas, the MPO planning and TIP responsibilities generally involve parallel similar activities within each local jurisdiction or operating agency.

Notwithstanding these barriers, ISTEA does represent a unique opportunity to strengthen the planning and programming linkage. To take advantage of this opportunity, several steps should be emphasized:

- Establishment of consistent criteria for defining:
  - policy goals and service objectives;
  - needs and project identification;
  - project evaluation and priority setting;
  - program evaluation; and
  - program and system performance monitoring.
- Use of the required management systems as a central approach to defining needs, examining system trade-offs, and identifying projects.
- Updating plans and programs on a consistent cycle.
- Establishing phased implementation strategies as part of the long-range planning process.
- Use of consistent financial constraints.

Encouraging Multimodal Solutions

While much of the analysis of multimodal options and trade-offs may occur within the planning function, there are several steps that can be taken to encourage consideration of modal trade-offs. These steps include:

- Avoidance of narrowly defined program categories that by their nature (i.e. defined by type of facility or funding category) tend to focus on a narrow range of solutions;
- Emphasizing evaluation criteria that reflect the movement of people and goods, not vehicles; and
- Encouraging similar programming processes across modes and jurisdiction in terms of timing, program period, evaluation criteria, and tradeoff analysis.

Obviously further steps to provide greater funding flexibility at state, regional, and local levels and strengthening multimodal planning efforts at the state and metropolitan levels would facilitate these changes to programming.

Defining a Role for Management Systems

Pavement management systems have been implemented widely at the state, regional, and local levels. More recently, bridge management systems have received increased attention, and a number of transit properties have developed asset inventories and started transit facility management systems. Vehicle and equipment maintenance systems are also common. Yet despite these activities, management systems in many agencies to date have had little impact on program decisions. ISTEA has attempted to address this issue by creating new requirements for the development and use of facility management systems for pavements, bridges, and transit, and service-oriented systems focusing on safety, congestion, and intermodal coordination. The development and use of these systems offers a tremendous opportunity to strengthen the linkage between planning and programming, provide better information for program decisions, and restructure the planning and programming process at the state and regional level.

Ideally a management system should provide direct guidance on:

- Impacts of different budget levels on facility conditions or system service levels;
- Implications of different facility or system service objectives;
- Allocation of budget to programs, networks, regions, and specific projects; and
- Deployment of inspection, surveillance, and data collection resources.

The facility-oriented systems (pavement, bridge, and transit) could serve as the central focus for developing and evaluating the appropriate goals and budgets for maintenance and facility preservation programs. The core of these systems will be new analytic tools. The basic concept of the service-oriented systems (congestion, safety, intermodal) is the same and they can provide a new focus for multimodal planning and programming for improvement programs. However, these systems are likely to be more complex, involve a broader planning process, and be supported by a variety of data sources and technical tools.

While collectively the management systems offer a new opportunity and approach for examining a wide range of program choices and trade-offs, the barriers encountered by pavement and bridge management systems in many areas must be overcome. These barriers include:

- Significant data collection costs, though new technology offers much potential for more cost-effective facility inspection and service level monitoring.
- Lack of top management and policymaker understanding and support for these tools which are often developed in research or operational units.
- An engineering and design standard perspective that resists consideration of an "optimal program" that doesn't meet predefined standards in every case.
- Conflicts between the "centralized" or system perspective imposed by management systems versus a tradition of decentralized program decisionmaking in district offices of many state DOTs or a variety of local jurisdictions and operating agencies in metropolitan areas.

While these and other barriers (both institutional and technical) are significant, the potential exists for management systems to serve as the focal point for redefining planning and programming and providing better information for program decisions.

CONCLUSIONS

The environment for programming is changing and traditional approaches to program decisionmaking must also change to confront the challenges of:

- A diverse and conflicting set of policy goals and objectives concerning mobility, economic growth, and the environment.
- New and significant funding flexibility that removes a key barrier to considering a wide range of program choices and trade-offs.
- Increased emphasis on multi-jurisdictional and multimodal coordination.

To address these challenges the programming process will need to:

- Strengthen the ties to planning at all levels of government.
- Explicitly consider a wide range of program options and trade-offs including multimodal choices.
- Broaden the concept of need and the evaluation criteria used throughout the planning and programming process.
- Improve the accountability for program decisions by establishing a program and system performance monitoring function.

Accomplishing these objectives will require new institutional arrangements, programming procedures, and technical support tools and data. The choices are complex, but the opportunities for innovation are tremendous and the profession must respond if effective resource allocation decisions are to be made in the future.

REINVENTING METROPOLITAN AND STATE INSTITUTIONS FOR SURFACE TRANSPORTATION PLANNING

Bruce D. McDowell, U.S. Advisory Commission on Intergovernmental Relations and
Sheldon M. Edner, Federal Highway Administration

INTRODUCTION

The institutional questions and intergovernmental relations issues posed by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) are very formidable. They have the potential to:

- Reinvent metropolitan planning organizations (MPOs),
- Cause state departments of transportation (DOTs) to reformulate their planning processes and reach out well beyond their own resources within state government,
- Rebuild MPO planning capacities lost during the 1980s,
- Occasion another look at how non-metropolitan regional councils can fit in, and
- Dramatically reformulate relationships between MPOs and state DOTs.

These are not just technical issues. The governors and state legislatures have been written into this Act, in addition to local political officials, local governments, transportation agencies, and many other "appropriate" agencies. At a number of points, renewed and expanded "involvement of the public" is called for.

The first hint we get that these are political issues comes from looking at the complex way many requirements are stated in the Act. Boundaries are not set simply by census definitions, but are ultimately set by agreements between governors and local elected officials acting under a number of rules. Membership in the MPOs also is a matter of political negotiation within certain general guidelines. There is not just one type of MPO, but four types with different powers and means of funding. In addition, potential for mutual vetoes by the governor and MPO are built in. The bottom line from an institutional viewpoint is that ISTEA raises many more questions than it answers. The hope is that this part of our conference will help generate answers to some of these questions.

To accomplish this task, we first take a look at issues concerning metropolitan institutions, and then state institutions. Next we look at the relationships between the metropolitan and state transportation planning processes, and then relationships between the MPOs and states as institutions that reflect their diverse planning needs. Finally, we offer some brief conclusions about building planning capacities, developing productive partnerships, and avoiding the gridlock that could come about from the exercise of mutual vetoes.

METROPOLITAN INSTITUTIONS

Metropolitan planning organizations (MPOs), recognized and certified by the U.S. Department of Transportation to meet the transportation planning requirements for continued federal highway and transit grants in metropolitan areas, have been around since the early 1960s. However, after every decennial census of population, new urbanized areas are recognized, existing areas grow beyond the 200,000 population mark that gives them extra planning responsibilities, and some urbanized areas grow together enough to require that their transportation plans be linked. In addition, for the first time, there are now air quality conditions that require amelioration through transportation measures applied across areas that sometimes are larger than the urbanized areas for which transportation plans have been prepared in the past. These factors occasion a new look at existing metropolitan transportation planning areas and planning organizations.

MPO Boundaries

The most basic consideration in developing and reformulating the MPOs is establishing the boundaries of the planning area. Each urbanized area of 50,000 population or more must have an MPO and a planning process meeting federal requirements. Sometimes, a single MPO provides planning for more than one urbanized area. At the same time, some urbanized areas have more than one MPO. Overall, there are about 50 more urbanized areas than MPOs. Thus, it is more common for a single MPO to encompass multiple urbanized areas than the other way around.

Still, when it is the other way around, as in more than a dozen cases, special coordination needs are created and required to be met. Most of these cases are interstate, so we cannot simply call on the state DOT or governor to provide the link. The old solution in the Chicago Metropolitan Area was a person with a secretary in an office somewhere acting as a convener. That was not very successful, and eventually was abandoned. For river basins and multistate economic regions, joint federal-state commissions have been tried voluntarily, and mostly abandoned. Interstate compact

organizations—some with federal members—have had greater staying power and effectiveness, but there are only a few of them. Solving this requirement for "coordination" will not be a trivial problem.

An urbanized area (UZA), as defined by the U.S. Census Bureau, is determined by technical criteria based upon density of contiguous urban development. In addition to that area, however, the MPO planning jurisdiction is expected to cover the area forecasted to become urbanized within the next 20 years. Obviously, different forecasters will expect these areas to be larger or smaller and of different shapes. Under ISTEA, the governor of the state, and the MPO together, determine the size and shape of this future urbanized area. The governor and MPO, together, also can extend the MPO planning area to include the whole metropolitan statistical area (MSA) or consolidated metropolitan statistical area (CMSA) as defined by the U.S. Census Bureau. Generally, those areas are larger than the urbanized area plus the 20 year expansion. Adding area beyond UZA + 20 is purely discretionary for the governor and MPO unless the planning area has poor quality air as measured by "nonattainment" of EPA standards for carbon monoxide and/or ozone (as in about 120 of the nearly 400 urbanized areas in the nation). Conversely, if the governor and MPO agree, the MPO jurisdiction can be smaller than the nonattainment area.

Where there is more than one state, more than one governor, and more than one MPO in a single region, this decisionmaking about boundaries gets pretty tough. EPA's air quality regions (requiring MPO coordination within them) tend to cross state, urbanized area, and metropolitan area boundaries more frequently than MPOs do.

MPO Members

As the area needing MPO planning grows, the existing MPO must consider taking jurisdiction over the new area. The added area usually will include additional local governments and may include additional transit authorities as well as other transportation providers that could be given a seat at the planning table.

In addition, where new UZAs are created in the expanding metropolitan area, there is the potential of creating additional MPOs if the existing one does not expand to encompass them.

Despite these dynamic forces, ISTEA appears to allow existing MPO organizations to remain unchanged unless:

- The governor and units of general purpose local government representing at least 75 percent of the affected population voluntarily and jointly request a change;
- Procedures established by applicable state or local law (including laws that provide for substate districting, local government consolidation, annexation, and interlocal agreements) change the organization; or
- General purpose local governments in the area representing at least 25 percent of the affected population in the Chicago or Los Angeles regions request a redesignation by joint action of the governor and local governments representing at least 75 percent of the population. (The Chicago area is the only one in the 5-10 million population range where this provision applies, and Los Angeles is the only "extreme" nonattainment area where this provision applies.)

There are no federal guidelines concerning how far out of step the existing organization could be with the reality of the area before a change must be made. In addition, there is great reluctance in some metropolitan areas to change the MPO organization for fear of losing the organization or spending inordinate amounts of time on organizational issues instead of on required and needed transportation planning. Consequently, means of "involving" additional governments, transit authorities, and other parties of major significance in the planning process, without giving them actual membership in the MPO, are being looked into in some areas to avoid the perceived difficulties of a redesignation fight.

State legislators could step in and solve this redesignation problem in single-state areas if the governor or local governments do not do it in a timely fashion, but there appears little that the federal government could do under ISTEA other than, perhaps, to jawbone and mediate. In a state with a statewide system of substate districts, for example, ISTEA might allow the state legislature to designate the substate districts as MPOs. This appears to be a new degree of flexibility not previously available under federal law.

For the 33 new urbanized areas recognized by the 1990 census, new MPOs are being designated. Some of the new urbanized areas are within existing metropolitan areas, and can be incorporated into existing MPOs if those MPOs and the governor are amenable. It appears that new MPOs are being created to serve about one-third of the new urbanized areas; the other areas will be served by existing or reformulated MPOs.

When an MPO is redesignated in a "transportation management area" (including all MPOs with an urbanized area over 200,000 population, plus some MPOs with smaller urbanized areas that the governor and the MPO request to be made into TMAs), some additional members may have to be added. These members would include elected officials from the additional local government jurisdictions being added, officials of agencies administering or operating major modes of transportation in the area, and appropriate state officials. Certainly, all transit authorities would be added at this time, but in addition there might have to be added representatives of airport, port, toll road, and other authorities. Appropriate state officials to be added might include those responsible for air and water quality, energy policies, growth management, and interstate commissions having energy, economic development, and water interests. The appropriateness of the state air quality official is obvious, and the appropriateness of the other officials mentioned is suggested by federal water quality run-off requirements, and the ISTEA listing of "factors to be considered in planning."

MPO Powers

Originally, all MPOs were treated the same. They received a proportionate share of the federal planning money, and they prepared their long range plans and three-year capital investment programs. Then, in the 1980s, when federal planning money got scarce, it was targeted more toward the larger MPOs—making two classes of MPOs. Now, ISTEA creates four classes of MPOs by providing the larger MPOs with additional powers and overlaying special provisions on MPOs in air quality non-attainment areas regardless of their size. Table 1 shows the four new types of MPOs and the special provisions applicable to them.

The large MPO regions, with populations of 200,000 or more, will have funds set aside for them by formula from the surface transportation block grant. The use of these funds will be determined by MPO project selections, and these MPOs will receive priority in the distribution of planning funds. In addition, the large MPOs that also are air quality non-attainment areas will be eligible to compete for special congestion mitigation and air quality improvement funds, but they will have their project selection powers constrained by the need to improve air quality.

The smaller MPOs with good air quality will receive none of these special considerations. However, small MPOs that are non-attainment areas (or that are upgraded to TMAs by special request), will receive all of these perks except for the formula distribution of block grant funds. They will, of course, be eligible to compete for some of the block grant funds allocated to the state.

Thus, the larger MPOs seem assured of more political clout than they presently posses, and the smaller non-attainment areas may also be so endowed. With money of their own to distribute, they are likely to be in a stronger position to bargain with the state and to become real political decisionmakers.

With most of the planning money going to the 123 MPOS serving urbanized areas with populations of 200,000 or more, and to the smaller areas with air quality problems, abbreviated plans may be acceptable from the remaining small areas. Some of the urbanized areas, including most of the newly designated ones from the 1980 and 1990 censuses, are smaller than the regions covered by regional councils and other regional planning bodies in their area.

Staffing the MPOs

In 1974, 75 percent of all MPOs were staffed by and attached to regional councils. By 1983, this percentage was down to 55 percent, and by 1989 it had dipped to below half (44 percent). Thus, regional councils are no longer the preferred institutions for carrying out the MPO planning.

Cities, counties, state DOTs, and separate (free standing) MPOs hold the other designations. Among these "other" MPOs, cities and counties are the most numerous. This may be because of the large number of new smaller urbanized areas recognized by the Census, and weakening of the previously strong requirement for a single MPO in each area. States with strong county government and states with easy municipal annexation laws account for many of the city, county, and city-county MPO designations.

MPO boundary expansions across growing urbanized areas and metropolitanwide air quality areas (of which there are about 120) could start making regional councils more attractive again as appropriate staffing and policy deliberation bodies for MPOs. The key factors in weighing this decision are (1) availability of staffing capacity, (2) confidence that the staff will give objective services to all MPO member governments, transportation agencies, and other interests, and (3) linking with an organization that regularly deals with the broad range of interrelated public policy issues to which transportation policies now must respond.

TABLE 1 STATUS AND POWERS OF MPOs UNDER *THE SURFACE TRANSPORTATION ACT OF 1991*[*]

Classes of MPOs	Population		Ozone or CO Nonattainment Area	Powers					Planning Required	
	200,000+	200,000–		Block Grant by Formula	Projects Constrained by CAA	Projects Selected by MPO	Priority for Planning Funds	Congestion and Air Quality Project Funds	Full	Abbreviated
1. Standard Large MPO	34			34		34	34		34	
2. Large MPO Nonattainment Area	91		91	91	91	91	91	91	91	
3. Small MPO Nonattainment Area		67	67		67	67	67	67	67	
4. Standard Small MPO		147								147
TOTALS	**125**	**214**	**158**	**125**	**158**	**192**	**192**	**158**	**192**	**147**

*The numbers in this table are not official. Official figures are not available. These preliminary figures are subject to change when official interpretations are made about how to count the populations of the areas and how to establish the relationships between the severity of air quality nonattainment and EPA planning requirements. For example, it appears that the population of individual urbanized areas (UZAs) rather than the aggregate population of the MPO area or of all the UZAs in that area may determine whether the area has a population larger or smaller that 200,000. In addition, it could be that areas with only marginally polluted air would not be required to perform full-scale planning.,

Interrelating Multiple MPOs

In at least 13 metropolitan areas, there are multiple MPOs. These are shown in Table 2. Since all but two of these areas are air quality nonattainment areas, it seems almost certain that the multiple MPOs in these areas will have to coordinate in some reasonably effective fashion. ISTEA calls for them simply to "consult with the other metropolitan planning organizations designated for such area and the state in the coordination of plans and programs required..." Nine of these thirteen areas are multistate, and for them the U.S. DOT Secretary is directed to establish requirements to "encourage governors and the metropolitan planning organizations with responsibility for a portion of a multi-state metropolitan area to provide coordinated transportation planning for the entire metropolitan area." ISTEA goes on to give congressional consent to interstate compacts and agreements for this purpose. Thus, it appears that there could be different standards of coordination in interstate and non-interstate areas. The language of the act seems to envision a much tighter coordination in interstate areas than within a single state. Perhaps that is because more reliance is placed on the governor and the state DOT to ensure coordination within a single-state area.

TABLE 2 CMSAS AND MSAS WITH MORE THAN ONE MPO (BEFORE 1990 CENSUS RE-DESIGNATIONS)

Name	Population
New York, NY-NJ-CT	16,044,012
Chicago, IL-IN	6,792,087
Philadelphia, PA-NJ-DE-MD	4,222,211
Boston, MA-NH	2,775,370
Miami, FL	1,914,600
Cleveland-Akron-Lorain, OH	1,677,492
Portland-Vancouver, OR-WA	1,172,158
Hartford, CT	546,198
Allentown-Bethlehem-Easton, PA-NJ	410,436
Memphis, TN-AK-MS	825,000
Portsmouth, ME-NH	114,960
Youngstown, Warren, Sharon, OH-PA	414,000
Raleigh-Durham, NC	511,280

The nature of this coordination bears considerable thought. Computerized transportation models, particularly for air quality considerations, can't simply be started and stopped at state lines or along other arbitrary boundaries. Growth assumptions across a large region need to be at least somewhat compatible, rather than optimistically competitive, and transportation alternatives to meet the same needs frequently will traverse political jurisdictions in widely spaced locations. Thus, occasional consultation, or consultation of the type in which different MPOs listen to each other in an obligatory fashion but do not hear each other, is likely to be inadequate to the task.

The number of areas needing coordination among MPOs is likely to increase in the future. For example, it appears almost certain that the Baltimore and Washington metropolitan areas will be consolidated as a result of the 1990 census, making the sixth largest CMSA in the nation.

STATE INSTITUTIONS

ISTEA will change state institutions in a number of ways. For example, it requires state transportation planning of a very broad type that considers such elements as energy conservation, land use and development policies, environmental protection, and all modes of transportation. Not more than a handful of states do such planning now.

ISTEA also requires the governors' involvement in transportation planning in a number of ways. For example, the governor must get involved in:

- Establishing the 20 year growth area around the existing urbanized area;
- Making a determination about whether the transportation planning area should remain smaller than the air quality planning area;
- Making a finding that multiple MPOs are needed in large complex regions;
- Requesting that some MPOs in smaller areas be designated as transportation management areas (TMAs);
- Redesignating MPOs to change their area of jurisdiction and membership;
- Coordinating multiple MPOs within in-state and multi-state metropolitan areas; and
- Approving MPO transportation improvement programs (TIPs).

Although many technical issues are bound up in these decisions, many political power relationships also are involved. Those governors who have already delegated these roles to their state DOT might want to reconsider.

At two points, ISTEA seems to provide the possibility that MPOs can be designated and redesignated by procedures provided under state or local laws. This opens a significant role for state legislatures to set MPO boundaries and designate MPO organizations. State

legislatures also have inherent roles in providing matching state funds, reappropriating federal aid, and designating which transportation projects are to be developed. In addition, the interstate agreements and compacts for metropolitan transportation planning, to which ISTEA gives congressional consent, often would require consent by state legislatures.

It is clear, furthermore, that transportation increasingly is becoming a means to reaching larger objectives. Both metropolitan and statewide transportation planning place the state DOT in partnership with programs for spurring economic competitiveness and growth, protecting the environment, conserving energy, managing growth, and organizing local governments. This partnership involves the governor, the legislature, independent state transportation regulatory agencies, state regulators of air and water quality, state energy agencies, state growth management agencies, and perhaps interstate commissions concerned with river basins and economic development. Although ISTEA simply sets forth these concerns as "factors to be considered," at least two of these concerns—air and water quality—carry mandatory federal regulatory requirements. Simply "considering" these factors inside the state DOT would seem to be a rather feeble response to these highly visible, growing needs of society. Entering into real partnerships with the other responsible state agencies would appear to be a more appropriate approach. The governor and legislature may have to make it clear that this is what they want. It is well within their right and responsibility to do so.

Especially when it comes to creating and reformulating metropolitan institutions, the legislature might be expected to play a significant role. Traditionally, this has been a politically touchy issue. It is unlikely to be resolved in a politically credible way without involvement of the legislatures.

THE METROPOLITAN AND STATE PLANNING PROCESSES

Planning Requirements

The ISTEA builds on the long term tradition of the "3C" planning process for metropolitan areas. One way it does that is to legislate many requirements that had been required only by regulation, including plan content, planning process, TIPs, and project selection activity. At the metropolitan level, fifteen specific, legislatively mandated factors must be addressed in developing long range plans. State planning requirements, adopted for the first time at the federal level, spell out twenty specific factors that states must consider. Table 3 compares these metropolitan and state planning factors.

As noted earlier, MPOs designated as TMAs (including urbanized areas over 200,000) particularly those in nonattainment areas, must fully comply with these provisions. In smaller metropolitan areas in attainment status, a simplified planning process can be utilized with the concurrence of the Secretary of Transportation. The distinction in the legislation regarding simplified procedures is a function of the complexity of transportation issues that must be addressed in the planning process. By implication, while all fifteen factors must be dealt with, the level of detail and thoroughness of analysis may be reduced proportionally.

The state planning process is modelled after the metropolitan process conceptually. However, as Table 3 indicates, it includes a different but related list of factors. The differences include both additional planning elements and the scope of state responsibilities. In the latter instance, the state must assume responsibility for non-metropolitan areas and issues potentially beyond the scope of MPO capability such as economic development and innovative financing approaches.

While the content of state and MPO plans is spelled out in specific terms, the process of integrating these plans is not. The state must address the content of MPO plans within its planning effort, but the nature and extent of integration is ambiguous. The process of integration resides in the operational meaning of terms such as "coordination," "consultation" and "cooperation." Hence, critical questions concerning the methodologies, models, and data utilized are left to the uncertainties of how states and MPOs are able to build an effective partnership in plan development. The timing of planning activity is left unspecified in the legislation. Initial guidance issued jointly by FHWA and FTA calls for full compliance with the metropolitan planning requirements in nonattainment areas by October 1, 1993, and in attainment areas by December 18, 1994. Statewide plans are required by January 1, 1995.

Building and Rebuilding Planning Capacity

Planning required by the ISTEA is a principal vehicle to achieve financially realistic intermodalism and decisionmaking which is sensitive to the needs of both mobility and environmental enhancement. The Act stops short of creating a federal mandate for land use planning but clearly expects a far greater sensitivity to multiple objectives planning. Further, the Act also supports planning by seeking to tie operational issues to

TABLE 3 METROPOLITAN AND STATE PLANNING ELEMENTS

METROPOLITAN	STATEWIDE
Preservation of and efficient enhancement of existing system	TSM strategies to enhance efficient operation of existing system
Consistency of plans with applicable federal, state and local energy conservation programs	Any federal, state or local energy use goals
The need to relieve and prevent congestion	The need to relieve and prevent congestion including methods which reduce motor vehicle travel, particularly SOV
Effect of transportation policy decisions on land use and development	Effect of transportation policy decisions on land use and development
Programming of expenditures on transportation enhancements	
Effects of all transportation projects in metropolitan area regardless of federal funding status	Any metropolitan plan
International border crossings and access to ports, airports, major freights distribution routes, intermodal facilities, national parks, recreation areas, monuments, historic sites, and military institutions	International border crossings and access to ports, airports, major freights distribution routes, intermodal facilities, national parks, recreation areas, monuments, historic sites, and military institutions
Connectivity of metropolitan roads with nonmetropolitan roads	Connectivity between metropolitan areas within the State and metropolitan areas in other states
Transportation needs identified through management systems	The results of the management systems
Preservation of rights-of-way for future projects	Preservation of rights-of-way for future projects
Methods to enhance efficient movement of freight	Methods to enhance the efficient movement of commercial motor vehicles
Life cycle costs in design and engineering of tunnels, pavement, and bridges	Life cycle costs in design and engineering of tunnels, pavement, and bridges
Overall social, economic, and environmental effects of transportation decisions	Overall social, economic, and environmental effects of transportation decisions
Methods to expand and enhance transit services	Methods to expand and enhance transit services
Capital investments that would result in increased security in transit systems	
	Strategies for incorporating bicycle paths and pedestrian walkways into projects
	The transportation needs of nonmetropolitan areas
	Recreational travel and tourism
	Innovative methods for financing projects
	Long range needs of State transportation system
	State developed water pollution control plan

the planning process. An overriding concern is the capacity of states and MPOs to respond to these expectations. MPOs have experienced a decline in comprehensive planning capacity over the past decade, and most states must build upon limited or no capacity to meet the greater expectations of the ISTEA.

ISTEA mandates the development of six management systems (bridge, safety, pavement, intermodal, congestion, and transit) to support the operational efficiency and management of current and future transport systems. The legislative intent is apparently to ensure that decisions concerning maintenance and

operational performance of the existing system be integrated with the development of future capacity or that capacity should be added only when additional efficiencies cannot meet demand. While past experience with safety, pavement, and bridge management provides a reasonable base for developing this integration, the content of the other three systems is not specified clearly in the ISTEA. Moreover, the technical relationship between these systems and the planning process is unclear. It appears that the analysis done in developing the management systems should be a major component of the planning process, but when and how remains to be specified.

Of all six systems, the congestion management system may be the most significant. A specific legislative prohibition against construction of significant new single occupant vehicle capacity in non–attainment areas unless this system is in place puts teeth in the management system process. Moreover, since this system will address both the operation of current transport facilities and justification for new capacity, it is the most important link between system operations and planning.

To make project level decisionmaking more realistic, the legislation requires that both the long range plan and the Transportation Improvement Program be financially constrained. This introduces a form of financial trade-off analysis to planning and program development that has not existed before in most transportation decisionmaking. The dimensions of such planning are not specified in the legislation but could conceivably include such techniques as return on investment, opportunity cost, benefit-cost, or input-output analysis. Moving from a "wish list" programming mode to a calculated, tradeoff decisionmaking analysis will require major upgrades in institutional capacity for most states and MPOs. Such change will take time and commitment.

Adding to the complexity of the task will be the extended public involvement requirements of the Act. Public hearings have been a mainstay of the planning process, but the legislation clearly expects a much more meaningful and extensive public involvement process. There are requirements for public involvement for both the long range plan and the TIP, and these requirements imply a greatly enhanced process, especially when the Clean Air Act requirements are added. The ISTEA even implies special status to representatives of transportation agency employees and private transportation providers by specifically identifying the need to involve them. These broader involvement requirements apply to both states and MPOs.

Congress mandated, to ensure that planning processes were adequate to the goals set by the Act, that TMA planning processes be certified by the Secretary every three years. The basis of certification will be MPO compliance with the provisions of applicable federal law and the existence of a jointly approved (MPO and Governor) TIP. The thrust of this requirement is to ensure the adequacy of plan content and the planning process. FHWA and FTA have been experimenting with joint reviews of the planning process in areas over 1,000,000. The universe of planning reviews will now have to be expanded to all TMAs. The results of these initial experiments suggest that the certification process will require a massive effort.

Recognizing the expectations of MPO and state planning agencies, Congress significantly increased the amount of PL and HPR funds. However, these funds are primarily allocated to the states on their proportionate share of the national metropolitan population. The states suballocate these funds to MPOs based on formulas that have traditionally relied on population or a base amount plus an additional share based on population. Nonattainment status now must be taken into account, thereby shifting state allocations more toward polluted areas. While the overall increase in funding may off-set the increased planning requirements of the ISTEA, there is no guarantee that the amount will be sufficient to fully replace atrophied capacity or meet the needs created by expanded planning requirements. Moreover, an inequitable allocation could emerge if some MPOs receive more than they need while others starve relative to the severity of their needs. In sum, while resources have increased, the mechanism for targeting these resources to the areas of greatest transportation planning need may not be in place.

Planning for Rural and Small Urban Areas

Unlike the metropolitan areas, rural and small urban areas were not empowered in the same fashion. The state has the responsibility for planning in rural and small urban areas but must explicitly consult with local officials from those areas in both plan and TIP development. The state must also take into account the improvement of adjoining state and local roads that support rural economic growth and tourism. In small urban and rural areas, the state still has the responsibility for selecting projects but in consultation with officials of affected jurisdictions.

The consultation process with local officials, while required, is not specified in detail. For most rural and many small urban areas, such a process will have to be constructed from the ground up or converted from processes developed for other purposes, e.g., economic development. The State of Washington provides an example of a possible approach where rural consultation

may be effectively obtained through its Regional Planning Organizations which cover both rural and urban areas.

In many respects, the flexibility provided by the ISTEA will be welcomed by states and metropolitan areas. However, for rural and small urban areas, the demise of the categorical federal-aid system will make financing some improvements more difficult. The federal-aid secondary program provided a "guarantee" of some funding for rural areas and interests. While federal funding to the states under the NHS and STP programs will still see dollars flowing to rural areas, there is no guarantee that this will amount to the level of dedicated funding under the prior system. The only remedy to this dilemma will be aggressive participation by rural officials to seek a "fair" share of state revenues.

Finally, the nature of surface transportation planning for rural areas represents an interesting change from previous transportation efforts. Highways clearly have dominated such efforts. With the underlying theme of efficiency in the ISTEA, the prudence of rural highway investments may come under greater scrutiny. In some states, disinvesting in rural systems has become a significant policy issue. In others, the interface between rural and metropolitan systems may change priorities substantially. At the same time, rural public transportation and intercity bus service may receive enhanced attention as alternatives to highway improvements.

Clearly, the states face a much more complex set of trade-offs in attempting to build a planning process that effectively poses the choices raised by balancing rural, metropolitan, environmental and statewide perspectives. MPOs will not be isolated from this complexity, because the funding for and priority of their investments will be significantly affected by the states' decisions about how much funding is needed elsewhere.

Implications and Possible Remedies

On its surface, the ISTEA appears to have radically revamped the transportation planning process. The emphasis on flexibility, intermodalism, public participation, air quality, greater comprehensiveness, and integration of long range planning and programming provide an overall image of "doing it the right way". Behind this facade, however, lurks a major challenge in policy implementation.

In some respects, the changes are "fixes" to perceived failings in the way things used to be done. From this perspective major inconsistencies and logical fallacies appear in the legislative design. While the CAAA and the ISTEA represent a unique legislative couplet, their integration poses major problems in terms of timing, the meaning of conformity, priorities, and concept. If planning could start on a clean slate, the task would be less formidable. However, significant planning already exists, and it must be adapted to the expectations of the ISTEA. Overall, the ISTEA does constitute a revolution and a shift from doing business as usual. However, the scope of change it envisions and the framework it provides may not fit within the six years of its existence.

For some, the easy answer may be to hope that Congress will retreat from overly ambitious legislative goals. However, the changes wrought by the ISTEA are too substantial to imagine a major retreat. A more appropriate response will be to find pragmatic methods for dealing with inconsistencies and ambiguity, and attempt to meet the broad expectations laid out in the policy declaration of the ISTEA.

In planning, this will mean initially attempting to ensure the development of capacity where it is needed to do the planning required. Congestion management plans should consider factors occurring well beyond the transportation right-of-way. Financial planning should take a creative look at revenue source forecasts and innovative opportunities, as well as return on investment, and foregone opportunities.

Integration of state and metropolitan plans will need to begin with communication and the sharing of data/analyses, so the technical adequacy of plans will be as sound as feasible. Flexibility will demand not just financial fungibility but iterative planning with an increased willingness to re-evaluate commitments and approvals. States may have to accept metropolitan plans as the state plans for urbanized areas until such time as state plans are fully enough developed to provide well justified alternatives to be considered.

Recognizing the mutual dependence on the same taxpayers for financing projects, and the increased public scrutiny that all plans will be under, will require rural, metropolitan, and state decisionmakers to address their individual and mutual interests more comprehensively. Building the technical and decisionmaking capacity to make intermodal trade-offs between mobility and air quality priorities will take time. The interim will require starting with existing facilities and asking how efficiency of operation and enhancement will help to create a seamless transport system. Compliance with planning requirements may have to occur in measured, annual stages.

In the end, the federal government will have to decide how good the planning has to be to justify certifying it as in compliance with ISTEA. The two basic options are to look at the results of the planning (outputs), or to assess the planning process and documents (inputs). The input

approach is traditional and easier to do, but it clearly is not good enough for air quality compliance. Arguably, it will not carry out the intent of the ISTEA management systems either.

MPO RELATIONSHIPS WITH THE STATE

ISTEA makes "appropriate state officials" members of the MPO policy board and requires the board to prepare and adopt plans for its region. Then, ISTEA goes on to say that the state shall develop a long-range transportation plan for **all areas** of the state and only needs to "consider" coordination with the MPO plans. Nevertheless, ISTEA also requires the state plan to be developed "in cooperation with" MPOs. In addition, state air quality officials can veto state and metropolitan transportation plans and projects. Water quality regulators also must regulate the runoff from urban transportation corridors, and wetlands regulators must regulate the location of transportation construction projects. It is unclear how this will work.

DOT has defined the differences between consultation (listening), cooperation (working together), and coordination (exercising mutual vetoes), and several of the interested parties are keying in on these distinctions as a central thrust of the Act.

Although no policy board is required to guide the preparation of the state transportation plan, some states have developed a council of MPO representatives to help with this and other tasks. Many intimate staff-to-staff working relationships, and a great deal of detailed data coordination, surely will be required to make this joint planning relationship work, but that still will not be enough. State interagency coordination procedures will be needed, and state-local political relationships in the planning process also will be vital. In the 26 states that have state ACIRs, those organizations might be good resources to help figure out how state-local policy exchanges should occur.

ISTEA is full of requirements to consult with, cooperate with, be in conformance with, comply with, and coordinate. Yet, when it comes right down to it, even the carefully drawn DOT definitions give no clear indication of how all this should work. Ideally, the MPO plans developed with participation by state officials, should be incorporated into the state plan by reference. If there is real working together, real exchange of fiscal estimates for implementation money, and real policy coordination along the way, there should be no surprises and no reason for the state to reiterate all the MPO work, or contradict it, in the state planning document. However, if these relationships are strained or inept, there are enough ambiguities in the Act to let the MPOs and states fight it out in court.

There can be a clear differentiation between the MPO and state plans if it is remembered that the essential difference between these two documents is that the metropolitan plan is for internal circulation and congestion relief, while the statewide plan is for statewide circulation and connectivity. A similar relationship between local projects within the nonmetropolitan areas and the statewide plan should be developed. Plans for rural and small urban areas, although the responsibility of the state under ISTEA, are to be developed in consultation and cooperation with affected local officials, and could well have a relationship to the statewide plan similar to the MPO-state plan relationship.

It should be recognized that the relationship between an MPO and state government in **interstate** areas represents not just a linear increase in difficulty, but an exponential increase. States, on occasion, can be very independent. They may not lay all their cards on the table in good faith negotiations, and they may not stick to the indications they give at one time during a negotiation. If there is a need to strike real interstate agreements, they are just as likely to meet directly as to meet through one or more MPOs that they view as unreliable and unnecessary third parties. In this context, the difference between acting "in cooperation with" or "in consultation with" may be a distinction without a difference. There will be projects in every interstate area for which MPOs will have primacy and others for which the states will have primacy. Thus, if the parties do not help each other, they will have little trouble finding ways to hurt each other. It is not clear that the federal government wants to get in the middle of this. Thus, extra time and effort may be needed by MPOs in interstate areas to build trust and confidence among the diverse partners.

CONCLUSIONS

Three things are needed, institutionally speaking, to make a success of ISTEA:

1. Building a lot of new planning and decisionmaking capacity at both the regional and state levels;
2. Developing many new partnerships; and
3. Avoiding gridlock.

With respect to building capacity, some very new and highly demanding styles of planning are being required for large metropolitan areas, large and small air quality nonattainment areas, and state DOTs. These new planning processes will require new types of data, new analytical techniques, new political priority setting processes, and new staff. No one will possess all of the

necessary data and technical capacity, or the political capacity, by themselves. They will have to rely upon the capacities of each other, and learn to work together to achieve the types of transportation connectivity, congestion relief, environmental protection, energy conservation, and other objectives envisioned by this new act.

Relying on the capacity of others implies building firm new partnerships. These partnerships will be successful only if they develop a degree of **trust** among the partners sufficient to allow them to incorporate each others' plans into their own, based on familiarity with and confidence in the quality of the work, the objectivity of the analysis, and the honesty of the commitments made. This trust must bind neighboring areas together, link regional bodies with state DOTs, cement relationships among diverse state agencies, and connect adjoining states that have interstate transportation needs in common.

Finally, success hinges on avoiding gridlock. There are opportunities aplenty in ISTEA for governors and MPOs to cancel each other out by mutual veto. The key here is to practice "getting to yes," rather than to "getting to no." If one wants to play games with this act, there is plenty of opportunity to do it. Grandfathered MPOs can last well beyond their useful lives. Designations and redesignations can be carried out with "the right" 75 percent of the population, ignoring the other 25 percent—as one might do in a hard fought annexation battle. We can "consult with and cooperate with" all we want, and then do the opposite when we make our final decisions. We can "consider" and then go ahead and ignore.

But if we are serious, we will not play games with this act. We will lay our cards on the table face up, negotiate in good faith, use mediators when that would be useful, make commitments in good faith, and stick to them if at all possible. As the old saying goes, we must hang together, or we most assuredly shall each hang separately.

Obviously, a great deal of attention needs to be given to writing regulations that try to sort out the many ambiguities and new challenges in ISTEA. But equally important, perhaps even more important, could be the research and development, and the technology transfer components of the effort. For example, we badly need better techniques for planning effective congestion management, air quality attainment, and investment strategies. In addition, we need to recognize that even the currently known "best practices" for confronting such issues are not in widespread use, and we need to remedy that situation. Other conferences are dealing with those matters, but this conference needs to add its weight to the urgent need for progress along these lines.

Strengthened requirements and regulations for transportation planning, programming, and finance, without strengthened technical, institutional, and political capacity to respond may simply widen the gap between expectations and performance. That would be a disaster for the nation. Placing greater reliance on research and development, technology transfer, technical assistance, and respectful partnering, rather than on legalisms and contentious protection of the rights and prerogatives of each player, can avoid that disaster.

ISTEA clearly calls for a great deal of change in institutions and planning processes. Yet, battles already have broken out between the forces of "business as usual" and the forces of change. People are chosing sides. We are still waiting to see whether ISTEA will become the Planners Assistance Act of 1991 or the Lawyers Assistance Act of 1991. We hope it will be the former.

STEERING COMMITTEE

CO-CHAIRMEN:
Lance A. Neumann

Transportation Consultant; born, October 15, 1948, New Haven, Connecticut. B.S., Brown University, 1970; M.S., Massachusetts Institute of Technology, 1972; Ph.D., Massachusetts Institute of Technology, 1976; Research Engineer, Massachusetts Institute of Technology, 1972–75; Principal, Vice President, Cambridge Systematics, 1976-86; President, Cambridge Systematics, 1986-present. Chairman, TRB Committee on Transportation Programming, Planning and Systems Evaluation. Member of the steering group, American Society of Civil Engineers, Committee on Facility Management; co-author, "Assessing Infrastructure Needs: The State of the Art", *Perspective on Urban Infrastructure*, National Academy Press, Washington, DC, 1984.

Michael D. Meyer

Engineer, administrator; born March 25, 1952, Madison, Wisconsin. B.S., University of Wisconsin, 1974; M.S., Northwestern University, 1975; Ph.D., Massachusetts Institute of Technology, 1978; Associate and Assistant Professor, Department of Civil Engineering, Massachusetts Institute of Technology, 1978-83; Director, Bureau of Transportation Planning and Development, Massachusetts Department of Public Works, 1983-88; Associate Professor of Civil Engineering, Georgia Institute of Technology, 1988-1991; Professor of Civil Engineering and Director, Transportation Research and Education Center, Georgia Institute of Technology, 1991-present. Has served as member and chairman of several TRB committees; currently chairs Committee on Statewide Multimodal Transportation Planning and Task Force on Transportation Demand Management.

MEMBERS:
David Preston Albright

Transportation Administrator; born August 25, 1947, Bend, Oregon. Owner, Open Research Project, Inc., 1980-84; Transportation Planner, 1985-88; Chief, Research Bureau, New Mexico State Highway and Transportation Department, 1988-91. President, Alliance for Transportation Research, 1992-present. Chairman, American Society for Testing and Materials IVHS Group; Member, IVHS AMERICA Committee on Standards and Protocols, and Long-Term Pavement Performance Advisory Committee. Representative of the New Mexico State Highway and Transportation Department to IVHS AMERICA and the Transportation Research Board. He has published papers on various transportation topics in the Transportation Research Board's *Transportation Research Record*, the Institute of Highway Transportation Research Engineers' *Journal*, and ASTM's *Standardization News*.

Gloria Jeff

Transportation Executive; born April 8, 1952, Detroit, Michigan. B.S.E. and M.S.E. in Civil Engineering, University of Michigan 1974 and 1976, respectively. Masters in Urban Planning, 1976; Principal Planner, Southeastern Michigan Transportation Authority, 1976–81; Division Administrator, 1981-84; Administrator, Urban Transportation Planning, 1984-85; Assistant Deputy Director, Bureau of Transportation, 1985-90; Deputy Director, Bureau of Transportation Planning, Michigan Department of Transportation, 1990-present; Adjunct Professor, College of Architectural and Urban Planning, University of Michigan, 1988-present. Member, American Institute of Certified Planners; Member, Women's Transportation Seminar; 1990 Achievement Award, Michigan Chapter, Conference of Minority Transportation Officials; Member, American Planning Association.

Neil J. Pedersen

Transportation Planner; born August 31, 1951, Great Barrington, Massachusetts. B.S., Civil Engineering, 1974 and B.A., Urban Studies, 1974, Bucknell University; M.S., Civil Engineering, Northwestern University, 1976; Transportation Engineer, R.H. Pratt Associates, 1975-77; Senior Associate, JHK and Associates 1977-82; Deputy Director, Office of Planning and Preliminary Engineering, 1982-84, Director, Office of Planning and Preliminary Engineering, Maryland State Highway Administration, 1984-present. Member, AASHTO Standing Committee on Planning; Member, Institute of Transportation Engineers; TRB Member, Committee on Statewide Multimodal Transportation Planning.

Ronald D. McCready

Transportation Administrator; born July 6, 1947, Butte, Montana. B.A., Urban Planning, University of Washington, 1969; M.A., Urban and Regional Planning, George Washington University, 1976; Urban Planner, U.S. Department of Transportation, 1970-76; Manager, Program Analysis Section, 1976-78; Manager, State Planning and Policy Section, Arizona Department of Transportation; Director, Transportation and Regional Planning Division, Puget Sound Council of Governments, 1988-present. Member, National Association of Regional Councils MPO Advisory Committee, 1988-present. Member, Washington Department of Transportation MPO Advisory Committee, 1988-91.

Dale A. Janik

Transportation Administrator; born January 28, 1948, Oak Park, Illinios. B.S., Civil Engineering, Iowa State University, 1970; M.A., Public Administration, Sangamon State University, 1978; Transportation Planner, Illinois Department of Transportation, 1970-83; Chief, Bureau of Statewide Program Planning, 1984-present. Member, Illinois Association of Highway Engineers; Member, American Public Works Association; Secretary, TRB Committee on Transportation Programming, Planning and Systems Evaluation.

Kumares C. Sinha

Transportation Educator; born Calcutta, India, July 12, 1942; U.S. Citizen. B.S.C.E, Jadavpur University, India, 1961; Diploma in Town and Regional Planning, Calcutta University, India, 1964; M.S.C.E., University of Connecticut, 1966; Ph.D., Civil Engineering, University of Connecticut, 1968; Assistant Professor, Civil Engineering, 1968-72; Associate Professor and Director of Urban Transportation Program, Marquette University, 1972-74; Associate Professor, Civil Engineering, 1974–78; Professor and Head, Transportation and Urban Engineering, Purdue University, 1978-present. Author of over 200 technical publications on transportation engineering and management. Recipient of Fred Burggraf Award, Transportation Research Board, 1972. Fellow, American Society of Civil Engineers; Fellow, Institute of Transportation Engineers; Member, American Institute of Certified Planners; Chairman, TRB Committee on International Activities, served on several other TRB committees.

Linda Bohlinger

Transportation Manager; born August 28, 1949; U.S. Citizen. B.A., University of California, Santa Barbara, 1971; M.A., University of Southern California, 1977; Transportation Planner, Southern California Association of Governments, 1977-79; Manager, Highway Programs, Los Angeles County Transportation Commission, 1979–85; Supervising Planner, Sacramento Area Council of Governments, 1985-86; Deputy Director for Transit Development, California Transportation Commission, 1986-89; Director, Capital Planning and Programming, Los Angeles County Transportation Commission, 1989-present. 1988 Woman of the Year Award, Sacramento Chapter of the Women's Transportation Seminar; Member, TRB Committees on Strategic Management and Statewide Multimodal Transportation Planning.

Hal Maggied

Transportation Planner; born August 18, 1929, Columbus, Ohio. B.A., Economics, 1963 and B.S., Transportation Management, Ohio State University, 1964; M.B.A., Xavier University, 1968; Ph.D., Public Administration, University of Georgia, 1979; Project Leader and Senior Economist, Battelle Columbus, 1966-71; Director, Regional and Community Development, State of Ohio, 1971-73; Principal Coordinator, Office of the Governor, State of Georgia, 1973-77, Senior Consultant, Ebasco Services Inc., 1977-80; Professor of Management, Nova University, 1980-84; Economic Planner and Policy Analyst, Broward County Metropolitan Planning Organization, 1984-present. Member, American Institute of Certified Planners, American Economic Association; American Academy of Poltical and Social Sciences; American Society for Public Administration; TRB Committees on Intergovernmental Relations and Policy Processes, Transportation and Land Development, and Transportation Planning Needs and Requirements of Small and Medium-sized Communities.

Darwin G. Stuart

Strategic Planner; born May 16, 1941, Peoria, Illinois. B.A., Dartmouth College, 1963; M.A. in Urban Planning, University of Illinois, Urbana-Champaign, 1965; M.S. in Transportation, Northwestern University, 1966; Ph.D. in Civil Engineering, Northwestern University, 1968; Principal Associate, Barton-Aschman Associates, 1968–85; Manager, Strategic Planning, Chicago Transit Authority, 1985-present. Member, American Institute of Certified Planners. Member, TRB Committees on Strategic Management; Transportation and Land Development; and Transportation Programming, Planning and Systems Evaluation.

Anne P. Canby

Transportation Consultant (financial and management); born April 14, 1955, Baltimore, Maryland. B.A., European History, Wheaton College; Deputy Assistant Secretary for Budget and Programs, U.S. Department of Transportation, 1977-81; Assistant Commissioner for Management, New Jersey Department of Transportation, 1981-82; Commissioner, New Jersey Department of Transportation, 1982-84; Treasurer/Comptroller, Massachusetts Bay Transportation Authority, 1984-85; Principal, Canby Associates, 1985-present. Member, Women's Transportation Seminar; 1981 Woman of the Year, Women's Transportation Seminar; Member, TRB Committee on Public Transportation Planning and Development.

James P. Toohey

Transportation Administrator; born April 19, 1948, Boston, Massachusetts. B.A., Finance and Accounting, University of Massachusetts, 1970; Financial Management and Organizational Planning, 1970-84; Assistant Secretary for Transit Research, and Intermodal Planning, Washington Department of Transportation, 1984-present. Member, TRB Committee on Statewide Multimodal Transportation Planning.