



TRANSPORTATION RESEARCH BOARD

CONFERENCE PROCEEDINGS ON THE WEB 15

Making Progress *Transportation Planners and Programmers Turn Ideas into Reality*

Summary of a Conference

May 23–25, 2012
Denver, Colorado



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Making Progress

Transportation Planners and Programmers Turn Ideas into Reality

Summary of a Conference

Katherine F. Turnbull, *Rapporteur*
Texas A&M Transportation Institute
Texas A&M University System

May 23–25, 2012
Denver, Colorado

Organized by
Transportation Research Board

Cosponsored by
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Colorado Department of Transportation
Pikes Peak Area Council of Governments

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This report has been reviewed by a group other than the authors according to the procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

This project was sponsored by the Federal Highway Administration, the Federal Transit Administration, the American Association of State Highway and Transportation Officials, the Colorado Department of Transportation, the Pikes Peak Area Council of Governments, and the Transportation Research Board.

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Preface

Transportation planning and programming—which are a major focus for state departments of transportation (DOTs), metropolitan planning organizations (MPOs), transit agencies, local governments, and federal agencies—continue to evolve in response to the availability of sophisticated analysis tools and techniques, a growing number of related considerations (e.g., climate change, quality of life, and economic stability), more diverse stakeholders (including more interest groups and more public agencies), expanding policies, and the desire for increased transparency and accountability. To further explore the ways in which transportation professionals can use the various tools and techniques at their disposal to achieve transportation planning and programming goals, the Transportation Research Board (TRB) organized Making Progress: Transportation Planners and Programmers Turn Ideas into Reality, a conference held in Denver, Colorado, on May 23–25, 2012.

Building on previous successful TRB statewide planning and programming conferences, this conference took a new approach by bringing the two topics, planning and programming, together. Considering these two topics together provided an opportunity to explore the connections between the two processes and to “cross train” the professionals in each area. The conference was cosponsored by the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the American Association of State Highway and Public Transportation Officials (AASHTO), the Colorado DOT, and the Pikes Peak Area Council of Governments.

TRB assembled a conference planning committee, appointed by the National Research Council (NRC), to help organize and develop the conference program. The planning committee was cochaired by Patricia Hendren of the Washington Metropolitan Area Transit Authority and Alix Bockelman of the Metropolitan Transportation Commission. Committee members provided expertise in statewide and metropolitan transportation planning and programming, performance management, stakeholder outreach, visualization, scenario planning, and investment prioritization.

The planning committee was solely responsible for organizing the conference, identifying speakers, and developing breakout session topics. Katherine F. Turnbull of the Texas A&M Transportation Institute acted as the conference rapporteur and prepared this conference summary. Some of the conference PowerPoint presentations are available at <http://onlinepubs.trb.org/onlinepubs/conferences/2012/MakingProgress/makingprogresspresentations.pdf>.

The conference attracted 162 participants, including representatives from state DOTs, MPOs, transit agencies, universities, consultancies, federal agencies, and other groups. After the opening session, the conference was organized around four steps:

1. Establishing the vision,
2. Establishing the roadmap,
3. Turning the vision into reality, and
4. Monitoring progress.

Each step included both general sessions and breakout sessions. The conference also featured a tools and technology showcase and a walking tour of the Denver Union Station.

The major topics addressed in the general sessions and breakout sessions are presented in this summary report following the same order as the conference program. The summary also includes further research needs, outreach activities, and implementation opportunities identified by the rapporteur from the discussions in the general sessions and the breakout sessions. Appendix A lists the conference attendees.

The views expressed in this summary report are those of the speakers, as attributed to them, and not the consensus views of the conference participants or the conference planning committee members. Any opinions, conclusions, or suggestions discussed in this summary are solely those of the individual participants and do not necessarily represent the views of the conference participants, the planning committee, TRB, or NRC.

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise in accordance with procedures approved by the NRC Report Review Committee. The purposes of this independent review are to provide candid and critical comments that will assist the institution in making the published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the project charge. The review comments and draft manuscript remain confidential to protect the integrity of the process.

TRB thanks the following individuals for their review of the summary: J. Matthew Carpenter of the Sacramento Area Council of Governments, Sonna Lynn Fernandez of the Idaho Transportation Department, Marsha Whitley Fiol of the Virginia DOT, and Donald Vary of CDM Smith.

Although the reviewers listed above provided many constructive comments and suggestions, they did not see the final draft of the symposium summary before its release. The review of this summary was overseen by Susan Hanson of Clark

PREFACE

University. Appointed by NRC, she was responsible for making certain that an independent examination of this summary was performed in accordance with established procedures and that all review comments were carefully considered. Responsibility for the final content of this summary rests entirely with the authors and the institution.

The conference planning committee thanks Katherine Turnbull for her work in preparing this conference summary report and extends a special thanks to FHWA, FTA, AASHTO, the Colorado DOT, and the Pikes Peak Area Council of Governments for their support of the conference.

Opening Session

Don Hunt, *Colorado Department of Transportation*

Michael Hancock, *Kentucky Transportation Cabinet*

Neil Pedersen, *Second Strategic Highway Research Program, Transportation Research Board*

Harlan Miller, *Federal Highway Administration (presiding)*

WELCOME

Don Hunt

Don Hunt, Executive Director of the Colorado Department of Transportation (DOT), welcomed conference participants to Colorado. He highlighted a few facts about the state and discussed some of the challenges faced by Colorado DOT and its strategic focus areas. Hunt noted the importance of planning in the state. He also recognized the hard work of the conference planning committee and TRB in organizing the excellent conference program. Hunt covered the following topics in his presentation:

- Colorado has 25 designated scenic byways, the most of any state. The Trail Ridge Road in the Rocky Mountain National Park has the highest elevation of any paved road in the United States. The Eisenhower Memorial Tunnel is the highest freeway tunnel in the United States.
- Colorado DOT is required to handle a diverse range of emergency conditions—from rock falls to avalanches to major snow storms—to maintain a safe roadway system for the traveling public and freight. The state highway system includes 9,146 centerline miles and 23,061 lane miles and accommodates 27.4 billion vehicle miles of travel annually.
- The Regional Transit District, which is responsible for public transportation in the Denver metropolitan area, operates bus, light rail transit, park-and-ride lots, and other services. The Regional Transit District, Colorado DOT, other public agencies, and private-sector groups partner on various projects. The Denver Union Station is being redeveloped into a premier multimodal hub for transportation in the Denver area and the state.
- Colorado continues to grow. The state population is forecast to increase by 60% by 2040. Approximately 80% of that growth is projected to occur in the Front Range area, which includes the Colorado Springs, Denver, and Fort Collins areas. Meeting

the increased demands for mobility from a growing population, making urban areas more sustainable and livable, and maximizing the performance of all transportation modes are all challenges for Colorado DOT and other transportation agencies.

- Colorado DOT has five external strategic focus areas. The first focus area is improving business processes for better customer service and efficiency. The second focus area is using innovation and improved management to provide more resources for construction. The third strategic area is getting more out of the existing highway system to improve mobility through better operations, management, and innovation without making major infrastructure improvements. Partnering with the private sector to augment public funds represents the fourth focus area. Achieving better transparency and accountability in the Colorado DOT budget through project planning, construction, and maintenance activities is the fifth strategic area.

- Innovative uses of technology will be important in the future. Key elements of the long-range transportation plan include performance-based planning and an increased emphasis on system operations. Multimodal integration, including bicycle–pedestrian, rail, transit, freight, and aviation, represents another important component.

PERFORMANCE-BASED PLANNING

Michael Hancock

Mike Hancock, Secretary of the Kentucky Transportation Cabinet and Chair of the AASHTO Standing Committee on Planning, welcomed conference participants. He thanked the planning committee for their hard work in organizing an excellent conference and recognized the efforts of TRB staff. He also thanked the various sponsoring agencies. He discussed the evolving nature of transportation planning, including the use of performance-based planning. Hancock covered the following topics in his presentation:

- There have been major changes in transportation planning and programming over the past 30 years. Planning and programming are more closely linked today, and transportation planning, performance measurement, and asset management are also interconnected. Performance-based planning is a key part of this evolution.

- As the transportation system in the United States ages, more focus is being placed on managing the existing system and less emphasis is being placed on new capacity. Operations and maintenance are key elements in most states. All states are facing challenges with limited resources and an aging infrastructure.

- The importance of linking transportation planning, programming, performance measurement, and asset management is being recognized by all groups. Performance-based planning connects all these elements. The need for all levels to work together

is also being recognized. Partnerships among agencies, as well as public–private partnerships, are critical.

- More closely linking transportation planning and asset management allows agencies to make better business decisions by making better resource allocation decisions. Asset management is also a key element of performance measurement. Moving Ahead for Progress in the 21st Century (MAP-21) provides additional direction on performance measurement.

LESSONS FROM PAST TRB CONFERENCES AND CHALLENGES FOR 2012 AND BEYOND

Neil Pedersen

Neil Pedersen discussed highlights from the 12 previous TRB conferences on transportation planning and programming. He described the issues and topics addressed at the conferences and presented quotations from speakers and conference proceedings. Table 1 presents the date, conference title, and location for the 12 conferences. In addition to outlining current and future challenges for consideration at this conference, Pedersen highlighted the following past conferences:

- **Issues in Statewide Transportation Planning (1974)**—This first planning conference examined approaches for organizing state DOTs for planning, planning and programming methodologies for both passenger and freight, and state and regional development and their relationship to transportation planning. Various policy issues were also discussed at the conference, including procedures for reaching decisions, incorporating private-sector transportation into planning, changing demand and not just supply, and financing and charging for transportation.

- **Second Conference on Statewide Transportation Planning and Programming (1979)**—Issues from this conference included methods for planners to support executives in dealing with and responding to change; measuring how well the transportation system is working; and communicating this information to technical staff, policy makers, and the public. The energy situation, including supply and price, represented another major topic at the 1979 conference. The importance of communicating with the many stakeholders involved in transportation decisions was also discussed.

- **Highway Programming Issues and Practices (1982)**—Participants at this conference focused on the need to provide a dynamic and flexible process that allows for changes in revenues, schedules, and federal funding and the use of alternative scenarios developed for different funding assumptions. Other issues included making management accountable for assuring that commitments are met; the importance of

TABLE 1 TRB Transportation Planning and Programming Conferences

Year	Conference	Location
1974	Issues in Statewide Transportation Planning	Williamsburg, Virginia
1979	Second Conference on Statewide Transportation Planning and Programming	Warrenton, Virginia
1982	Highway Programming Issues and Practices	Washington, D.C., and Denver, Colorado
1989	Future of Statewide Transportation Planning	Boston, Massachusetts
1992	Transportation Planning, Programming, and Finance	Seattle, Washington
1995	Conference on Transportation Programming Methods and Issues	Irvine, California
1996	Statewide Transportation Planning	Coeur d'Alene, Idaho
1999	Refocusing Statewide Transportation Planning for the 21st Century	Girdwood, Alaska
2003	Statewide Transportation Planning: Making Connections	Duck Key, Florida
2006	The Metropolitan Planning Organization, Present and Future	Washington, D.C.
2006	Key Issues in Transportation Programming	Seattle, Washington
2008	Meeting Federal Surface Transportation Requirements in Statewide and Metropolitan Transportation Planning: A Conference	Atlanta, Georgia
2012	Making Progress: Transportation Planners and Programmers Turn Ideas into Reality	Denver, Colorado

public perceptions related to equity; and maintaining credibility with decision makers, elected officials, and the public through ongoing communication and transparency.

- **Future of Statewide Transportation Planning (1989)**—Participants at this conference discussed the need to establish a vision to help justify funding needs to decision makers. The credibility of information provided to decision makers and management of the transportation system as a planning issue were also discussed. Other topics included multimodal planning versus planning for multiple modes, or moving beyond analyzing and funding each mode separately to explore optimal combinations of modes; the relationship between land use and transportation; and linkages between transportation and the environment. Additional topics included communication challenges faced by planners, personnel and education issues, and the future role of technology.

- **Transportation Planning, Programming, and Finance (1992)**—This event focused on implementing the provisions of the Intermodal Surface Transportation

Efficiency Act of 1991. Provisions related to multimodal planning and programming, funding flexibility, and fiscally constrained plans and programs represented a major conference focus. Other topics included the potential incompatibility between long-range plans and fiscal uncertainty, consensus building, and measuring program effectiveness.

- **Conference on Transportation Programming Methods and Issues (1995)**—Subjects discussed at this conference included linking goals to implementation, developing a true multimodal programming process, and identifying effective institutional arrangements for programming. Other issues were modifying fiscal constraint rules, taking advantage of innovative financing options, and increasing inclusiveness in the programming process. Finding a balance between air quality and mobility goals and flexibility to modify programs represented additional issues.

- **Statewide Transportation Planning (1996)**—Selected issues at this conference included financially constrained plans and the organizational linkage of planning and programming. Performance-based planning, analysis tools to predict outcomes rather than outputs, and accountability represented other issues. Linking planning and operations, incorporating freight concerns into the planning process, and multistate planning issues were also discussed.

- **Refocusing Statewide Transportation Planning for the 21st Century (1999)**—Topics at this conference included land use considerations in statewide planning, the integration of environmental issues into the transportation planning process, and the impacts of globalization on freight. Other issues focused on asset management, safety issues in the planning process, and environmental justice and equity. Organizational change needed to address new issues and the impacts of changing demographics were also discussed.

- **Statewide Transportation Planning: Making Connections (2003)**—This conference covered topics such as understanding the broader context of changes expected to occur in the future and making connections with the political process and decision makers. Communicating with customers, linking planning and program delivery, and connections between transportation planning and other types of planning were also covered.

- **The Metropolitan Planning Organization, Present and Future (2006)**—Presentations at this event included the organizational structures of metropolitan planning organizations; regional decision making; and integrating freight, operations, safety, asset management, and environmental considerations into the planning process. Comprehensive planning considerations and relationships with decision makers responsible for implementation were also discussed.

- **Key Issues in Transportation Programming (2006)**—Speakers at this conference addressed policy and politics in the programming process, agency relationships and roles, and striking a balance among needs. Understanding different funding sources, maximizing available funding, and cost estimation challenges were

other topics covered. Managing uncertainty and risk and accountability reporting represented additional topics covered in the conference sessions.

- **Meeting Federal Surface Transportation Requirements in Statewide and Metropolitan Transportation Planning: A Conference (2008)**—The key focus of this conference was multijurisdictional planning issues, including megaregion and multistate metropolitan planning organizations. Other topics addressed were collaborative decision making, Strategic Highway Safety Plans, and linking planning and the National Environmental Policy Act process. Cost estimation and risk analysis, uncertainty in revenue predictions, devolution and fragmentation of decision making, and climate change represented other topics discussed at the conference.

Pedersen noted that the planning committee for the present planning and programming conference identified various items to help focus the discussions over the next few days. Addressing transportation's role in achieving a broader vision, societal goals, and desired outcomes represents one topic. This broader vision includes economic prosperity, quality of life, environmental health, energy use, and public health. Another issue is better understanding changes occurring outside transportation that affect transportation. These changes include technology, global and national economic trends, changing demographics, changing lifestyles, energy availability, and climate change.

Still other topics for discussion at this conference are change and uncertainty; the need to be nimble and flexible; the need to plan for a range of possible futures; and the need to address financial uncertainty. Changes in customer expectations driving the planning process represent an additional issue. These changing expectations focus on reliability and operations, instant access to information, transparency, and accountability.

Meeting the needs of decision makers is another critical item to be addressed at this conference. Elements within this topic include understanding decision makers' and constituents' most important issues; providing timely, relevant information; and communicating in easily understandable language. Other related topics are providing accurate and credible information, demonstrating a return on investment, equity issues, changing priorities, and letting decision makers make the decisions.

Additional topics include focusing on demand and supply issues, planning for multistate and megaregion issues, and emphasizing goods movement. Encouraging collaboration, consensus building, and partnerships are needed in an increasingly partisan environment. There is also a need to demonstrate how planning links directly to implementation. Maintaining, reconstructing, and operating an aging infrastructure is another concern, as is underinvestment in transportation. It appears transportation is not a public priority because it is taken for granted. There is a need to communicate a vision and what outcomes will occur as a result of transportation investments. Private-sector transportation services are another topic. Considering if transportation agencies

are organized appropriately for planning and programming in the future represents another possible topic.

Pedersen concluded his presentation with a few final questions that can be considered at the conference: How can planners effectively collaborate with the numerous partners and stakeholders involved in the process? How does planning best add value for decision makers and customers? How can planners lead change into the future? How do we establish and maintain the credibility and integrity of transportation planning and programming?

Conference Overview

Patricia Hendren, *Washington Metropolitan Area Transit Authority (cochair)*

Alix Bockelman, *Metropolitan Transportation Commission (cochair)*

Patricia Hendren and Alix Bockelman, cochairs of the conference planning committee, provided an overview of the conference program and activities. They thanked the conference sponsors, the conference planning committee, TRB staff, and the conference supporters. Hendren and Bockelman covered the following topics in their presentation:

- They recognized and thanked the members of the conference planning committee for their hard work and dedication in organizing an excellent conference. The cosponsoring agencies (the Federal Highway Administration, Federal Transit Administration, American Association of Highway and Transportation Officials, Colorado Department of Transportation, and Pikes Peak Area Council of Governments) were recognized and thanked. The conference supporters (Cambridge Systematics, Inc., HDR Engineering, and CDM Smith) were also recognized and thanked. The two TRB organizing committees are the Statewide Multimodal Transportation Planning Committee (ADA10) and the Transportation Programming, Planning, and Systems Evaluation Committee (ADA50). The extra efforts of TRB staff members Kimberly Fisher, Mary Kissi, Freda Morgan, and Bruce Millar were acknowledged.
- The conference was organized around the four-step process of establishing a vision, establishing a road map, turning a vision into a reality, and monitoring and measuring progress. General sessions and breakout sessions were used to highlight tools, techniques, and case study examples with each step. Speakers at the closing session summarized key elements and common themes. Participants also had the opportunity to create individual action plans for implementing the new ideas from the conference when they return to work.
- The conference also included a tools and technology showcase. The showcase included demonstrations of a wide range of tools for scenario development and testing, community engagement and priority setting, data visualization, investment analysis and prioritization, and risk analysis.
- An optional walking tour of the Denver Union Station multimodal project was scheduled.

Step 1. Establishing the Vision

Matthew Hardy, *American Association of State Highway and Transportation Officials*

Sandi Kohrs, *Colorado Department of Transportation*

Jennifer L. Weeks, *Parsons Brinckerhoff*

The development of transportation plans and programs begins with the identification of a long-range vision. Goals and objectives are established based on the vision. This session included seven case studies presented in three breakout sessions focusing on engaging the public, communicating with decision makers, and using data and tools. The first speaker described the elements of the vision process and highlighted the seven case studies.

INTRODUCTION TO STEP 1: ESTABLISHING THE VISION

Matthew Hardy (presiding)

Matt Hardy introduced the first step of establishing the vision. He highlighted the importance of this step and described the case studies to be presented in the three breakout sessions. Hardy noted that the long-range vision is the beginning point for the development of transportation plans and programs. From the vision, goals are established and objectives are set.

Hardy highlighted the seven case studies, focusing on engaging the public, communicating with decision makers, and using data and tools, presented in the three breakout sessions. The case studies feature examples from state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) and cover all aspects of the multimodal transportation system.

BREAKOUT GROUP 1: ENGAGING THE PUBLIC

Sandi Kohrs (moderator)

This breakout group explored public engagement methods to help establish the vision and the experiences encountered using different approaches.

Brad Zumwalt of the Nebraska Department of Roads discussed Vision 2032, Nebraska's Long-Range Transportation Plan. The objective of Vision 2032 was to create a statewide transportation planning document through a collaborative process. Zumwalt described the stakeholder involvement methods, including a survey of 2,219

citizens and 1,131 businesses, a needs assessment of all Nebraska cities and counties, statewide outreach, and a Vision 2032 Stakeholder Summit.

Regina Aris of the Baltimore Metropolitan Council discussed gauging public attitudes related to linking land use and transportation as part of the imagine 2060 planning process. The public outreach process included using the imagine 2060 Scenario Selection Wizard. The Wizard allows people to choose their preferred land use and transportation options and provides the impacts of their selections in terms of vehicle miles traveled, transit travel times, emissions, and other variables. Individuals could indicate if they liked the results, or they could modify their selections to obtain different results. Land use options included focusing on downtowns, town and village centers, established neighborhoods, and expanding suburbs. Transportation alternatives focused on urban multimodal transportation, local and regional connections, commuter options, and expanding roadways.

Linda Koenig of the Oklahoma DOT and Lisa Nungesser of Parsons Brinkerhoff described the use of traditional and Internet tools to engage the public in the development of the 2010–2035 Oklahoma DOT Statewide Transportation Plan. Three citizen committees were used. The Tribal Travel Advisory Committee included representatives from nine tribal nations. The Personal Travel Advisory Committee included representatives from 22 stakeholder groups. The Freight Advisory Committee included representatives from 30 stakeholder organizations. Interviews were also conducted with representatives of the different groups. Outreach activities included mailings to all county clerks and other stakeholders, press releases, and bilingual newsletters. An interactive website received over 3,000 hits, and a bilingual web survey received 291 responses. Two rounds of public meetings were held, with 14 meetings in the first round and six meetings in the second round. The same web survey was used in print form, with 164 responses received. Examples of challenges encountered included providing enough background information to assist the public in making informed comments, without overwhelming the public; framing questions and invitations for comments to be clear and informative regarding constraints; and reaching traditionally underserved populations and gauging when to employ additional tools and resources. Some of the solutions included using mixed approaches with traditional and Internet media to connect with more people faster; multilingual materials to reach more of the state's population; hosting meetings across the state to facilitate broader public engagement; and using the citizen committees described above to tap into expertise and input that could otherwise have gone unaddressed.

BREAKOUT GROUP 2: COMMUNICATING WITH DECISION MAKERS

Jennifer L. Weeks (moderator)

This breakout group discussed different techniques for keeping transportation decision makers informed and engaged during the visioning process.

Lindsey Douglas of the Kansas DOT, Julie Lorenz of Burns & McDonnell, and Deb Miller of Cambridge Systematics, Inc., discussed the development of Transportation Works for Kansas, or T-WORKS, which was approved by the Kansas Legislature in May 2010. T-WORKS is a 10-year program totaling \$8 billion, including \$2.7 billion in new revenue from sales tax. The Partnership Project was key to the success of T-WORKS. This project was a high-level, agencywide assessment that surveyed approximately 900 stakeholders to obtain feedback on how well Kansas DOT met the needs of the public and opportunities to improve Kansas DOT's efficiency and cost-effectiveness. The results indicated that Kansas DOT delivered good projects, but how they delivered these projects needed to be improved. Kansas DOT changed by working more closely with partners, communicating early and often, and collaborating with stakeholders. The speakers stressed four key points. First, rather than focusing on decision makers, concentrate on influencers, including city and county elected officials and staff, community leaders, chambers of commerce, and editorial boards. Second, in developing a vision, it is important to listen, craft a vision, and let it evolve. Third, it takes time and multiple iterations to gain broad support for a vision, plan, or program. Fourth, going slowly is necessary to ultimately go fast. The Kansas experience highlights the need to evaluate, engage, envision, and execute.

James Cromar of the Broward MPO described the techniques used to communicate with decision makers in the development of the Broward 2035 Transit Cost Feasibility Plan. He highlighted the location and characteristics of the MPO area, the MPO board composition, and the key elements of the 2035 Transit Cost Feasibility Plan. The plan focuses on premium transit services with high-capacity and rapid bus service and three types of mobility hubs (gateway hubs, anchor hubs, and community hubs).

BREAKOUT GROUP 3: USING DATA AND TOOLS

Matthew Hardy (moderator)

Speakers in this breakout group discussed the use of data and tools in the visioning phase of different plans and projects. The benefits and challenges of the different approaches and technologies were explored.

STEP 1. ESTABLISHING THE VISION

John Thomas of the Utah DOT discussed the development of the Utah DOT UPlan geographic database. UPlan is an interactive planning and analysis tool developed by Utah DOT that provides access to data to support informed discussions and decisions. The web geographical information system (GIS) application provides quick and easy access to a wide range of information from numerous sources. It facilitates synchronizing plans and projects with state and federal agencies, local governments, utility companies, and Utah DOT divisions and regions. Thomas highlighted data elements and different applications of UPlan.

Kermit Wies of the Chicago Metropolitan Agency for Planning (CMAP) discussed using regional indicators to track progress in CMAP's GO TO 2040 comprehensive regional plan. Transportation is a key component throughout the plan, but there is not an individual transportation chapter. Transportation is a strategy, not a goal. Examples of regional indicator categories include system reliability; system operations; system accessibility; travel choices; mobility for people with disabilities; and system maintenance, investment, and safety. Different data sets are used to track performance on indicators within these categories. Working with partners, CMAP is creating indicators for predicting and measuring economic, environmental, social, and cultural variables that affect quality of life. A web interface will facilitate access for local officials, planners, and other decision makers.

Step 2. Establishing the Road Map

Charlie Howard, *Puget Sound Regional Council*

Elise Barrella, *Georgia Institute of Technology (moderator)*

Thomas Brigham, *HDR Alaska, Inc. (moderator)*

Alix Bockelman, *Metropolitan Transportation Commission (moderator)*

Sandi Kohrs, *Colorado Department of Transportation (moderator)*

Steve Heminger, *Metropolitan Transportation Commission*

Kathleen Neill, *Florida Department of Transportation*

Charmaine Knighton, *Federal Transit Administration*

The development of a long-range plan provides the road map to accomplish the vision. It also provides the critical link between planning and programming. The first speaker highlighted recent changes in long-range transportation plans and the planning process. Speakers in three breakout sessions provided details on performance measures and targets, scenario planning, and collaboration. A final session focused on how agencies are using these planning techniques to inform project and program decisions.

IT'S NOT YOUR GRANDPA'S TRANSPORTATION PLAN

Charlie Howard

Charlie Howard introduced the topic of establishing a road map by describing some of the recent changes in transportation planning. These changes include addressing broader topics and policy issues, coordinating with other plans and programs, participation by more diverse groups, advanced planning and analysis tools, and greater public expectations. Howard covered the following topics in his presentation:

- Transportation plans at all levels are addressing broader topics and policy issues. Unprecedented policy connections are being made to transportation. For example, transportation is being linked to policies related to health, climate change, economic development, and setting and achieving performance targets.

- Coordination with other plans and planning efforts has increased significantly. Transportation is not a means to itself, and the connection to other planning is becoming more visible and more important. Transportation is increasingly being linked to economic development, land use and growth management, habitat protection, stormwater management, and climate change planning for both mitigation and adaptation.

- There is also broader involvement and participation in the transportation planning process today. More people and more groups expect to be engaged meaningfully in transportation planning. Examples of these groups include environmental justice and equity networks, tribal governments and tribal employers, business groups, and communities.
- There are better, more advanced, and more complicated planning and analysis techniques available today. Advanced computing capabilities allow more sophisticated and complex tools. Activity-based models, other advanced travel demand models, and advanced land use forecasting models (such as UrbanSim) and postprocessors (such as air quality tools and cost–benefit tools) provide a few examples.
- Public expectations are also different today. Planners need to be able to communicate complex and interrelated topics clearly and in a way that helps inform public decisions. One example is explaining how financing through tolling relates to traffic management and reducing emissions.
- The three breakout sessions focused on establishing signposts (performance measures) and how to use them in performance-based planning; scenario planning (testing transportation and land use models to achieve performance targets); and achieving integrated planning through collaboration by forming effective partnerships. The final session addressed linking planning and programming.

BREAKOUT GROUP 1: ESTABLISHING SIGNPOSTS AND HOW TO USE THEM

Elise Barrella (moderator)

The four speakers in this breakout group discussed approaches for developing and using performance measures.

Martin Kidner of the Wyoming Department of Transportation (DOT) described the use of performance indicators, performance qualifications, and mapping analyses in Wyoming Connects: An Integrated Planning Framework. He used pavement condition as an example to explain the process.

Ryan Wilson of the Minnesota DOT discussed integrating performance measures into an evolving capital investment framework. He described the performance management cycle and the link between the policy plan, the highway investment plan, and ongoing performance monitoring. He also highlighted emerging direction at the federal level, other considerations, adjustments being made to the various processes and plans, and the performance level concept. Opportunities include increased accountability and transparency, linking planning to programming to project delivery, and making the case for increased funding. Challenges include the following: goals must drive the measures, targets must be attainable, and there must be a commitment to a process that requires considerable staff time and financial resources.

Matthew Carpenter of the Sacramento Area Council of Governments discussed the evolution toward performance-based planning and programming in the Sacramento region. He described recent planning studies and reports, including the *Blueprint Transportation and Land Use Plan*, the *Rural–Urban Connections Strategy*, and the *2035 Metropolitan Transportation Plan/Sustainable Communities Strategy*. The *Blueprint* represents information-based planning that addresses the regional, jurisdiction, and neighborhood levels; uses citizen democracy; and uses a sketch planning tool for testing scenarios. The *Rural–Urban Connections Strategy* focuses on enhancing rural economic viability and environmental sustainability in the region. The *2035 Metropolitan Transportation Plan/Sustainable Communities Strategy* principles include smart land use, environmental quality, financial stewardship, economic vitality, access and mobility, and equity and choice.

Leigh Blackmon Lane of the Center for Transportation and the Environment at North Carolina State University described translating sustainability goals into performance measures. She discussed the development of the North Carolina DOT *Blueprint*. Steps in the process include a plan review and practices inventory, defining sustainability for North Carolina DOT, developing the *Blueprint*, and implementation. Developing the *Blueprint* included defining the principles and objectives, identifying the performance measures, and outlining the strategies. Some of the highlighted lessons learned included developing outcomes and objectives that are defensible, tangible, and encompassing as well as developing the selection criteria for performance measures.

BREAKOUT GROUP 2: SCENARIO PLANNING: TESTING TRANSPORTATION LAND USE MODELS TO ACHIEVE PERFORMANCE TARGETS

Thomas Brigham (moderator)

This breakout group focused on defining the transportation system needed to achieve a community’s vision. Examining the complex interactions between transportation and land use and considering potential trade-offs among different objectives are part of the process. Best practices in scenario planning at the regional and state levels that integrate transportation and land use were discussed, along with the scenarios, the development processes, and setting performance targets.

David Ory of the Metropolitan Transportation Commission (MTC) described the process used in the OneBayArea scenario analysis to examine greenhouse gas (GHG) emissions. He focused on three questions. First, how much policy nuance should be communicated in scenario performance targets? The OneBayArea scenario analysis forecasted the emissions of passenger vehicles and light-duty trucks to understand

the progress being made to achieve the goal of reducing GHG emissions by 15% per capita relative to 2005 levels. The forecast did not include reductions from vehicle regulations and truck changes. A simplified version of the same performance target is to reduce GHG emissions by X percent relative to YYYY levels. The wording of the first target is consistent with state statutes and introduces policy nuances, but it is difficult for the public to comprehend and is routinely misquoted, resulting in misunderstandings. The alternative target is easier for the public to understand, but it is harder to link to the state statute. The second question related to the usefulness of the assertion of land use outcomes in scenario analysis. Ory noted that land use models are relatively new and complex. Experience is being gained in the use of these models and in understanding the impacts of different land use outcomes. He also suggested that experience can be gained by establishing policies, monitoring behavior, and assessing outcomes. The third question considered whether the investment in analytical staff and tools were commensurate with demands in an area. He highlighted examples of studies and analyses that MPO staff may be requested to perform.

Jerri Bohard of the Oregon DOT described recent state legislation requiring reductions in GHG emissions, local planning and scenario planning to assist in this research, and the Oregon Sustainable Transportation Initiative. She discussed the state transportation strategy, which identifies the most promising approaches to significant GHG reductions while fostering other societal goals in the state, and the three phases of developing a statewide transportation strategy: implementation, monitoring, and adjusting. Bohard also described the relationship of the Oregon Sustainable Transportation Initiative to the transportation planning process, challenges, the development process and features of the statewide transportation strategy approach, and the use of scenario planning.

Erik Sabina of the Denver Regional Council of Governments discussed the development of the council's Metro Vision 2040 Plan, including the scenario formation and the analytical tools. He highlighted the impetus for a new vision, the scenario analysis based on the Metro Vision Guiding Vision (adopted in 1992), and the 2007 scenario analysis refining the vision. He outlined the new challenges and new measures considered in Metro Vision 2040, the planning process and schedule, and the use of new analytical tools. The benefits of using Focus, the council's new activity-based model, rather than Compass, its trip-based model, were discussed.

Andy Waple of the Fredericksburg Area Metropolitan Planning Organization and Matt Noonkester of the Seven Hills Town Planning Group, Inc., described the development of the George Washington Region Scenario Planning Study. They discussed the characteristics of the area, which is experiencing rapid and decentralized growth, and community-based regionalism, which is a new, emerging concept in regional planning. This approach addresses big growth issues facing the

region, uses the MPO as a project enabler, better balances conflict and collaboration, and provides a regional vision and local implementation. The study included a trade-off analysis of the five development scenarios, constant contact with stakeholders, scenario planning and a four-part partnering strategy involving an online citizen survey, focus groups, citizen workshops, and a project steering committee. A development scenario report card based on six regional growth principles was examined. Lessons learned from the study included the importance of establishing roles and expectations of all groups in the beginning, ongoing coordination, and providing local governments with needed tools and making them part of the recommended outcome.

BREAKOUT GROUP 3: COLLABORATION FOR INTEGRATED PLANNING: FORMING EFFECTIVE PARTNERSHIPS

Alix Bockelman (moderator)

The three presentations in this session focused on successful partnerships for integrated transportation planning.

Sondra Rosenberg of the Nevada DOT discussed the I-15 Mobility Alliance, a partnership for the efficient movement of people and goods involving the California, Nevada, Arizona, and Utah state DOTs and the private sector. She described the vision for the I-15 corridor system master plan, the characteristics of the I-15 corridor from San Diego to Salt Lake City, the prioritization process, and the diverse mix of public and private stakeholders. Tips for keeping stakeholders involved included valuing their time and input, understanding and respecting partners' goals and priorities, ensuring a feeling of ownership in the process, focusing on common interests, providing a credible and transparent process, having flexibility and openness, and celebrating successes.

Mell Henderson of the Mid-America Regional Council discussed National Cooperative Highway Research Program Project 8-36 (104): Integrating Performance Measures into a Performance-Based Planning and Programming Process. The objectives of this project were to move from a conceptual framework to realistic examples; to examine state, regional, and local collaboration as a means of implementing national performance measures; and to identify barriers to strategies to overcome them. The performance measurement framework developed in this project was pilot tested in Kansas City (safety focus), Pennsylvania (preservation focus), and the Maryland–Washington, D.C., region (congestion focus). The Kansas City pilot used measures to identify engineering-related safety emphasis areas, discussed options for addressing them in the regional plan, assessed organizational models for collaborative performance-based planning, and developed an implementation plan for sharing safety data between agencies.

Del Walker of the Denver Regional Transportation District described the FasTracks program and the partnerships involved in implementing the program. Major elements of the program include 122 miles of light rail transit and commuter rail, 16 miles of bus rapid transit, 31 new park-and-ride lots, enhanced bus networks and transit hubs, and redevelopment of Denver Union Station. The Denver Union Station serves as the hub of the FasTracks program, with bus, light rail transit, commuter rail, and Amtrak. Walker described translating the vision of the Denver Union Station into action and highlighted the project elements, costs, funding sources, schedule, stakeholder input process, and the adopted plan.

LINKING PLANNING AND PROGRAMMING

Sandi Kohrs (moderator)

This session examined agency success stories connecting the planning, project, and programming processes. Three agencies highlighted the use of planning activities, including scenario planning and performance targets to inform project selection and the final program.

MAKING A COMPELLING CASE: USING PERFORMANCE ANALYSIS TO GUIDE PROJECT SELECTION IN THE BAY AREA

Steve Heminger

Steve Heminger discussed the development and key elements of Plan Bay Area, the MTC's new long-range transportation plan for the San Francisco Bay area. He described the use of scenario and project performance assessments in the plan and the high-performance projects prioritized for regional funding. Heminger covered the following topics in his presentation:

- Plan Bay Area is the MTC's first regional plan to integrate transportation, land use, and housing into the Sustainable Communities Strategy initiated by California Senate Bill 375. Steps in the development of the plan included establishing performance targets, conducting a scenario performance assessment, conducting a project performance assessment, and defining the preferred scenario.
- New performance targets focusing on the economy, the environment, and equity were adopted as part of the plan. The economy performance targets focus on economic vitality by increasing gross regional product and improving transportation system effectiveness through increases in the nonautomobile mode share, reductions in vehicle miles traveled per capita, and maintaining the transportation system.
- The environment performance targets focus on climate protection by reducing

the per capita GHG emissions from automobiles and light-duty trucks and on healthy and safe communities by reducing premature deaths from exposure to particulate emissions, reducing injuries and fatalities from collisions, and increasing average daily time spent walking or biking. The equity performance targets focus on adequate housing by accommodating the entire region's projected housing growth and by decreasing housing and transportation costs as a share of low-income household budgets.

- The performance assessment framework includes a planning framework and a performance assessment. There are scenario-level target assessments and two elements of project-level performance assessments: target assessments and benefit-cost assessments. The target assessments determine the impact on targets adopted by MTC and the Association of Bay Area Governments. All 900 uncommitted projects were analyzed in the target assessments. The benefit-cost assessment compares the benefits and costs of a project. A benefit-cost assessment was conducted on the approximately 100 most significant projects.

- The target assessments addressed each project qualitatively by using target scores, with a maximum score of +10. The scoring categories include climate protection, adequate housing, particulate matter, collisions, and active transportation. Other categories are open space, equitable access, economic vitality, nonautomobile mode share/vehicle miles traveled, and state of good repair.

- The benefit-cost assessment uses the MTC Travel Model One to quantitatively examine each project. Benefits included in the analysis are travel time (including recurring and nonrecurring delay), travel costs (automobile operation and ownership, parking), emissions (CO₂, PM_{2.5}, reactive organic gases, NO_x), collisions (fatalities, injuries, property damage), health impacts due to active transport, and noise. Costs included in the assessment are capital costs and net operating and maintenance costs.

- Heminger cited three key findings that emerged from the Plan Bay Area performance assessment. First, the results focus on improving and maintaining existing assets, with an emphasis on system management. Second, the process provides significant regional funding to the most cost-effective projects. Third, the need to reconsider the inclusion of low-performing projects due to cost-ineffectiveness or adverse impacts on performance targets emerged.

- The project prioritization using this process resulted in some changes from the previous long-range transportation plan adopted in 2009. Both plans allocated 30% of available funds to operation and maintenance of roads and bridges. The amount allocated to road and bridge expansion declined from 5% to 3%, and the transit expansion allocation declined from 14% to 9%. The allocation for transit operations and maintenance increased from 51% to 58%. The overall funding level increased from \$218 billion to \$277 billion.

- Examples of high-performing projects prioritized for regional funding included Bay Area Rapid Transit (BART) Metro, Caltrans electrification and frequency

improvements, and bus rapid transit systems in San Francisco and Oakland. Other high-performing projects included San Francisco congestion pricing, the BART extension to San Jose, and the freeway performance initiative.

- Low-performing projects—which were defined as having a benefit–cost ratio less than one or significant adverse impacts on the performance targets—were required to make a compelling case to policy makers. This process led to a more efficient plan that better aligns with the region’s goals and targets.

- Of the 32 low-performing projects, 12 were withdrawn by sponsors and one was addressed in a different manner. A total of 11 projects were rescoped: seven addressed the environmental phase only, three had sponsors who agreed to fully fund the projects locally, and one was downscoped to achieve a benefit–cost ratio greater than one. Eight compelling cases were approved: six based on communities of concern, one based on air quality, and one based on recreational trips.

- Other examples of low-performing projects that were modified included SMART commuter rail extensions that were scaled back to include only the most cost-effective segments, the Dumbarton Rail project that was rescoped to pursue only the environmental study, and the US-101 and SR-239 freeway widening projects that were rescoped to pursue only environmental studies. Examples of low-performing projects that were approved as compelling cases included the Lifeline Program, the suburban–rural bus frequency improvements, and the Capitol Expressway light rail transit extension in East San Jose. These projects were approved primarily based on support for low-income and minority communities.

- Heminger closed his presentation by saying that the experience with the Plan Bay Area performance assessment provides some lessons learned. First, given the limited budget for expansion projects, performance data were at a premium. Second, modeling capabilities were stretched thin for nonexpansion projects. Third, performance results helped to advance good projects and weed out bad ones. Finally, experience indicated the need to carefully consider performance objectives and which projects to evaluate.

FLORIDA’S DECISION-MAKING FRAMEWORK: FROM PLANS TO INVESTMENTS

Kathleen Neill

Kathleen Neill discussed the transportation decision-making framework used at the Florida DOT. She described the strategic intermodal system (SIS) in the state, the strategic investment tool (SIT), and some of the challenges faced by Florida DOT. Neill covered the following topics in her presentation:

- Florida’s transportation system includes state highways, local roads, public transit, freight railroads, seaports, intercoastal and inland waterways, commercial and

military airports, and spaceports. The owners and operators of these facilities include the federal government, the state, local governments, local agencies, special districts, and the private sector.

- The policy framework for investment decisions at Florida DOT is based a variety of plans. The Florida Transportation Plan provides a 20-year horizon. The *Florida Transportation Plan Performance Report* focuses on a 5-to-10-year horizon. The Program and Resource Plan includes a 5-year work program and an annual budget. The Florida DOT performance-based planning and programming process is based on established goals and objectives. Financial policies are developed based on these goals and objectives. The financial policies allow for project delivery. Performance measurement is linked into each of these elements.

- The state investment priorities focus on safety, system preservation and maintenance objectives, and transportation system capacity. The SIS provides a statewide system of high-priority facilities. The SIS includes highways, corridors, and connectors for the different modes. The SIS is funded by Florida DOT, local governments and local authorities, direct federal funding, and the private sector.

- The adopted 5-year work program includes \$6.1 billion for improvements. The SIS second 5-year plan includes \$4.6 billion for improvements. The SIS Cost Feasible Plan prepared in December 2009 includes \$10 billion in projects for the 2020 to 2035 timeframe.

- The SIS links planning to programming through the project pipeline. The SIS Needs Plan focuses on a 20-year horizon and is unconstrained by cost. The SIS Cost Feasible Plans are 10- and 20-year plans that are constrained by revenue projections. The Florida DOT Work Program is a 5-year plan matched with available funding. Public involvement is a key component throughout the development of all these plans and programs.

- Priority setting inputs for the SIS statewide managed funds include district priorities, the SIT, modal plans, and project cost and phasing. The SIT is used to evaluate how candidate projects address the Florida Transportation Plan goals and the SIS Strategic Plan objectives. The SIT is a transparent, coordinated, documented, and automated process that provides the ability to compare projects across the state. The SIT has three components: the system viewer, the analyzer, and the reporter.

- One challenge with the SIT is moving from a highway focus to a multimodal focus and setting priorities across modes. Considering the return on investment represents another challenge. The changing nature of future freight trends related to international trade and intermodal logistics centers is still another challenge. Finally, providing flexibility in the process and enhancing the ability for quick responses are ongoing challenges.

FTA NEW STARTS AND LIVABILITY: MAKING IT HAPPEN AT THE REGIONAL LEVEL

Charmaine Knighton

Charmaine Knighton discussed the FTA New Starts Program and the Sustainable Partnership involving the U.S. Department of Housing and Urban Development (HUD), the U.S. DOT, and the U.S. Environmental Protection Agency (EPA). Knighton covered the following topics in her presentation:

- To fulfill its mission of improving public transportation for America's communities, the FTA provides funding for transit in 50 states, the District of Columbia, and several U.S. territories. Transit modes include buses, bus rapid transit, subways, light rail transit, commuter rail, monorail, passenger ferry boats, trolleys, inclined railways, and people movers. Approximately 75% of FTA funding is allocated based on formula, and 25% is discretionary. FTA's annual budget is approximately \$10 billion.
- The FTA New Starts Program represents a large discretionary program that has a 30-year history of investing in transit infrastructure in the United States. Approximately \$2 billion per year is allocated to new rail, streetcar, bus rapid transit, and ferry systems. Projects are evaluated to enter the New Starts pipeline. Multiyear federal funding is awarded to finance project construction. The New Starts Program includes the New Starts category, which includes fixed guideways or extensions to existing fixed guideway systems, and the Small Starts category, which includes fixed guideways and corridor-based bus projects.
- The FTA must evaluate and rate projects annually in a report to Congress. New Starts are evaluated and rated to enter into preliminary engineering, enter into final design, and before a full funding grant agreement and construction. Small Starts are evaluated and rated to enter into project development and before a project construction grant agreement and construction.
- Although the New Starts Program has been successful for 30 years, the process is complex and complicated. The FTA initiated an effort in 2010 to revise the process and measures. The proposed changes focused on reducing red tape and allowing projects to reach construction more quickly and being more responsive to community needs and concerns. Other changes focused on eliminating time-consuming technical requirements, capturing a broader set of the benefits for projects, and using a more holistic approach in evaluating benefits to a community. Projects would be evaluated using equal weights for mobility, cost-effectiveness, environmental benefits, land use, economic development, and operating efficiencies. Trips, rather than travel time savings, would become the driving factor. Knighton noted that MAP-21, which was approved by Congress and the President after the conference, included new directions for FTA in revising the New Starts Program criteria.

- The HUD–U.S. DOT–EPA Sustainable Partnership is based on six guiding principles: providing more transportation choices, promoting equitable and affordable housing, enhancing economic competitiveness, supporting existing communities, coordinating policies and leveraging investment, and valuing communities and neighborhoods.

- Two examples of local projects combine the New Starts Program and focus on livability, workforce development, and affordable transit-oriented development. The first project involves the Regional Transportation District’s Workforce Initiative Now Program, which is part of the East Corridor (Denver Union Station to Airport and Denver Union Station to Arvada), the commuter rail maintenance facility, and the northwest electrified segment. The second project is an affordable transit-oriented development project that involves a \$4.5 million HUD Regional Planning Grant for the Denver Region Sustainable Communities Initiative. Catalytic sites for this project include the West Sheridan Station area, the East and Gold corridors, and the Northwest Rail–US-36 bus rapid transit corridor.

Step 3. Turning Vision into Reality

Camelia Ravanbakht, *Hampton Roads Transportation Planning Organization*
Jennifer Evans, *Southeast Michigan Council of Governments*
David Wasserman, *North Carolina Department of Transportation*
Patricia Hendren, *Washington Metropolitan Area Transit Authority (moderator)*
Suzann Rhodes, *CDM Smith (moderator)*
Steven Pickrell, *Cambridge Systematics, Inc. (moderator)*
Denise Jackson, *Michigan Department of Transportation (presiding)*

After a vision has been established, the next step is turning it into reality through programming. Speakers described techniques and procedures for moving projects from the long-range plans developed in the previous steps into fiscally constrained transportation improvement programs (TIPs) and state transportation improvement programs (STIPs). Speakers in the first panel described how their organizations have embraced a performance-based project prioritization process, effectively obtained public input, and assisted policy makers to make more informed decisions. These topics were discussed in more detail in the three breakout sessions. Denise Jackson presided over the panel discussion.

GOING THE EXTRA MILE: INTEGRATING PRIORITIZATION, OUTREACH, AND POLITICS INTO TRANSPORTATION PLANNING IN HAMPTON ROADS, VIRGINIA

Camelia Ravanbakht

Camelia Ravanbakht described the development of the 2034 Long-Range Transportation Plan (2034 LRTP) and the use of a project prioritization tool at the Hampton Roads Transportation Planning Organization (HRTPO). She discussed future modifications to the project prioritization tool and use of the tool in short-term planning applications. Ravanbakht covered the following topics in her presentation:

- HRTPO, serving a population of approximately 1.67 million, covers Hampton Roads, which includes the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg; the counties of Isle of Wright, James City, and York; and a portion of Gloucester County. The area

is a strategic location for foreign trade, military facilities, and tourism. The Hampton Roads peninsula is bisected by many rivers and bays, so bridges and tunnels are a major focus for the Virginia DOT and HRTPO.

- The 2034 LRTP is required to be fiscally constrained. There were approximately 150 candidate projects totaling \$30 billion, with only \$7.7 billion in funding available for new transportation projects.

- The development of the 2034 LRTP included a number of steps, with public outreach occurring throughout the process. Initial steps included development of the vision and goals and the identification of candidate transportation projects. Development of the prioritization tool and applying the tool to evaluate and prioritize the candidate transportation projects represented the next steps. A fiscally constrained list of projects was developed. The final steps in the process included finalizing the list of projects and completing the air quality conformity analysis. The HRTPO Board approved the 2034 LRTP in early 2012.

- The HRTPO project prioritization tool was used with six project categories: highways; bridges and tunnels; intermodal; transit; systems management, travel demand management, and operational improvements; and bicycle and pedestrian. The tool uses three general categories of weighing factors: project utility, project viability, and economic vitality. Specific factors within the project utility category are congestion level, system continuity and connectivity, safety and security, and cost-effectiveness. Other project utility factors are land use and future development compatibility, modal enhancements, pavement condition, infrastructure condition, enhancing other categories, reducing emissions, regional significance, user benefits, and better accommodating intermodal movements. Project viability factors include additional funding, federal mandates, prior commitments, and project readiness. Economic vitality weighing factors include reducing travel time, addressing the needs of basic sector industries, addressing economic distress, and improving interaction between travel modes. Other economic vitality factors are labor market access, increased opportunities, and impact on truck movement.

- Different weighing factors were used for different types of projects. For example, highway project utility weighing factors included congestion levels, system continuity and connectivity, safety and security, cost-effectiveness, land use and future development compatibility, modal enhancements, and pavement condition. Transit project utility weighing factors included existing usage and ridership, coverage area and population, system continuity and connectivity, user benefit (annual travel time savings per rider), land use and future development compatibility, air quality and emissions reduction, cost-effectiveness (annualized costs/annual riders), and enhancing other categories. A prioritized list of projects for the 2034 LRTP was developed using this tool. The 2034 LRTP includes regionally funded and locally funded projects.

- Various modifications are anticipated for the HRTPO project prioritization tool and the process. These modifications include developing a dynamic tool that can be adjusted as needed, involving the policy board and stakeholders at key milestones throughout the prioritization process and obtaining their buy-in along the way, and enhancing public involvement. Another possible modification includes producing a single score based on the three components regardless of the project category. Modifications may also be made to expand the tool to consider social equity, the impacts of tolls, and environmental justice; the economic impact of tolls on freight movements; climate change; and public–private partnership projects.

CREATING REGIONAL SUCCESS THROUGH TRANSPORTATION: THE SOUTHEAST MICHIGAN EXPERIENCE

Jennifer Evans

Jennifer Evans discussed the development of the Southeast Michigan Council of Governments 2035 Regional Transportation Plan. She described techniques to communicate with the public and stakeholders and use transportation to help promote the region. Evans covered the following topics in her presentation:

- A major part of the 2035 Regional Transportation Plan was developing a quantitative process for linking spending to performance. The process was used to decide how much of available funding should be spent on pavement, safety, bridge, transit, nonmotorized travel, congestion relief, and operation projects to best achieve the region’s performance goals.
- An initial step in developing the process was examining the historical investment among the various categories of transportation projects. A major focus had been on preserving existing roads and transit, along with targeting funding for highway capacity improvements.
- The next step was determining how to measure performance in each project category, such as the percentage of pavement in good condition. A number of forecasting tools were used to develop an investment–performance curve for each project category to graphically illustrate the relationship between the two. This information was used to examine future performance based on different funding levels. This trade-off analysis helped focus discussion on the key transportation system components.
- Different investment scenarios were developed and analyzed. These scenarios included preservation-first and transit-first options. A public opinion scenario was developed through a telephone survey and a series of workshops that asked the public to make trade-offs. A maximum performance scenario was also developed.

- The scenarios and current spending allocations were discussed with policy makers. The response from elected officials was to allocate more resources for transit and pavement and less for bridges and congestion relief. Projects submitted for consideration in the TIP were compared to the adopted funding allocation, providing a first step in assessing the impacts of investment decisions on transportation goals and beginning the conversation about trade-offs between competing needs.

- The region lost approximately 351,000 jobs and 129,000 residents between 2000 and 2010. Although the economy is recovering, the forecast for 2040 is for approximately the same number of people and jobs as when the recession began. The population mix will be older in 2040, and jobs will be more focused on knowledge, technology, and health care rather than on basic manufacturing.

- The Creating Success program was developed to respond to this new reality. Creating Success focuses on the desired outcomes of economic prosperity; desirable communities; fiscally sustainable public services; reliable, quality infrastructure; healthy, attractive environmental assets; and access to services, jobs, markets, and amenities. A series of measures was selected to determine if these outcomes are being achieved. Traditional measures (e.g., percentage of pavement and bridges in good condition) were used, along with new measures. Examples of new measures include the infrastructure utilization rate, access to jobs, transit ridership as an indicator of the attractiveness of the region, and greenspace per capita.

- The long-range plan and the TIP are being linked as part of the update process. Rather than maintaining two separate documents, the plan and the TIP will be tied together through simultaneous adoption and amendment. The investment prioritization process is being taken to the local level. To address different needs in various counties, the approach to resource allocation is not static. Work is under way with local governments to use asset management principles to spend limited resources effectively and efficiently.

- Regional policies are also being developed and implemented to address the new reality and to influence local project selection. These policies include identifying and using underused corridors, focusing less on meeting peak demand and adding capacity, and focusing more use of operations to address congestion. Other policies are coordinating with other infrastructure providers before making project decisions and coordinating efforts on high-priority corridors during commercial and industrial redevelopment.

- These and other activities are being coordinated with the state to align regional and statewide goals. For example, the directive from the governor to consider green infrastructure in highway projects has been incorporated into the regional approach.

- Support from the public is critical to the success of the planning process in the region. The communication strategy focused first on the message content. Key elements included “change can be good,” “smaller can be better,” and “it is acceptable for the region to be different.” Other messages focused on aligning scarce public

resources around common values and communicating that personal expectations and behaviors influence regional sustainability. Talking about how transportation fits with other elements within the region is critical. For example, it is not just about roads and buses; it is also about water, sewer, and energy. It is not just about driving; it is also about walking and biking. It is not just about an individual's ability to get to work, it is also about the ability of everyone to get to work, because that affects the economy.

- Finally, Evans said that it is also important to use creative methods to deliver these messages. The public is more likely to care about transportation decisions if they understand how those decisions affect their lives. Activities in the planning stage include a public opinion survey to understand people's perceptions of current conditions compared to those in other areas of the country, a transportation funding primer to increase transparency and generate support for additional or different funding, and using social media to reach the widest possible audience. Other approaches include a webinar-based town hall meeting and coordinating with a local arts and culture alliance to craft a mobile theater production.

NORTH CAROLINA'S TRANSPORTATION REFORM: PRIORITIZATION, OUTREACH, AND REALITY

David Wasserman

David Wasserman described the strategic prioritization and programming process used by the North Carolina DOT. He highlighted the scoring process used for highway mobility and modernization projects and bicycle and pedestrian projects, the performance level of service (LOS), and the investment strategy summits. Wasserman covered the following topics in his presentation:

- The North Carolina DOT is responsible for six modes of transportation: aviation (including 74 publicly owned airports, the second largest system in the United States), bicycle and pedestrian, ferries, highways (80,000 miles), public transportation, and rail. The North Carolina DOT's annual budget is approximately \$4.1 billion, with federal dollars accounting for approximately 25%. North Carolina DOT has 14 field offices or divisions. There are 17 MPOs in the state and 20 rural planning organizations (RPOs).

- In response to concerns related to political influence on the transportation project decision-making process, North Carolina Governor Beverly Perdue issued an Executive Order requiring North Carolina DOT to implement a professional approval process for all highway construction programs, highway construction contracts, highway construction projects, and plans for the construction of projects. The Strategic Planning Office was created within the department in response to this Executive Order.

- North Carolina DOT developed a prioritization process based on the department’s three primary goals of safety, mobility, and infrastructure health in collaboration with its partners. The resulting strategic prioritization and programming process focuses on highway mobility and modernization projects and bicycle and pedestrian projects. Aviation, transit, ferry, rail, and highway safety, bridge, and pavement projects are prioritized by North Carolina DOT staff experts using data and local knowledge.

- Wasserman said further that the strategic prioritization and programming process includes the three steps of scoring, strategizing, and scheduling. Scoring highway projects includes the use of quantitative data, local input, and multimodal bonus points. Criteria using quantitative data include congestion, safety, pavement, benefit–cost, economic competitiveness, lane width, and shoulder width. Different weights are assigned to these criteria. Local input is obtained by having MPOs, RPOs, and divisions rank projects. Finally, bonus points are awarded for multimodal options (8 points), multimodal connections (5 points), military base or seaport connections (5 points), and multimodal design features (3 points).

- The same scoring system is used for bicycle and pedestrian projects. The criteria and points are right-of-way acquired (18 points), connectivity (15 points), inclusion in adopted plan (15 points), demand/density (12 points), and crashes (5 points). Finally, MPOs and RPOs rank their top five projects, with the following points assigned: No. 1, 35 points; No. 2, 28 points; No. 3, 21 points; No. 4, 14 points; and No. 5, 7 points.

- The performance LOS, a measure of quality of service provided to the user, is used to develop the investment strategy. This LOS is different from the *Highway Capacity Manual* definition of LOS. The criteria for determining the performance LOS are measures that are reliable, repeatable, and affordable and that can be graded on an A to F scale. The performance LOS is translated into the funding needed to maintain and improve performance. Example LOS measures include miles of uncongested roadways, miles of good pavement, the number of bridges in good condition, and the bicycle–pedestrian index.

- A total of 14 investment strategy summits are held throughout North Carolina to obtain input from North Carolina DOT partners and the public. The purpose is to provide an analysis of where to apply expected revenue. The following questions are asked at the summits: What are the high-level priorities? What is the investment needed to achieve those priorities? Revenue is based on the expected 10-year, unconstrained total. Participants allocate funding from the 10-year total to prioritization categories. The performance LOS is used to determine the return on investment. The outcome provides a picture of where transportation funding should be allocated.

- The results of the prioritization process do not automatically become the TIP. Other factors influencing the TIP include the project development time, the

investment strategy, funding constraints, the equity formula, and construction sequencing.

- The prioritization process has been well received. North Carolina DOT recently completed the second prioritization effort, which included evaluating over 1,200 highway projects and 600 bicycle and pedestrian projects totaling \$45 billion in needs. The third prioritization development is under way. Enhancements being made include moving to a GIS-based environment, automating the cost-estimation tool, and updating measures as appropriate. A recent survey of MPOs and RPOs by the state legislature indicated substantial support for the process. The prioritization process also helped quell requests to lower the state gas tax. The legislature is considering codifying the prioritization process.

BREAKOUT GROUP 1: PRIORITIZATION AND RESOURCE ALLOCATION

Patricia Hendren (moderator)

This breakout group included five quick-burst presentations that focused on different approaches for prioritizing projects within and across modes at the state and MPO levels, incorporating economic impact and environmental factors into prioritization, and applying fiscal reality to a prioritized list of projects.

Jim Ritzman of the Pennsylvania DOT described the project prioritization weighting process in Pennsylvania. He highlighted the location of the MPOs and regional development organizations in the state, the financial guidance workshop, and the use of asset management planning. He provided examples of asset management performance for bridges and pavements. He described the use of the five-step decision lens process to bring structure and quality to key decisions by helping to manage the strategic alignment of goals and priorities with investments while bringing together multiple and diverse stakeholders.

Chris Lukasina and Shelby Powell of the North Carolina Capital Area Metropolitan Planning Organization (MPO) discussed effective prioritization, programming, and implementation of local transportation projects in the Raleigh, North Carolina area. They discussed issues with unspent funding that had been allocated to locally administered projects and described the development and use of a project scoring process.

Christie Gotti of the North Central Texas Council of Governments discussed forging innovation through project prioritization and funding. She described the project selection process and the use of innovative funding mechanisms in the Dallas–Fort Worth metroplex. The project selection process occurs through calls for projects and funding initiatives and involves competitive project selections based on technical

review, strategic project selections based on priorities, partnerships or roundtable discussions, and public and committee involvement. Examples of innovative funding mechanisms include the use of federal–local funding exchanges, regional toll revenue, and the credit union bank concept. The use of innovative funding sources is enabling constant project prioritization and reprioritization, advancing project implementation, and allowing funding to flow from one project to another to maximize leveraging and minimize time.

Dave Vautin of the Metropolitan Transportation Commission discussed assessing project performance for the Bay Area’s first sustainable communities strategy. Plan Bay Area is the first regional plan to integrate transportation land use and housing as outlined in California State Bill 375. He discussed the process of determining which projects should be subjected to performance assessment, the use of qualitative and quantitative measures, available analysis tools, quantifying nontraditional benefits, and making the performance results meaningful. He noted that detailed project-level assessments for long-range planning provide useful analysis results to inform policy and funding decisions, and he highlighted the importance of using a project performance assessment process that both maximizes the ability to capture key benefits and is comprehensible to a broader audience.

Bill Lawrence of the Utah DOT described the department’s project prioritization process. He reviewed the legislative requirements, the direction from administrative rules, and Utah DOT’s strategic goals, which focus on preserving infrastructure, optimizing mobility, improving safety, and strengthening the economy. He noted the ranking process is designed to support the decision-making process of the Utah Transportation Commission rather than rendering a decision. He described the ranking factors and their weights for the different categories of projects.

BREAKOUT GROUP 2: COMMUNICATING WITH THE PUBLIC

Suzann Rhodes (moderator)

This breakout group used a speed-presentation format that allowed participants to circulate among multiple presenters to learn about innovative approaches for seeking input from the public and stakeholders on project selection and techniques for communicating the results of the prioritization process and projects programmed in the STIP and TIP.

Jerri Bohard of the Oregon DOT discussed Area Commissions on Transportation in Oregon. The commissions are chartered by and are advisory to the Oregon Transportation Commission. They address all forms of transportation with an emphasis on the state system. These area commissions provide input into the development of the STIP, provide a forum for public input, and help coordinate and communicate their areas’ projects and needs.

Reena Mathews of the Maryland State Highway Administration discussed

the process for developing the Consolidated Transportation Plan (CTP)–STIP in Maryland and how the process enhances communication among agencies, local governments, and the public. Elements of the process include reviewing long-range plans developed by state MPOs and the Maryland Transportation Plan, priority letters from each county, and annual consultation meetings. During an event known as the “Fall Tour,” the Maryland Secretary of Transportation and the modal administrators visit each of the state’s 23 counties and Baltimore to present and solicit input on the CTP–STIP. These meetings are attended by local elected officials, state legislators, and the public. Input from these meetings are reviewed in the development of the final CTP–STIP.

Craig Casper of the Pikes Peak MPO described new methods for communicating with the public. A number of strategies were used to gain input from the public and stakeholder groups for the 2035 Moving Forward Update Regional Transportation Plan. Input strategies included public workshops, open house public meetings, and a Moving Forward traveling booth. A telephone survey of 500 households, focus groups, and an online survey were also used to gain input on the plan update.

Mary Beth Ikard of the Nashville Area MPO discussed a roadmap for engaging diverse stakeholders as part of the 2035 Regional Transportation Plan, a multibillion dollar transportation strategy for livability, sustainability, prosperity, and diversity. Many of the plan recommendations are based on other studies that included their own public involvement elements. Strategies used with the plan included national and local public opinion polling, a speakers’ bureau focusing on diverse groups, rebranding the agency website and including a 3-minute video, a social media campaign, public hearings as “community conversations” hosted by mayors, regional symposiums, and a documentary film screening in partnership with Transit Now Nashville. The three key elements of the plan are a bold new vision for mass transit, support for active transportation and walkable communities, and preservation and enhancements of strategic roadways.

Scott Reed of the Denver Regional Transportation District described some of the challenges in reaching stakeholder consensus associated with implementing the FasTracks Plan. He discussed the experience with the Northwest Rail Line, which initially focused on a 41-mile commuter rail line on a shared right-of-way in an active freight corridor. Because of the high costs of this alternative, stakeholders asked for an examination of the options of starting with a bus rapid transit system and completing the rail line in the future or replacing the rail option with a bus rapid transit system. As part of the project, the Regional Transportation District conducted 40 meetings in the corridor with stakeholders and groups, used earned media and social media aggressively, and presented expert findings to live-stream audiences. There was no consensus among stakeholders for any of the three options. A hybrid plan was developed that also did not gain consensus. The lack of consensus hurt the district’s ability to pursue a 2012 tax election.

BREAKOUT GROUP 3: ASSISTING POLICY MAKERS: POLITICS AND PROGRAMMING

Steven Pickrell (moderator)

This breakout group explored prioritization processes states and MPOs use that recognize both technical merit and political reality.

Gian-Claudia Sciara of the University of California at Davis discussed meeting the planning and programming challenges of unplanned federal earmarked projects. She reviewed trends in congressional earmarks for transportation projects, financing earmarks, planning and programming impacts and challenges, and responses by MPOs and state DOTs. Potential planning issues associated with earmarks include projects not included in adopted plans, redistributing available funding, insufficient funds for projects, and disrupting existing agreements. Responses by states and MPOs have included adding earmarked projects to TIPs and STIPs, rejecting the earmarked projects, and adding projects conditionally.

Cindy VanDyke of the Georgia DOT discussed the Georgia transportation sales tax referendum. She described the elements of the Transportation Investment Act of 2010, which provided the opportunity for additional transportation investments in the state. The Transportation Investment Act created 12 special tax districts in the state and allowed each district to levy a 1% sales tax for 10 years. It also established a roundtable and executive committee, a project selection process, and regional screening criteria for different types of projects. (Note: The vote for each region was held statewide on July 31, 2012. The referendum was approved by voters in three regions: Region 7, Central Savannah; Region 8, River Valley; and Region 9, Heart of Georgia. It was defeated in the other nine regions, including Region 3, Atlanta.)

Tom Brigham of HDR Alaska, Inc., described the development of a new project selection system at the Alaska Department of Transportation and Public Facilities. The new governor and the newly appointed commissioner of transportation focused on three priorities: improve the National Highway System routes to current design standards, promote a robust enhancement program, and develop a project selection system to fairly prioritize community transportation needs. The new system is a criteria-based scoring and ranking of roads, transit, ferries, and enhancement projects. The department directors serve as the project evaluation board. The process was well received by the legislature, other stakeholders, and the public.

Step 4. Making Progress

Craig Newell, *Michigan Department of Transportation*

Jennifer Yeaman, *Metropolitan Transportation Commission*

Jeff Carroll, *CDM Smith*

Neil Pedersen, *Second Strategic Highway Research Program, Transportation Research Board (presiding)*

The fourth step is making progress toward improving the fit between the vision, long-range plans, capital programs, and eventual outcomes. The three speakers in this general session explored both technical and organizational challenges and solutions to tracking progress toward the vision and highlighted the evolution of the state of the practice over the past 10 years. The session used a combination of brief expert presentations, moderated panel discussion, and audience questions and answers to consider the effectiveness of tools and methods for monitoring performance results, organizational structures for effective performance management, and understanding and managing the role of uncertainty and financial risk in the planning and programming process.

TOOLS AND METHODS FOR MONITORING PERFORMANCE RESULTS

Craig Newell

Craig Newell discussed the Michigan Department of Transportation's (DOT's) use of different tools and methods to monitor the performance of various aspects of the transportation system. He described the Vision 2007 pavement condition goal, the use of the Road Quality Forecasting System (RQFS) tool, the program development process, and ongoing activities. Newell covered the following topics in his presentation:

- Michigan DOT has jurisdiction over approximately 25% of the state's federal aid-eligible routes. Approximately \$450 million per year is allocated for pavement preservation, with \$360 million spent on rehabilitation and reconstruction and \$90 million spent on preventive maintenance. There is an annual call for projects. A rolling 5-year plan is published annually.
- The Vision 2007 pavement preservation goal was established in 1997 by the State Transportation Commission. The goal was to maintain 95% of freeways and

85% of nonfreeways in good-to-fair condition. The remaining service life was established as a performance measure.

- RQFS is a program-level model used to forecast Michigan DOT pavement conditions based on the remaining service life. RQFS is also used to determine funding needs based on desired future conditions. The “fix strategies” identify the percentage of the network to move from one remaining service life category to another. They identify the lane miles or the percentage of network improved, the average regional costs for each major category of fix type, and the strategy most effective with a “mix of fixes.”

- The program development call-for-projects process includes a number of steps. The program funding template targets are established to allocate funding in alignment with the investment strategy. Pavement funding is allocated by formula to regions. The RQFS fix strategies guide project selection. Strategies are constrained to funding targets.

- The process identified the need for an additional \$500 million in funding beginning in 2003 to meet the Preserve First Initiative. The need for an additional \$270 million in funding beginning in 2006 was also identified through the Jobs Today analysis. These goals were achieved as a result of many adjustments along the way.

- Various improvements have been made to the RQFS. These improvements address worst-first situations, fix-life annual reviews, cost matrix annual reviews, and accounting for inflation. Improvements to the call-for-projects process include addressing strategy emphasis areas and funding formula allocations. There is insufficient funding to keep pavement conditions at current levels as a result of increasing costs and downtrending revenues.

- Michigan DOT also monitors the performance of other highway programs, including bridge, safety, intelligent transportation systems, and congestion. The bridge condition forecasting system uses National Bridge Investment Analysis System ratings to measure the bridge network condition. Michigan DOT has developed statewide congestion definitions, as well as requirements and a tool for asset management of the intelligent transportation system. The asset management tool serves as an inventory system and provides a work order development and tracking system. Developing a budget forecasting component to forecast maintenance needs is a future activity. Additional safety funding has resulted in a decline of serious injuries and fatalities over the past several years.

TRACKING PROGRESS TOWARD REGIONAL EQUITY GOALS WITH THE METROPOLITAN TRANSPORTATION COMMISSION'S SNAPSHOT ANALYSIS

Jennifer Yeamans

Jennifer Yeamans discussed the snapshot analysis used by the MTC for tracking progress in meeting regional equity goals. She described the snapshot analysis objectives and development process, key metrics, mapping and analysis capabilities, lessons learned, and future work activities. Yeamans covered the following topics in her presentation:

- The MTC's Long-Range Plan contains the following vision for 2035: "The vision for Transportation 2035 is to . . . produce equitable opportunities for all Bay Area residents to share in the benefits of a well-maintained, efficient, regional transportation system." Addressing environmental justice and Title VI "communities of concern" is important in the region. To help address this need, community stakeholders sought alternatives to the long-range, high-level, and model-derived analyses that have traditionally been used.
- The snapshot analysis objectives were to develop a set of regionally mappable and trackable indicators that would inform judiciously, avoid data overload, and remain simple, focused, and accessible. The indicators would focus on addressing community stakeholders' key questions and concerns and provide relevant, timely data at the beginning of the long-range planning processes, rather than at the end.
- The snapshot analysis–development process included two major steps. The first step was to identify possible measures, and the second step was to evaluate and select final measures. Activities conducted as part of the first step included enlisting stakeholders to help frame key questions for priority issues and proposing metrics and data sources available to answer key questions. These questions and metrics were iterated with stakeholders based on data available. Activities in the second step included identifying the measures and criteria that most directly addressed the key questions, as well as those tied to other regional planning goals. Measures associated with the previous regional transportation plan equity analyses of disproportionate burdens on communities of concern were considered. Assessing whether the measures produced intuitive results when mapped was also considered.
- Thirteen metrics were developed. For example, one key question concerned the availability and frequency of transit in communities of concern. This question relates to the theme of transportation availability and choices. One measure is transit service frequency. The data source is the MTC regional transit database, which is updated annually. The measures were mapped, and the data were presented in tables.
- Various lessons were learned from the development and initial use of snapshot analysis. First, some important stakeholder concerns could not be analyzed and

measured because of a lack of meaningful regional data. These concerns were used to guide priorities for future research. Second, proprietary data can provide benefits, but they also have limitations. Third, there is a need to resist overanalyzing available data. Fourth, even with a relatively simple approach, data overload still occurred. Fifth, not all measures are equally important. Finally, a truly stakeholder-driven process requires lengthy and in-depth commitment on all sides.

- Future work activities include integrating the transportation metrics into broader monitoring efforts as the regional planning context evolves into a new state-mandated land use transportation process. Adding the capability to link to an online, interactive GIS platform represents another future activity, as does streamlining the data collection and analysis processes. Migrating the framework to the MTC’s updated “communities of concern” definition is another future activity.

MANAGING RISK AND UNCERTAINTY IN CAPITAL PLANNING

Jeff Carroll

Jeff Carroll discussed managing risk and uncertainty in the transportation capital planning process. He described recent NCHRP projects on risk analysis techniques and capital cost estimating methods. Carroll covered the following topics in his presentation:

- Several recent NCHRP projects have focused on capital cost estimation and risk analysis techniques. Available documents include *NCHRP Report 574: Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction*; *NCHRP Report 625: Procedures Guide for Right-of-Way Cost Estimation, and Cost Management*; and *NCHRP Report 658: Guidebook on Risk Analysis Tools and Management Practices to Control Transportation Project Costs*.

- Risk can be defined as an uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objective. Identifying risk is important for a number of reasons, including developing reliable planning-level cost estimates. Identifying risk is essential for developing financially feasible capital programs.

- Typical risks can be identified in the planning process. Risks internal to an agency might include competing interests and projects, as well as uncertain funding. Risks may also be associated with unknown project elements, including environmental, right-of-way, and utility impacts. External risks may include uncertain political and public support.

- Typical risks may also occur during the programming process. Examples of such risks include changes in design requirements, costs associated with environmental compliance, delays in right-of-way acquisition, and uncertain funding.

- Planning-level cost estimates can address risk by including a contingency that is based on a quantification of the anticipated risk associated with a project. The total project estimate is based on the known and unknown costs.
- A five-step cyclical risk management process can be defined. The steps include identifying the risks, assessing and analyzing possible impacts, planning and mitigating these impacts, allocating resources, and monitoring and controlling risks.
- Carroll noted that the risk identification step includes identifying, categorizing, and documenting the highest level of risks to a project's scope and feasibility. Available tools for use in this step include brainstorming possible risks, red flagging items, and using checklists. Risks are typically classified as low risks, which are monitored, and high risks, which need a management process. The results of this step provide the basis for estimating contingency and baseline cost estimates.
- The risk assessment and analysis step focuses on the identified high-risk events. The probability of occurrence and impact, including the frequency and severity, are estimated. Estimated cost and schedule contingencies are developed. Techniques that may be used in this step include expert interviews, risk workshops, probability × impact matrices, priority risk ranking, and estimate ranges.
- The risk mitigation and planning step focuses on high-risk events. Elements in this step include ranking risks, assigning responsibilities, and exploring response strategies to accept, avoid, mitigate, or transfer the risks. An updated contingency and cost estimate can be developed based on the results. A risk register may be used with minor projects, but a risk management plan is typically used with major projects.
- The risk allocation step focuses on analyzing and selecting the appropriate delivery method. It contractually allocates risks to different parties. This step typically occurs in the programming phase.
- In the final step, a plan for risk monitoring and control is developed and executed. Elements in this plan include a process to track risks, a process to identify new risks, a process to manage contingency reserves, and a process to document lessons learned.
- Carroll described a cost estimation calculator developed for the Georgia DOT that uses new processes and tools. The AASHTO tool Trns•port CES was used along with a right-of-way and utility tool. Cost groups automatically calculate a cost estimate based on the project length and typical section in the planning-level templates. Historical bid data specific to the Georgia DOT are used, and the database is updated quarterly. Contingency percentages are included in the calculator.

Finally, Carroll stated that challenges and keys to successful risk management programs include challenging the status quo and creating a culture of change, developing a systems perspective, dedicating sufficient time, and dedicating sufficient human resources. Identifying project risks early is important, as is developing contingency factors.

CLOSING SESSION

Turning Plans into Reality

Themes and Best Practices

Gordon Proctor, *Gordon Proctor & Associates*
Suzann Rhodes, *CDM Smith (presiding)*

Gordon Proctor, the speaker at the closing session, compared the issues examined at the 1974 conference with those of today. The common themes from the conference were also highlighted. After the speaker's remarks, participants worked in small groups to create an action plan for implementing what they learned at the conference and how they would apply it within their agency, organization, or firm.

Proctor summarized common themes from the presentations at the conference. He also compared the topics of interest at the 1974 planning conference with those discussed at this conference, and he identified possible lessons for future planners highlighted by speakers at the conference. Proctor covered the following topics in his presentation:

- There are some similarities between issues discussed at the 1974 and the 2012 conferences. The role of planning to support decision making was discussed at both conferences, as was the need to change demand, not just supply. Issues related to funding and financing (including the potential application of user charges), transportation capital, maintenance, and operating costs were important at both conferences.

- There were also differences between the topics of interest at the two conferences. In 1974, programming had a limited role in statewide planning. Today programming is driven by statewide planning goals. In 1974, there were no effective ties between planning and programming. Today, the planning process drives programming decisions. In 1974, short-term programming was divorced from long-term policy planning. Today, long-term social and transportation goals influence short-term programming decisions.

- The four themes emerging from presentations and discussions at this conference focus on accountability, sustainability, scarcity, and uncertainty. These themes frame the planning, programming, performance measurement, and risk management approaches being used by transportation agencies today.

- One feature of accountability is using data and information not merely to improve decision making, but to explain it. Some speakers suggested that explaining decisions is as important as making them. Implicit in the explanation is a desire to demonstrate accountability. Traditional community outreach is being linked with new data and communication and visualization tools to promote ongoing dialogues with stakeholders.

- Technology has had, and will continue to have, a major influence on planning. Technology is shaping accountability, public involvement, and decision making. It is also influencing operations, monitoring, and performance measurement.

- Planning considers the past, and the present, and the potential of the future. Conference speakers highlighted the uses of visualization and modeling to create lenses for viewing communities' futures. These new tools are being tailored to the needs of different communities.

- According to Proctor, technology can increase accountability in the planning process. The public has unprecedented access to data today, which narrows the divide between experts and the public. The Internet allows planners to send and receive information. Planning can tap the public's "cognitive surplus," and decisions can be enhanced through the "wisdom of crowds." Wiki-planning was suggested by some speakers.

- The Sacramento *Blueprint* provided an example of using tools to present good information and data at different scales, from the regional level to the neighborhood level. The example from the Minnesota DOT highlighted the link between the policy plan, the highway investment plan, and performance monitoring. The policy plan presents the goals, policies, performance measures, and targets. The highway investment plan is a fiscally constrained 20-year investment plan with projected performance results. Performance monitoring includes regular review of performance in each policy area.

- Focusing on how the U.S. DOT could integrate states' and MPOs' mature performance systems into a national framework was suggested as one productive approach. Some speakers suggested that accountability is the greatest when resources are scarce and that public support is the greatest demonstration of accountability.

- Sustainability, the second conference theme, has expanded from primarily a focus on environmental considerations to include social and economic considerations. The triple bottom line was discussed by some speakers, as was intergenerational equity.

- Scarcity represents the third conference theme. Scarcity has a number of impacts. Agencies are refocusing scarce resources on the areas of most acute need. There is no slack left for mediocre projects. Consideration is also being given to using risk management and performance management to identify less important assets and using improved data and decision making to ensure critical assets are maintained.

- Scarcity is focusing planning on pavement, bridge, maintenance management, and advanced operations considerations. There is more emphasis today on sustaining assets, not expanding them. Scarcity spurs creativity. Scarcity increases the focus on asset management. Scarcity turns a linear planning cycle into a cyclical one focused on long-term preservation of assets.

- Uncertainty represents the final theme. Many speakers noted that traditional assumptions are no longer valid. The assumption of regular federal funding increases has changed, as has the assumption of ever-growing traffic. There is also a change toward less hierarchical decision making and a change away from the assumption of ever-improving conditions.

- In Proctor's view, the conference validates the need for more planning at times of greatest uncertainty. Providing good data and good analysis to support decision making is more important than ever. The planning process includes dealing more effectively with the public, not just politicians. No one wants to make a bad decision; planners help people to make good decisions.

CONFERENCE SUMMARY

Research Needs, Technology Transfer, and Outreach Activities

Katherine F. Turnbull, *Texas A&M Transportation Institute (rapporteur)*

In preparing the conference summary, conference rapporteur Katherine Turnbull of the Texas A&M Transportation Institute identified potential areas for additional research, technology transfer, and outreach activities based on the presentations and discussions at the conference. Speakers at the conference highlighted the best practices examples and case studies in a variety of areas. Developing syntheses on some of these topics, including the use of visualization techniques and social media to enhance public involvement, and linking planning and programming could be beneficial.

Areas for additional research that speakers identified include expanding the use of technology in all phases of planning, learning from other disciplines and industries, developing new analysis tools, and examining methods to integrate multiple databases and processes. A number of potential technology transfer and outreach activities were discussed, including web seminars highlighting conference presentations, sponsoring sessions at future TRB Annual Meetings and related conferences, and communicating and coordinating with other TRB committees, organizations, and agencies at the federal, state, and local levels. Participant suggestions were drawn from breakout sessions, question-and-answer forums, and other conversations during the conference. Examples of possible research, technology transfer, and outreach activities suggested by some participants include the following:

- Complete a synthesis on current uses of visualization techniques and social media to enhance public and stakeholder involvement in transportation planning. A number of conference speakers discussed innovative approaches to engage the public and stakeholders throughout the planning process by using social media, visualization, and other technology-based applications. Documenting these approaches and sharing best practices in a synthesis may provide immediate benefits. The synthesis could also build on the successful practices by identifying areas for further research, development, and pilot projects. The TRB Public Involvement in Transportation Committee (ADA60) could assist with refining the synthesis scope and identifying possible case studies.

- Complete a synthesis on linking the transportation planning and programming processes. Good examples were presented at the conference from state DOTs, MPOs, and other agencies. Capturing these and other best practices case studies could be of benefit to transportation agencies still working to integrate the two processes. The synthesis could also identify areas for further research and additional technology transfer activities.

- Examine the potential to expand the use of technology in all phases of planning and programming, especially the movement toward performance planning. Good examples of using technology throughout the planning and programming processes were discussed at the conference. These examples included visualization techniques, analysis methods, project-ranking analysis, and forecasting models. Building on the experience with these approaches to take advantage of rapidly developing technologies may be beneficial.

- Conduct a research project examining risk management techniques used by industries and other public agencies and how risk management is linked to the planning process. Numerous industries and public agencies, including the energy sector and utilities, have used risk management practices for many years. This research project could examine the approaches used by these industries and agencies and identify how they could be applied in the transportation sector.

- Conduct research to further define and apply performance-based planning. The concept has evolved over the past few years. This project could build on existing efforts by developing a performance-based planning process and presenting examples of best practices.

- Continue to develop new planning models, methods, and analysis tools. Many speakers highlighted new models and analysis tools. Research examining the further development of existing approaches and new techniques could be beneficial.

- Conduct a series of webinars highlighting speakers in the four planning steps covered in the conference: creating a vision, developing a roadmap, turning vision into reality, and monitoring progress.

- Sponsor sessions at future TRB Annual Meetings, summer meetings, and other conferences on performance planning, planning and programming, and the link to risk management and asset management. These sessions could build on the topics and discussions at this conference and continue to provide updated information and current experiences on these topics.

- Finally, many speakers emphasized the importance of continuing outreach activities to other TRB committees, organizations, and federal, state, regional, and local agencies. Examples of other TRB committees include the Public Involvement in Transportation Committee and the Asset Management Committee. AASHTO, the Association of Metropolitan Planning Organizations, and the American Public Transportation Association are examples of organizations.

APPENDIX

Conference Attendees

Charles U. Airiohuodion, Texas Department of Transportation
Bret Anderson, Arizona Department of Transportation
Regina Aris, Baltimore Metropolitan Council
Victor Austin, Federal Transit Administration
Everett Bacon, Atkins
Elise Barrella, Georgia Institute of Technology
Sandra Beaupré, Wisconsin Department of Transportation
David Beckhouse, Federal Transit Administration
Carolyn Bednar-Wood, Texas Department of Transportation
Allison Bejarano, Colorado Department of Transportation
Garson Bell, Resolve Group
Alix Bockelman, Metropolitan Transportation Commission
Jerri Bohard, Oregon Department of Transportation
Beverly Bowen, ICF International
Meredith Brady, Rhode Island Department of Transportation
Ann Brennan, National Renewable Energy Laboratory
Thomas Brigham, HDR Alaska, Inc.
David Burton, Kentuckiana Regional Planning and Development Agency
Stacey Burton, Kentuckiana Regional Planning and Development Agency
Jose Luis Caceres, Sacramento Area Council of Governments
Brent Cain, HDR Engineering
J. Matthew Carpenter, Sacramento Area Council of Governments
Jeff Carroll, CDM Smith
Craig Casper, Pikes Peak Metropolitan Planning Organization
Ed Christopher, Federal Highway Administration
Mitch Coffman, Wichita Area Metropolitan Planning Organization
Cathy Cole, Colorado Department of Transportation
Nathaniel Coley, Federal Highway Administration
Kathleen Collins, Colorado Department of Transportation
James Cromar, Broward Metropolitan Planning Organization
Don Davis, Idaho Transportation Department
Dennis Decker, Louisiana Department of Transportation and Development
Nathan Diaz, Regional Transportation District
Janet d'Ignazio, ICF International
Lindsey Douglas, Kansas Department of Transportation

Chandler Duncan, EDR Group
Stan Elmquist, North Front Range Metropolitan Planning Organization
Evan Enarson-Hering, Cambridge Systematics, Inc.
Jennifer Evans, Southeast Michigan Council of Governments
Sonna Lynn Fernandez, Idaho Transportation Department
Marsha Whitley Fiol, Virginia Department of Transportation
Christie Gotti, North Central Texas Council of Governments
Andrew Grzymiski, Charlotte Department of Transportation
Joe Guerre, Cambridge Systematics, Inc.
Michael Hancock, Kentucky Transportation Cabinet
Ed Hard, Texas A&M Transportation Institute
Matthew Hardy, American Association of State and Highway Transportation Officials
Shruti Hari, Metropolitan Transportation Council
David Haynes, Atlanta Regional Commission
Marie Heidemann, Alaska Department of Transportation and Public Facilities
Steve Heminger, Metropolitan Transportation Commission
Mell Henderson, Mid-America Regional Council
Patricia Hendren, Washington Metropolitan Area Transit Authority
Susan Herbel, Cambridge Systematics, Inc.
Chris Herrick, Kansas Department of Transportation
Paul Hershkowitz, CDM Smith
Brenton Holper, Wichita Area Metropolitan Planning Organization
Myron Hora, Colorado Department of Transportation
Charlie Howard, Puget Sound Regional Council
Don Hunt, Colorado Department of Transportation
Stephen Hunt, King County Metro Transit
Mary Beth Ikard, Nashville Area Metropolitan Planning Organization
Denise Jackson, Michigan Department of Transportation
Dale Janik, CDM Smith
Caley Johnson, National Renewable Energy Laboratory
Jessie Jones, Arkansas State Highway and Transportation Department
John Kaliski, Cambridge Systematics, Inc.
Alex Karner, University of California, Davis
Elizabeth Kemp-Herrera, Colorado Department of Transportation
Amy Kennedy, HDR Engineering
Kristin Kenyon, Federal Transit Administration
Martin Kidner, Wyoming Department of Transportation
Charmaine Knighton, Federal Transit Administration
Linda Koenig, Oklahoma Department of Transportation
Sandi Kohrs, Colorado Department of Transportation
Jennifer Kovarik, National Park Service

CONFERENCE ATTENDEES

Deborah LaCombe, Yakima Valley Conference of Governments
Leigh Blackmon Lane, North Carolina State University
Bill Lawrence, Utah Department of Transportation
John Lazzara, HDR Engineering
Joung Lee, American Association of State and Highway Transportation Officials
David Lee, Florida Department of Transportation
Bryce Lloyd, National Park Service
Julie Lorenz, Burns & McDonnell
Sheila Ludlow, Montana Department of Transportation
Chris Lukasina, North Carolina Capital Area Metropolitan Planning Organization
Reena Mathews, Maryland State Highway Administration
Doug McBroom, Montana Department of Transportation
Jason McGlashan, HDR Engineering
Gary McVoy, Parsons Brinckerhoff
Joy Melita, Parsons Brinckerhoff
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Harlan Miller, Federal Highway Administration
Susan Moe, Federal Highway Administration
Matt Muraro, Colorado Department of Transportation
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Kathleen Neill, Florida Department of Transportation
Craig Newell, Michigan Department of Transportation
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Lisa Nungesser, Parsons Brinckerhoff
Felix Nwoko, Durham–Chapel Hill–Carrboro Metropolitan Planning Organization
Janet Oakley, American Association of State and Highway Transportation Officials
Scott Omer, Arizona Department of Transportation
John Orr, Atlanta Regional Commission
David Ory, Metropolitan Transportation Commission
Jeff Ottesen, Alaska Department of Transportation and Public Facilities
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Larry Squires, Federal Transit Administration
Darin Stavish, Colorado Department of Transportation
Jennifer Stewart, Federal Transit Administration
Jack Stickel, Alaska Department of Transportation and Public Facilities
Jeffrey Sudmeier, Colorado Department of Transportation
Lori Sundstrom, Transportation Research Board
John Thomas, Utah Department of Transportation
Katherine F. Turnbull, Texas A&M Transportation Institute
Cindy VanDyke, Georgia Department of Transportation
Donald Vary, CDM Smith
David Vautin, Metropolitan Transportation Commission
Brian Vitulli, Pikes Peak Area Council of Governments
Nicole Waldheim, Cambridge Systematics, Inc.
Benjamin Waldman, City of Lakewood, Colorado
Del Walker, Denver Regional Transportation District
Andy Waple, Fredericksburg Area Metropolitan Planning Organization
David Wasserman, North Carolina Department of Transportation

CONFERENCE ATTENDEES

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Aaron Willis, Colorado Department of Transportation
Ryan Wilson, Minnesota Department of Transportation
Mark Wingate, Wyoming Department of Transportation
Ray Winn, Pikes Peak Area Council of Governments
Marian Yasuda, Oahu Metropolitan Planning Organization
Jennifer Yeaman, Metropolitan Transportation Commission
Greg Youell, Omaha–Council Bluffs Metropolitan Area Planning Agency
James Zumpf, Arizona Department of Transportation
Brad Zumwalt, Nebraska Department of Roads
Andrea Zureick, Riverside County Transportation Commission



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