TRIENNIAL SELF-EVALUATION and STRATEGIC PLAN REPORT
ABC30 -Performance Measurement Committee
For the period of April 2006 – April 2009

As submitted by ABC30 Committee Chair, Daniela Bremmer, on April 15, 2009

Committee Name and Number: ABC30 - Performance Measurement Committee

Committee Chairperson: Daniela Bremmer
Committee Secretary: Joe Zietsman

TPS Three-Year Period: April 15, 2006 to April 15, 2009
Date Prepared: November 2008 to April 2009, submitted April 15, 2009

1. Committee Scope

A. When did your committee last consider the scope?
November 2008- to April 2009

B. Does the current scope statement accurately reflect your committee's activities?
Yes

C. What changes are proposed and why are these changes necessary?
See below –updated to reflect changing research needs and new performance measurement and management developments
Scope: The committee supports the development and use of performance measurement and performance management across all modes of transportation, public and private, including passenger and freight transportation systems. The committee promotes the use of performance measurement in all aspects of an organization's responsibilities to support public accountability and effective systems management. This includes planning, programming, budgeting, program and service delivery, and system operations. The scope includes measurement with regard to system efficiency and performance and non-traditional measures of sustainability and system externalities as well as organizational effectiveness and customer satisfaction metrics. The scope also includes the research for implementing performance management in an organization, including the definition of performance data needs and the establishment of data collection, analysis, reporting, and communication methods. The committee also serves as the principal TRB clearinghouse for the integration of activities and exchange of information among TRB committees and other organizations, including international partners, concerned with the various aspects of performance measurement and management.

2. Committee Strategic Planning

A. *Has your committee conducted strategic planning sessions?*
Yes, three since fall of 2008. Please see www.trb-performancemeasurement.org for the current updated and complete new Strategic Plan.

B. *If you have not done strategic planning, what are your committee's strategic directions for the future?*

Not applicable: committee has performed strategic planning. *See **2.A***

3. Critical and Cross Cutting issues

A. *What are the long term and emerging issues that your committee is tracking?*
The Committee has established three goals to help achieve the mission statement:
Goal 1: To promote and contribute to the research, development, and application of performance measurement and performance management in transportation organizations that can help to address current and emerging transportation issues.
Goal 2: To improve global communications and dissemination of research findings and best practices applicable to public and private transportation organizations.
Goal 3: To enhance the understanding, knowledge and skills of transportation leaders and professionals in the science, methods, and application of transportation system performance analysis, performance measurement, and performance management.

B. *What plans to you have to address cross-cutting issues with other committees*?
The Performance Measurement Committee will address cross cutting issues thru interactions with other TRB Committees and Technical Societies. Please see section **6.A**
In addition: the following cross cutting performance measurement development focus areas were indentified in the strategic plan:

1. Update a list of key research needs in performance measurement and management.
2. Prepare new research problem statements based on emerging issues including joint sponsorship with other committees on crosscutting issues.
3. Respond to the call for problem statements for the TRB synthesis program.
4. Advocate through American Association of State Highway and Transportation Officials (AASHTO) committees and other means of support for funding problem statements.
5. Maintain a compendium of ongoing research projects and report on their status at the annual meeting and in newsletters.
6. Coordinate with the Communications Subcommittee to contribute to and maintain discussion on the Federal Highway Administration's (FHWA's) Performance Measurement Exchange Website.
7. Focus on the following cross cutting performance measurement topics in coordination with other committees and outside organizations
    i. Sustainability measurement and analysis
    ii. Economic impacts of transportation investments , strategies and programs
    iii. Mobility and traffic operations analysis and measurement
    iv. Stimulus (ARRA) project delivery performance and accountability analysis
    v. Performance Based Federal Aid Program -Federal Reauthorization

4. Committee Activity Plan

A. *What activities are planned next year to achieve your goals?*
The Performance Measurement Committee's 2009 Strategic Plan has detailed short-term activities.

B. *What activities are envisioned in future years?*
The Performance Measurement Committee's 2009 Strategic Plan has detailed long-term activities.

5. Committee Organization and Membership

A. *Describe the membership gender and racial diversity:*
The performance measurement committee currently has five minority members, three international members, and nine female members (including the chair of the committee, and one subcommittee chair)

B. *How is membership distributed geographically?*

Eastern: 13	Central: 5
Western: 5	International: 3

C. *How is membership distributed across professional affiliation?*

State Government: 8	Federal Government: 3
Education: 4	Private Sector: 3
Local Government: 3	Non Profit/Other: 5

D. *How many "friends" are associated with the committee?*
185

E. *List Subcommittee's and Chairs.*

ABC30 Subcommittees and Chairs

Research

Jeff Price, co-chair	jeff.price@vdot.virginia.gov
Greg Marsden, co-chair	g.r.marsden@its.leeds.ac.uk

Communications

Connie Yew, chair	connie.yew@dot.gov

International Activities

Randy Halvorson, co-chair	rhalvorson@camsys.com
Paresh Tailor, co-chair	paresh.tailor@highways.gsi.gov.uk

Session Planning

Mara Campbell, co-chair	mara.campbell@modot.mo.gov
Amy van Doren, co-chair	avandoren@co.marin.ca.us

Paper Review Lead

Ramkumar Venkatanarayana,	ramkumar@virginia.edu

The complete Performance Measurement Committee's Subcommittee chair and membership list is available online at www.trb-performancemeasurement.org

6. Interaction with other TRB Committee, Organizations and Customers

The Committee is composed of a broad cross-section of industry, government, and research professionals. Each member is actively involved in other technical societies. As a committee, we have linkage with several other TRB committees and external organizations such as AASHTO. This interaction can involve attendance at other committee annual and mid-year meetings, serving as members of other TRB committees, joint sponsorship of sessions at the Annual Meetings and development national and international conferences.

A. *Other TRB Committees with Significant Interactions*:
- ABC10 Strategic Management Committee
- ABC20 Management & Productivity Committee
- ABC40 Transportation Asset Management Committee
- ABJ10 National Transportation Data Requirements and Programs
- ABJ95 Visualization in Transportation
- ADA50 Transportation Programming, Planning, and Systems Evaluation
- ADD40 Transportation and Sustainability
- AHB10 Regional Transportation Systems Management and Operations
- AHB35 Committee on HOV, HOT, and Managed Lanes
- ADA10 Statewide Multimodal Transportation Planning Committee
- ADA20 Metropolitan Policy, Planning, and Processes Committee
- AP010 Transit Management and Performance

B. *Other Technical Societies and Organizations with Significant Interactions:*
- AASHTO American Association of Highway and Transportation Officials
- APTA American Public Transit Association
- TTI Texas Transportation Institute
- JSCE Japanese Society of Civil Engineers
- [BJ]TRC Beijing Transportation Research Center
- UKHA United Kingdom Highway Agency

C. *Shared Activities during the past year*:
- Multiple co-sponsored sessions (see section **8E** for detailed listing)
- TRB Performance Measurement Committee Meeting-Baltimore, June 2008
- AASHTO Standing Committee on Performance Management coordination
- December 2008 American Public Transportation Association: participated in the Performance Measurement Conference.

7. Business Meeting Attendance (from recent meeting)

A. Annual business meeting: Members: 26 Guests: 32
B. Summer business meeting: Members: 26 Guests: 16

8. Technology Transfer Activities

A. *Is the committee planning to publish documents within the next two years?*

The Performance Measurement Committee plans on publishing the conference proceedings from the 4th International Performance Measurement Conference, which is proposed to be held in either 2010 or 2011 through TRB

B. *Workshops proposed (excluding the TRB annual meeting):*
The Performance Measurement Committee does not currently plan for workshops other than the annual meeting performance measurement visualization workshops with government and private sector participants as it has done in 2007 and 2008.

C. *Conferences Proposed:*
- The Performance Measurement Committee will continue to plan the 4th U.S. and International Approaches to Performance Measurement for Transportation Conference, which is being proposed for either 2010 or 2011.
- The Performance Measurement Committee has requested TRB sponsorship approval and proposed that some members attend the October 2009 Workshop on Innovations in Traffic Congestion Monitoring in Beijing, China. The conference is being sponsored by one of the committee's new external partners, the Beijing, Transportation Research Center.

D. *Other Future Activities*:
The Committee will continue to take actions to achieve its strategic goals as previously outlined above on page 2. The most immediate priorities are as follows:
- Continue to plan the 4th U.S. and International Approaches to Performance Measurement for Transportation Conference, which is being proposed for either 2010 or 2011.
- Continue to build upon good relations with officials from international communities such as Japan and the United Kingdom, which have actively participated in committee research, panels, and conferences.
- Work with newer partners in Europe and Asia. Examples include the cooperative work done with Swedish officials and the 2009 Beijing Workshop in Traffic Congestion Monitoring.
- Continue to conduct outstanding technical sessions at the TRB Annual Meetings, as well as the mid-year meetings.
- Continue to promote research through improved communication, including the ABC30 newsletter and website, publishing in other TRB or transportation-performance research based organizations, and find additional technical sessions at the TRB annual meeting to co-sponsor.
- Promote the participation in committee activities with a diverse membership, representing as many modes of transportation as possible.
- Serve as a resource to others, through collaboration with related TRB committees and other national and international organizations. This collaboration allows the committee to communicate the full range and crosscutting nature of performance measurement activities and be aware of other organizations and TRB committees' activities.
- Expand system-wide performance analysis and measurement capacity and expertise, particularly in the following focus areas:
    - Sustainability measurement and analysis

        - Economic impacts of transportation investments , strategies and programs
        - Mobility and traffic operations analysis and measurement
        - Stimulus (ARRA) project delivery performance and accountability analysis
        - Performance Based Federal Aid Program -Federal Reauthorization
    - Address federal highway funding reauthorization (SAFTEA-LU)
    - Address performance measurement issues as they arise from both federal and state stimulus programs targeting transportation infrastructure development (2009 American Recovery and Reinvestment Act

E. *Other current activities that support technology transfers (current and past):*
Current:
    - Performance Measurement Committee Website: linked from trb.org, the ABC30 committee website has published materials and can be viewed at www.trb-performancemeasurement.org/ .
    - Performance Measurement Committee Newsletter: published twice a year in June and December, the newsletter has cross cutting issues, committee activities, and announcements on Research Needs and NCHRP funded projects. Also available online at: www.trb-performancemeasurement.org/
    - TRB/FHWA Performance Measurement Exchange: an electronic forum for exchanging information and research on performance measurement: (http://knowledge.fhwa.dot.gov/cops/pm.nsf/home) is an interactive website that allows professionals with common interests, goals or expertise to share their experiences and knowledge, collaborate on work, identify and exchange best practices and advance the state-of-the-art in their respective transportation fields. The goal of the database is to transfer knowledge within and throughout our organization to promote better decision-making, spark innovation, and improve the quality of service to customers and partners. The website supports seven 'group areas' for topical discussion:
        - *Customer Satisfaction and External Communications Measures*
        - *Economic & Freight Measures*
        - *Environmental and Sustainability Measures*
        - *Performance Management*
        - *Safety Performance Measures*
        - *System Operations and Reliability Measures*
        - *System Preservation Measures*
            - *Event calendar*
            - *News and events feeds*

    Past:
    The Performance Measurement Committee has made overall contributions to the transportation industry by sponsoring and co-sponsoring TRB sessions and research papers in the last three years
    2009 Annual Meeting Sessions:
    - 126 Transforming Archived Intelligent Transportation System Data into Information (*co-sponsored*)
    - 149 Visualization for Performance Measurement (*co-sponsored*)

- 223 Best Practices Through Comparative Performance Measurement (*sponsored)*
- 361 Beyond Vehicle Miles Traveled: Expanding the Toolbox for Climate Change Measurement Strategies (*sponsored*)
- 533 Reauthorization Issues, Part I: Emerging Policy Positions (*co-sponsored*)
- 590 Reauthorization Issues, Part II: Implications for Statewide and Metropolitan Planning and Programming (*co-sponsored*)
- 738 Achieving the Highest Return for Our Transportation Dollar: Challenges of Linking Funding and Performance Measurement in Transportation Programs and Projects (*co-sponsored*)
- 745 Moving Cooler: How Effective Are Different Transportation Strategies in Reducing Greenhouse Gasses? (*co-sponsored*)

2008 Annual Meeting Sessions:

- 318 Performance Measures for Multi-Criterion Decision Making (*sponsored*)
- 677 Performance Measurement for Sustainability (*sponsored*)
- ---- Comparative Performance Measurement: Sharing Good Practices (co-*sponsored)*
- ---- Measuring and Evaluating Performance of Road Pricing (*co-sponsored*)
- ---- Developing Performance Measures for Context-Sensitive Solutions and Community Impact Assessment (*co-sponsored*)
- ---- Output and Performance-Based Road Contracts (*co-sponsored*)
- ---- Visualization for Performance Measurement (*co-sponsored*)

2007 Annual Meeting Sessions:

- 403 Performance-Based Contracting (*sponsored*)
- 371 Challenges of Data for Performance Measurement (*sponsored*)
- 715 Performance Measurement Tools and Practice (*sponsored)*
- 361 Beyond Vehicle Miles Traveled: Expanding the Toolbox for Climate Change Measurement Strategies (*sponsored*)
- ---- Accountability and Performance: How Some State Department of Transportation are Reporting on Performance Measurement (*co-sponsored*)
- ---- Successful Asset Management and the Role of Organizational Culture (*co-sponsored*)
- ---- Safety Management and Asset Management (*co-sponsored*)
- ---- Asset Management: Lessons from the Domestic Scan, Executive Session, and Best Practices (*co-sponsored*)

2008 Summer Meeting:

- --- Performance Based Federal Aid Program: Results, Implications and Opportunities in Light of the National Surface Transportation Policy and Revenue Study Commission's Report (*sponsored)*
- --- The Need for Accountability in a Global Market (*sponsored*)

Conference:
2007 U.S. and International Approaches to Performance Measurement for Transportation Systems Conference – Irvine, CA:

- Six plenary sessions
- Five breakout sessions
- 42 presentations and/or papers presented
- Forty-three research topics officially proposed

Miscellaneous:

- In addition to these initiatives, the Committee has continued to serve as a national forum for the identification, discussion, and analysis of performance measure issues. Members are active in many other organizations and use the committee as a means of sharing and advancing the work of these individual groups.

9. Research Needs and Problem Statements

A. *How do you determine and select research needs and problem statements?*
The Committee has been active in identifying research needs and developing problem statements through the annual and semi-annual TRB Meetings and in coordinating with other organizations conducting conferences and workshops related to performance measurement. The following are the major events over the last three years during which the committee has identified and developed future research needs:

- 2009 TRB Annual Meeting – the Committee sponsored three panel sessions, one conference call, and the full committee business meeting.
- 2008 TRB Annual Meeting – the Committee sponsored three panel sessions and the full committee business meeting.
- 2007 TRB Annual Meeting – the Committee sponsored three panel sessions, and the full committee business meeting.
- 2008 Summer (mid-year) Meeting – the Committee sponsored two panel sessions, and one committee meeting.
- 2007 Summer (mid-year) Meeting – the Committee held one committee meeting.
- 2006 Summer (mid-year) Meeting – the Committee held one committee meeting.
- 3rd U.S. and International Approaches to Performance Measurement for Transportation Systems, conference held in Irvine, CA, 2007.

B. *Number of Research Problem Statements currently under development?*
The Performance Measurement Committee has entered six problem statements into the online TRB Research Needs database (www.rns.trb.org), which includes:

- Performance Measures for Highway Stimulus Spending and Related Economic Outputs (2009)
- Strategies to Align Goals and Performance Measures Across Public Agencies (2007)
- Identifying and Using Existing Data Source to Support the Use of Other or Less Traditional Performance Measures (2007)

- Performance Measurement and Evaluation of Tolling and Congestion Pricing Project Benefits and System Impacts (2007)
- Integrating Risk Management into Performance Measurement for Decision Making (2007)
- Develop a Framework and Methodology for Incorporating Environmental Factors into Performance Management Programs (2007)
- (detailed descriptions of these Research Problem Statements are available as Appendix B)

C. *List Research Problem Statements funded during last three years:*
   - *25-25 (Task 23)*: Environmental Performance Measurements Related to Transportation Project Planning, Design, Construction, Maintenance, and Operations
     effective 2005, completed 2008
   - *15-32*: Context Sensitive Solutions: Qualification of the Benefits in Transportation
     effective 2006, expected completion 2009
   - *20-24 (58)*: Toward Developing Performance Based Federal-Aid Highway Programs
     effective 2008, expected completion 2009
   - *08-62* : Transportation Performance Management Programs – Insight from Practitioners
     effective 2007, completed 2009
   - *08-67*: Integrating Individual Transportation System – Level Performance Programs to Determine Network Performance
     effective 2008, expected completion 2009
   - *08-70* : Target-Setting Methods and Data Management to Support Performance-Based Resource Allocation by Transportation Agencies
     effective 2008, expected completion date 2010
   - *08-*74: Sustainable Transportation Performance Measures for State Department of Transportations (DOTs)
     effective 2008 – expected duration 24 months
   - *08-75*: Performance Measurement and Evaluation of Tolling and Congestion Pricing Project Benefits and System Impacts,
     effective 2008 – expected duration 18 months
   - *20-74*: Developing an Asset-Management Framework for the Interstate Highway System, *effective 2007, completed 2009*
   - *20-74 (A)*: Development of Service Levels for the Interstate System
     effective 2008, expected completion 2009
   - Performance Measures for Highway Stimulus Spending and Related Economic Impacts Synthesis Proposal
     status unknown, submitted February 2009
   - (detailed descriptions of these Research Problem Statements are available as Appendix A)

D. *Are the research statements available to the public?*
   Yes.

- The 'Research Needs' are available at www.rns.trb.org and are viewable by entering 'ABC30' into the search window labeled 'committee ID'.
- The funded research projects are available online through the NCHRP Projects website, http://www.trb.org/CRP/NCHRP/NCHRPProjects.asp, and they include past and currently funded projects. The projects are not searchable. However, the Performance Measurement Committee has included additional detailed information and website links for current projects as Appendix B.

E. *Supplementary Research:*

Research Needs Indentified in the Triennial Strategic Plan:

8. Update a list of key research needs in performance measurement and management.

9. Prepare new research problem statements based on emerging issues including joint sponsorship with other committees on crosscutting issues.

10. Respond to the call for problem statements for the TRB synthesis program.

11. Advocate through American Association of State Highway and Transportation Officials (AASHTO) committees and other means of support for funding problem statements.

12. Maintain a compendium of ongoing research projects and report on their status at the annual meeting and in newsletters.

13. Coordinate with the Communications Subcommittee to contribute to and maintain discussion on the Federal Highway Administration's (FHWA's) Performance Measurement Exchange Website.

Research Needs Identified in 2007 Irvine, California International Performance Measurement Conference:

- The Performance Measurement Committee also helped synthesize identified research needs following the conclusion of the 3rd U.S. and International Approaches to Performance Measurement for Transportation System conference in 2007. In the published conference proceedings (*TRB [published] conference proceedings 44*) there were over 43 separate research problems that were identified amongst participants as having a potentially significant contribution to both domestic and international performance measurement needs. Both of the NCHRP research awards given in 2008 (*08-74 & 08-75*) were identified under the "Hot Topics" section. The list is available as Appendix C.

Other Research:

- Complete list of research ideas generated by the Performance Measurement Committee members are available as a table in Appendix D.

10. General Remarks and Comments Offered by the Committee

A. *Should your committee continue in its present form with its present title?*
Yes (continued existence and with continued title)

B. *Should it be merged with one or more other committees*?
No (for either suggestion)

C. *Any other comments considered appropriate by the committee:*

ABC30 is an active and productive committee with strong member ship and friends base and has made significant contributions to the discipline, development and application of system performance management and performance measurement.

11. Annual Reports of Committee Activities

A. FY 2008 Performance Measurement Committee Annual Report (please visit www.trb-performancemeasurement.org)
B. FY 2007 Performance Measurement Committee Annual Report (please visit www.trb-performancemeasurement.org)
C. FY 2006 Performance Measurement Committee Annual Report (please visit www.trb-performancemeasurement.org)

12. Appendices attached within this Word Document

***Appendix A*:** NCHRP Research Awards

***Appendix B*:** Entries from TRB Research Needs Database

Appendix C: Extract from Conference Proceedings 44: Summary of Suggested Research Topics

***Appendix D*:** Consolidated Research Ideas from the Performance Measurement Committee, 2007-2009

Project NCHRP 25-25 (Task 23)
Environmental performance measurements related to transportation project planning, design, construction, maintenance, and operations
Effective Date: 10/7/2005 Completion Date: 7/1/2008
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1295

BACKGROUND

The objective of National Cooperative Highway Research Program (NCHRP) Project 25-25, Task 23 is to establish guidelines for the development and implementation of environmental performance measurements for state departments of transportation (DOT). Through an analysis of existing literature, practices, and research, practical procedures to integrate environmental measurements into agency practices and decision-making are identified and described.

Transportation agencies increasingly are utilizing performance-based management approaches to guide their planning, design, maintenance, operations, and contracting practices. These include the adoption of goals and objectives, performance standards, and monitoring of actual performance. Typically performance measures have been limited to a set of measures directly under the agency's control, such as capacity and pavement quality. Today's transportation decisions, though, are being made in a much broader and more collaborative context in which water quality, air quality, ecology, economic development, historic preservation, community quality of life, and other environmental considerations are being given increased importance. While transportation may have an important influence on outcomes in these areas, a variety of other factors also affect the degree to which these desired other objectives are achieved. Not only do these outcomes require more complex measures, but they also often overlap with efforts being undertaken by other agencies such as departments of natural resources. Nonetheless, transportation agencies are concluding that it is important to incorporate these broader indicators in their performance-based strategic management processes.

Project NCHRP 15-32
Context sensitive solutions: qualification of the benefits in transportation
Effective Date: 5/25/2006 Completion Date: 5/31/2009
http://www.trb.org/trbnet/projectdisplay.asp?projectid=412

BACKGROUND

As more organizations apply the principles of context sensitive solutions (CSS), evidence is increasing that measurable benefits result from a more broadly informed and flexible approach to all phases of transportation decision making. There is a widely shared belief that involving stakeholders in decision making results in solutions that balance environmental, engineering, community, mobility, funding, and safety needs with minimum delay and controversy. If this is true, there should be significant quantifiable benefits from the strategic and appropriate application of CSS principles.

Evaluation of the benefits of transportation programs is often limited to the cost savings accrued from reduced travel times, emissions, environmental impacts, and operations. These evaluations continue to produce an abundance of data that often address a particular mode such as transit or highways and specific aspects that are easily quantified such as ridership, noise levels, wetland impacts, and arterial capacity. Data on less readily quantifiable aspects have been lacking. The economic impacts of CSS, in terms of achieving value-added benefits and reducing costs and delays, have not been well documented.

Quantification of benefits and cost savings realized through application of CSS in transportation should be of great value to agencies and stakeholders working to deliver projects and will advance CSS implementation nationally.

Project NCHRP 20-24 (58)
Toward developing performance based federal-aid highway programs
Effective Date: 3/3/2008 Completion Date: 3/2/2009
http://www.trb.org/trbnet/projectdisplay.asp?projectid=2112

BACKGROUND
The United States Congress and the National Surface Transportation Policy and Revenue Study Commission (established under federal SAFETEA-LU legislation) have sought to examine how well today's Federal-aid transportation programs meet certain performance goals. Some state departments of transportation (DOTs) have developed sophisticated management tools and procedures for setting performance targets and using performance-based management in their planning, programming, and other decision making. These tools and procedures may not be well known to other DOTs and the Congress. Research is needed to present best current DOT practices for performance-based management of federal-aid transportation programs and to support the work of AASHTO's leadership in further dissemination and development of such practices. The objective of this research is to work with the AASHTO to (a) describe the current state of practice in performance-based management of federal-aid programs, (b) assess how apportionment formulas and the distribution of federal funding among programs can influence overall performance of federal assistance for which an agency is responsible, and (c) assess how federal-aid programs may be better organized to enable agencies to manage for higher performance.

Project NCHRP 08-62
Transportation Performance Management Programs – Insight from Practitioners
Effective Date: 34/5/2007 Completion Date: 2/4/2009
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=938

BACKGROUND
Many states have developed transportation performance management programs to support a broad range of activities such as strategic planning and decision making, comprehensive asset management, transportation system performance, project management and cost control, and demonstration of effective departmental stewardship of public funding. Implementation and integration of transportation performance management programs is essential, not only for transportation agencies to make the transition to more business-like operations, but also to ensure that departmental responses to emerging issues are being effectively and efficiently carried out. To date, research into transportation performance management programs has focused primarily on specific areas of measurement, tools, and institutional frameworks necessary for evaluating performance of projects and programs. More information is needed on in-depth examples of how transportation performance management programs are being integrated into key decision-making processes (e.g., departmental management, strategic planning, and transportation system performance). In recent years, a growing number of states (e.g., Washington, Virginia, Maryland, and Florida) have initiated comprehensive transportation performance management programs designed to inform the public about departmental actions to fulfill statutory mandates, while using performance management programs to evaluate and monitor progress on project delivery, budget and cost controls, and program efficiency. There is a need for detailed analyses of how transportation performance management programs are implemented and integrated into decision-making processes that govern the way departments of transportation in the United States deliver services to their customers.

Project NCHRP 08-67
Integrating Individual Transportation System-Level Performance Programs to Determine Network Performance
Effective Date: 4/8/2008 Completion Date: 10/8/2009

http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1617

BACKGROUND

Transportation systems typically span multiple jurisdictions, serve common markets, and often provide overlapping services within regions and corridors. The majority of research for developing transportation system performance management highlights the tools, frameworks, and guidelines necessary for performance program creation and implementation. Absent from this research is the examination of integrating system-level programs to measure the performance of multimodal and multi-jurisdictional transportation networks. There is a need for network performance measurement to efficiently plan for and manage a multimodal and/or multijurisdictional transportation network.

Whether individual systems are owned, operated, and maintained by state, regional, or local governments; specially designated authorities; or the private sector, users expect to navigate among the systems without regard to the controlling entity—having the appearance of a "seamless" transportation network. Performance evaluation of individual systems alone is not sufficient. What is needed is in-depth analysis of the potential for integration or development of performance measures to gauge the performance of multimodal and multijurisdictional transportation networks. Once an understanding of network performance is gained, results can be used to inform and improve planning, project selection, implementation, and management.

Project NCHRP 08-70
Target-Setting Methods and Data Management to Support Performance Based Resource Allocation by Transportation Agencies
Effective Date: 1/24/2008 Completion Date: 1/23/2010

BACKGROUND

Transportation agencies at all levels of government are embracing performance measurement to guide their resource allocation decisions for operations, asset management, capital investment, planning, and policy development. While there is extensive and growing literature on defining and applying performance measures, little attention has been given to specific methods for setting performance targets within the context of their efforts to achieve multiple objectives and interact with multiple decisionmakers and stakeholder groups. Setting targets generally entails balancing among competing objectives and dealing with political implications. Unless performance targets are set with sound and defensible bases, and with the concurrence of key decision makers and stakeholders, the effectiveness of performance measurement as a management tool to improve agency efficiency and accountability is compromised.

NCHRP Report 551: Performance Measures and Targets for Transportation Asset Management, outlines basic steps for setting targets, but the methods described are limited primarily to asset preservation. Research is needed to develop a more comprehensive set of methods to establish performance targets to guide resource allocation decisions in all aspects of transportation agency management, from planning and policy development to project implementation and operations. This research must address methods that agencies can use for setting appropriate performance targets as well as the data management systems and institutional relationships needed to support agencies' use of performance-based resource allocation. Examples and cases from a variety of organizational settings may be instructive and adaptable to application by transportation agencies.

The objectives of this research are to (1) describe a comprehensive framework and set of methods (a) to analyze opportunities to improve the multiple-objective performance of transportation systems within the context of broader societal goals and (b) to set specific performance targets to guide agency policies, plans, and programs; (2) detail the factors that influence target setting and the success of performance-based resource allocation systems and explain how agencies may successfully design, implement, and use such

systems; and (3) analyze the data and information needs, data acquisition and management systems, and institutional relationships required to support successful performance-based resource allocation systems. The research will guide agencies in establishing and applying performance-based resource-allocation decisionmaking and target setting. Case studies of organizations that use performance-based resource allocation will be provided, together with examples to illustrate methods for presenting performance information to decisionmakers and other stakeholders. Examples of successful performance-based decision-support systems will be provided from transportation and other fields, and directions given for adapting these cases and examples to transportation agencies. The project will be accomplished in three phases.

Project NCHRP 08-74
Sustainable transportation performance measures for state department of transportations (DOT's)
Effective Date: 24 months
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=2500

BACKGROUND
State departments of transportation and other transportation agencies are struggling with how to integrate sustainability into their investment and operating decisions. In part, this is because there are multiple definitions of sustainability, and they are variously applied at different scales and at different points in system planning and programming; project development, design, construction, and maintenance; and operations. Transportation agencies are incorporating the principles of Context Sensitive Solutions and environmental stewardship into their decisionmaking, and sustainability potentially presents at least a variation and at most an entirely new way of evaluating agency performance. Agencies need assistance in developing sustainability goals and objectives and related performance measures.
Popular definitions of sustainability consider the environmental, economic, and social implications of a decision and the rate of natural resource consumption relative to resource availability and the needs of future generations. For sustainability to be successfully incorporated into transportation decisionmaking, it is essential that these concepts are adequately understood, quantified and applied.
Transportation agencies have strategic goals that cover a broad range of topics, many of which may be consolidated into categories that specifically address the dimensions of sustainability—economic health, social equity, and environmental stewardship.
Examples include improved safety, reduced congestion, wetland conservation, enhanced economic opportunity, improved air quality, reliable mobility, system preservation, accelerated project delivery, economic vitality, ecosystem services, neighborhood preservation, and increased value of transportation assets. Climate change constitutes an emergent and critical area where agencies need immediate assistance.
To achieve the goals of sustainable transportation, agencies require practical and easy-to-use tools or methods to continuously integrate sustainability into current agency performance measurement programs. Working with performance measures, however, can be a daunting task due to the large number of possible measures, extensive data that might be required, and computational complexity—hence the need for identifying useful and easy-to-use performance measures.

Project NCHRP 08-75
Performance measurement and evaluation of tolling and congestion pricing project benefits and system impacts
Effective Date: 18 months
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=2501

BACKGROUND

Highway traffic congestion is one of the biggest challenges facing transportation agencies today. Congestion will likely become even worse in the future as demand for highway facilities increases and capacity remains limited. Increasing peak times, loss of productivity during congested periods, and underutilization of existing capacity during off peak periods are some of the current system management challenges. Significant capacity expansion opportunities are limited due to environmental, right of way, and financial constraints; maximizing existing and underused capacity has become paramount. Transportation authorities and organizations around the country and abroad have explored and applied capacity improvement strategies as well as several Transportation Demand Management and Transportation System Management (including active traffic management and integrated corridor management) methods in an effort to mitigate the negative consequences of current and future congestion levels.

There is a growing national momentum within government transportation agencies to explore congestion pricing and evaluate its performance. A number of states are considering or implementing congestion pricing projects such as High Occupancy Toll (HOT) lanes. In addition, U.S. DOT issued a set of national strategies to reduce congestion that includes pricing concepts. A key element of this strategy is the development of Urban Partnership Agreement (UPA) and Congestion Reduction Demonstration (CRD) programs, which include tolling, transit, telecommuting, technology, and operations components. Following a competitive process, U.S. DOT selected six metropolitan areas to receive grants (Miami, Minneapolis, San Francisco, Seattle, Los Angeles, and Chicago). Implementation of these congestion pricing projects will require focused data tracking and analysis of the effectiveness and impact of pricing. Performance measurement is an important part of this process.

In addition, the last highway reauthorization legislation, SAFETEA-LU, made provisions that provide state departments of transportation with flexibility to use congestion pricing programs in their congestion mitigation programs (Sec. 1604), providing over $50 million during this authorization period for pilot programs to use congestion pricing to mitigate congestion and air pollution, as well as improve fuel efficiency.

U.S. DOT is also encouraging region-wide planning for congestion management. Current projects are underway in Dallas, Seattle, and Washington, D.C., among others. Performance measures for congestion pricing will be an important aspect of the planning process.

Congestion pricing options face considerable political and public pressures. Transportation organizations need assistance in developing and tracking measurements for assessing the benefits and impacts of congestion pricing strategies. Effective performance assessment of pricing projects is essential at the planning, development, deployment, operation, and evaluation stages. Currently, there is lack of knowledge on how to develop appropriate performance measurements, data tracking and analysis methods, and communicating the results to the public.

Project NCHRP (Topic Submittal as of April 15, 2009)
Performance Measures for Highway Stimulus Spending and Related Economic Impacts
Effective Date: Unknown
http://www.trb.org/Studies/Synthesis/SynthesesSubmittal.asp

BACKGROUND

As a global recession of unprecedented scale threatens to engulf much of the United States' economy, congress and federal policy-makers have assembled a large package of government "stimulus" spending that can reverse job losses and revive consumer demand. Economists identify road construction as a good way to create jobs in the short-term and to boost economic productivity in the long-term by lowering transportation costs. As a result, highways feature prominently in the proposed Congressional economic

stimulus bill and about $30 billion in new federal money for pavements, bridges, and tunnels is likely to flow to state DOTs in 2009 and 2010.

For the highways element of the economic stimulus package to be successful, state DOTs must quickly roll out projects that get stimulus money to construction sector and into the broader economy. With a significant commitment of taxpayer funds at stake, DOT leaders, external stakeholders and the public will watch closely and expect results. Even with "shovel ready" project designs considered ready to go, DOT staffs will face great pressure to finalize plans, bid, let and construct a huge volume of projects over the next 12 to 36 months. Performance management - the systematic process by which organizations analyze system and organizational performance and use performance data to make investment and budget decisions– will play an important role in helping DOTs meet the stimulus challenge and respond to federal accountability demands.

Many state DOTs already use performance measures to manage bridge and pavement conditions, congestion, highway safety and project delivery. The challenges inherent in spending a massive amount of stimulus funds, however, suggest that current performance measurement and management tools need to be enhanced and expanded to provide the accountability and economic impact information required to be successful. High-level language in the federal stimulus bill requires monitoring of stimulus spending by the Federal Highway Administration, but how it will be implemented is unclear. In the coming months, many DOTs may also craft a range of new performance management practices that help ensure their stimulus funds are spent in a timely, efficient and accountable manner. As with any new program, however, states will be looking to their peers and experts to build on good analysis and measurement practices.

Project NCHRP 20-74
Developing an Asset-Management Framework for the Interstate Highway System
Effective Date: 4/2/2007 Completion Date 1/1/2009
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=660

BACKGROUND

The United States has made significant investments in its transportation infrastructure and, as this infrastructure is used and exposed to natural environmental forces, it ages and deteriorates. Responsible agencies expend time, effort, and money to preserve and maintain the infrastructure to ensure that it will support consistent, reliable, and safe transportation services and produce economic benefits. One of the nation's most significant investments in transportation infrastructure is the Dwight D. Eisenhower System of Interstate and Defense Highways, often referred to simply as the Interstate Highway System. That system, initiated 50 years ago, is vital to the nation's economy and is an increasingly critical contributor to global production and distribution systems. Investments in the system are managed by the state departments of transportation (DOTs) and a variety of other associated agencies responsible for specific Interstate facilities. To ensure that the benefits of the Interstate Highway System continue for future generations, these agencies must preserve, operate, maintain, and augment the system's assets.

The principles and practices of transportation asset management constitute a framework for making decisions about planning, programming, design, construction, maintenance, and operation of roadways, bridges, tunnels, and other transportation facilities. These principles and practices have been developed in recent years and applied in a number of countries and parts of the United States to protect and ensure high returns on investment in transportation infrastructure assets. Interpretations and practices of transportation asset management can vary among these several applications in appropriate response to the specific asset portfolios, institutional settings, funding, and priorities affecting each particular agency. While many agencies share responsibility for Interstate investments, these assets serve national purposes. Research is needed to develop a practical framework for applying asset-management principles and practices, with an appropriate balance between state and national interests, to support decision making for

management of the assets produced by Interstate Highway System investments. The objective of this research is to develop a practical framework for applying asset-management principles and practices to managing Interstate Highway System investments. This framework should be holistic; be applicable to existing facilities and those that may be developed in the future; provide the bases for making decisions across asset classes in an integrated manner and from a systemwide perspective about operation and maintenance as well as new construction and reconstruction; and be easy to implement, cost-effective, and sufficiently beneficial to be attractive for adoption by transportation officials and agencies nationwide.

Project NCHRP 20-74 (A)
Development of Service Levels for the Interstate Highway System
Effective Date 3/31/2008 Completion Date: 9/30/2009
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1638

BACKGROUND
Global trade, population growth, and other factors are driving large increases in heavy trucks and other traffic on many of the nation's highways. This traffic growth has accelerated rates of pavement and other roadway deterioration, particularly on the Interstate Highway System, and increased the significance of declining service levels as a drain on the nation's economic vitality. At the same time, demands for on-time delivery of goods; personal mobility; and a safe, reliable, and environmentally responsible highway system have raised system maintenance costs and increased public dissatisfaction with service disruptions associated with highway repair and reconstruction. Limited funds make it difficult for many agencies to ensure adequate maintenance of their highways. The development of nationwide service levels for the Interstate Highway System would provide benchmarks that departments of transportation (DOTs) and other responsible agencies can use to assess their Interstate maintenance and preservation needs.

Project NCHRP 20-24 (37) (B)
Measuring Performance Among State DOTs: Sharing Good Practices Based on the International Roughness Index
Effective Date: 9/19/2007 Completion Date: 5/18/2008
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1972

BACKGROUND
Previous work under NCHRP Project 20-24(37) has demonstrated the benefits of measuring and comparing performance among peer state departments of transportation (DOTs). Keeping such comparisons in the proper context, they are meant to enhance the performance of participating peer state DOTs by identifying and sharing good practice. The purpose is not to rank state DOTs for the popular press, especially when such publicly available comparisons often rely on measures with incompatible data results.
NCHRP Project 20-24(37) focused on the comparison of on-time, on-budget capital project delivery performance. The project successfully demonstrated how this comparative process is gathering user support as well as delivering timely feedback on good practices that have achieved successful results. The project report, *Measuring Performance among State DOTs*, describes how state DOTs may increase their use of comparative performance measures and provides a foundation for further collaborative development of comparative performance measures by the American Association of State Highway and Transportation Officials (AASHTO) and its member states. NCHRP Project 20-24(37)A continued this effort by expanding the number of participating states and producing a summary of best practices, titled, *Comparing State DOTs' Construction Project Cost & Schedule Perfromance-28 Best Practices from 9 States*. For copies of these reports, see the writeup for NCHRP project 20-24(37) found at (http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=543)

It would be beneficial to continue the positive momentum realized from this cooperative success by directing it toward another key concern of transportation officials. Several years of experience with the Federal Highway Administration's Highway Performance Monitoring System (HPMS) and its *Highway Statistics* report have allowed state DOTs to establish a mature set of asset management data that's available for comparisons, making this set of data a very good source for continuing the process and to further demonstrate the concept of comparative performance measures.

The *Highway Statistics* report has been published annually since 1945. It provides a wealth of transportation data for each state and is a readily available source of information to establish long-range trends. Unfortunately, as its publishers warn, inconsistencies in measurement interpretation and data collection practices limit the accuracy of this data for direct comparisons among the state agencies. The report suggests that care be taken to properly identify peer states before analyzing the data, but little guidance is provided.

Project NCHRP 20-24(37)C
Measuring Performance Among State DOTs, Sharing Best Practices
Effective Date: 10/29/2008 Completion Date: 7/28/2009
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=2483

BACKGROUND

NCHRP Project 20-24(37) has been conducted to describe how use of comparative performance measures may help managers of state departments of transportation (DOTs) to improve performance of their own systems and organizations. Work to date has demonstrated that widely acceptable performance measures can be developed and provides a foundation for further collaborative development of comparative performance measures by the American Association of State Highway and Transportation Officials (AASHTO) and its member agencies.

Initial work under NCHRP 20-24(37) entailed a comparison of on-time, on-budget capital project delivery performance that expanded from an original pilot to include twenty state participants. This work demonstrated a successful approach to attracting user support as well as delivering timely feedback on best practices that have achieved successful results. A second comparative initiative, completed in April 2008, highlighted five states that have "smooth pavements" and what practical management tools they are using to deliver smoothness.

Building on the success of these first two initiatives, this project will address another key concern of transportation officials: safety. Apart from certain crash fatality statistics, variability in the characteristics of data reporting complicates performance comparisons among states. The purpose of such comparisons, in this project and in general, is not to rank states' performance, but rather to highlight top-performing management strategies and to give DOT managers benchmarks for judging their own performance. Anonymity is maintained for states providing the comparison data with the exception of the top performing states that are highlighted in the reporting of successful practices.

NHTSA data may be used to conduct time series and cross-sectional analysis of fatality and serious injury rates. After normalizing for urban and rural travel differences and capturing the demographic differences (such as age and ethnicity), the researchers may then be able to identify (using statistical methods) causal factors underlying lower rates observed in some states, for example, laws, adjudication, roadway condition, and emergency medical services.

The objective of this project is to use the techniques developed in NCHRP Projects 20-24(37)A and 20-24(37)B) to develop comparative statistics on highway safety, factors likely influencing safety experience of states, and strategies used by states with best safety experience.

Accomplishing the project's objective will entail the following tasks: (1) Conduct one or two teleconference meetings with volunteer states to define data to be provided by these states for the project. (2) Conduct one

conference call to confirm that each volunteer state can produce the required data defined in the first task; each state will collect and submit the agreed upon data to the consultant for compilation and analysis. (3) Prepare a compilation of data provided by participating states, compute comparative and summary performance statistics, and provide a compilation report to each of the volunteer states. Anonymity of participating states shall be maintained and each state shall have the option to withdraw from the study at any time. (4) Identify states that are lead performers. Secure approval from these lead performers to disclose their identities for the purpose of determining Best Practices that contribute to superior performance results. (5) Prepare a summary report and PowerPoint presentation of the comparative performance measure data and analyses to illustrate examples of what could be expected from the project. (6) Conduct detailed Best Practice Analysis of the top performing states. To identify likely factors contributing to good safety performance. Survey all participants to solicit recommendations for improvements to data and research procedures for future multi-state comparisons. (7) Prepare a final report documenting the project.

Strategies to Align Goals and Performance Measures Across Public Agencies

TITLE: Strategies to Align Goals and Performance Measures Across Public Agencies

PROBLEM: Lack of common goals or performance measures across transportation organizations serving the same citizens in a region is a frequent barrier to concerted planning and action to improve transportation performance results. The issue has surfaced repeatedly at national meetings on performance measurement. Ideally transportation, mass transit, and other agencies within a geographic region generally are to provide comparable or coordinated transportation products and services to their customers. However, when the goals or measures of these types of agencies are not aligned to one another, the intended performance of their products and services in their region could result in conflicts, reduced credibility, and poorer services for customers.

OBJECTIVE: To investigate and describe interagency transportation performance measures and goals that conflict and the resulting impacts for state, local, and modal agencies. Successful corrective strategies to achieve better alignment shall also be presented.

Then, the purpose of this project includes: (a) To identify typical patterns and sources of potential conflicting goals within and among agencies, (b) To assess the impact of such conflicting alignments, (c) To identify promising ways of preventing, minimizing, reconciling or correcting of such misalignments.

KEY WORDS: Action, alignment, conflict, corrective, goal, impact, interagency, performance measure, transportation.

RELATED WORK: A recent congressional report compares transportation problems to intended and unintended consequences of other policy issues (Mallett, *Surface Transportation and Congestion: Policy and Issues*, May 10, 2007). As such, the goals within an agency itself could be conflicting, and the solution development process could be chaotic.

NCHRP 08-67 Integrating Individual Transportation System-Level Performance Programs to Determine Network Performance in a related project underway in the fall of 2007.

URGENCY/PRIORITY: Urgent

COST: $150,000

USER COMMUNITY: Transportation agencies, transit agencies, municipal planning organizations.

IMPLEMENTATION: Findings of the research should be disseminated through reports, presentations and other materials targeted to associations representing a variety of types of transportation services, including county and MPO organizations, transit associations, etc.

EFFECTIVENESS: A community is best served when transportation agencies coordinate and align their goals and performance measures. Improved quality of life and

transportation services within a community are more likely to have stronger public support.

Identifying and Using Existing Data Sources to Support the Use of Other or Less Traditional Performance Measures

TITLE: Identifying and using existing data sources to support the use of other or less traditional performance measures.

PROBLEM: The data sources and data collection techniques used to measure outputs or outcomes of the services or products a transportation agency provides, typically include snow plowing, highway and bridge reconstruction contracts, etc. There are likely other or less traditional uses that have not been considered. There may even be some that are measured by others, including local planning, health, economic, etc. The use of other or less traditional performance measures may result in benefits to sustainable transportation, the environment, quality of life, and social equity. There may be creative uses that are not widely known or may not have been considered, and therefore unlikely to be implemented.

OBJECTIVE: To identify and use existing data sources to support the innovative use of other or less traditional performance measures by researchers, designers and practitioners.

KEY WORDS: Existing data sources, less traditional performance measures, other performance measures, community, environment, society, data collection

RELATED WORK: The AASHTO Standing Committee on Planning released a report in May 2006, exploring the non-traditional transportation performance measures, following an NCHRP peer-exchange on the same topic. This report is a synthesis of the relevant and current information on the topic of non-traditional measures. The importance, and yet the lack of use, of these measures is clear from the report. The report also clearly identifies the challenges associated with using existing data sources to support these measures, and the need to examine these data sources carefully, before identifying new data sources needed. This project will fill that knowledge gap.

URGENCY/PRIORITY: Urgent

COST: $200,000

USER COMMUNITY: State DOT's, MPO's, Transportation agencies, environmental agencies government, public, scientific and engineering communities.

IMPLEMENTATION: This research will help transportation agencies identify, develop and implement methods to use existing data sources for non-traditional performance measures.

EFFECTIVENESS: Understanding other or less traditional performance measures and having ways to quantify and apply them to challenging problems broadens the potential for societal benefits. It also can provide policy-makers with crucial information thereby strengthening public involvement and support of transportation initiatives and goals.

Performance Measurement and Evaluation of Tolling and Congestion Pricing Project Benefits and System Impacts

Performance Measurement and Evaluation of Tolling and Congestion Pricing Project Benefits and System Impacts

PROBLEM TITLE Performance Measurement and Evaluation of Tolling and Congestion Pricing Project Benefits and System Impacts

PROBLEM Highway Traffic congestion will likely become worse in the future as demand for highway facilities increases and supply (or capacity) remains stagnant. Peak time spreading, loss of productivity during congested periods and underutilization of existing capacity during off peak periods are some of the current system management challenges. Transportation authorities and organizations around the country and abroad have explored and applied capacity improvement strategies as well as several Transportation Demand Management and Transportation System Management methods in an effort to mitigate the negative consequences of current and future congestion levels. What has been realized in many areas is that significant capacity expansion opportunities are limited due to environmental, right of way and financial constraints, thus maximizing existing and underused capacity has become paramount.

One of the lesser used tools in the congestion management tool box is tolling and congestion pricing of existing and new infrastructure. However, there is a growing, national momentum within government transportation entities to explore that option and evaluate its performance. A growing number of states are considering and or implementing tolling and congestion pricing projects such as HOT lanes (Orski, Ken, Innovation Briefs: News Analysis "*Highway Tolling has reached the Tipping Point*."). In addition, USDOT just issued a set of national strategies to reduce congestion that includes pricing concepts. (U.S. Department of Transportation, *National Strategy to Reduce Congestion on America's Transportation Network* (May 2006) http://isddc.dot.gov/OLPFiles/OST/012988.pdf;

These options, however, also face considerable political and public pressures. Effective performance assessment and analysis of existing and planned pricing projects is central to gaining public acceptance and use, along with encouraging broader application. Currently, there is lack of knowledge and benchmarking of best practices on how to develop appropriate performance measurements and related data tracking and analysis methods and communicate the results to the public.

Transportation organizations need assistance in developing and tracking measurements for assessing the benefits and impacts of tolling and congestion pricing strategies.

LITERATURE There is a body of research that supports and explains congestion pricing and similar financing concepts and their benefits such as the following, recently released papers: DeCorla-Souza, P. (2006) *Implementing Congestion pricing on metropolitan highway networks with self-financing public-private partnerships.* Journal of the Transportation Research Forum, *45* (1), 5-22. http://www.trforum.org/journal/2006spr/abstract1.php?PHPSESSID=b2bcda6bf84233563d857a41610e5ee4 DeCorla Souza points out two key benefits of road tolling: traffic management and revenue generation.

Another recent summary by Replogle, M., and Funderburg, K. (2006): *No more just throwing money out the window: Using road tolls to cut congestion, protect the environment, and boost access for all.* Washington, DC: Environmental Defense. (Available online: http://www.environmentaldefense.org/documents/5257_TollingReport0506.pdf?ContentID=4763) describes a policy framework for ideal toll-road conditions and stresses that, toll roads must: be designed to meet short and long term goals for performance.

While these works provide good summaries on generally expected benefits, there is little if any available research that focuses on specific analysis, evaluation and performance measurement methodologies for evaluating the various congestion pricing projects and approaches.

A recently released report on congestion management for Melbourne, Australia, contains a discussion on the nature of congestion and its measurements, using both user-based indicators ("the community's viewpoint") and economic measures but is limited to an overview level (Victorian Competition and Efficiency Commission: *Making the Right Choices: Options for Managing Transport Congestion.* (April 2006).

http://www.vcec.vic.gov.au/CA256EAF001C7B21/0/AE0E4846D18AA8DFCA25707C001EEE61?OpenDocument.

Another upcoming body of work, a yet to be released NCHRP report, *Guide to Effective Freeway Performance Measurement* (due to be completed on July 31, 2006) will provide measures on congestion, mobility, and operational efficiency, but does not specifically address congestion pricing evaluations and assessments.

RESEARCH OBJECTIVE

The research objective is to create a guide that provides departments of transportations (DOT)and Municipal Planning Organizations (MPO) with specific information to develop appropriate performance measures, track data and evaluate and communicate the results of pricing projects based on the various goals but especially in terms of efficiency, system management and maximizing throughput and available capacity.

Specific measures that should be considered during the course of this research include system efficiency; system management; maximization of throughput and capacity; efficiency related to collection methods and tools; measures related to user benefit (such as increased travel time and reliability) and measures related to efficiency and equity in toll revenue allocations.

Due to the limited exiting pricing projects in the US, the research would have to include a detailed look at the use of pricing related performance measures by other countries such as Japan and European countries.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: Estimated at $200,000

Research Period: Due to the immediate need for this guide it should be completed in 12-24 months.

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

Congestion pricing maybe a critical and efficient method of managing congestion and enhance system efficiency. The current, national momentum is growing and aids in the implementation of trial projects. Many states are closely watching the deployment and performance of existing projects. Setting up the appropriate framework and data tracking for measurement, evaluation and communication will not only impact and affect that specific state or MPO but its success has potential impacts on many others. As stated above, there is little if any available research that focuses on the specific analysis, evaluation and performance measurement methodologies for evaluating the various tolling/congestion pricing projects and approaches. The transportation community is struggling to quantify and convey benefits and impacts to the public and to legislators generally resistant to pricing schemes. This research would provide a much needed tool to assist state DOTs, MPOs and other practitioners.

Integrating Risk Management into Performance Measurement for Decision Making

TITLE: Integrating Risk Management into Performance Measurement for Decision Making.

PROBLEM: There is no consensus on how risk management should be integrated into performance metrics. Yet risk management is an increasingly popular way to better identify, assess, prioritize, and communicate future risks, and make decisions to maximize opportunities and minimize threats. Performance measurement is a vital management tool that must include the predictable results of decisions in the design, construction and operation of transportation facilities while accounting for possible unintended consequences of those decisions.

OBJECTIVE: To identify from the body of available research how risk management techniques and methods have been integrated into performance measures. Specifically recommendations and improvements to evaluate transportation facility design, construction and operation.

KEY WORDS: consequence, decision, management, method, outcome, output, performance, risk, technique, operations, design, construction.

RELATED WORK: A preliminary search of the transportation literature did not identify any significant research on this topic.

URGENCY/PRIORITY: Urgent

COST: $200,000

USER COMMUNITY: Transportation agencies.

IMPLEMENTATION: This research can be implemented immediately into an agency's current performance measurement process. It can also be used by agencies that are developing and institutionalizing a performance measurement organizational environment.

EFFECTIVENESS: Managing risks results in many societal benefits ranging from improved transportation safety, system reliability and improved cost-effectiveness of decisions related to the design, construction and operation of transportation facilities, demonstrating to the public how transportation system owners accept accountability in incorporating risk into their decision making process.

Develop a Framework and Methodology for Incorporating Environmental Factors into Performance Management Programs

TITLE: Develop a framework and methodology for incorporating environmental factors into performance management programs

PROBLEM: Transportation performance management is now a well established and accepted best practice for establishing accountability and driving results in transportation agencies. Holistic approaches to performance management require that performance measures and considerations be integrated into all functions from policy development and long range planning to programming and budgeting, program and project delivery, system operations, maintenance and monitoring and reporting results. In addition, holistic approaches need to reflect all the key performance areas of concern including system and facility conditions, congestion and mobility, safety, cost effectiveness as well as harder to measure areas such as environmental factors.

While some research has been done on environmental performance measures, environmental management systems and particular environmental impact areas (air quality, noise, wetlands, etc.), a comprehensive framework and approach has not yet been fully developed for integrating environmental factors into performance management programs. Specific issues include the appropriate environmental measures to include in such a program and the appropriate approach and level of detail for considering environmental performance factors at various stages of the planning, development, delivery and operation.

Just as importantly, since investments in environmental mitigation are often driven by permitting and resource agency decisions, transportation agencies may not have control over how these factors are weighted within holistic performance management frameworks. Often, funds going towards environmental performance are subsumed into the "cost of doing business, " since most transportation agencies do not independently track the cost of direct mitigation or design specifications that provide environmental benefit. Performance measurement systems that fully incorporate environmental considerations longitudinally within the planning, development, and delivery processes will necessarily include performance goals that serve multiple missions including both transportation and the environment. Ideally, such processes should provide benefit to the transportation program as well as to specific environmental resources. There is no accepted business process for how such multi-mission performance goals are established, how long-term costs (such as maintaining viable wetlands) are considered in trade off analysis between performance categories, or how early commitments relative to the environment later benefit the transportation programs of state DOTs.

OBJECTIVE: To develop a framework and methodology, including potential performance measures and approaches, for integrating environmental factors into agency-wide performance management programs . This approach will not be a catalog of measures.

KEY WORDS: Performance management, performance measures, environmental factors

RELATED WORK: A wide range of prior research has been done on various environmental impact areas and some preliminary research has been done on environmental performance measures and environmental management systems.

URGENCY/PRIORITY:	Urgent
COST:	$300,000
USER COMMUNITY:	State DOT's, MPO's, Transportation agencies, environmental agencies.
IMPLEMENTATION:	The findings of this research will provide transportation decision makers with an approach for incorporating environmental issues into their performance management programs. While performance management is an accepted best practice, difficult to measure areas such as environmental issues have often been excluded from these programs because of the challenges associated with defining appropriate measures and developing a framework for integrating these measures into performance management programs. This research will address those challenges and provide transportation agencies with a methodology for expanding performance management programs to include environmental factors.
EFFECTIVENESS:	The research will assist agencies in more effectively addressing environmental issues throughout the transportation planning, development and delivery process.

Performance Measures as an Organizational Management Tool to Establish Accountability

- Examine best practices in performance measurement that have been used to generate financial and legislative support from both public and private agencies for ongoing transportation initiatives and projects.
- Assess analytical models and visualization techniques that address performance measures for different modes and multimodal systems.
- Examine performance measures, benchmarks, and targets used to evaluate air quality, environmental sustainability, and economic impacts of transportation projects.
- More research is especially needed in this area on non-highway modes.
- Examine partnerships among state departments of transportation and other public- and private- sector agencies to develop, implement, and monitor performance measures.
- Conduct a study to examine the use of technology by public and private agencies to effectively communicate performance measures and transportation funding needs to policy makers.
- Examine the use of public opinion surveys to effectively select appropriate performance measures and prioritize policy choices.
- Examine the use of trip- time reliability as a transportation performance measure.
- Examine transportation agencies that have been successful in using performance measures to develop support from the legislature and other groups for additional funding.
- Identify and analyze case study examples where the use of performance measures by state departments of transportation, public transit agencies, and other agencies has resulted in broad support for new and ongoing initiatives and projects, including increased funding levels. Elements to be examined in the case studies include the performance measures, communication techniques, and new or sustained funding levels.

Communicating Performance Results
Effectively To Your Customers

- Examine how the application of performance measures used in the environmental review process are associated with new and expanded capacity projects.
- Examine different approaches toward coordinating public and private performance measures used in freight and goods movement.
- Examine the costs and benefits of freight transportation projects in both the public and private sectors.
- Explore the use of performance measures that assess operational efficiencies in the trucking and freight industries.
- Conduct a detailed assessment of multijurisdictional and multimodal transportation systems.
- Conduct a study on the involvement of nonprofit and transportation resource agencies in the development and use of transportation performance measures.
- Conduct a study on the role of the private sector in the development and use of transportation performance measures.
- Conduct a study that examines performance measures currently being used by state departments of transportation.
- Conduct a study on the use of stated- preference surveys to assist in determining customer expectations related to different aspects of the transportation system for setting benchmarks.
- Conduct a study to examine the real cost of setting and meeting targets.
- Prepare synthesis reports on performance measures in the following areas:
  - Customer service issues (in both public and private agencies)
  - Internal operations at state departments of transportation, transit agencies, and other public sector transportation organizations
  - Employee- based incentives at federal, state, and local transportation agencies
  - Use of performance measures at the corridor scale

Data And Tools

- Complete a synthesis report on visualization techniques and other innovative technologies used in performance measurement (to include issues concerning the recruitment of skilled staff and expertise in visualization technology).
- Conduct a study to explore strategies for establishing collaborations between human factors researchers and transportation agencies to address safety, sustainability, congestion, and environmental issues.
- Complete a synthesis report on the evolution of performance measurement systems and the values associated with the measures.
- Complete a synthesis report that examines the challenges related to collecting, archiving, and reporting data with regard to performance measurement.
- Conduct a study to examine techniques used to improve current data collection methods and to explore future data collection strategies and techniques.

• Examine alternative methodologies to validate
travel forecasting models.
• Assess the strengths and weaknesses or limitations of different travel forecasting models and methods.
• Conduct a study to examine techniques used in forecasting conditions in a multimodal system, including land- use considerations.

Hot Topics

- Complete a synthesis report on the current use of performance measures related to sustainability at state departments of transportation and other public- sector agencies. Follow up the synthesis report with a comprehensive assessment of these measures.
- Complete a synthesis report on performance measures used with tolling and congestion pricing projects in the United States, Canada, Mexico, and Europe. Follow up the synthesis report with a study that examines the application of these measures in tolling and congestion pricing projects.
- Develop and maintain a safety countermeasure effectiveness clearinghouse or warehouse.
- Complete a synthesis report on currently available safety planning tools and techniques.
- Conduct a study that examines the relationship between demographics and crashes, including fatal crashes.
- Conduct a study that examines the effectiveness of safety strategies applied in urban and rural areas.
- Explore the potential to develop a national highway safety database.
- Conduct a study that examines methods to integrate safety data and visualization techniques to support comprehensive safety strategies.
- Examine the costs and benefits of safety programs across all of the 4Es of highway safety (engineering, enforcement, education, and emergency medical services), to include a cross- functional trade- off analysis.
- Explore the development and use of bipartisan road safety committees among states and local communities.
- Develop a "just- in- time" index for trucks and freight movement.
- Complete a synthesis report on freight- related performance measures used by state departments of transportation, metropolitan planning organizations, and other transportation agencies.

Performance- Based Contracting and Measuring Project Delivery

• Conduct research that examines the opportunities and drawbacks associated with public–private partnerships
(PPPs) in the United States and identify strategies that would most benefit both the public and private sector through this approach. The following topics could be examined in the study:

  - Strategies to align contractor performance measures with agency objectives;
  - Strategies to create incentives for contractors to improve performance within current and future
  - market conditions;
  - Techniques in developing contracting procedures that allow for greater innovation;
  - Strategies related to standard specifications that allow for private equity and greater competition; *148 U.S. And International Approaches To Performance Measurement*
  - Strategies that provide incentives to contractors to maintain a roadway or transportation facility so that it remains in good condition throughout the extent of the leasing period;
  - Strategies to provide flexibility in long- term contracts that can address future conditions and needs;
  - Strategies that provide incentives for contractors;
  - Strategies to assist transportation agencies in defining goals and objectives in a PPP;
  - Leadership techniques that are used in developing and managing PPPs.

- Explore how state departments of transportation or other transportation agencies can become more innovative in planning, designing, financing, constructing, operating, and maintaining transportation facilities.

The study should also address changes in legislation and policies that may be needed to support these initiatives.

- Explore the use of a web- based system for comparing contractor performance, which is currently being used in the United Kingdom.
- Complete a synthesis report on performance measures that are used in construction project delivery.
- Follow up the synthesis report with a study that builds on techniques outlined in the synthesis and further explores performance measures associated with innovative construction contracting and procurement techniques.

Category	Description of Problem
Environmental	Develop performance measures regarding land use approaches that address transportation
	Develop appropriate measures and methods to assess effectiveness of environmental strategies in the transportation sector.
	Perform a synthesis of data collection needs for performance measures associated with quality of life and environmental quality.
	Develop methods and data sources to incorporate sustainability, quality of life, social equity, and similar difficult to measure goals into the performance measurement process.
Communication	Explore approaches for communicating problems encountered with meeting performance targets.
	Develop strategies and best practices to educate the stakeholders with regard to performance measurement.
	Develop training mechanisms for staffs and managers in the use of performance measures.
	Develop a web library that will include performance measures segmented by market groups and segmented over space and time.
	Examine methods used by non-transportation agencies and businesses for addressing internal barriers to the use of performance measures.
	Identify formats and approaches that appear to best communicate key information to policy makers and other external groups.
Performance Targets	Evaluate reliability measures for international border crossings.
	Examine how state departments of transportation have sought and obtained support from external groups for performance measures and targets.
	Develop analysis tools for managers and policy makers to use with performance measures.
	Identify benefits from benchmarking used by state transportation agencies.
	Document key transportation system targets including speeds, transit operations, security impacts, reliability, etc.
	Develop a method to incorporate community or socio-cultural goals into the performance-measurement process.
	Investigate the use of consistent standards so that performance measures can be compared across agencies within states.
	Impartial analysis of performance measures addressing operational improvements versus adding capacity.
	Examine approaches to making the monitoring and feedback loop more effective and ensure that resources are being allocated to meet performance targets.
	Evaluate strategies for dealing with interagency performance measures and goals that are not in alignment.
Software	Conduct an assessment of new data sources due to new technologies that can assist in performance measurement.
	Evaluate performance measurement software that meets the needs of transportation agencies.
Market Research	Identify and document the analytical methods available in conducting customer satisfaction surveys.
	Conduct a customer/user market survey to evaluate what constitutes an effective measure and obtain a better understanding of the importance of different types of measures.
	Develop strategies and best practices for engaging external audiences and managing their expectations specifically in creating and implementing performance measures and performance targets.

	Identify and document how market research is linked to the decision-making process including investment decisions.
	Conduct a national symposium or peer exchange focusing on customer research practices and experiences.
	Compile and make available the basic types of questions that should be included in transportation customer satisfaction surveys.
	Examine the opportunities for benchmarking national averages or peer states to be used in customer surveys.
Data Quality and Needs	Conduct surveys of database and operating system needs for performance measurement.
	Determine data collection needs related to economic development return on investment equity and transportation and land use.
	Identify ways to use existing data sources to support the use of non-traditional performance measures. (e.g. Freight quality of life security sustainability choice/affordability health)
	Perform a synthesis of MPO data needs for performance monitoring and management.
	Compile existing performance measures and their communication methods (graphics dashboards periodic reports etc.).
	Conduct a study of the tools and technologies needed for obtaining collecting and analyzing freight data.
Freight and Economic Development	Conduct a study examining freight safety and security issues as they relate to the development of performance measures including trade-offs with efficiency.
	Evaluate private-sector performance measures related to toll facilities and document how they relate to public measures.
	Identify performance measures to address economic development associated with transportation infrastructure.
	Conduct a synthesis to examine current freight performance measures used by transportation agencies and to identify other possible measures.
Decision Making	Investigate how states, MPO's, counties, and cities align key performance measurement systems and goals.
	Evaluate the conflicts with interagency performance measures and goals and the impact of not being in alignment.
	Investigate performance measurement as it relates to risk management.
	Conduct a synthesis of techniques for incorporating risk assessment and uncertainty into project costing.
	Develop prototypical case studies of how non-traditional performance measures could be applied in state or metropolitan planning contexts.
	Investigate the use of market research in decision making and how it can be used to provide decision makers with important outcome information.
	Develop a methodology to use performance measures for decision making during catastrophes.
	Perform case studies on successful applications of performance measurement and decision making.
	Identify methods to standardize performance measures so that what is being measured is common across state departments of transportation and local transportation agencies.
	Examine methods and techniques to engage policy makers proactively in the project delivery process and in establishing performance measures.
	Conduct a study to assess how states counties and cities are currently aligning performance measures to coordinate project delivery.