Regional Transportation Performance Measures: Introduction

- Regional Transportation Performance Measures address needs of proposed “performance-based funding” processes.
- Project goal: develop a set of regional performance measures for use in funding decisions.
- Project prioritizes the acquisition and development of the data and analysis for the proposed measures.
Outline of Presentation

- The case for performance-based funding
- Transportation performance measurement concepts
- Performance measure evaluation
- Proposed performance measures
- What the measures are telling us about the Chicago region’s transportation system
The Case for Performance-Based Funding: the Problem

- Forecast GO TO 2040 core revenues are $4.5 billion less than capital and operating funds necessary for safe and adequate highway and transit systems.

- Systematic enhancements (arterial improvements, technology improvements, transit improvements) and major capital projects will require additional revenues.

- Support for additional revenues has been scarce. Key groups are demanding more accountability.
The Case for Performance-Based Funding: the Problem

- Management systems in place for maintenance of pavements and structures
- But only general goals for modernization and expansion projects
- IDOT’s 45/55 formula split for highway expenditures (Chicago region/downstate)
The Case for Performance-Based Funding: What Partners Say

The Pew Center on the States’ recently ranked Illinois lower than 42 other states on infrastructure performance, and it’s easy to see why—current state law requires no goal setting, no performance measurement, no objective method for recommending projects for funding, and no public review of the annual transportation program before the General Assembly approves the budget.

- Metropolis Strategies

The Case for Performance-Based Funding: What Partners Say

A performance-based process for prioritizing projects will provide taxpayers with the best return on their investment, and improve Illinois’ global competitiveness, as well as community livability and sustainability. A statewide, data-rich, outcomes-based approach to prioritizing infrastructure investments also would help restore voter trust and mark a new era of transparency.

- Metropolitan Planning Council

http://www.metroplanning.org/news-events/article/6665
The Case for Performance-Based Funding: the Solution

- Use variety of **performance measures** to assist in prioritizing and selecting projects for funding.
- The performance measures are selected to address adopted goals, objectives, and strategies.
- Transparent, public process. Projects are scored, with the scores publicly available.
- Relies on professional judgment of transportation stakeholders for final project selection.

Transportation Performance Measurement Concepts

- Performance measurement facilitates data-based decision-making.
- Performance measurement tracks progress toward long-term goals and objectives.
- Measures “outcomes, outputs, efficiency, or cost-effectiveness” (FHWA).
Transportation Performance Measurement Concepts

Uses of performance measures (FHWA):

- Set goals and standards
- Detect and correct problems
- Manage, describe, and improve processes
- Document accomplishments
Transportation Performance Measurement Concepts

Benefits of performance measurement (FHWA):

- Greater accountability
- Improved transparency
- Facilitates assessment of system performance
- Refocus decision-making on outcomes
- Cost effectiveness
Transportation Performance Measurement Concepts

CMAP’s performance categorizations:

- Safety
- System Preservation
- Mobility
- Reliability
- Accessibility
- Livability
Transportation Performance Measurement Concepts

Travel modes addressed:

☐ Auto
☐ Transit
☐ Freight
☐ Walking and Cycling
Established 26 performance measure evaluation criteria.

1. Availability
2. Experience
3. Sharing
4. Legal
5. Data management
6. High-level data
7. Low-level data
8. Project-level data
9. Time series
10. Broad agency consensus
Performance Measure Evaluation

11. Public’s grasp
12. Clear definition
13. Stratification for determining cause
14. Compatibility with HSM
15. GO TO 2040 target
16. Regional indicator
17. Timeliness
18. Completeness
19. Validity
20. Project response
21. Policy response
22. Project forecasting
23. Policy analysis
24. CMAQ Relevance
25. TAP Relevance
26. MAP-21 Relevance
Recommended key safety performance measures:

- Fatalities and serious injuries and rates per VMT, by mode
  - *This measure is required by MAP-21.*

Recommended supplementary safety tracking indicators (required by MAP-21 at state level):

- High risk rural road safety
- Older drivers
- Pedestrians and bicyclists
Draft Proposed Performance Measures

Recommended supplementary safety datasets:

- Total potential safety improvement
- IDOT crash severity index/5% locations
- IDOT crash shapefiles
Recommended key system preservation performance measures:

- International roughness index
  - A measure of pavement conditions is required by MAP-21.
- Condition Rating Survey
- Structurally deficient bridges (deck area)
  - This measure is required by MAP-21
- Transit state of good repair
- Freight/walking and cycling: none
Recommended key mobility performance measures:

- Travel time and delay (calculated for all vehicles and for trucks)
  - A measure of system performance is required by MAP-21.
- Congested hours
- Transit service speed
- Regional trails plan completion
- Bicycle and pedestrian level of service (at project level only)
Draft Proposed Performance Measures

Recommended key reliability performance measures:

- Planning time index/reliability index (calculated for all vehicles and for trucks)
  - A measure of system performance is required by MAP-21.
- Motorist delay at highway/rail grade crossings
- Transit on-time performance
- Walking and cycling: none
Draft Proposed Performance Measures

Recommended key accessibility performance measures:

- Index of job accessibility lost due to highway congestion (new)
- Transit connectivity index
- Transit ridership
- Pedestrian environment factor
- Land use mix
- Bike-ped safety and attractiveness (project-level)
What Have We Learned

- Performance measurement is not new.
- CMAP adopted transportation performance measures beginning in 2007 as part of 2030 Regional Transportation Plan.
- Regional Indicators Project
- GO TO 2040 targets
- What have we learned so far?
Importance of Understanding Complexity: Chicago Region

Weekday Trips by Trip Purpose by Time of Day, 2007

Trips in Motion by Major Purpose of Trip by Time of Day

- All Other
- Visit Friends
- Recreation
- Eat Meal
- Personal Business
- Shopping
- School Activities
- School
- Return Home
- Return Home From Work
- Work

Image: CMAP
Highway Data: Sensing, Monitoring, and Archiving

- Highway Speed/Volume Sensors:
  - Inductive Loops - Occupancy
  - Cameras/Video

- Vehicle Probe Data:
  - Public Fleets
  - Commercial Vehicles/Fleet Monitoring
  - Bluetooth
  - Cell Phones

- Weather: Important New Sensor Data
Link Performance Analysis – Congestion Scan

Image: CMAP
Complexity: Regional Transportation Data Archive
Complexity: Regional Data Archive: Planning Applications

2010 Annual Average Daily Traffic
On I-94 / Dan Ryan Expressway, from I-90 / Chicago Skyway to U.S. Route 12/20 / 95th Street
ITS – Regional Transportation Data Archive

Current Inefficient Data Processing of IDOT Sensor Data from Sensor Output to CMAP Travel Demand Model Validation

Proposed Streamlined Data Processing of IDOT Sensor Data from Sensor Output to CMAP Travel Demand Model Validation
### Some Additional Measures: Safety

<table>
<thead>
<tr>
<th>Highway traffic fatalities, 7-county region</th>
<th>N.A.</th>
<th>2002: 675</th>
<th>2011: 371</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway traffic non-fatal injuries, 7-county region</td>
<td>N.A.</td>
<td>2002: 85,810</td>
<td>2011: 56,293</td>
</tr>
</tbody>
</table>

Source: CMAP analysis of IDOT data
### Some Additional Measures: System Preservation

<table>
<thead>
<tr>
<th>Metric</th>
<th>2006</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Arterials of Acceptable Ride Quality (IRI &lt; 170, Centerline Miles)</td>
<td>61.9%</td>
<td>73.2%</td>
</tr>
<tr>
<td>Structurally Deficient Bridges (Percent of All Bridges)</td>
<td>13.5%</td>
<td>9.7%</td>
</tr>
</tbody>
</table>

**Source:** CMAP analysis of IDOT data
Thank you.

http://www.cmap.illinois.gov/mobility/roads/cmp/performance-measurement

http://www.cmap.illinois.gov/mobility/strategic-investment/performance-based-funding

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