Collecting and Managing Data for Performance-Based Planning

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presented by
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Federal Laws and Regulations
Two Laws, Many Regulations

Moving Ahead for Progress in the 21st Century Act (MAP-21)

Fixing America’s Surface Transportation (FAST) Act

- Statewide and Metropolitan Planning
- Metropolitan Planning Organization (MPO) Coordination and Planning Area Reform
- Public Transit Safety
- Transit Asset Management
- Highway Safety
- National Highway System (NHS) Pavement and Bridge
- Performance of the NHS, Freight Movement on the Interstate System, and CMAQ Program
## 25 Performance Measures

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Highway Safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of fatalities</td>
<td>Rate of fatalities per 100 million VMT</td>
</tr>
<tr>
<td>Pavement</td>
<td>Percentage of pavements of the Interstate system in good condition</td>
<td>Percentage of pavements of the Interstate system in poor condition</td>
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<tr>
<td></td>
<td></td>
<td>Percentage of pavements of the non-Interstate NHS in good condition</td>
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<td></td>
<td>Percentage of pavements of the non-Interstate NHS in poor condition</td>
</tr>
<tr>
<td>Bridge</td>
<td>Percentage of NHS bridges in good condition</td>
<td>Percentage of NHS bridges in poor condition</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Freight</td>
<td>Truck travel time reliability index on Interstate</td>
<td></td>
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<tr>
<td>System Performance</td>
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<tr>
<td></td>
<td>Percent of the person-miles traveled on the Interstate that are reliable</td>
<td>Percent of the person-miles traveled on the non-Interstate NHS that are reliable</td>
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<td></td>
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<tr>
<td></td>
<td>Percent change in the tailpipe CO2 emissions on the NHS compared to the calendar year 2017 level (*indefinitely delayed)</td>
<td></td>
</tr>
<tr>
<td>CMAQ</td>
<td>Annual hours of peak hour excessive delay per capita</td>
<td>Percent of non-single occupancy vehicle travel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total emissions reduction</td>
</tr>
<tr>
<td>Transit Asset Management</td>
<td>Percentage of non-revenue service vehicles that have either met or exceeded their useful life benchmark</td>
<td>Percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percentage of track segments with performance restrictions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percentage of facilities within an asset class, rated below condition 3 on the TERM scale</td>
</tr>
<tr>
<td>Public Transportation Safety</td>
<td>Total number of reportable fatalities and rate per total vehicle revenue miles by mode</td>
<td>Total number of reportable injuries and rate per total vehicle revenue miles by mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean distance between major mechanical failures by mode</td>
</tr>
</tbody>
</table>
Performance Management Implementation

Integrate goals, objectives, performance measures, and targets into planning processes and coordinate implementation (State DOT, MPO, transit, and across boundaries)

Establish federal policies via laws and regulations

<table>
<thead>
<tr>
<th>General Purposes for Public Transportation (49 USC Section 5301)</th>
<th>National Goals for Federal-Aid Highway System (23 USC Section 150(b))</th>
</tr>
</thead>
</table>

Set targets for future performance

Report performance metrics (typically annually) and document progress toward performance targets in Annual, Biennial, or Quadrennial Performance Reports

Publish plans and transportation improvement programs that describe how transportation investments and long-term strategies will help achieve targets

Congress and U.S. DOT

State Departments of Transportation, Metropolitan Planning Organizations, and Transit Agencies
Integrating Performance Management Into Each Step of the Transportation Planning Cycle

Data Analytics and Software

- Develop policies and plans
- Establish measures and set targets
- Assess needs and define strategies
- Allocate resources
- Evaluate and prioritize
- Implement
- Monitor outcomes and results

OUTCOMES
- Environmental
- Economic
- Social
SHRP2 PlanWorks Implementation
What is SHRP2?

Strategic Highway Research Program (second edition)

» Partnership effort between FHWA, AASHTO and TRB

» Established for the purpose of addressing the Nation’s most critical transportation challenges

» Develops products and solutions that help the transportation community operate more efficiently and safely, resulting in saved lives, saved money and saved time
What is SHRP2?

SHRP2 Focus Areas:

» Safety
  ▪ Addressing driver, roadway and vehicle factors

» Renewal
  ▪ Efficiently maintaining and repairing aging infrastructure

» Reliability
  ▪ Reducing congestion and enhancing predictability

» Capacity
  ▪ Creating a transportation system that meets the needs of its users and the communities it serves
SHRP2 PlanWorks Implementation

What is PlanWorks?

» Interactive web-based resource designed to facilitate the transportation decision-making process

» Assists transportation professionals through the consensus-building process by recommending appropriate planning partners and a course of action for their engagement

» Focuses on decision points at each level of the planning process
SHRP2 PlanWorks Project - Phase I

SHRP2 C01 Grant Project

» Project Purpose
  ▪ To develop a framework for addressing the newly established Performance Measures which are defined in MAP-21 and the FAST Act.
  ▪ To provide a linkage that will utilize the processes from WVDOT’s data collection and management tools to identify and obtain the data that is needed to quantify these Performance Measures.

» The process will be facilitated by linking it to the decision points within PlanWorks.
SHRP2 PlanWorks Project - Phase II

Performance Tracking for Performance-based Planning

» Will include:
  - Performance target setting for each of the required performance measures
  - Development of a mechanism for quantifying WVDOT’s achievements in reaching performance targets, linked to PROVIS, WVDOH’s Project Mapping Tool
  - Development of a framework for performing investment trade-off analyses

» Timeframe: target completion date – November 30, 2018
Collecting and Managing Data for Performance-based Planning
Data Collection Processes

- WVDOT Existing Resources and Guidebooks
  - Traffic Data Collection, Processing, and Analysis Handbook
  - Travel Demand Modeling Handbook
  - Transportation Planning Guidebook
  - Strategic Highway Safety Plan
  - PROVIS Project Mapping Application
  - Freight Plan
Performance-based Planning Requirements
Planning Rule

Effective June 27, 2016

Addresses State DOT and MPO long-range planning and programming

Contains critical changes to the planning process related to performance management
The Planning Rule – Performance Management Requirements

Establishes the framework for **performance management** in the planning process

» Integrating goals, objectives, measures and targets contained in other transportation plans (HSIP, SHSP, asset management, freight, transit safety…)

» Establishing targets

» Reporting on progress toward achieving targets

» Coordination responsibilities of states and MPOs with each other and with public transportation providers

» Written agreements to document roles, responsibilities, and data collection among states, MPOs, and public transportation providers
The Planning Rule – Performance Management Requirements

Requirements for **reporting** on performance management in the planning process

<table>
<thead>
<tr>
<th>Planning Product</th>
<th>What Must be Reported</th>
</tr>
</thead>
</table>
| Long-Range Statewide/Metropolitan Plan | • A description of the performance measures and targets  
• System Performance Report evaluating the condition and performance of the transportation system with respect to targets and progress achieved in meeting the targets in comparison with previous reports  
• Additional evaluation for MPOs conducting scenario analyses as part of their Plan |
| TIP and STIP     | • Discussion of the anticipated effect of the STIP or TIP toward meeting performance targets, linking investment priorities to performance targets |
The Planning Rule – Performance Management Requirements

Establishes requirements for **Coordination** when setting targets

<table>
<thead>
<tr>
<th>Agency</th>
<th>Coordination</th>
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</thead>
<tbody>
<tr>
<td>State</td>
<td>Must coordinate with MPOs when selecting targets to ensure consistency to “maximum extent practicable”</td>
</tr>
<tr>
<td>MPO</td>
<td>Must coordinate with State and public transportation providers when selecting targets to ensure consistency to “maximum extent practicable”</td>
</tr>
<tr>
<td>“Maximum extent practicable”</td>
<td>Capable of being done after taking into consideration cost, technology, and logistics</td>
</tr>
</tbody>
</table>
HSIP & Safety Performance Management Final Rules

- Effective date of April 14, 2016
- Purpose: Achieve a significant reduction in fatalities and serious injuries on all public roads
- HSIP Final Rule Policy Changes
  - Reporting Content and Schedule
  - Strategic Highway Safety Plan Update Cycle
  - Model Inventory Roadway Elements (MIRE)

Safety Performance Measures

- Fatalities
- Fatality Rate
- Number of Serious Injuries
- Serious Injury Rate
- Non-Motorized Fatalities and Injuries
Highway Safety Improvement Program (HSIP)
- Developed by DOT
- Report submitted annually August 31st
- Infrastructure improvements
- FHWA approves

Highway Safety Plan (HSP)
- Developed by SHSO (GHSP)
- Plan submitted annually July 1st
- Behavioral programs
- NHTSA approves

MPOs
- Report annual MPO targets or support of State target to DOT
- Included in System Performance Report in Metropolitan Transportation Plan

Strategic Highway Safety Plan (SHSP)
- Plan development coordinated by DOT involving 4E stakeholders
- Safety Management Task Force Reviews data
- Updated every 5 years
- Infrastructure and behavioral countermeasures
- SHSP process approved by FHWA
- Requirement of HSIP

Targets must be identical for
- Fatalities
- Fatality rate
- Serious injuries
Data Requirements for Performance-Based Planning – Safety

Performance Management Cycle – results reflected in LRTP policies and strategies

GHSP Submits HSP to NHTSA (July 1, 2017)

- Number of fatalities
- Fatalities per 100 million VMT
- Number of serious injuries


- Number of fatalities
- Fatalities per 100 million VMT
- Number of serious injuries
- Serious injuries per 100 million VMT
- Number of non-motorized fatalities and serious injuries

MPOs Submit Targets to WVDOH (Feb 27, 2018)

- FARS
- FARS/HPMS
- SMVCD
- SMVCD/HPMS
- FARS/SMVCD

MPOs report baseline safety performance, VMT estimate, and methodology if a quantifiable rate target was established, and progress toward the achievement of their targets in the system performance report in the Metropolitan Transportation Plan

Determinant of Significance (March, 2020)

Legend
- Reporting Deadline
- Reporting Requirement
- Performance Measure
- Data Source/Reporting Mechanism
- Related Plan
- WVDOT Resource

SMTF analyzes data for SHSP

Traffic Data Handbook

TM&A responsible for data collection

GTI responsible for submitting data to HPMS

Mobility/Safety Section is responsible for SMVCD

FARS – Fatality Analysis Reporting System
HPMS – Highway Performance Monitoring System
SMVCD – State Motor Vehicle Crash Database
Pavement & Bridge Condition Performance Measures Final Rule

Effective Date of May 20, 2017

Purpose: Carry out the National Highway Performance Program (NHPP)

Addresses measures, targets, reporting, and significance determination

Pavement and bridge condition performance measures:

- Percentage of pavements in Good/Poor condition on the Interstate System
- Percentage of pavements in Good/Poor condition on the Non-Interstate NHS
- Percentage of bridge deck area classified as in Good/Poor condition
Asset Management Plan Final Rule

- Effective Dates November 23, 2016 (Plan Development) and October 2, 2017 (Evaluation of Facilities)
- Establishes minimum standards for development and operation of bridge and pavement management systems
- Periodic evaluation to identify alternatives for infrastructure that requires continual repair and reconstruction.
- Requires States to adopt and implement a risk-based Asset Management Plan
  » Description of system conditions
  » Objectives aligning with WVDOT’s mission
  » Measures and performance targets
Data Requirements for Performance-Based Planning – Bridge and Pavement

4-Year Performance Period - Results reflected in LRTP policies and strategies

WVDOH Sets Pavement and Bridge Performance Targets (Feb 17, 2018)

Submit Baseline Performance Report (Oct 1, 2018)

Submit Mid-Performance Period Progress Report (Oct 1, 2020)

Submit Full-Performance Period Progress Report (Oct 1, 2022)

Asset Management Plan

Pavement
1. % of pavements on the Interstate System in Good Condition
2. % of pavements on the Interstate System in Poor Condition
3. % of pavements on the NHS in Good Condition
4. % of pavements on the NHS in Poor Condition

Bridge
1. % of bridge deck area classified as in Good Condition
2. % of bridge deck area classified as in Poor Condition

WVDOH Asset Management System – Reported to HPMS (IRI, Rutting, Faulting, Cracking_Percnt)

WVDOH Asset Management System – Reported to National Bridge Inventory (NBI) (Deck, Superstructure, Substructure, Culverts)

GTI responsible for submitting data to HPMS

TM&A responsible for data collection

Traffic Data Handbook

Legend

System Performance Report (included in LRTP update)

FHWA Determination of Significance

WVDOH reports 2-year performance from latest data collected and progress toward achieving targets. WVDOH may adjust 4-year targets at this time.
**System Performance/Freight/CMAQ Performance Measures Final Rule**

**Effective Date of May 20, 2017**

**Purpose:**
- Establish measures to assess performance on the Interstate and NHS
- Assess freight movement on the Interstate System
- Assess traffic congestion and on-road mobile source emissions

<table>
<thead>
<tr>
<th><strong>System Performance Measures</strong></th>
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<tbody>
<tr>
<td>1. Percent of person-miles traveled on the Interstate System that are reliable (Interstate LOTTR)</td>
</tr>
<tr>
<td>2. Percent of person-miles traveled on the Non-Interstate NHS System that are reliable (Non-Interstate LOTTR)</td>
</tr>
<tr>
<td>3. Percent change in tailpipe CO2 emissions on the NHS compared to the calendar year 2017 level (GHG Measure) *</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th><strong>Freight Performance Measures</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Truck travel time reliability index (TTTR)</td>
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</table>

<table>
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<tr>
<th><strong>CMAQ Performance Measures</strong></th>
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<tbody>
<tr>
<td>1. Annual hours of peak-hour excessive delay per capita (PHED Measure)</td>
</tr>
<tr>
<td>2. Percent of non-SOV travel</td>
</tr>
<tr>
<td>3. Total emissions reduction</td>
</tr>
</tbody>
</table>

* The effective date for certain portions of the GHG measure have been delayed indefinitely.
Data Requirements for Performance-Based Planning – System Performance/Freight/CMAQ

4-Year Performance Period - results reflected in LRTP policies and strategies

- WVDOH Sets System Performance Targets (Feb 20, 2018)
- Submit Baseline Performance Report (Oct 1, 2018)
- Submit Mid-Performance Period Progress Report (Oct 1, 2020)
- Submit Full-Performance Period Progress Report (Oct 1, 2022)

* The effective date for certain portions of the GHG measure have been delayed indefinitely.

- WVDOH fuel sales data, HPMS, FHWA CO2 Emission Factors
- NPMRDS, HPMS, FHWA occupancy factors

- NVURDS

- 1. NPMRDS, segment length, HPMS, vehicle classification, FHWA occupancy factors, total population
- American Community Survey
- CMAQ Public Access System

- GTI responsible for submitting data to HPMS
- TM&A responsible for data collection
- Traffic Data Handbook

- System Performance
  1. GHG Measure
  2. Travel Time Reliability Measures

- Freight Performance
  1. Truck travel time reliability index

- CMAQ Performance
  1. PHED Measure
  2. Percent of Non-SOV Travel
  3. Total Emissions Reduction

- WVDOH submits baseline report with urbanized area boundaries, freight bottlenecks, non-attainment and maintenance areas for targets, MPO CMAQ performance plans, GHG metrics, and data collection method for % of Non-SOV Travel measure

- WVDOH submits 2-year condition/performance and progress towards achieving targets. WVDOH may adjust 4-year targets at this time.

- System Performance Report (included in LRTP update)

- FHWA Determination of Significance

Legend

- Reporting Deadline
- Reporting Requirement
- Performance Measure
- Data Source/Reporting Mechanism
- Related Plan
- WVDOT Resource

HPMS: Highway Performance Monitoring System
NPMRDS: National Performance Management Research Data Set
CMAQ: Congestion Mitigation and Air Quality
Transit Asset Management (TAM) Final Rule

- Effective Date: October 1, 2016
- Defines “State of Good Repair”
- Requires Transit Asset Management (TAM) Plans
- Establishes performance measures:
  - Equipment
  - Rolling Stock
  - Infrastructure
  - Facilities

- Data Needs:
  - Division of Public Transit agency sources, e.g., enterprise asset management systems and tools like TransAM, SGR Database
Public Transit Safety Program Final Rule

Effective Date September 12, 2016

Purpose: To improve the safety of the Nation’s public transportation systems.

Provides guidance for the FTA to ensure the implementation of transit safety.
Linking Data to Performance-based Planning through PlanWorks
# Linking Data to Performance-based Planning through PlanWorks

<table>
<thead>
<tr>
<th>PlanWorks Step</th>
<th>Description</th>
<th>Guidebook/Resource</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LRP-1 Approve Scope of LRTP Process</strong></td>
<td>Broad assessment of the data, decisions, and relationships to consider, acquire, or make throughout the entire long range transportation plan (LRTP) process.</td>
<td>Planning Guidebook</td>
<td>Use Planning Guidebook to identify relevant plans/data/steps of the LRTP process.</td>
</tr>
<tr>
<td><strong>LRP-2 Approve Vision and Goals</strong></td>
<td>Community values, visions, and goals are used to guide transportation-specific vision and goals. This is the first opportunity for public involvement, which eventually influences the transportation projects that are built.</td>
<td>Planning Guidebook, SHSP</td>
<td>Use Planning Guidebook to guide stakeholder collaboration and visioning efforts. Use SHSP to coordinate safety goals/visions.</td>
</tr>
<tr>
<td><strong>LRP-3 Approve Evaluation Criteria, Methods, and Measures</strong></td>
<td>Evaluation criteria, methods and measures are approved that will allow decision-makers to compare scenarios to the vision and goals and to one another.</td>
<td>Data Collection and Management for PBP Planning Guidebook, SHSP</td>
<td>Use this guide to identify required performance measures under MAP-21. Use Planning Guidebook to coordinate efforts with MPOs on target setting. Use SHSP to link safety PMs.</td>
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## Linking Data to Performance-based Planning through PlanWorks

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<tr>
<td><strong>LRP-4 Approve Transportation Deficiencies</strong></td>
<td>The approved list of specific corridors, roads and areas which are deficient identified at this key decision point serves as a basis for problems and opportunities addressed in both the corridor planning and environmental review processes.</td>
<td>SHSP Traffic Data Handbook</td>
<td>Use SHSP to support identification of safety deficiencies. Use procedures in Traffic Data Handbook to identify infrastructure deficiencies.</td>
</tr>
<tr>
<td><strong>LRP-5 Approve Financial Assumptions</strong></td>
<td>Information from the Programming/Fiscal Constraint Phase is introduced into the LRTP decision making process, including potential revenue sources, a methodology for identifying costs of individual projects, and acknowledgement of restrictions and requirements associated with each funding source. In order for the adopted LRTP to meet the fiscal constraint requirement, this information must be approved by the decision makers as the basis for the LRTP development.</td>
<td>Planning Guidebook</td>
<td>Use Planning Guidebook to understand relationship between STIP and LRTP.</td>
</tr>
<tr>
<td><strong>LRP-6 Approve Strategies</strong></td>
<td>Strategies are developed to address the deficiencies identified in LRP-4. A strategy is a specific tactic or policy employed or recommended by an organization. Strategies could include road or multi-modal improvements, land use changes, and other means of addressing deficiencies.</td>
<td>SHSP PROVIS</td>
<td>Use SHSP to align safety strategies in LRTP. Use PROVIS to identify existing road or multi-modal improvement projects.</td>
</tr>
</tbody>
</table>
# Linking Data to Performance-based Planning through PlanWorks

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<tr>
<td><strong>LRP-7</strong> Approve Plan Scenarios</td>
<td>Scenarios are based on approved strategies and are compared using the evaluation criteria, method and measures. Collaboration with partners from other planning processes is important at this stage as scenarios could involve strategies that encompass land use, infrastructure or other components. This step begins the iterative process of refining scenarios in order to select the preferred scenario.</td>
<td>Planning Guidebook TDM Handbook PROVIS</td>
<td>Use Planning Guidebook to guide stakeholder collaboration. Use TDM Handbook to establish model outputs that will be used to evaluate performance. Use PROVIS to identify projects that will be evaluated under each scenario.</td>
</tr>
<tr>
<td><strong>LRP-8</strong> Adopt Preferred Plan Scenario</td>
<td>A preferred plan scenario is adopted for inclusion in the Draft LRTP. A comparison of the plan scenarios using the evaluation criteria, methods and measures is the basis for the selection of the preferred scenario. This represents the conclusion of the iterative process to evaluate and refine scenarios.</td>
<td>PROVIS</td>
<td>Use PROVIS to evaluate scenarios using performance measures/criteria.</td>
</tr>
<tr>
<td><strong>LRP-9 – LRP 11</strong> Conformity Determination and Plan Adoption</td>
<td>MPOs in non-attainment areas conduct transportation conformity analysis on preferred plan scenario. MPO Board adopts final LRTP. FHWA/FTA make federal conformity determination.</td>
<td>Planning Guidebook TDM Handbook</td>
<td>Use Planning Guidebook to guide conformity analysis process. TDM Handbook describes how models outputs can be used to support conformity determination.</td>
</tr>
</tbody>
</table>
Next Steps

Identify Gaps in Available Data

» Assess data that is currently available ✓

» Identify required data for quantifying performance measures ✓

» Identify data that is needed to “bridge the gap” between data requirements and data currently available
Next Steps (cont’d)

Apply Processes from Existing Handbooks / Guidebooks

» Develop methodology for fulfilling data needs of measuring and quantifying the performance measures

» Link processes to decision points within PlanWorks
Next Steps (cont’d)

» Develop Data Processes within PROVIS

» Develop processes for integrating data that will be used for quantifying performance measures into PROVIS

» Processes will provide a framework for incorporating the project prioritization process into PROVIS during development of the LRTP Update
Next Steps

» Develop Action Plan
  » Action Plan will define how data needs of performance measures will be satisfied
  » Will be supported by decision-making processes within PlanWorks
  » Workshop with WVDOT, FHWA, SHRP2 staff and other stakeholders, to present draft project findings and provide opportunity to incorporate their input into final action plan (early November)
  » Timeframe: target completion date – November 30, 2017
Discussion