Overview of FHWA CMAQ & System Performance Measures

Presented by:

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Association for Commuter Transportation &

Best Workplaces for Commuters
Agenda

Background
Overview of System Performance Measures
Overview of CMAQ Performance Measures
ACT’s Positions
Next Steps
Background

• Section 150 of MAP-21 Requires State DOTs and Metropolitan Planning Organizations to demonstrate progress towards national performance metrics

• The Secretary is required to establish performance measures and standards within 18 months of passage of MAP-21 (Jan 6, 2014)

• MAP-21 specifically limits the rulemaking process to measure only the performance measures listed by the section
Background

What are we Measuring?

- State of Good Repair -- Condition of Pavement & Bridges on the National Highway System
- Highway Safety
  - Serious injuries and fatalities per vehicle mile travelled
  - The number of serious injuries and fatalities
- Performance of the Interstate System-National Highway System
- Congestion Mitigation & Air Quality Program
  - Traffic congestion
  - On-road mobile source emissions
- National Freight Movement
Background

Missed Deadlines........

Timing According to MAP-21 --- (These deadlines are no longer being used)

Not less than 1-year after the Secretary has issued the final rule (no later than Jan 6, 2015) each State is required to set performance targets for the issues highlighted above.

No later than 4-years after the enactment of MAP-21 (Jul 6, 2016) and every two years after each State is required to submit a report to DOT describing:

- The condition and performance of the National Highway System in the State;
- The effectiveness of the investment strategy document in the State asset management plan for the National Highway System;
- Progress in achieving performance targets identified by DOT; and,
- The ways in which the State is addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan, within the State.
## Background

<table>
<thead>
<tr>
<th>Performance Area</th>
<th>NPRM</th>
<th>Comments Due</th>
<th>Final Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide and Metro Planning; Non-Metro Planning</td>
<td>June 2, 2014</td>
<td>Closed October 2, 2014</td>
<td>Anticipated May 2016</td>
</tr>
<tr>
<td>Performance of the NHS, Freight, and CMAQ Measures</td>
<td>April 22, 2016</td>
<td>Open until August 2016</td>
<td>TBD</td>
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</table>
Overview of System Performance Measures

Proposed Metrics for NHS & Interstate Highway Performance

- Percent of the Interstate System where peak hour travel times meet expectations
- Percent of the Interstate System providing for reliable travel time
- Percent of the NHS system where peak hour travel times meet expectations
- Percent of the Interstate System providing for reliable travel time

- Travel Time Reliability is Key metric to Performance
- Proposed Rule Establishes 80% reliability as the minimum standard
Overview of System Performance Measures

Travel Time Reliability - HOW IS THIS CALCULATED?

Travel Time (during a 5 min segment)

Normal Travel Time

Reporting only includes daylight hours
Overview of System Performance Measures

Reliability Measure Explained

HOW IS THIS CALCULATED?

FHWA establishes a reliable segment as one that does not have a factor greater than 1.5.

To find a systems reliability percentage you take

\[
\frac{\% \text{ of reliable NHS/IS Miles}}{\text{Total Miles}}
\]
Overview of System Performance Measures

Each Reporting Segment

**METRICS**
Level of Travel Time Reliability (LOTTR) of each time period of each reporting segment for the full extent:
1. Interstate System
2. Non-Interstate NHS

**THRESHOLD**
LOTTR < 1.50 for the reporting segment = reliable

Entire Applicable Network

**MEASURES**
Percent of system providing for reliable travel times.
1. Interstate System
2. Non-Interstate NHS

**Interstate Example**
30 sec (80th percentile)/15 sec (50th percentile)
LOTTR = 2.00

2.00 > 1.50 = Not Reliable

8,125 reliable miles/10,000 total Interstate miles = 81.3% reliable
Overview of System Performance Measures

What are Reporting Segments?

FHWA proposes allowing State DOTs and MPOs develop reporting segments that would be used for the basis of calculating and reporting metrics to FHWA.
Overview of System Performance Measures

Who is reporting?
Overview of System Performance Measures

Peak Travel Times

FHWA is proposing to establish peak travel time indexes for urban areas over 1 million people.

Specifically, FHWA is defining peak travel time as the travel time during 3 morning and 3 evening peak hours.

State DOTs and MPOs would establish target peak reliability indexes.
Overview of System Performance Measures

Where do State DOTs and MPOs get the DATA from?

FHWA is proposing that data used in performance reporting come from the ‘National Performance Management Research Data Set’ (NPMRDS) or an FHWA approved equivalent.

The NPMRDS is a dataset based on actual, observed data collected from probes in vehicles along the NHS. The data set includes travel time information collected from probes that is available at 5 minute intervals.
Timing

Overview

4 Year Performance Period

State DOT
- Report Targets
  - FHWA

MPO
- Report Targets
  - State DOT

2 Yr Target
- Adjust Targets
  - Report on Progress
    - FHWA

4 Yr Target
- Report on Progress
    - FHWA

System Performance Report
Timing

**Proposed Establishment of Performance Targets**

**State DOTs**
- Establish 2-year* and 4-year targets, as applicable
  - Within 1-year of the effective date of the final rule.
- Target adjustment of 4-year target allowed at the mid-point of target period
- Optional additional urbanized/non-urbanized targets

**MPOs**
- Establish 2-year and 4-year targets, as applicable, by either committing to support the State DOT target or establishing a quantifiable target
  - Within 180 days of the State DOT
- If State DOT adjusts target, any MPO adjustments must occur within 180 days

*Non-Interstate NHS Travel Time Reliability only: 2-year targets not required for 1st performance period*
Timeline for Biennial Performance Reporting

1st Performance Period

- Baseline Performance Period Report (due Oct 1, 2018)
- Mid Performance Period Progress Report (due Oct 1, 2020)

2nd Performance Period

- Full Performance Period Progress Report (due Oct 1, 2022)
- Baseline Performance Period Report (due Oct 1, 2022)
- Mid Performance Period Progress Report (due Oct 1, 2024)
- Full Performance Period Progress Report (due Oct 1, 2026)
## Timing

### State DOT Reporting on Performance Targets

<table>
<thead>
<tr>
<th>Baseline Performance Period Report</th>
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<tbody>
<tr>
<td>NHS limits</td>
</tr>
<tr>
<td>Adjusted urbanized area boundaries and population data</td>
</tr>
<tr>
<td>Nonattainment and maintenance areas and MPOs' CMAQ Performance Plan*</td>
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<tr>
<td>Baseline performance</td>
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<tr>
<td>2-year and 4-year targets</td>
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<tr>
<td>Discussion of congestion at freight bottle necks.</td>
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<tr>
<td>Relationship to other plans, including freight</td>
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<table>
<thead>
<tr>
<th>Mid Performance Period Progress Report</th>
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</thead>
<tbody>
<tr>
<td>2-year performance</td>
</tr>
<tr>
<td>Progress discussion</td>
</tr>
<tr>
<td>Investment strategy effectiveness</td>
</tr>
<tr>
<td>Adjusted 4-year targets (optional)*</td>
</tr>
<tr>
<td>Extenuating circumstances*</td>
</tr>
<tr>
<td>Target achievement discussion*</td>
</tr>
<tr>
<td>MPOs' CMAQ Performance Plans*</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Full Performance Period Progress Report</th>
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</thead>
<tbody>
<tr>
<td>Same content as Mid Performance Period Progress Report, except:</td>
</tr>
<tr>
<td>Reporting on 4-year performance</td>
</tr>
<tr>
<td>No option for adjusted targets</td>
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*Only include when applicable*
Timing

MPO Reporting on Performance Targets

**System Performance Report**
- Part of MPO’s Metropolitan Transportation Plan (MTP)
- Report baseline performance and progress toward achieving targets

**CMAQ Performance Plan**
- Required for MPOs serving a TMA with a population over 1 million with ozone, CO, or PM nonattainment and maintenance areas
Issues with Measure

Key Initial Concerns:

• Improper Weighting
• Concerns about segment selection
• Peak Period Weighting
• No sense of PPT
• Incomplete data sets would be filled in by using the posted speed limit

\[
\frac{6,500 \text{ reliable miles}}{8,000 \text{ total miles}} = 81.3\% \text{ Reliable}
\]
Overview of CMAQ Performance Measures

Proposed Metrics for CMAQ:

- Annual Hours of Delay
- 2- and 4-year Total Emission Reductions for each applicable pollutant and pre-cursor

*FHWA considering adding CO2 emissions standard in final rule*
Geographic Area: On-Road Mobile Source Emissions Measure

Legend:
- Purple: Nonattainment and Maintenance Areas for Ozone, CO, PM
- Green: State DOTs to Report for Proposed Measure
Overview of CMAQ Performance Measures

How Annual Hours of Delay is Calculated

Actual time to get through a segment – baseline time to get through segment

(baseline for .5 mile of freeway/Interstate/expressway is 35 MPH while principle arterial is 15 MPH)

So.....If I am travelling on I-66 and it takes me 2 min (or 120 seconds) to go half a mile, that is 69 more seconds then the baseline

That delay figure is then multiplied by the vehicle count (see next slide)

The delay for a segment is then added together.

The sum of that number is then divided by 3600 and then the sum of all segments is combined to create a figure.

That is then divided by the population of a region to get a measure
Overview of CMAQ Performance Measures

How Annual Hours of Delay is Calculated

Hourly vehicle volumes (actual or estimated) are collected one of two ways

- Hourly traffic counts collected by count stations
- Average Annual Daily Traffic reported to HPMS
### Total Excessive Delay

- **Full Extent (3,000 mi.):**
  - 4,462,525,000 hours
  - Total Population: 1,047,102
  - Excessive Delay Per Capita: 4.3 vehicle-hours

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**11,900,000 vehicle-hours excessive delay annually over 8 miles**
Overview of CMAQ Performance Measures

How 2- and 4-year Total Emission Reductions for each applicable pollutant and pre-cursor emission reductions are counted

FHWA will use existing practices related to emission reduction modeling and data submission

CMAQ Public Access System:
https://fhwaapps.fhwa.dot.gov/cmaq_pub/
Issues with Measure

Key Initial Concerns:

• Improper Weighting

• Concerns about segment selection
  • Segment selection
  • Missing segments

• Baseline speeds (35/15) too low

• CMAQ modeling data

• Does not include Non-CMAQ funded projects in emission reduction
Add Person Throughput as a System Performance and CMAQ Measure

Congestion delays affect PEOPLE -
  ◦ Vehicles don’t lose time, people do

Selected measures will influence future system decision-making
  ◦ Focusing solely on vehicles may lead to only vehicle-oriented solutions that unintentionally may limit investment decisions
  ◦ Improving person throughput requires cost-effective regional or area programs such as TDM that support corridor improvements
Measuring Performance Solely by Vehicle Counts Can Be Misleading

After HOT lanes (MNPass) conversion opening

The segment carried **10% MORE VEHICLES**

1,605 vs 1,457 vehicles

**BUT ... 10% FEWER PEOPLE**

2,593 vs 2,853 persons
WHAT'S NEXT

Comments Due August 20th

ACT Reviewing and Developing Comments to Submit and Boilerplate comments for ACT/BWC Members

http://actweb.org/advocacy/performance-measures-resources/

DEVELOPING APPROPRIATE PERFORMANCE MEASURES

Background:

MAP-21 introduces performance measures and outcome-based planning. Specifically, MAP-21 establishes a process by which States and local governments will measure the effectiveness of proposed projects as a part of their planning process. The first step in that process is identifying what to measure and how. Over the last several years, ACT and other organizations have been working with the Federal Highway Administration on the development of appropriate metrics.

MAP-21 requires the development of metrics for the following areas:

- Safety Performance Measures
- Pavement and Bridge Performance Measures
- Performance of the NHS, freight, and CMAQ Measures

Importance of Performance Metrics

Performance-based policies mark an important turning point in our nation’s transportation policy: it represents both opportunity and danger for ACT and its members. ACT urges all of its members to become familiar with the importance of this process and understand the impact it will have on future funding decisions. TDM projects rank incredibly high in many performance metrics and measures. However, the process of determining what gets counted and how will have a long-lasting impact which will determine how years of Federal (and local) funding will be spent. This process will serve as the cornerstone of decisions for the foreseeable future and as such, we cannot overstate the importance of this process to all ACT members.

Below is a series of resources and information.

ACT & BWC will host a Webinar on May 26th — 2:00 PM Information on Registration Forthcoming

Proposed Rules:

FHWA NPRM System Performance & CMAQ Performance Metrics

Comment Now — Comments Due August 20th

ACT’s Role & Position:

ACT System Performance & CMAQ Performance Metrics Recommendations – 2013
“Perfect is the enemy of the good”
- Voltaire

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