Transportation Performance Management

National Performance Management Measures to Assess System Performance, Freight Movement, and CMAQ Improvement Program

Final Rule Webinar

June 1, 2017

U.S. Department of Transportation
Federal Highway Administration

A Message From

Peter Stephanos

Director, FHWA Office of Program Administration

TPM: Putting the Pieces Together

- National Goals
- Measures
- Targets
- Plans
- Reports
- Accountability and Transparency

Agenda

- Introduction
- National Performance Management Measures
- Target Establishment and Reporting
- TPM Resources

Introduction

U.S. Department of Transportation
Federal Highway Administration

TPM
HOW WE GET THERE

Why Are We Doing Performance Management?

- Provide the **most efficient investment** of Federal transportation funds
- Refocus on **national transportation goals**
- Increase **accountability and transparency**
- **Improve decision-making** through performance-based planning and programming

FHWA TPM Rulemaking: Status

TPM Related Rules	Final Rule Published	Rule Effective Date
Safety Performance Measures	March 15, 2016	April 14, 2016
Highway Safety Improvement Program	March 15, 2016	April 14, 2016
Statewide and Non-Metropolitan Planning; Metropolitan Planning	May 27, 2016	June 27, 2016
Highway Asset Management Plans for NHS	October 24, 2016	October 2, 2017
Pavement and Bridge Condition Measures	January 18, 2017	May 20, 2017
Performance of the NHS, Freight, and CMAQ Measures	January 18, 2017	May 20, 2017*

* Except for portions of the rule related to the percent change in CO2 emissions from 2017 (GHG measure). Those portions are delayed and FHWA will be publishing an NPRM in the Federal Register pertaining to this measure.

Summary of New 23 CFR Part 490

National Performance Management Measures

Subpart A: General Information (Target Establishment, Reporting, and NHPP and NHFP Significant Progress Determination)

Subpart B: Measures to Carry Out the Highway Safety Improvement Program (HSIP)

Subpart C: Measures for Assessing Pavement Condition

Subpart D: Measures for Assessing Bridge Condition

Subpart E: Measures to Assess Performance of the National Highway System (NHS)

Subpart F: Measure to Assess Freight Movement on the Interstate System

Subpart G: Measures to Assess the CMAQ Program – Traffic Congestion

Subpart H: Measure to Assess the CMAQ Program – On-Road Mobile Source Emissions

Summary of Comments and Updates

- We received nearly 9,000 comment letters with over 96,000 individual comments
- The final rule, as effective, was updated. It:
  - Revised and streamlined measures by reducing the total from 9 to 6
  - Simplified data processing and calculation processes
  - Integrated measures to address multimodal and person-focused concerns
  - Addressed concerns with use of absolute thresholds
  - Addressed comments regarding applicability

Final Measures: System Performance and Freight

Measure Area	Performance Measures
Performance of the National Highway System (Subpart E)	• **Interstate Travel Time Reliability Measure**: Percent of person-miles traveled on the Interstate that are reliable • **Non-Interstate Travel Time Reliability Measure**: Percent of person-miles traveled on the non-Interstate NHS that are reliable
Freight Movement on the Interstate System (Subpart F)	• **Freight Reliability Measure**: Truck Travel Time Reliability (TTTR) Index

Note: These measures contribute to assessing the National Highway Performance Program (NHPP) and National Highway Freight Program (NHFP)

Final Measures: CMAQ Program

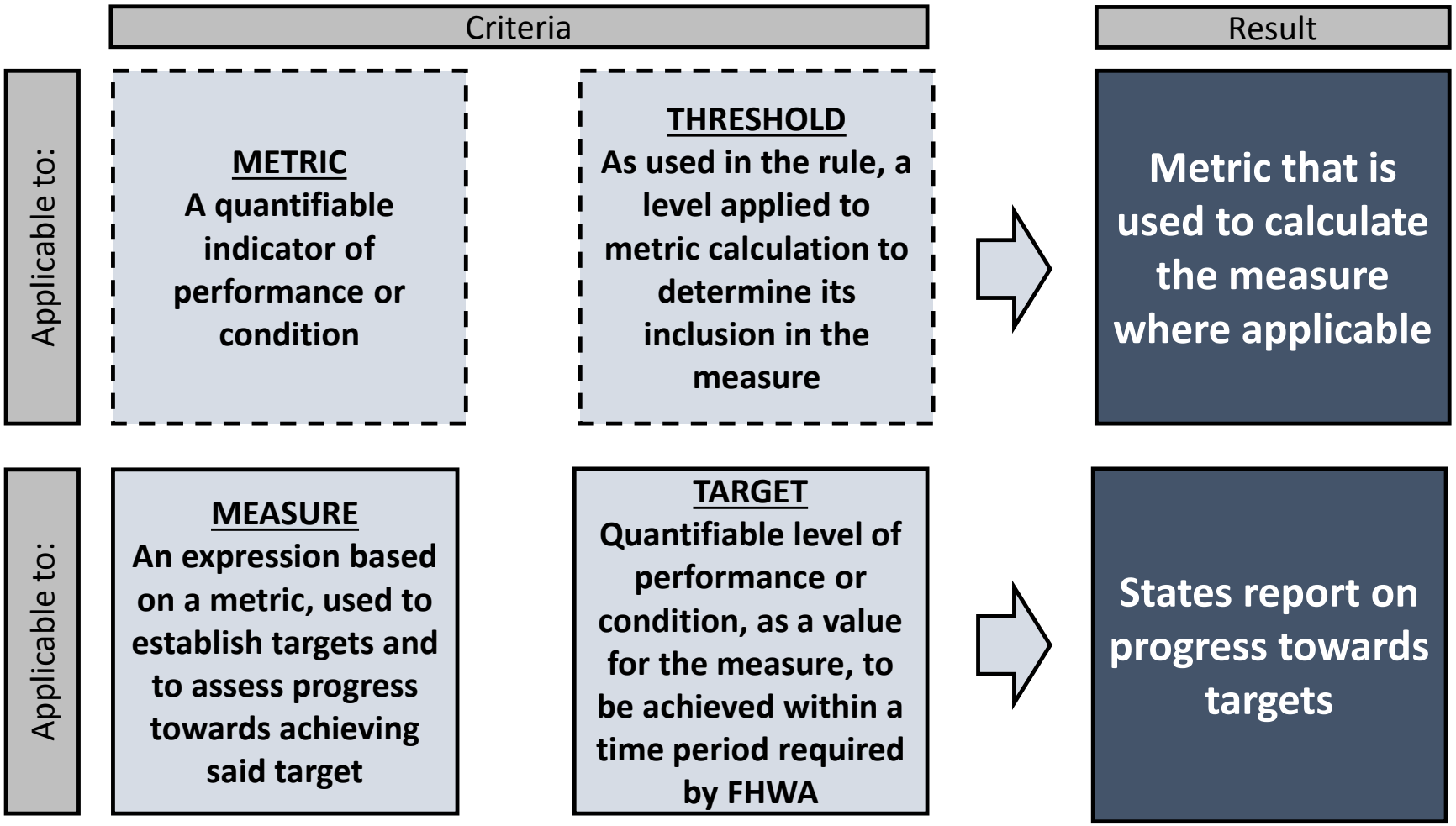
Measure Area	Performance Measures
Measures to Assess the CMAQ Program – Traffic Congestion (Subpart G)	• **Peak Hour Excessive Delay(PHED) Measure**: Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita • **Non-Single Occupancy Vehicle Travel (SOV) Measure:** Percent of Non-Single Occupancy Vehicle (SOV) Travel
Measure to Assess the CMAQ Program – On-Road Mobile Source Emissions (Subpart H)	• **Emissions Measure:** Total Emissions Reduction

National Performance Management Measures

U.S. Department of Transportation
Federal Highway Administration

TPM
HOW WE GET THERE

§ 490.101 Metrics, Thresholds, Measures and Targets



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Applicable to all measures

Applicable to some measures

Subpart E

National Performance Management Measures to Assess Performance of the National Highway System

Subpart E Measures

- **Interstate Travel Time Reliability Measure**: Percent of person-miles traveled on the Interstate that are reliable
- **Non-Interstate Travel Time Reliability Measure**: Percent of person-miles traveled on the non-Interstate NHS that are reliable

GHG Measure Delayed

- While the rule took effect on May 20, 2017, certain portions of the rule pertaining to the GHG measure (the percent change in CO2 emissions from 2017, generated by on-road mobile sources on the NHS) have been delayed indefinitely.
- FHWA will be publishing a NPRM in the *Federal Register* pertaining to the GHG measure.

Changes to Travel Time-Based Measures

- Simplified data processing requirements and metric calculation
  - Use of 15 minute travel time intervals instead of 5 minute intervals
  - Consistent time periods for all travel time derived measures
  - Recognition of commercial data sets that could be pre-approved by FHWA
  - Removed requirement to "fill" missing all vehicle data with travel time at posted speed limit (TT@PSL)
  - Use all vehicle travel times to replace missing truck travel times
- Will work with State DOTs and MPOs to use a pooled-fund approach to acquire services and tools that will help process and analyze data

§ 490.507 Travel Time Reliability Measures

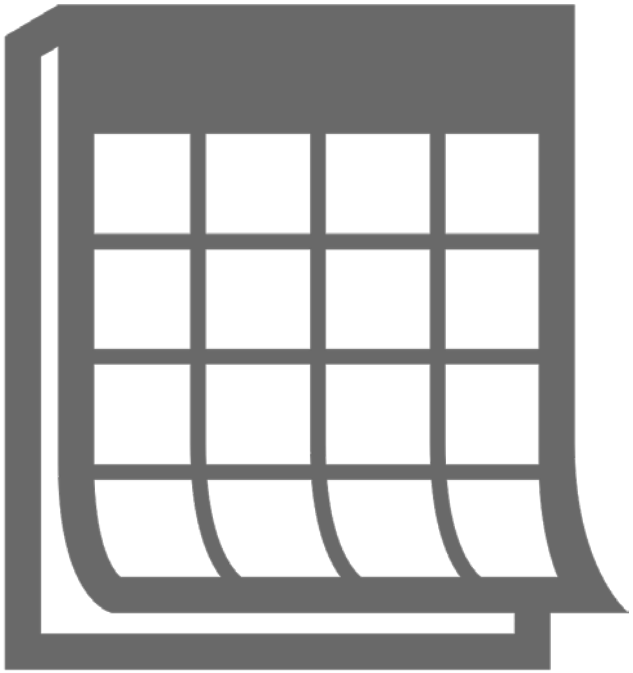
	Criteria		Result
Each Reporting Segment	**METRICS** Level of Travel Time Reliability (LOTTR) for each time period and reporting segment on: 1. Interstate System 2. Non-Interstate NHS	**THRESHOLD** LOTTR < 1.50 for the reporting segment = reliable	Reporting Segment included / not included in measure
National Highway System	**MEASURES** Percent of person-miles traveled that are reliable: 1. Interstate System 2. Non-Interstate NHS	**TARGETS** 1. % of Interstate System person-miles reliable 2. % of non-Interstate NHS person-miles reliable	States report on progress towards targets

§ 490.509 Data Requirements: Travel Time Reliability

Relevant Data	Data Source(s)
• **Travel times** • **NHS travel time segments**	• National Performance Management Research Data Set (NPMRDS) , ***OR*** • Equivalent data set
• **AADT/volumes** • **Annual traffic volume** (AADT x 365)	• Highway Performance Monitoring System (HPMS)
• **Occupancy factors**	• Provided by FHWA, likely based on national surveys, ***OR*** • Other allowed data sources

§ 490.509 Data Requirements: Applicable Time Periods

Full Year (Jan 1-Dec 31)



Weekdays (Mon – Fri)

- 6 – 10am
- 10am – 4pm
- 4 – 8pm

Weekends

- 6am – 8pm

Four Total Time Periods

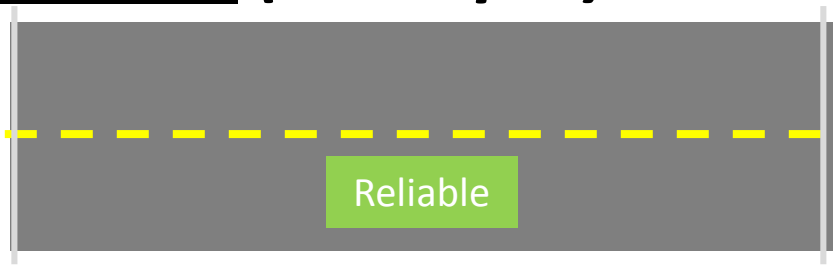
§ 490.511 Level of Travel Time Reliability (LOTTR) Metric (Example)

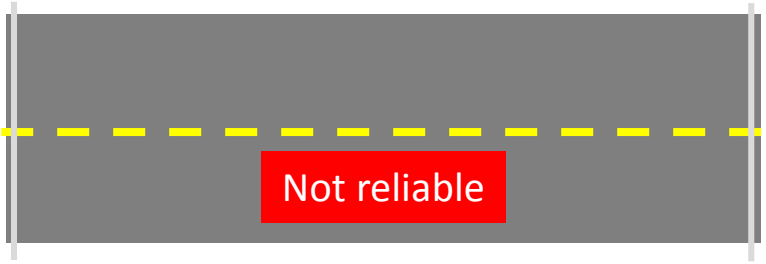
$$\frac{\text{Longer Travel Time (80th)}}{\text{Normal Travel Time (50th)}} = \frac{\text{\# seconds}}{\text{\# seconds}} = \text{Level of Travel Time Reliability Ratio}$$

Level of Travel Time Reliability (LOTTR) *(Single Segment, Interstate Highway System)*		
Monday – Friday	6am – 10am	LOTTR = $\frac{44 \text{ sec}}{35 \text{ sec}} = 1.26$
	10am – 4pm	LOTTR = 1.39
	4pm – 8pm	LOTTR = 1.54
Weekends	6am – 8pm	LOTTR = 1.31
Must exhibit LOTTR below 1.50 during **all** of the time periods		**Segment is not reliable**

HPMS Submittal: *Starting in 2018, State DOTs report LOTTR metrics and the corresponding 80th and 50th percentile times for each time period and directional AADT for each reporting segment by June 15 of each year, for the previous year's measures*

§ 490.513 Calculating Travel Time Reliability Measures (Example)





Length	1.000 mi.		0.750 mi.
Annual Traffic Volume	x 2,000,000		x 3,500,000
Occupancy Factor	x 1.3 persons/vehicle		x 1.7 persons/vehicle
Segment Total	**Reliable: 2,600,000 person-miles**	$\frac{\Sigma\ (\text{Reliable person-miles})}{\Sigma\ (\text{Total person-miles})}$	**Unreliable: 4,462,500 person-miles**

Measure: % of person-miles reliable, for full extent of the system

Subpart F

National Performance Management Measure for Freight Movement on the Interstate

Subpart F Measure

- **Freight Reliability Measure**: Truck Travel Time Reliability (TTTR) Index
  - The sum of maximum TTTR for each reporting segment, divided by the total Interstate system miles

§ 490.607 Freight Reliability Measure

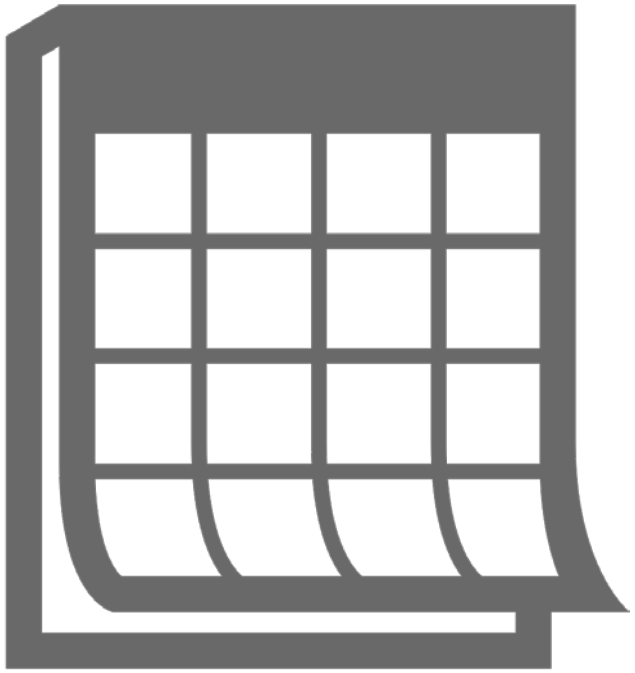
	Criteria		Result
Each Reporting Segment	**METRIC** Truck Travel Time Reliability (TTTR) for each time period and each segment on the Interstate System	**NO THRESHOLD**	Maximum TTTR for each reporting segment
Interstate System	**MEASURE** TTTR Index: The sum of maximum TTTR for each segment, divided by total Interstate miles	**TARGET** TTTR Index for the Interstate System	States report on progress towards targets

§ 490.609 Data Requirements: Freight Reliability

Relevant Data	Data Source Options
• Truck travel times • Interstate travel time segments	• NPMRDS, ***OR*** • Equivalent data set

§ 490.609 & 490.611 Data Requirements: Applicable Time Periods

Full Year (Jan 1-Dec 31)



Weekdays (Mon – Fri)	Weekends
6 – 10am	**6am – 8pm**
10am – 4pm	
4 – 8pm	
Overnight (all days) **8pm – 6am**	

Five Total Time Periods

§ 490.611 Freight Reliability Metric (Example)

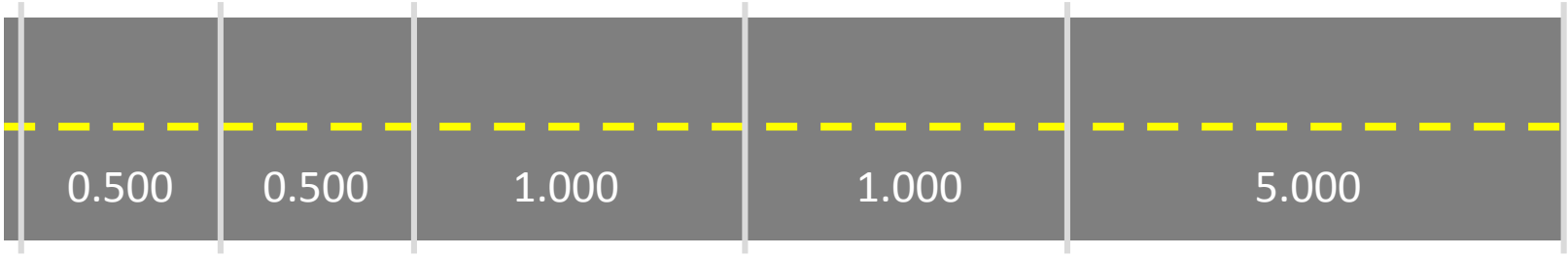
$$\frac{\text{Longer Truck Travel Time (95th)}}{\text{Normal Truck Travel Time (50th)}} = \frac{\text{\# seconds}}{\text{\# seconds}} = \text{Truck Travel Time Reliability (TTTR) Ratio}$$

Truck Travel Time Reliability (TTTR) (Single Segment, Interstate Highway System)		
Monday – Friday	6am – 10am	$TTTR = \frac{72 \text{ sec}}{50 \text{ sec}} = 1.44$
	10am – 4pm	TTTR = 1.39
	4pm – 8pm	TTTR = **1.49**
Weekends	6am – 8pm	TTTR = 1.31
Overnight	8pm – 6am	TTTR = 1.20
Maximum TTTR		**1.49**

HPMS Submittal: *Starting in 2018, State DOTs report TTTR metrics and the corresponding 95^{h} and 50th percentile times for each time period and each reporting segment by June 15 of each year, for the previous year's measures*

§ 490.613 Calculating Freight Reliability Measure (Example)

$$\text{TTTR Index} = \frac{\sum \text{All segment length weighted TTTR}}{\sum \text{All segment lengths}}$$



Segment length (mi.)	0.500	0.500	1.000	1.000	5.000
	x	x	x	x	x
MaxTTTR	1.49	1.59	1.50	1.41	1.36
	=	=	=	=	=
Length-weighted TTTR	0.75	0.80	1.50	1.41	6.80

TTTR Index = $\frac{11.25}{8.000 \text{ mi}}$ **= 1.41**

Measure: TTTR Index, full extent of the Interstate system

Subpart G

National Performance Management Measures for Congestion Mitigation and Air Quality Improvement (CMAQ) Program – Traffic Congestion

Subpart G Measures

- **PHED Measure:** Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita

- **Non-SOV Travel Measure:** Percent of Non-Single Occupancy Vehicle (SOV) Travel

§ 490.703 Applicability: PHED and Non-SOV Travel Measures

- Areas with the following criteria:

Area Characteristics		***Nonattainment or Maintenance Area***
• Designated urbanized area, • Contains NHS mileage, **AND** • Population over 200,000*	+	• ozone (O_3), • carbon monoxide (CO), **OR** • particulate matter (PM_{10} or $PM_{2.5}$)

- **All MPOs and State DOTs** that have NHS mileage that overlaps with an applicable urbanized area must coordinate on a **single, unified target** and report on the measures

* *Phase In: For the first performance period only, the population criteria applies to urbanized areas with populations over 1 million.*

§ 490.707 PHED Measure

	Criteria		Result
Each Reporting Segment	**METRIC** Total excessive delay (person-hours) for each reporting segment on the NHS	**THRESHOLD** Travel Time at 20 mph OR at 60% of the posted speed limit (PSL) for each reporting segment, whichever is greater	Total excessive delay (person-hours) for the reporting segment
National Highway System	**MEASURE** Annual hours of PHED per capita	**TARGET** Annual hours of PHED per capita for each urbanized area	States report on progress towards targets

§ 490.709 Data Requirements: PHED

Relevant Data	Data Source Options
• **Urbanized Area Boundary**	• US Decennial Census • HPMS
• **Reporting Segment Length**	• NPMRDS, ***OR*** • Equivalent data set
• **Travel Time in 15-minute intervals**	• NPMRDS, ***OR*** • Equivalent data set
• **Hourly Traffic Volume**	• Hourly continuous traffic volume counts, ***OR*** • Derived from AADT reported to the HPMS
• **Annual Vehicle Classification for Buses, Trucks, and Cars**	• Annual traffic volume counts, ***OR*** • AADT, AADT single unit, and AADT combination as reported to the HPMS
• **Annual Vehicle Occupancy**	• Data provided by FHWA, ***OR*** • Alternative estimate that is more specific

§ 490.711 PHED Metric (Example)

0.500 Mile Reporting Segment

Average of 105 seconds for a 15-min. segment per vehicle

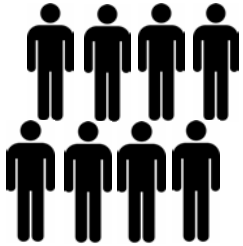
Travel Time

Excessive Delay Threshold: **72 seconds**

Threshold Travel Time

105 - 72 = **33 seconds**

Travel Time Segment Delay



500,000 people traveling during **peak hours** (per mode)

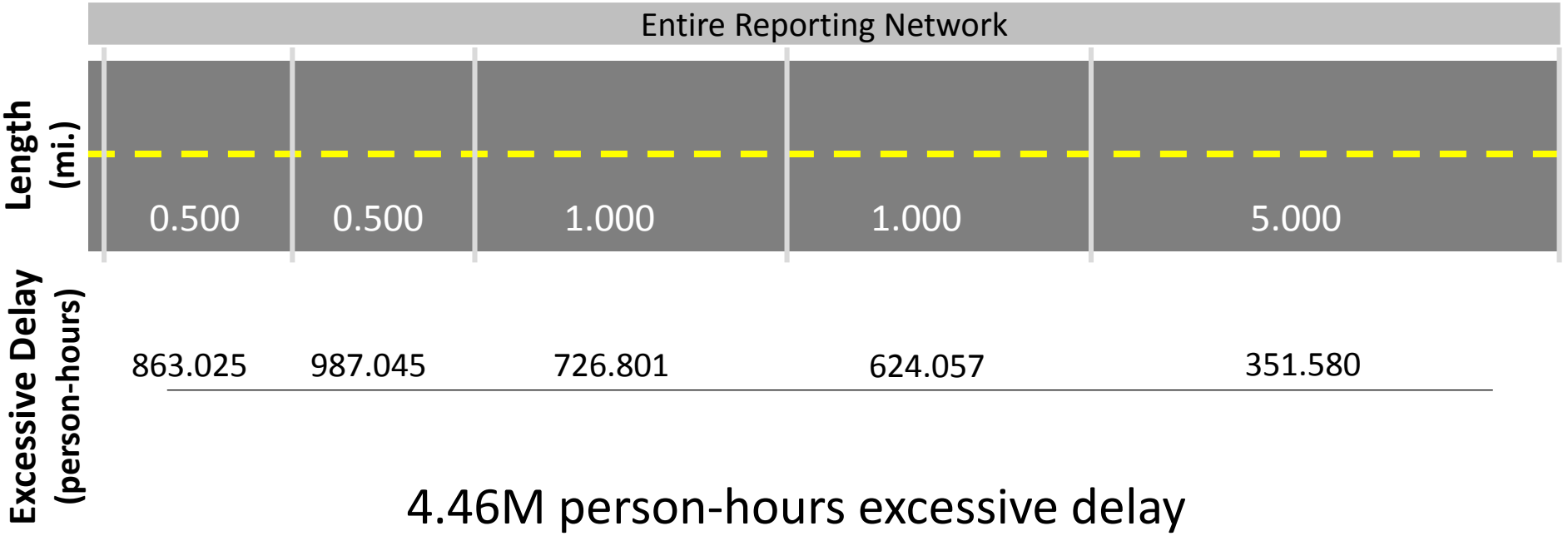
For all **peak periods** in a full calendar year

= 863.025 person-hours

Total Excessive Delay*

***HPMS Submittal:** *Starting in 2018, State DOTs report PHED metric for each reporting segment by June 15 of each year, for the previous year's measures*

§ 490.713 Calculating PHED Measure (Example)



$$\frac{\text{4.46M person-hours excessive delay}}{\text{1.05M urbanized area population}}$$

= 4.3 hours per capita

Measure: Peak hour excessive delay per capita

§ 490.707 Non-SOV Travel Measure

	Criteria		Result
Not Applicable	**NO METRIC**	**NO THRESHOLD**	**Not applicable**
Urbanized Area	**MEASURE** **Percent of non-SOV travel for an entire urbanized area**	**TARGET** **% of non-SOV travel in each urbanized area**	**States report on progress towards targets**

§ 490.709 Data Requirements: Non-SOV Travel

Option	Relevant Data	Source
Method A	• **5 Year Estimate for "Commuting to Work" totaled by mode, as of August 15 of year Performance Report is due**	• American Community Survey (Table DP03)
Method B	• **Travel mode choices gathered within 2 years of the start of the Performance Period**	• Local Survey
Method C	• **Sample or continuous count of travelers using different modes**	• Modal Counts

§ 490.707 Non-SOV Travel Measure

- Percent of Non-SOV Travel

Based on one of three methods

- A: 100% - SOV% travel
- B: Results of local survey
- C: $\frac{\text{Annual volume of non-SOV}}{\text{Total annual volume}}$

Subpart H

National Performance Management Measure to Assess the CMAQ Program – On-Road Mobile Source Emissions

Subpart H Measure

- Measure: Total Emissions Reduction

- Calculation: Cumulative 2-year and 4-year Emissions Reduction (kg/day) for CMAQ funded projects of reduced emissions for:
  - Nitrogen Oxide (NOx),
  - Volatile Organic Compounds (VOCs)
  - Carbon Monoxide (CO), or
  - Particulate Matter (PM10 and PM2.5)

§ 490.803 & 490.809 Applicability: Emissions Reduction

- Ozone (O_3), CO, PM_{10} and $PM_{2.5}$ nonattainment and maintenance areas
- Applicability Determination: one year before State DOT Baseline Performance Period Report due to FHWA
- Applicability Re-assessment: one year before State DOT Mid Performance Period Progress Report due to FHWA

§ 490.809 Data Requirements: Emissions Reduction

Relevant Data	Source
• **Nonattainment or maintenance areas**	• Determination based on 40 CFR part 81 or EPA's Greenbook
• **Applicable States and MPOs**	• FHWA will post on website
• **Emissions reduction estimated for each CMAQ funded project by pollutant and precursor**	• CMAQ Public Access System*

Data Submittal: *State DOTs shall enter project information into the CMAQ project tracking system for each CMAQ project funded in the previous fiscal year by March 1 of the following fiscal year.*

§ 490.813 Calculating Emissions Measure (Example)

Project	Fiscal Year of CMAQ Obligation	NO_x Benefit (kg/day)	VOC Benefit (kg/day)	CO Benefit (kg/day)
1. Ozone area transit	2018	10.500	7.830	
2. Ozone area traffic flow improvement	2019	0.953	0.487	
3. CO area bike/ped	2018			2.127
4. CO area traffic flow improvement	2019			2.335
5. CO area transit project	2020			49.900
Measure Calculation	***2-Year Total*** *(2018-2019)*	***11.453***	***8.317***	***4.462***
	4-Year Total *(2018-2021)*	***11.453***	***8.317***	***54.362***

Final Rule: Target Establishment and Reporting

U.S. Department of Transportation
Federal Highway Administration

§ 490.105 Establishing Targets – State DOTs

- Establish 2-year and 4-year targets for each performance period
  - First set of targets within 1 year of the effective date of the final rule: May 20, 2018 (23 USC 150(d))
  - Targets must be reported to FHWA by October 1, 2018.
  - For the 1st Performance Period Only - 2-year target is NOT required for non-Interstate NHS Travel Time Reliability measure - phase-in requirements
- Establish a single, unified target (both 2-year and 4-year) for entire urbanized area for PHED and non-SOV Travel measures:
  - For the 1st Performance Period – applicable to State DOTs with NHS in the urbanized area with a population greater than 1 million containing any part of a nonattainment or maintenance area (For the 1st Performance Period Only - 2-year target is NOT required for PHED measure - phase-in requirements)
  - Beginning with the 2nd Performance Period and beyond – applicable to State DOTs with NHS in the urbanized area with a population greater than 200,000 containing any part of a nonattainment or maintenance area
- Adjustment of 4-year target allowed at the mid-point of performance period

§ 490.105 Establishing Targets - MPOs

- Establish 4-year targets by supporting the State DOT target or establishing a quantifiable target for Travel Time Reliability and Freight Reliability measures:
  - Establish targets within 180 days relevant State DOT(s) establish targets
  - A multistate planning area - may choose different target establishment options for the portion of the planning area within each State
- Targets for Emissions Reduction Measure:
  - MPOs serving TMA with a population over 1 million representing a nonattainment or maintenance area – must establish quantifiable 2-year and 4-year targets
  - Other MPOs with a nonattainment or maintenance area within metropolitan planning area – only required to establish 4-year target
- Establish a single, unified target (both 2-year and 4-year) for entire urbanized area for PHED and non-SOV Travel measures:
  - For the 1st Performance Period – applicable to MPOs with NHS in the intersected area of the urbanized area with a population greater than 1 million, metropolitan planning area, and a nonattainment or maintenance area (For the 1st Performance Period Only - 2-year target is NOT required for PHED measure - phase-in requirements)
  - Beginning with the 2nd Performance Period and beyond – applicable to MPOs with NHS in the intersected area of the urbanized area with a population greater than 200,000, metropolitan planning area, and a nonattainment or maintenance area

§ 490.107 Reporting on Performance Targets – State DOTs

- **Baseline Performance Period Report**:
  - Baseline condition/performance;
  - 2- and 4-year targets;
  - **Congestion at truck freight bottlenecks**
  - **Data collection method for the Non-SOV Travel measure**; etc.
- **Mid Performance Period Progress Report**:
  - 2-year condition/performance;
  - 2-year progress in achieving performance targets;
  - Adjusted 4-year targets (optional);
  - **Congestion at truck freight bottlenecks**; etc.
- **Full Performance Period Progress Report**:
  - 4-year condition/performance;
  - 4-year progress in achieving performance targets;
  - **Congestion at truck freight bottlenecks**; etc.

§ 490.107 Reporting on Performance Targets - MPOs

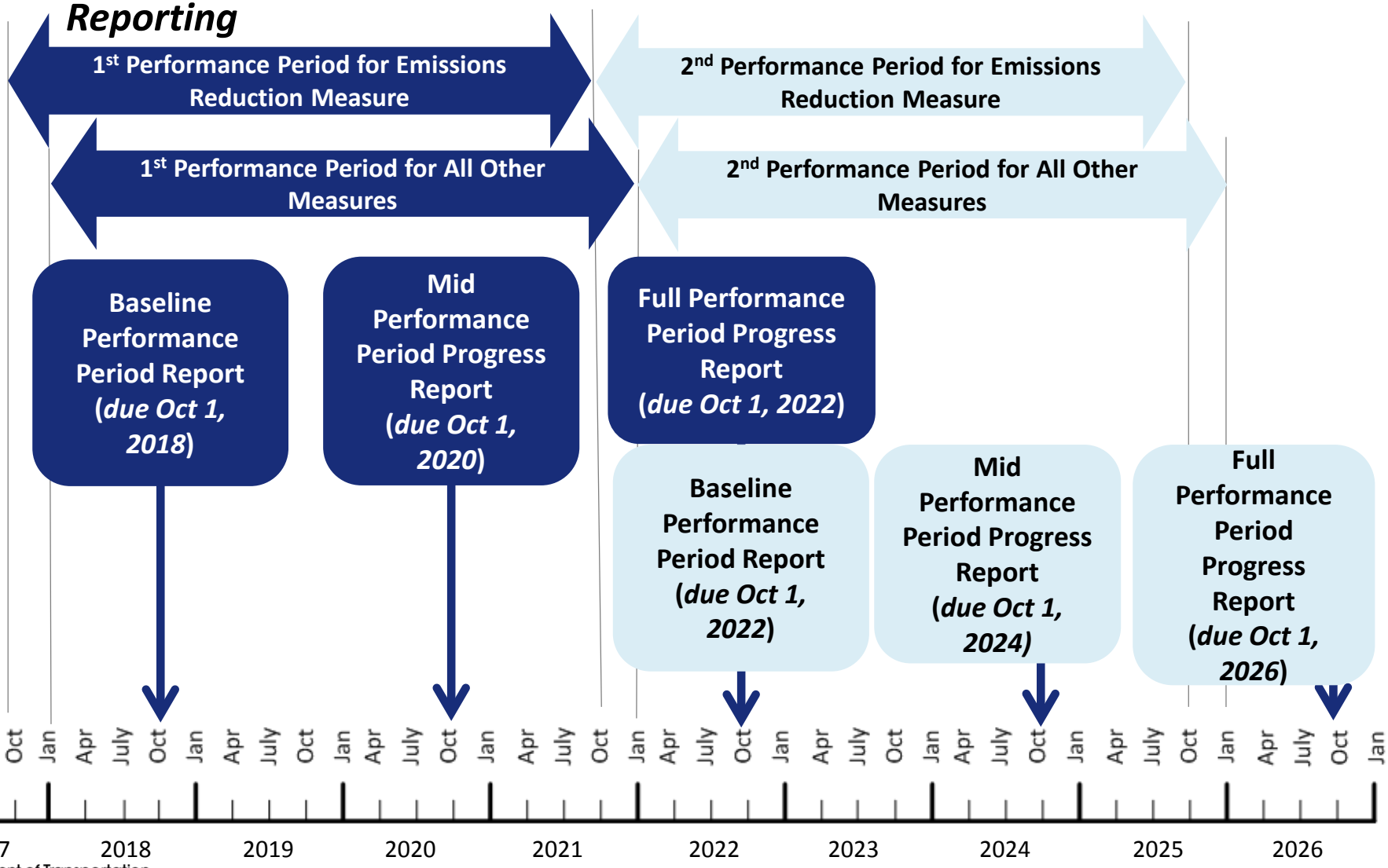
Reporting includes:

- Targets to respective State DOT(s) in a manner that is documented and mutually agreed upon by both parties

- Baseline level and progress toward targets in Metropolitan Transportation Plan

- CMAQ Performance Report in State Biennial Performance Reports (for applicable MPOs only)

§ 490.105 & 490.107 Timeline for Performance Periods and State DOT Biennial Reporting



§ 490.109 Significant Progress Determination

- Applies to statewide NHPP and NHFP targets only
  - Interstate and non-Interstate NHS Travel Time Reliability measures, and Freight Reliability measure
- FHWA assessment of State DOT target achievement (every 2 years)
  - The actual condition/performance level is better than the baseline, or
  - The actual condition/performance level is equal to or better than the established target
- Consequences of not making significant progress
  - NHPP – State DOT documents the actions it will take to achieve target
  - Freight Reliability measure – additional documentation requirement
- Extenuating circumstances may be considered

§ 490.105, 490.107 & 490.109 First Performance Period: Phase-In Requirements

Applies to first performance period and 2 measures only

- Non-Interstate NHS Travel Time Reliability Measure
- PHED measure

Reporting

- **First Baseline Performance Period Report (due October 1, 2018)**
  - State DOTs establish and report their 4-year targets
  - State DOTs are not required to report baseline condition/performance nor 2-year targets
- **First Mid Performance Period Progress Report (due October 1, 2020)**
  - State DOTs report the 2-year condition/performance as the baseline condition/performance
  - State DOTs may adjust their 4-year targets

Significant Progress Determination

- In 2020, at the midpoint of the first performance period, FHWA will not make a determination of significant progress toward the achievement of 2-year targets for the non-Interstate NHS Travel Time Reliability measure

What's Next

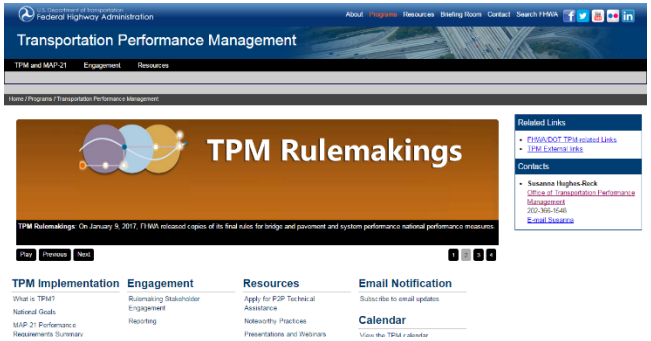
U.S. Department of Transportation
Federal Highway Administration

Roles of State DOTs and MPOs in Implementing Final Rule

- Read the final rule
- Contact your FHWA Division office with questions
- Coordinate with other agencies
- Establish coordinated targets
- Collect and submit data
- Report progress

FHWA's TPM Website

- Visit http://www.fhwa.dot.gov/tpm/ to find the latest resources:
  - Guidance
  - Training
  - TPM Toolbox
  - TPM Workshop request form
  - Webinar recordings, presentations, fact sheets, noteworthy practices, and more…



TPM Implementation Workshops

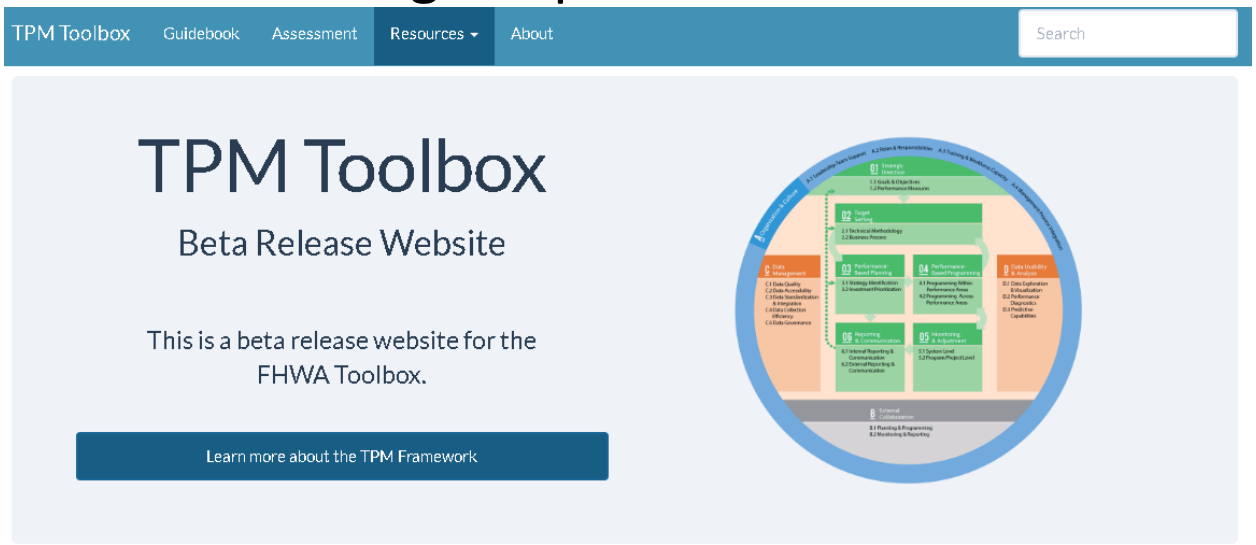
- AM Plan Implementation
- PM2 and PM3 Rule Implementation
- 4 Regional Workshops based on DFS area
  - Mid-America: Kansas City, MO, June 20-23
  - Southern: Raleigh, NC, July (tentative)
  - TBD: August
  - TBD: September

TPM Guidance

- Technical Advisories
  - Asset Management, Target Establishment for the Long Term, How the TIP helps to achieve the targets in the LRP and How the System Performance Report describes progress toward achieving targets
- Guidebooks
  - TPM Investment Strategy Analysis
    - (summer 2017)
  - TPM Target Setting Coordination
    - (summer 2017)
  - Analyzing Freight Bottlenecks for TPM
    - (Winter 2017)

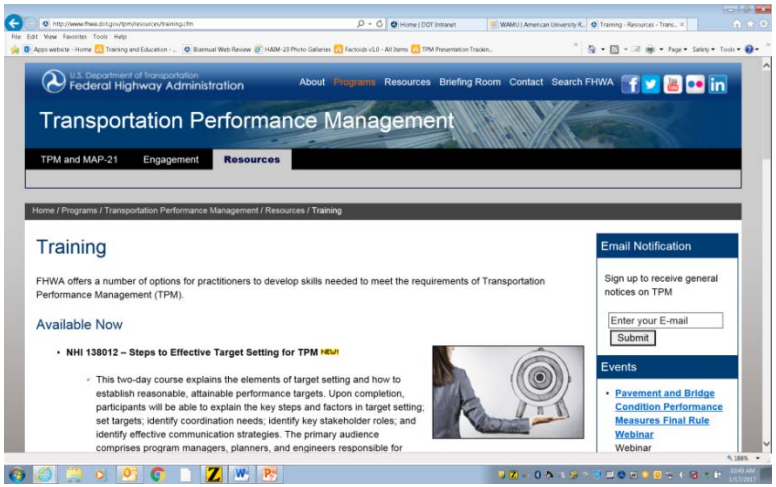
TPM Toolbox

- Visit http://www.tpmtools.org
  - Assess your agency's level of TPM maturity
  - Use the practical tools to move your agency to the next level in a range of performance areas



TPM Training through NHI

- Available Now:
  - Overview of MAP-21 TPM (w/ FAST Act updates)
  - TPM for Safety
  - Performance-based Planning and Programming
  - Steps to Effective Target Setting
  - The Role of Data in TPM



Final Rule in the Federal Register & Docket

- **Federal Register**
  https://www.federalregister.gov/documents/2017/01/18/2017-00681/national-performance-management-measures-assessing-performance-of-the-national-highway-system

- **Docket**
  https://www.regulations.gov/docket?D=FHWA-2013-0054

Questions?

Contacts

For questions or more information, please contact:

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