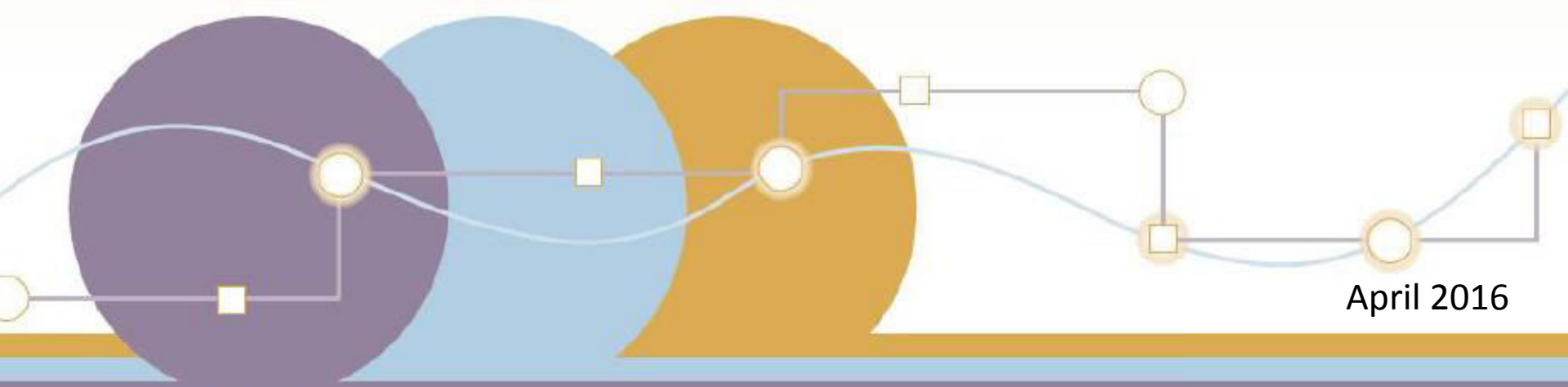
National Performance Management Measures NPRM

Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and the Congestion Mitigation and Air Quality Improvement Program

Subpart F: Freight Movement on the Interstate



April 2016

Opening Comments and Introductions

Jeffrey Lindley

Associate Administrator

Office of Operations

Today's Webinar

Part 1

Introduction to Transportation Performance Management

Francine Shaw Whitson, *Office of Transportation Performance Management*

Part 2

Proposed Performance Measures and Concepts

Rich Taylor, *Office of Operations*

Part 3

Calculating the Proposed Performance Measures

Nicole Katsikides, *Office of Freight Management and Operations*

Part 4

Target Establishment, Reporting, NHPP & NHFP Significant Progress

Francine Shaw Whitson, *Office of Transportation Performance Management*

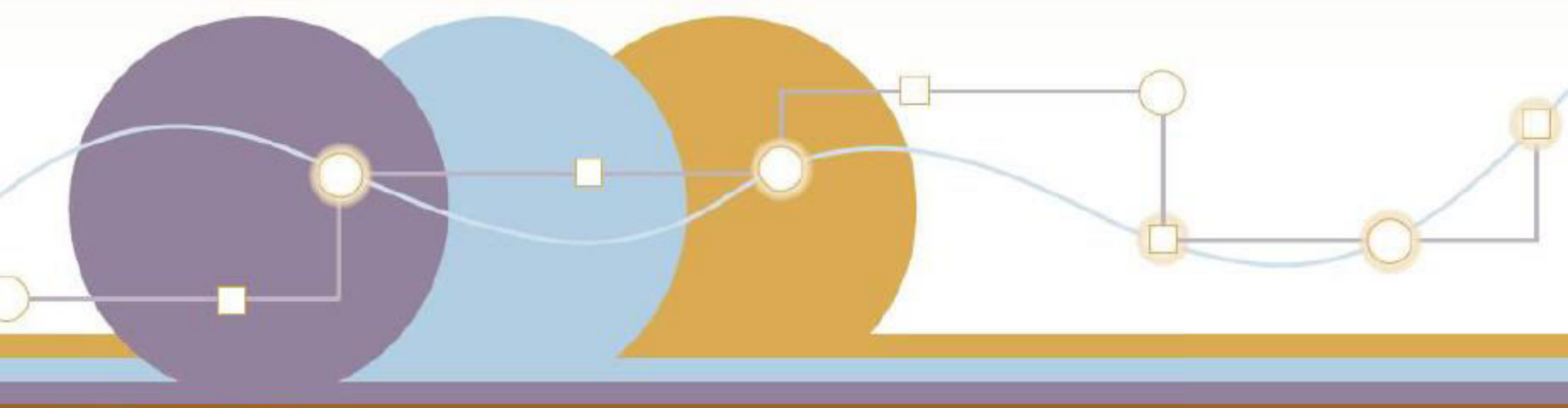
Part 5

Summary and Q&A

Francine Shaw Whitson, *Office of Transportation Performance Management*

Part 1

Introduction to Transportation Performance Management



Why Are We Doing Performance Management?

- To transform the Federal-aid Highway Program and to provide a means to the **most efficient investment** of Federal transportation funds
- To refocus on **national transportation goals**
- To increase the **accountability and transparency** of the Federal-aid Highway Program
- To **improve decision-making** through performance-based planning and programming

FHWA TPM Rulemaking Schedule

Performance Area	NPRM	Comments Due	Final Rule
Safety Performance Measures	March 11, 2014	Closed June 30, 2014	Published March 15, 2016
Highway Safety Improvement Program	March 28, 2014	Closed June 30, 2014	Published March 15, 2016
Statewide and Metro Planning; Non-Metro Planning	June 2, 2014	Closed October 2, 2014	Anticipated May 2016
Pavement and Bridge Performance Measures	January 5, 2015	Closed May 8, 2015	Anticipated October 2016
Highway Asset Management Plan	February 20, 2015	Closed May 29, 2015	Anticipated October 2016
Performance of the NHS, Freight, and CMAQ Measures	April 22, 2016	Open until August 2016 120 days	TBD

Summary of Proposed New 23 CFR Part 490

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

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

Subpart C: Measures to Assess Pavement Condition

Subpart D: Measures to Assess Bridge Condition

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

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

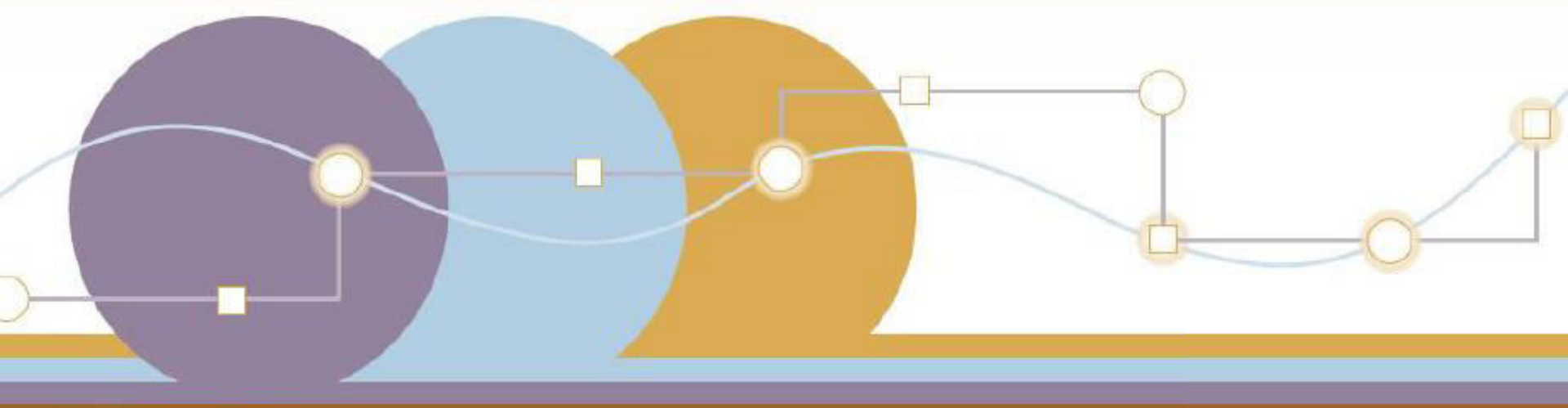
Subpart G: Measure to Assess the CMAQ Program – Traffic Congestion

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

Part 2

Proposed Performance Measures and Concepts

Key Concepts, Performance Measure Data Requirements, and Applicability



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

1 **Truck Travel Time Reliability**	Percent of the Interstate System Mileage providing for Reliable Truck Travel Times
2 **Mileage Uncongested**	Percent of the Interstate System Mileage Uncongested

Metrics, Thresholds, and Measures

	Each Reporting Segment		Entire Applicable Network
	METRIC **A quantifiable indicator of performance or condition**	**THRESHOLD** **The level of performance for a specific reporting segment that would determine its inclusion in the measure**	**MEASURE** **An expression based on a metric, used to establish targets and to assess progress towards achieving the established target**
Example	Average truck speed = **52.30 mph**	Uncongested = **Avg truck speed > 50.00 mph**	2,510 uncongested miles 3,000 total miles = **83.7% uncongested**

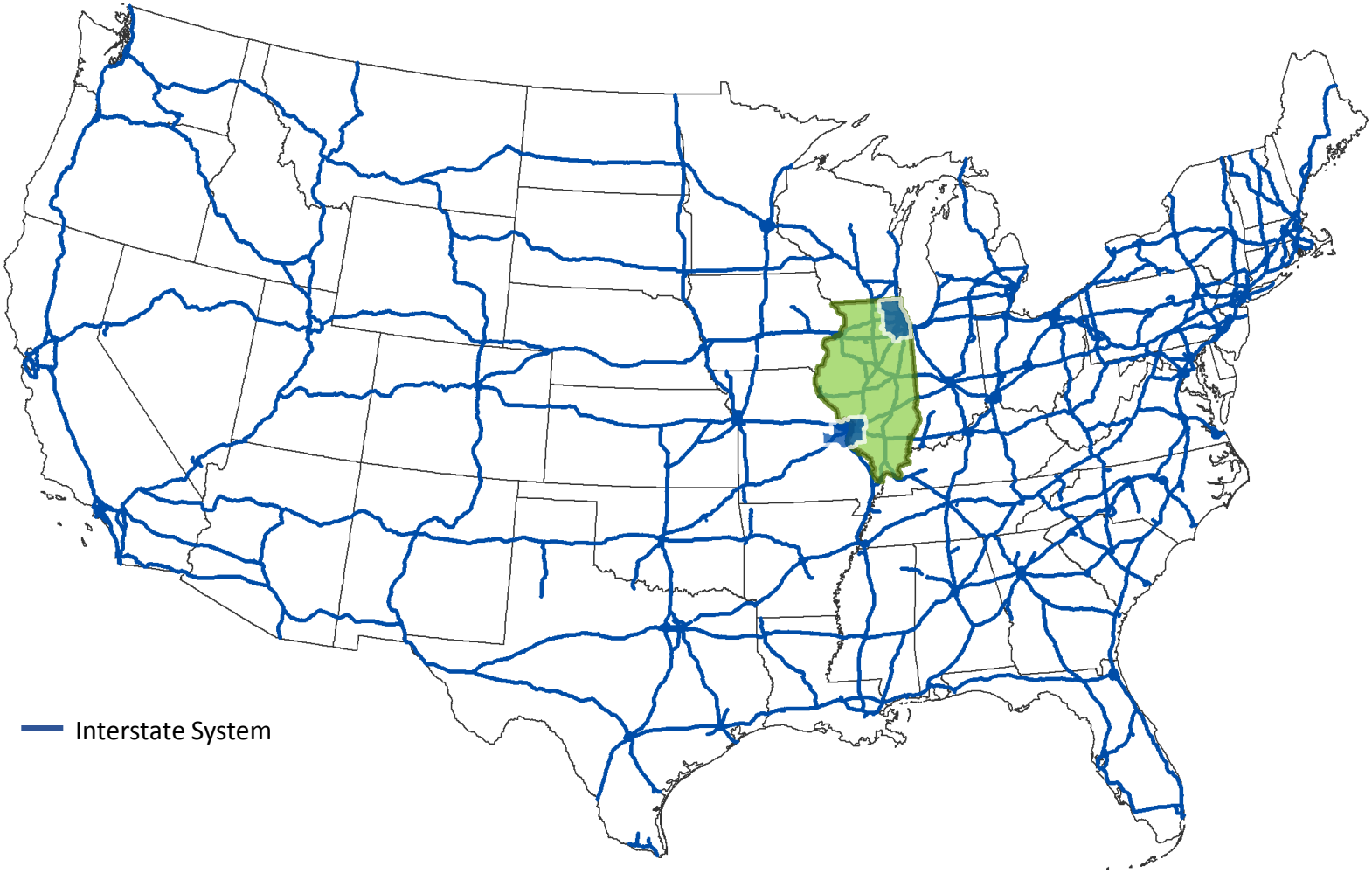
Measures vs. Targets

Entire Applicable Network

MEASURE	TARGET
An expression based on a metric, used to establish targets and to assess progress towards achieving the established target	A quantifiable level of performance or condition, as a value for a measure, to be achieved within a time period required by FHWA
83.7% total Interstate miles uncongested	Target: 80.0% Uncongested Actual: 83.7% Uncongested ✓ **Target Achieved**

Geographic Areas used by Proposed Measures

Geographic Areas used by Proposed Measures



Geographic Areas used by Proposed Measures

Geographic Areas used by Proposed Measures

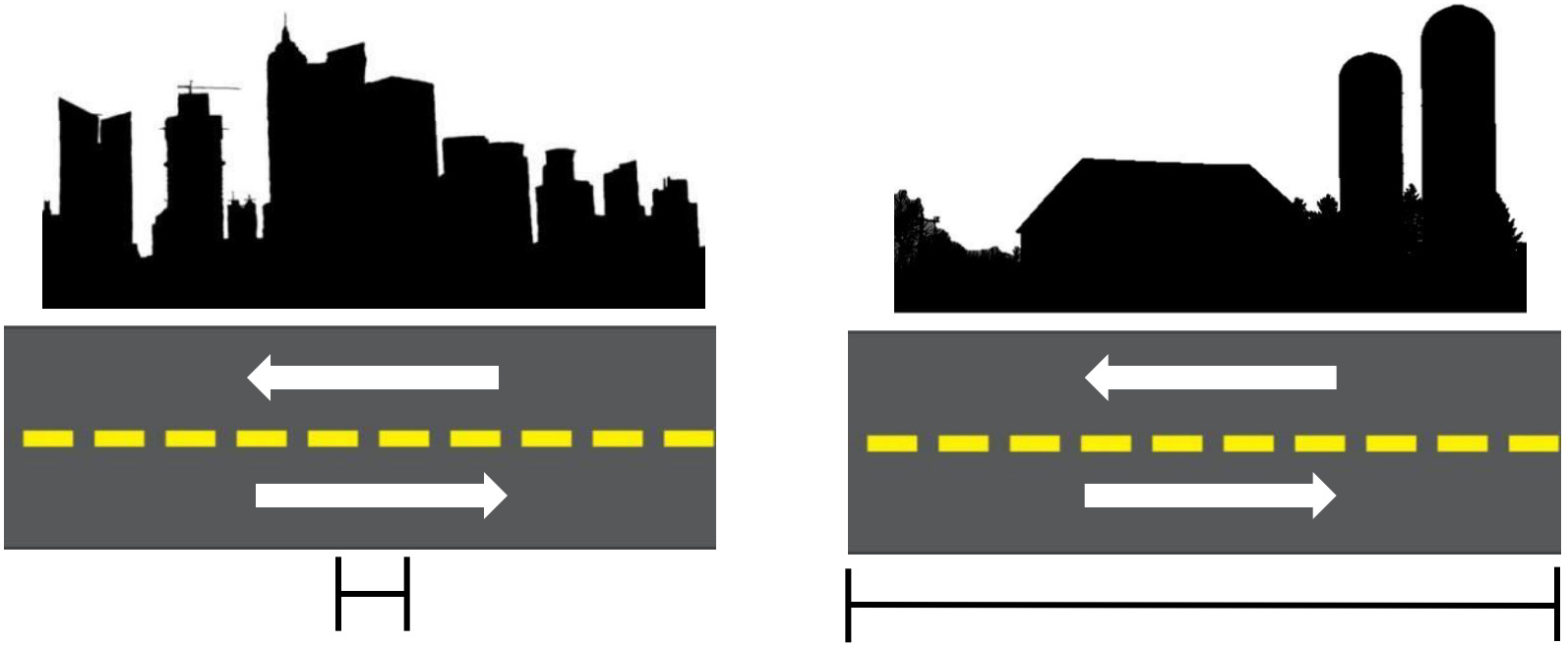
What is the National Performance Management Research Data Set (NPMRDS)?

- Is a data set provided by FHWA **monthly to State DOTs and MPOs**
- Includes **travel times derived from all traffic using the highway system**, in 5-minute bins
- Includes a breakdown of travel times of **freight vehicles** and **all traffic (freight and passenger vehicles)**
- Uses travel times that are reported via vehicle probes on **contiguous segments of roadway** covering the entire mainline NHS
- **Uses vehicle probes** that could include mobile phones, vehicle transponders, and portable navigation devices

Equivalent Data Set Requirements

- Include contiguous segments that cover the full NHS, as defined in 23 U.S.C. 103, within the State boundary and/or MPA
- Include average travel times for at least the same number of 5-minute intervals and the same locations that would be available in the NPMRDS
- Be populated with actual measured vehicle travel times and shall not be populated with travel times derived from imputed methods (historic travel times or other estimates)
- For each segment at 5-minute intervals throughout a full day (24 hours) for each day of the year, include the average travel time, recorded to the nearest second, representative of at least one of the following:
  - All traffic on each segment of the NHS (freight and passenger)
  - Freight vehicle traffic on each segment of the Interstate System

Reporting Segments



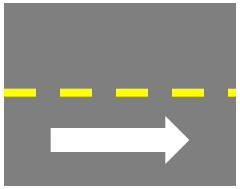
Maximum Urban Length ½ mile*

Maximum Rural Length 10 miles*

**Unless an individual Travel Time Segment is longer*

Example of NPMRDS Travel Times

Single Road Segment (eastbound travel)



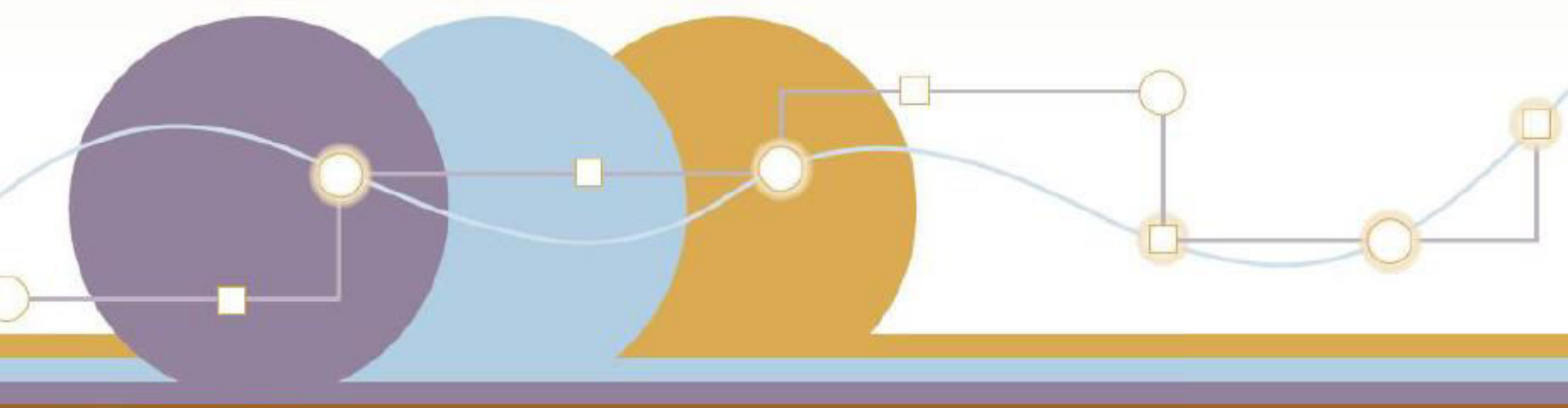
All 5 min bins in a 24-hour periods

Full Year (Jan 1-Dec 31)

5-minute bins (105,120 per year)		Avg Travel Time (EB)	
		Freight Vehicles	All Traffic
Feb 3	6:00 – 6:05am	32	31
Feb 3	6:05 – 6:10am	31	30
Feb 3	6:10 – 6:15am	--	--
Feb 3	6:15 – 6:20am	37	36
Feb 3	6:20 – 6:25am	36	37
Nov 7	7:25 – 7:30pm	29	29
Nov 7	7:30 – 7:35pm	--	28
Nov 7	7:35 – 7:40pm	30	30
Nov 7	7:40 – 7:45pm	29	29
Nov 7	7:45 – 7:50pm	31	31

Part 3

Calculating the Proposed Performance Measures



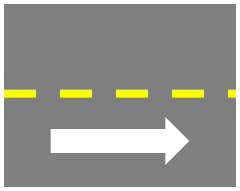
Measures to Assess Freight Movement on the Interstate System – Truck Travel Time Reliability

Each Reporting Segment		Entire Applicable Network
METRIC **Truck Travel Time Reliability (TTTR) for each segment on the Interstate System**	**THRESHOLD** **TTTR < 1.50 for the reporting segment = reliable**	**MEASURE** **Percent of the Interstate System mileage providing for reliable truck travel times**
Example 60 (95th percentile)/ 42 (50th percentile) **TTTR = 1.43**	1.43 < 1.50 **Reliable**	2,492 reliable miles / 3,000 total miles = **81.3% reliable**

Calculating Truck Travel Time Reliability Metric

Assemble travel times for all 5-minute bins

0.500 mi Segment (eastbound travel)



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Nov 7	7:25 – 7:30pm	29	29
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Nov 7	7:35 – 7:40pm	30	30
Nov 7	7:40 – 7:45pm	29	29
Nov 7	7:45 – 7:50pm	31	31

Calculating Truck Travel Time Reliability Metric

Replace missing values with all traffic values

5-minute bins		Avg Travel Time (EB)	
		Freight Vehicles	All Traffic
Feb 3	6:00 – 6:05am	32	31
Feb 3	6:05 – 6:10am	31	30
Feb 3	6:10 – 6:15am	--	--
Feb 3	6:15 – 6:20am	37	36
Feb 3	6:20 – 6:25am	36	37
	[illegible] – 7:30pm	29	29
Nov 7	7:30 – 7:35pm	28	28
Nov 7	7:35 – 7:40pm	30	30
Nov 7	7:40 – 7:45pm	29	29
Nov 7	7:45 – 7:50pm	31	31

If the time for freight vehicles are not reported, but a time is available for all traffic, substitute the all traffic time if it is less than travel time at the posted speed limit.

Calculating Truck Travel Time Reliability Metric

Replace remaining missing values with truck travel time at posted speed limit

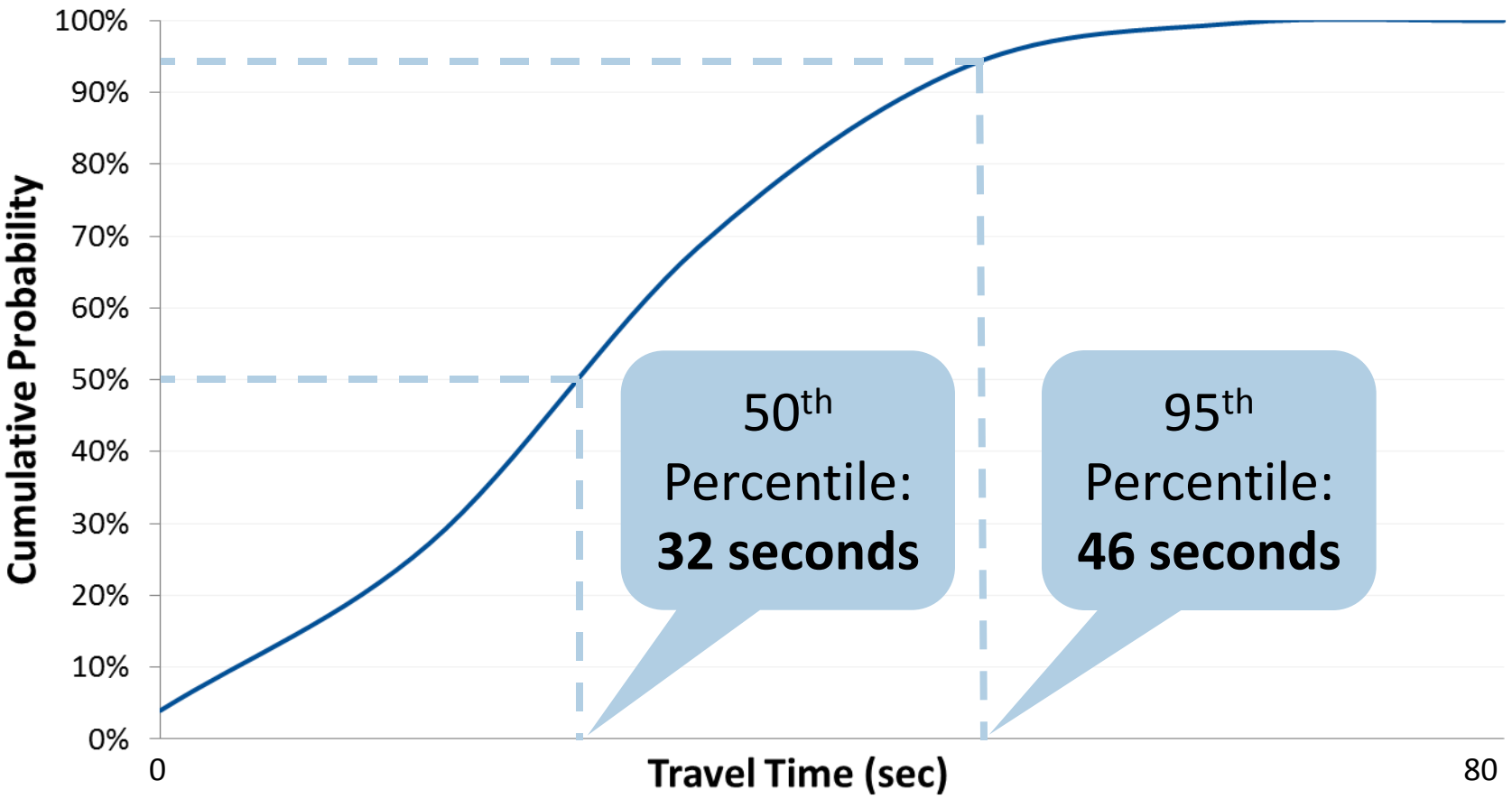
5-minute bins		Avg Travel Time (EB)	
		Freight Vehicles	All Traffic
Feb 3	6:00 – 6:05am	32	31
	6:05 – 6:10am	31	30
	6:10 – 6:15am	TTT@PSL = 33	--
	:20am	37	36
	6:20 – 6:25am	36	37
	7:25 – 7:30pm	29	29
	7:30 – 7:35pm	28	28
	7:35 – 7:40pm	30	30
Nov 7	7:40 – 7:45pm	29	29
Nov 7	7:45 – 7:50pm	31	31

In all other cases, substitute the Truck Travel Time at Posted Speed Limit (TTT@PSL).

$$\text{TTT@PSL(seconds)} = \frac{\text{Segment Length (miles)}}{\text{Posted Speed Limit (miles per hour)}} \times 60 \times 60$$

Calculating Truck Travel Time Reliability Metric

Identify the normal and 95th percentile travel times



Calculating Truck Travel Time Reliability Metric

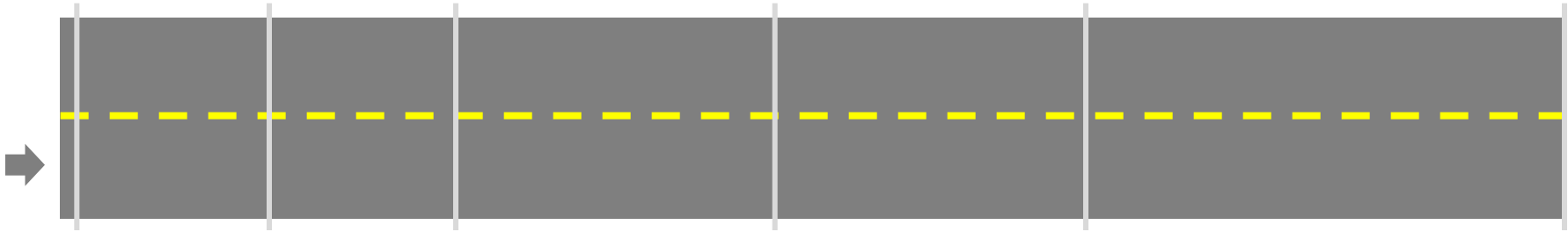
Calculate the Truck Travel Time Reliability Ratio (TTTR)

- $$\text{Truck Travel Time Reliability} = \frac{\text{95th PercentileTravel Time}}{\text{Normal Travel Time (50th)}} = \frac{\text{\# seconds}}{\text{\# seconds}}$$

Truck Travel Time Reliability (TTTR)		
$\text{TTTR} = \frac{46 \text{ sec}}{32 \text{ sec}} = \mathbf{1.44}$	Must exhibit a **TTTR < 1.50** to meet threshold.	**1.44 < 1.50** ✓ Segment provides for **reliable truck travel times**

Calculating Truck Travel Time Reliability Measure

Calculate the percentage of all reporting segments providing for reliable travel times



Length	0.500 mi.	0.500 mi.	1.00 0mi.	1.000 mi.	5.000 mi.
TTTR	1.44	1.59	1.50	1.41	1.36
Reliability (Threshold: TTTR<1.50)	✓	✘	✘	✓	✓

$$\frac{6.500 \text{ reliable miles}}{8.000 \text{ total miles}} = \textbf{81.3\% providing for reliable travel times}$$

Measure vs. Target

Entire Applicable Network

MEASURE
Percent of the Interstate system mileage providing for reliable truck travel times

TARGET
Percent of the Interstate system mileage providing for reliable truck travel times, during a calendar year

81.3% of miles
providing for reliable truck travel times

Target: 80.0% reliable miles
Actual: 81.3% reliable miles
✓ **Target Achieved**

Questions?

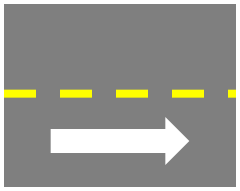
Measures to Assess Freight Movement on the Interstate System – Mileage Uncongested

Each Reporting Segment		Entire Applicable Network
METRIC **Average Truck Speed for each travel time segment on the Intestate System for a calendar year**	**THRESHOLD** **Average truck speed > 50 mph for the segment = uncongested**	**MEASURE** **Percent of the Interstate System mileage uncongested**
Example Average truck speed (single segment, full year) **= 52.30 mph**	52.30 mph > 50.00 mph = **Uncongested**	2,250 uncongested miles / 3,000 total miles = **75.0% uncongested**

Calculating Mileage Uncongested Metric

Assemble travel times for all 5-minute bins

0.500 mi Segment
(eastbound travel)



All 5-min bins in a 24-hour period

Full Year (Jan 1-Dec 31)

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		Freight Vehicles	All Traffic
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Feb 3	6:10 – 6:15am	--	--
Feb 3	6:15 – 6:20am	37	36
Feb 3	6:20 – 6:25am	36	37
...	...	...	...
Nov 7	7:25 – 7:30pm	29	29
Nov 7	7:30 – 7:35pm	--	28
Nov 7	7:35 – 7:40pm	30	30
Nov 7	7:40 – 7:45pm	29	29
Nov 7	7:45 – 7:50pm	31	31

Calculating Mileage Uncongested Metric

Replace missing values

5-minute bins		Avg Travel Time (EB)	
		Freight Vehicles	All Traffic
Feb 3	6:00 – 6:05am	32	31
Feb 3	6:05 – 6:10am	31	30
Feb 3	6:10 – 6:15am	TTT@PSL = 33	--
Feb 3	6:15 – 6:20am	37	36
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Nov 7	7:25 – 7:30pm	29	29
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Nov 7	7:35 – 7:40pm	30	30
Nov 7	7:40 – 7:45pm	29	29
Nov 7	7:45 – 7:50pm	31	31

As before, substitute times for all traffic if freight vehicles times are not reported and those times are less than times at than PSL. In all other cases, substitute TTT@PSL.

Calculating Mileage Uncongested Metric

Calculate average travel speed for each 5-minute bin

5-minute bins		Average Travel Time (sec)	Average Travel Speed (mph)
Feb 3	6:00 – 6:05am	32	**56.25**
Feb 3	6:05 – 6:10am		58.06
		33	54.55
	6:20am	37	48.65
	6:20 – 6:25am	36	50.00
	7:25 – 7:30pm	29	62.07
	7:30 – 7:35pm	28	64.28
	7:35 – 7:40pm	30	60.00
Nov 7	7:40 – 7:45pm	29	62.07
Nov 7	7:45 – 7:50pm	31	58.06

Average Travel Speed (mph) =

$$\frac{\text{Segment Length (mi)}}{\text{Travel Time (hrs)}}$$

$$\frac{0.500 \text{ mi}}{(32 \text{ sec} \div 60 \div 60)} = 56.25 \text{ mph}$$

Calculating Mileage Uncongested Metric

Calculate average truck speed for each segment

5-minute bins		Average Travel Time (sec)	Average Travel Speed (mph)
Feb 3	6:00 – 6:05am	32	56.25
Feb 3	6:05 – 6:10am	31	58.06
Feb 3	6:10 – 6:15am	33	54.55
3	6:15 – 6:20am	37	48.65
3	6:20 – 6:25am	36	50.00
7	7:25 – 7:30pm	29	62.07
7	7:30 – 7:35pm	28	64.28
7	7:35 – 7:40pm	30	60.00
v 7	7:40 – 7:45pm	29	62.07
ov 7	7:45 – 7:50pm	31	58.06
	Annual Average Truck Speed		**52.54 mph**

$$\text{Average Truck Speed (s)} = \frac{\left[\sum_{b=1}^{T} \frac{\text{Segment Length (s)}}{\text{Truck Travel Time}_b}\right]}{T} \times 60 \times 60$$

T = total number of time intervals in everyday in a full calendar year (e.g. 102,528)

Calculating Mileage Uncongested Measure

Compare annual average truck speed to threshold

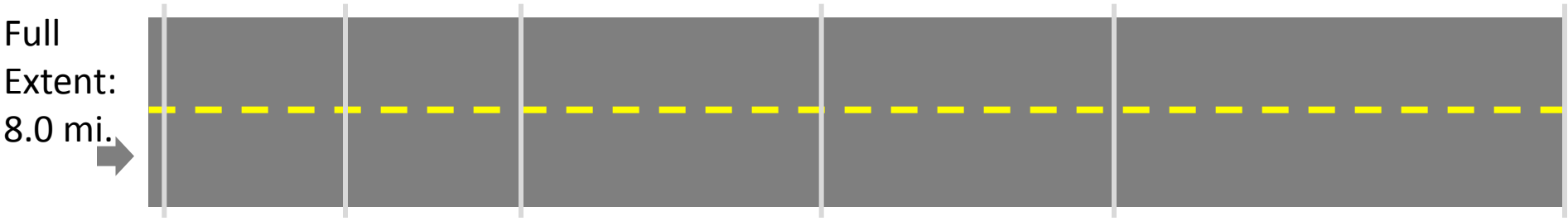
5-minute bins		Average Travel Time (sec)	Average Travel Speed (mph)
Feb 3	6:00 – 6:05am	32	56.25
Feb 3	6:05 – 6:10am	31	58.06
Feb 3	6:10 – 6:15am	33	54.55
Feb 3	6:15 – 6:20am	37	48.65
Feb 3	6:20 – 6:25am	36	50.00
Nov 7	7:25 – 7:30pm	29	62.07
Nov 7	7:30 – 7:35pm	28	64.28
Nov 7	7:35 – 7:40pm	30	60.00
Nov 7	7:40 – 7:45pm	29	62.07
Nov 7	7:45 – 7:50pm	31	58.06
		Annual Average Truck Speed	**52.54 mph**

Threshold:
Truck travel speed > 50 mph

Segment = "uncongested"

Calculating Mileage Uncongested Measure

Calculate Percent of the Interstate System Mileage Uncongested



Length	0.500 mi.	0.500 mi.	1.000 mi.	1.000 mi.	5.000 mi.
Average Travel Speed	**52.54 mph**	**53.10 mph**	**50.00 mph**	**47.75 mph**	**55.02 mph**
Uncongested (Threshold > 50 mph)	✓	✓	✘	✘	✓

$$\frac{\text{6.00 uncongested miles}}{\text{8.00 total miles}} = \textbf{75.0\% uncongested miles}$$

Measure vs. Target

Entire Applicable Network

MEASURE	TARGET
Percent of the Interstate System mileage uncongested	**Percent of the Interstate System mileage uncongested, for a calendar year**
75.0% total Interstate miles uncongested	Target: 75.0% Uncongested Actual: 75.0% Uncongested ✓ **Target Achieved**

Data Submittal Requirements

Data Submittal Requirements for Metric Calculations

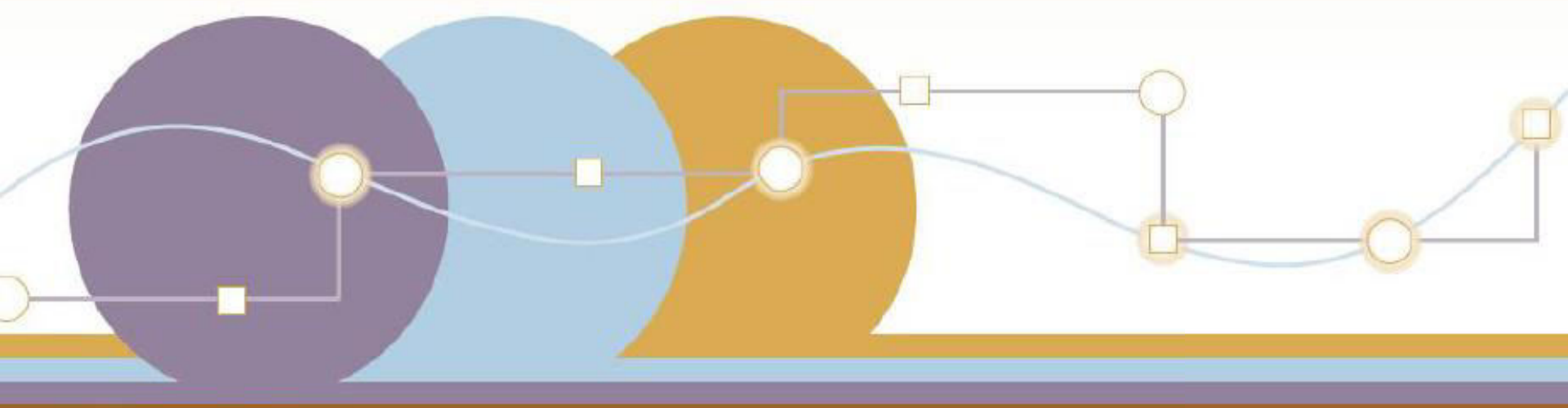
Measure	Data	Submit Data to	Submission Deadline	Extraction Date
Both	Reference NPMRDS TMC Codes *or* HPMS Location Referencing	HPMS	June 15*	August 15
	NHS Reporting Segments	HPMS	November 1	--
Truck Travel Time Reliability	TTTR	HPMS	June 15*	August 15
	95th Percentile TT			
	50th Percentile TT			
System Congestion	Average Truck Speed	HPMS	June 15*	August 15

*Data would be submitted each year for the previous calendar year. For example, on June 15, 2019, data would be submitted for January 2018 – December 2018.

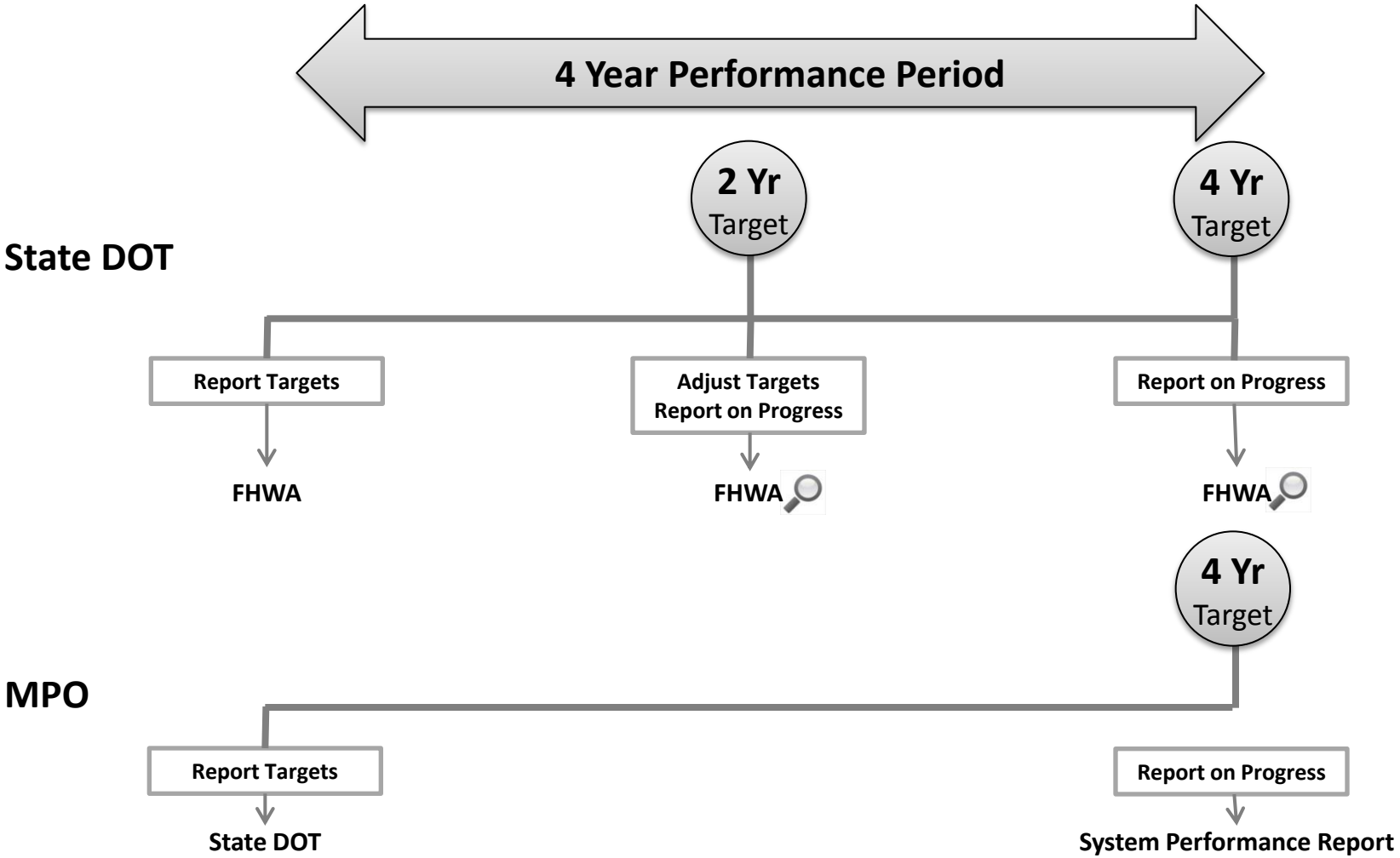
Questions?

Part 4

Target Establishment, Reporting, and Significant Progress



Overview


4 Year Performance Period
State DOT
2 Yr Target
4 Yr Target
Report Targets
FHWA
Adjust Targets
Report on Progress
FHWA
Report on Progress
FHWA
MPO
4 Yr Target
Report Targets
State DOT
Report on Progress
System Performance Report

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 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

Freight Movement Target Establishment Summary

Proposed Measures	State DOT Targets	MPO Targets	Performance Period Start Date
Percent of the Interstate System Mileage providing for Reliable Truck Travel Times	2-year & 4-year targets (Statewide)	4-year target only (MPA)	January 1, 2018
Percent of the Interstate System Mileage Uncongested	2-year & 4-year targets (Statewide)	4-year target only (MPA)	January 1, 2018

Reporting

Initial State DOT Reporting

Initial State Performance Report (due October 1, 2016)

- Performance where data is available
- Effectiveness of asset management investment strategy for NHS
- Progress toward targets
- Activity to reduce freight bottlenecks

State DOT Reporting on Performance Targets

Baseline Performance Period Report

- NHS limits
- Adjusted urbanized area boundaries and population data
- Nonattainment and maintenance areas and MPOs' CMAQ Performance Plan*
- Baseline performance
- 2-year and 4-year targets
- Discussion of congestion at freight bottle necks.
- Relationship to other plans, including freight

Mid Performance Period Progress Report

- 2-year performance
- Progress discussion
- Investment strategy effectiveness
- Adjusted 4-year targets (optional)*
- Extenuating circumstances*
- Target achievement discussion*
- MPOs' CMAQ Performance Plans*

Full Performance Period Progress Report

- Same content as Mid Performance Period Progress Report, except:
  - Reporting on 4-year performance
  - No option for adjusted targets

*Only include when applicable

MPO Reporting on Performance Targets

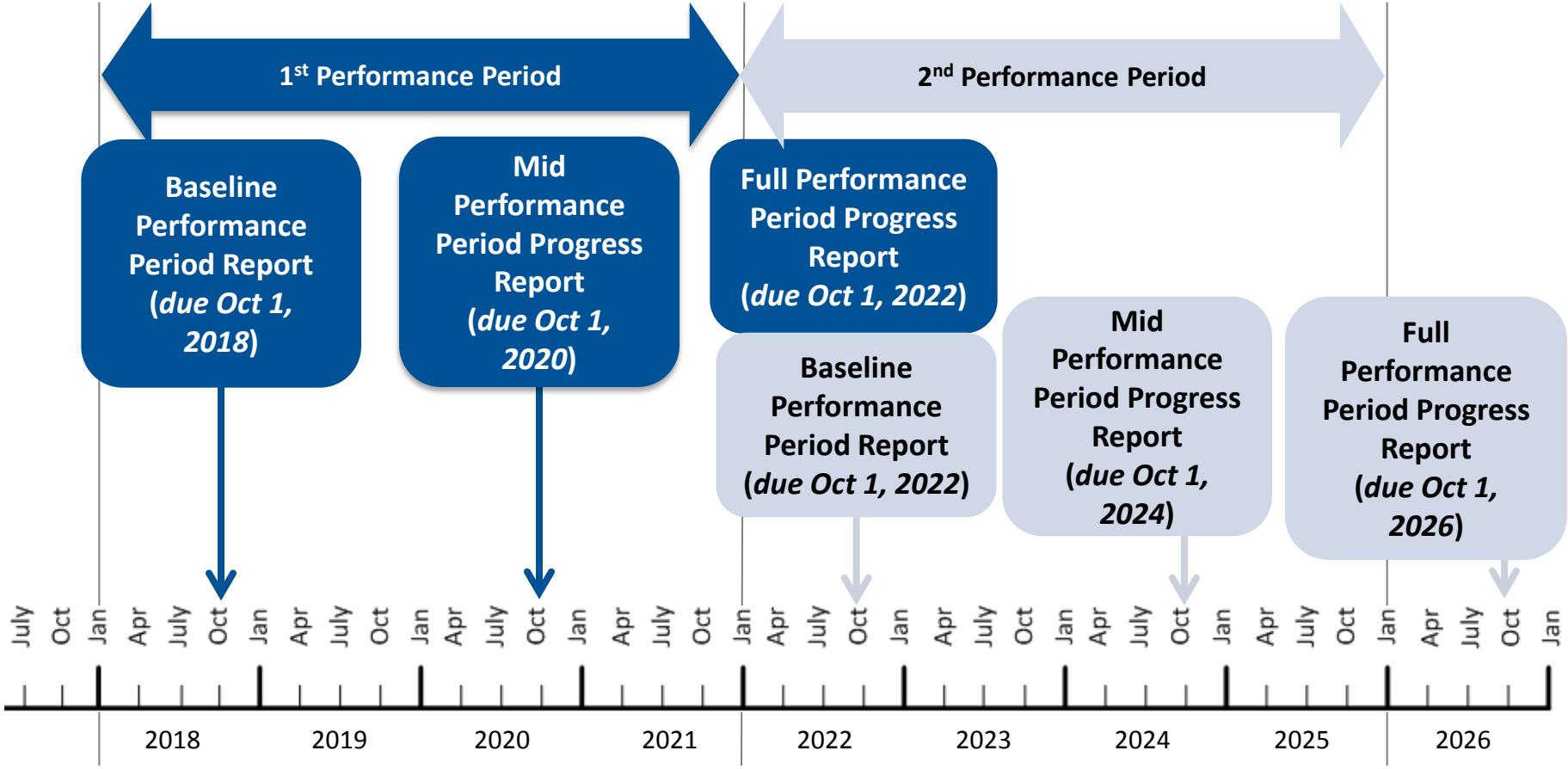
System Performance Report

- 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

Timeline for Biennial Performance Reporting



Significant Progress

Assessing Significant Progress Toward Achieving NHFP Targets

NPRM Subpart	Group	Proposed Measures	Significant Progress
Subpart F - Freight Movement on the Interstate System		Percent of the Interstate System Mileage providing for Reliable Truck Travel Times	**NHFP**
		Percent of the Interstate System Mileage Uncongested	**NHFP**

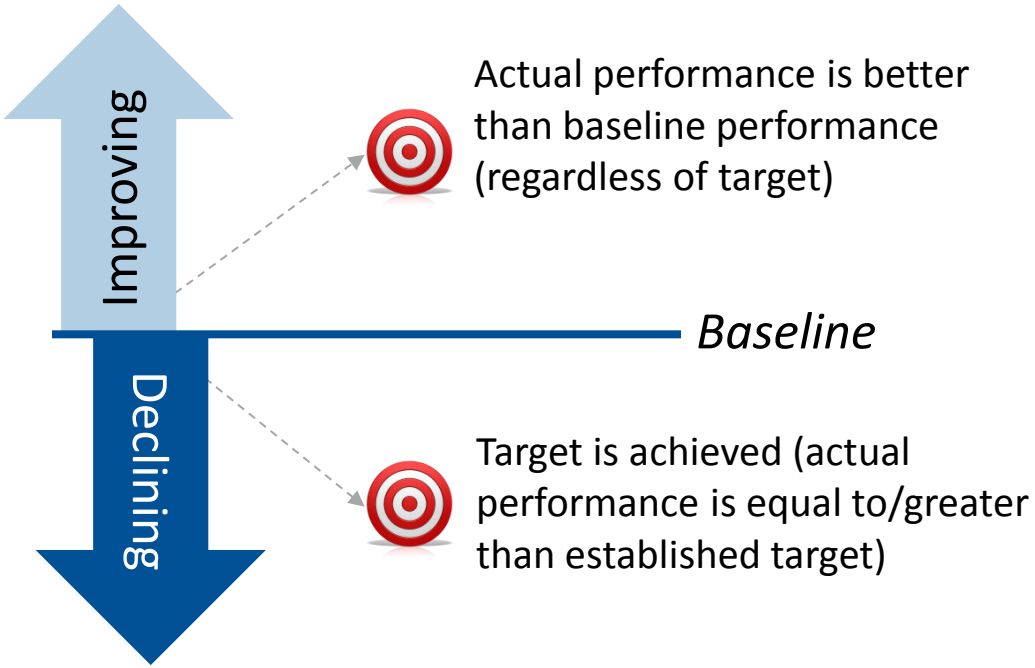
Assessing Significant Progress Toward Achieving NHFP Targets

Who	• FHWA determines if a State DOT has made significant progress
What	• Makes determination for each NHFP target individually
When	• Assesses significant progress every 2 years

Consequence: State DOTs are required to achieve or make significant progress toward their NHFP targets every biennial reporting period (every 2 years), and are to take additional reporting actions for the measure group if FHWA determines significant progress is not made.

Assessing Significant Progress Toward Achieving NHFP Targets

Significant progress is made when either…



Regulatory Impact Analysis (RIA)

Regulatory Impact Analysis Findings over 11 Years

Reduced delay for freight travel times

Freight Movement (undiscounted)

Metric Calculation	$3.31 million
+	
Measure Calculation	$14.81 million

= $18.12 million*

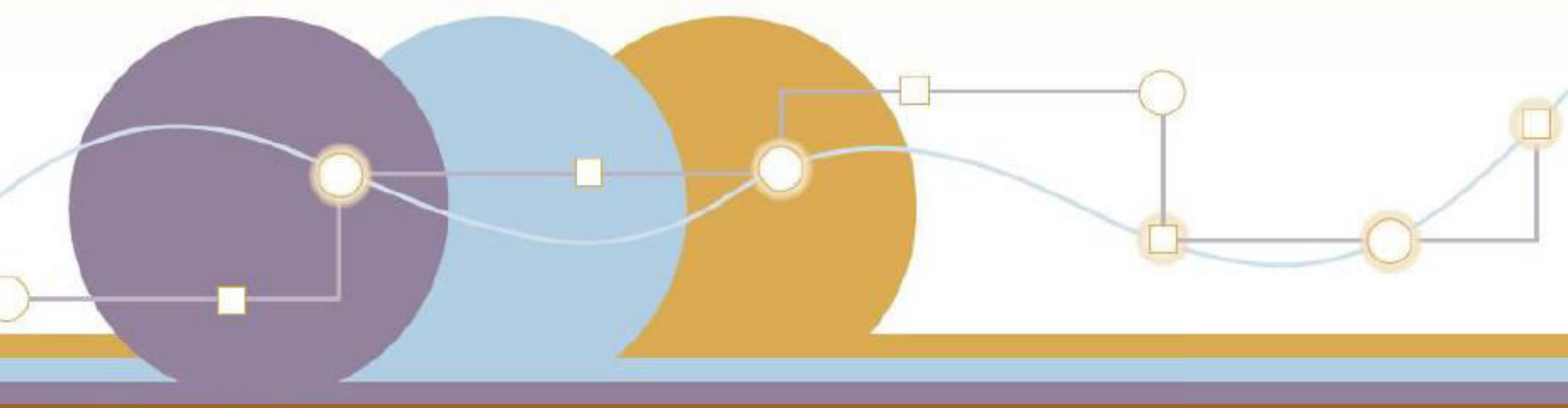
Change Needed to Justify Costs

Expected Costs

**The NPRM contains a detailed breakeven analysis on the change needed to justify these costs. Refer to the RIA for full details.*

Part 5

Summary and Q&A



Rulemaking Resources

Office of TPM website: http://www.fhwa.dot.gov/tpm/

In-Depth Webinars on Proposed Measures

- 4/26: Performance of the NHS (Subpart E)
- 5/3: CMAQ – Traffic Congestion and On-Road Mobile Emissions (Subparts G and H)
- TBD: Freight Movement on the Interstate System (Subpart F) – Industry Overview

Fact sheets, published NRPMs, webinar registration, and related information at http://www.fhwa.dot.gov/tpm/rule/pm3_nprm.cfm

Submit comments to:

www.regulations.gov:

FHWA 2013-0054

For clarifying questions or more information, please contact:

Francine Shaw Whitson
FSWhitson@dot.gov
PerformanceMeasuresRulemaking@dot.gov

Thank you!