



COMMONWEALTH of VIRGINIA

Office of the

SECRETARY of TRANSPORTATION

# Transportation Performance Management Mid-Term Performance

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# Performance Management Background

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- **MAP-21 Federal Law – Established performance targets for:**
  - **Asset Condition: Pavements and Bridges**
  - **System Performance**
  - **Congestion**
  - **Air Quality**
  - **Safety**
- **HB2241/SB1331 (2017) – Board to establish performance targets for surface transportation**

# Performance Management Background - Federal Requirements

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- **Baseline Performance Period is CY 2017**
- **State establishes 4-year targets (CY 2021) for all measures and 2-year targets (CY 2019) for some measures**
- **Baseline Performance Report submitted October 1, 2018**
- **Mid-Term Performance Report due October 1, 2020**
  - States have the opportunity to adjust 4-year targets
  - Requires explanation for 2-year targets not achieved and what will be done to achieve the 4-year targets
- **FHWA Determination of Significant Progress**
  - **If significant progress is not made, state must:**
    - Document actions to achieve targets
    - Depending on performance measure, may have funding and/or reporting impacts

# Asset Condition Performance Management Performance Measures

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Asset Condition Measure	Scope
Percentage of Pavement in Good Condition	Interstate
Percentage of Pavement in Poor Condition	Interstate
Percentage of Pavement in Good Condition	Non-Interstate NHS
Percentage of Pavement in Poor Condition	Non-Interstate NHS
Percentage of Deck Area of Bridges in Good Condition	NBI on NHS
Percentage of Deck Area of Bridges in Poor Condition	NBI on NHS

NHS - National Highway System  
NBI - National Bridge Inventory

# Asset Condition Performance Management Background

- Focus on the National Highway System (NHS) - limited portion of the network (<15%) for which VDOT is responsible
- Measures relate only to pavement and bridges in Good and Poor condition
- Targets initially established based on trend analysis and modeling
- Federal Targets were adopted by the CTB in September 2018



# Asset Condition Performance Management Background - Maintenance and Operations Comprehensive Review

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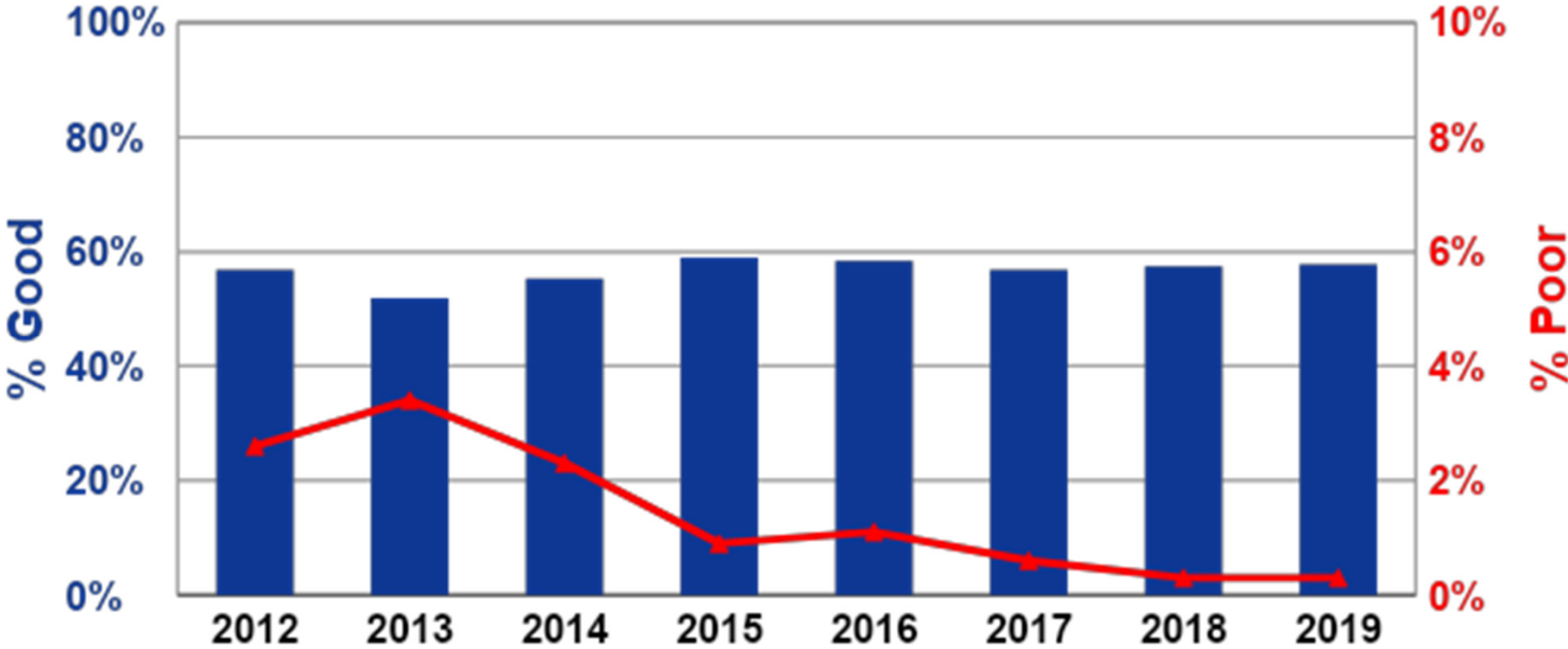
Pursuant to 2019 Acts of Assembly, Enactment 2 of Chapters 83 and 349, VDOT conducted a detailed analysis to establish long term sustainable performance targets for pavements, bridges and Special Structures

- Focused on network funded by VDOT's Maintenance and Operations and State of Good Repair Programs to include, Interstate, Primary and Secondary systems
- Established new statewide performance measures and targets
  - Pavement measures based on Critical Condition Index and % sufficient, includes thresholds based on traffic volume (AADT) for primary and secondary roads
  - Bridge measures based on General Condition Rating and % not Structurally Deficient
- Modified investment strategy to be more comprehensive and strategic resulting in a more balanced approach to asset management

Statewide Performance Measures and Targets adopted by CTB in December 2019

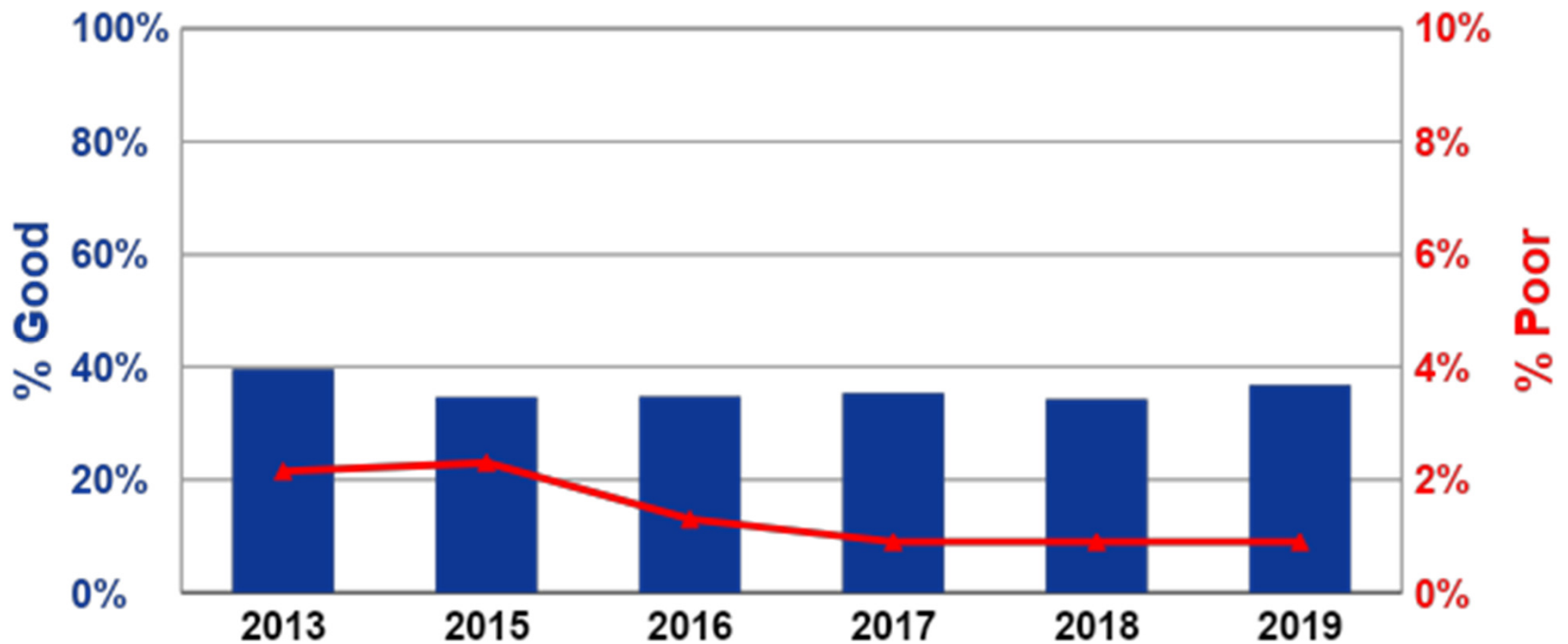
# Interstate Pavement Performance Management

## How are we doing?



# Non-Interstate NHS Pavement Performance Management

## How are we doing?





# Pavement Performance Management

## How are we Doing?

Measure (Percent)	CTB Adopted Targets (percent)		Performance (percent)			Trend / Target Achievement
	2-yr	4-yr	2017	2018	2019	
Pavement in Good Condition (interstate)	45.0	45.0	57.8	57.5	57.9	Improving/ Meeting Target
Pavement in Poor Condition (interstate)	<3.0	<3.0	0.6	0.3	0.3	Improving/ Meeting target
Pavement in Good Condition (non-interstate NHS)	25.0	25.0	33.5	34.8	36.7	Improving/ Meeting target
Pavement in Poor Condition (non-interstate NHS)	<5.0	<5.0	0.9	0.9	0.9	Improving/ Meeting target

# Pavement Performance Management

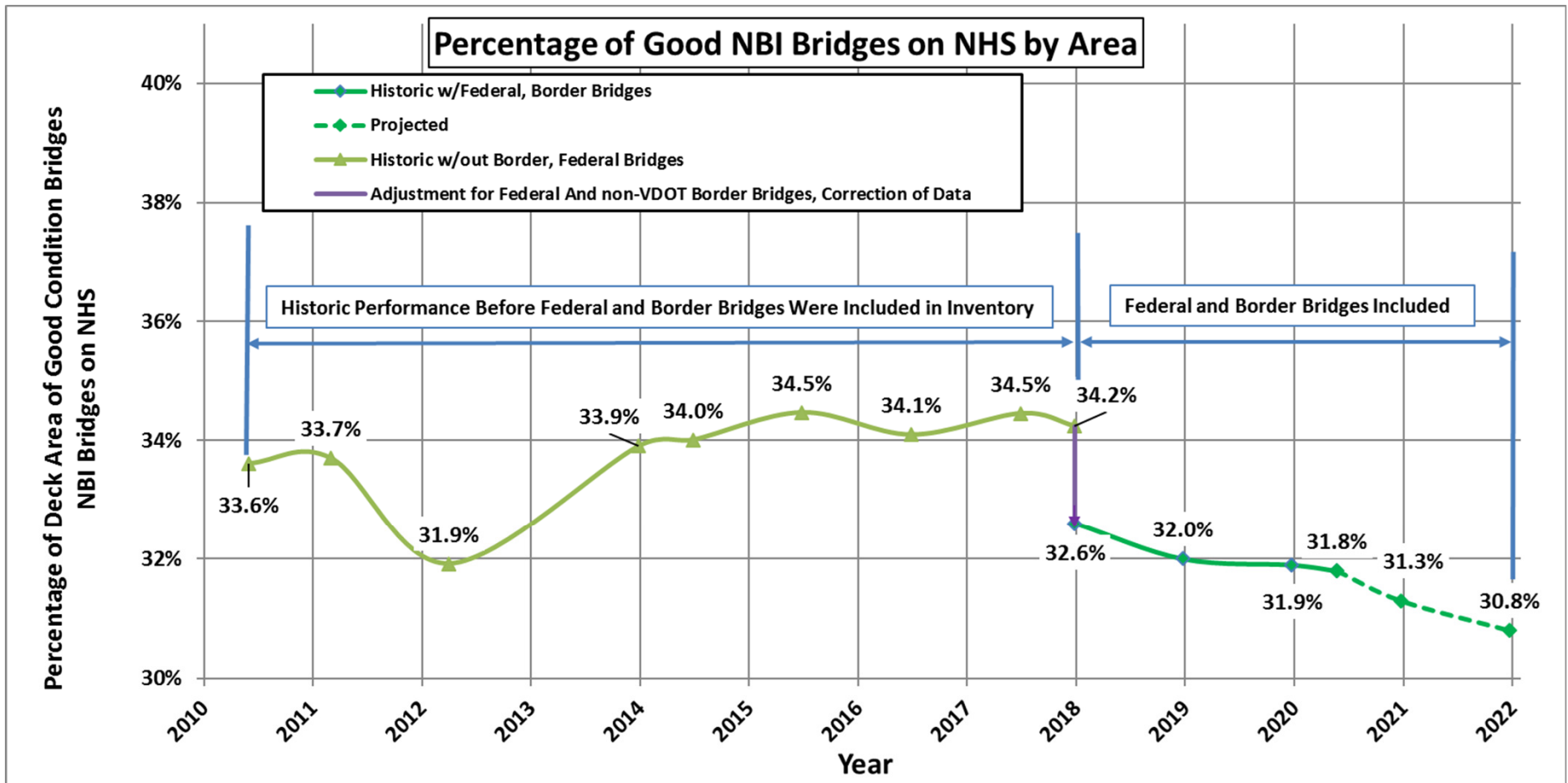
## Discussion on Performance

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- **Based on work conducted through the Comprehensive Review and modified investment strategies it is projected that 4-year targets can be achieved**
- **No change to CTB adopted 4-year targets are proposed**

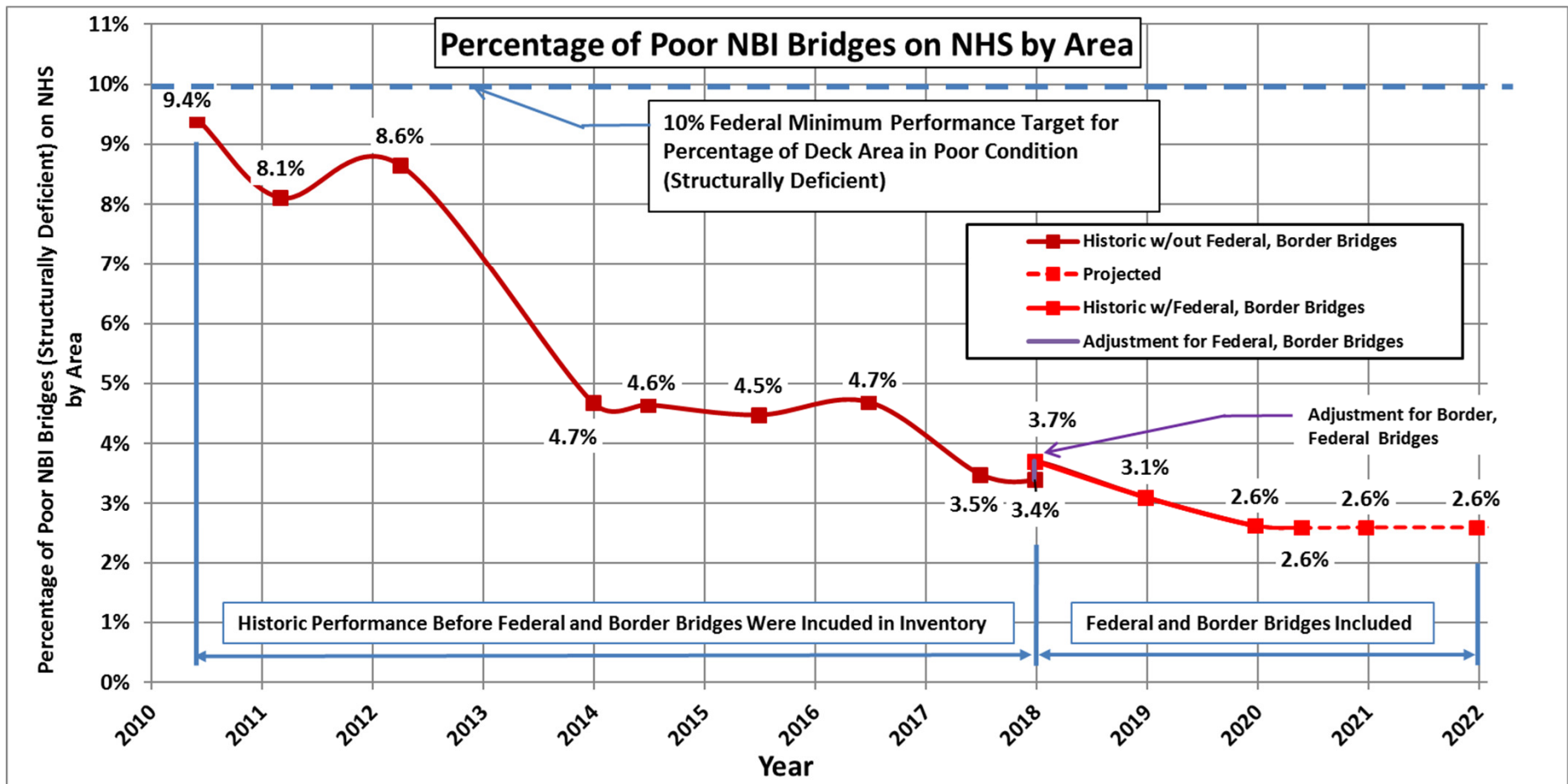
# Bridge Performance Management

## How are we doing?



# Bridge Performance Management

## How are we doing?



# Bridge Performance Management

## How are we Doing?

Measure (Percent)	CTB Adopted Targets (percent)		Performance (percent)*			Trend / Target Achievement
	2-yr	4-yr	2017	2018	2019	
Deck Area of NHS Bridges in Good Condition	33.5	33.0	34.3	32.6	32.0	Declining/ Not Meeting Target
Deck Area of NHS Bridges in Poor Condition	3.5	3.0	3.4	3.7	3.1	Improving/ Meeting Target

\*Performance Year in this table correlates to data that is formalized in the following year. Accordingly, data provided in this chart for a particular year corresponds to the data shown for the following year in the bar charts provided in the previous two slides

# Bridge Performance Management Targets and Anticipated Performance

Bridge Targets and Anticipated Performance			
Performance Measure	Target period	Target	Anticipated Performance
Percentage of Deck Area in Good Condition	2 yr target	33.5%	31.8%
	4 yr target	30.5%*	30.8%
Percentage of Deck Area in Poor (Structurally Deficient) Condition	2 yr target	3.5%	2.6%
	4 yr target	3.0%	2.6%

\* Proposed change to the 4-yr target for percentage of deck area in Good condition.

# Percentage of Deck Area in Good Condition

## Discussion on Performance

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### Reasons for Lower than Anticipated Good Deck Area Performance

- **The 2018 baseline percentage should have been approximately 1.6% lower**
  - Database did not include all border and federally-owned bridges
  - Data inconsistency issue (e.g. bridge width as 4,000' vs. 40')
- **Programmed projects based on the prior established performance measures and reducing the number of Poor bridges**
  - State of Good Repair funding is only available for poor bridges
  - Most replacement bridges since 2018 have been on Non-NHS routes
  - Focused on preservation, restoration, rehabilitation of Fair and Poor bridges

**The target adjustment is recommended to align targets with current best estimate of performance.**

# Percentage of Deck Area in Good Condition

## Discussion on Performance

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### Factors affecting the 4-year percentage of deck area in good condition projections:

- **Funding continues at current levels**
- **On-time completion of several large and P3 projects with new bridges entering the inventory**
  - Construction completion dates in late 2021 so slight acceleration or delay in schedule could affect good deck area
- **Bridge deterioration rates continue at historical trends**



# Asset Condition Performance Management Discussion on Performance

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## Comprehensive Review included several key assumptions

- General decline of “Good” performance to allow for a long term sustainable outcome
- Pavement program requires additional investment
  - 2020 General Assembly passed legislation and Governor signed into law to provide additional funding for pavements and special structures
- No increased funding necessary for the bridge program (excludes special structures)
  - Changes to § 33.2-369. *State of good repair* required for bridge preservation approach
    - Current language limits use of funds for reconstruction and replacement of structurally deficient bridges and reconstruction and rehabilitation of deteriorated pavement on the Interstate and primary systems
    - No changes made in 2020 General Assembly session

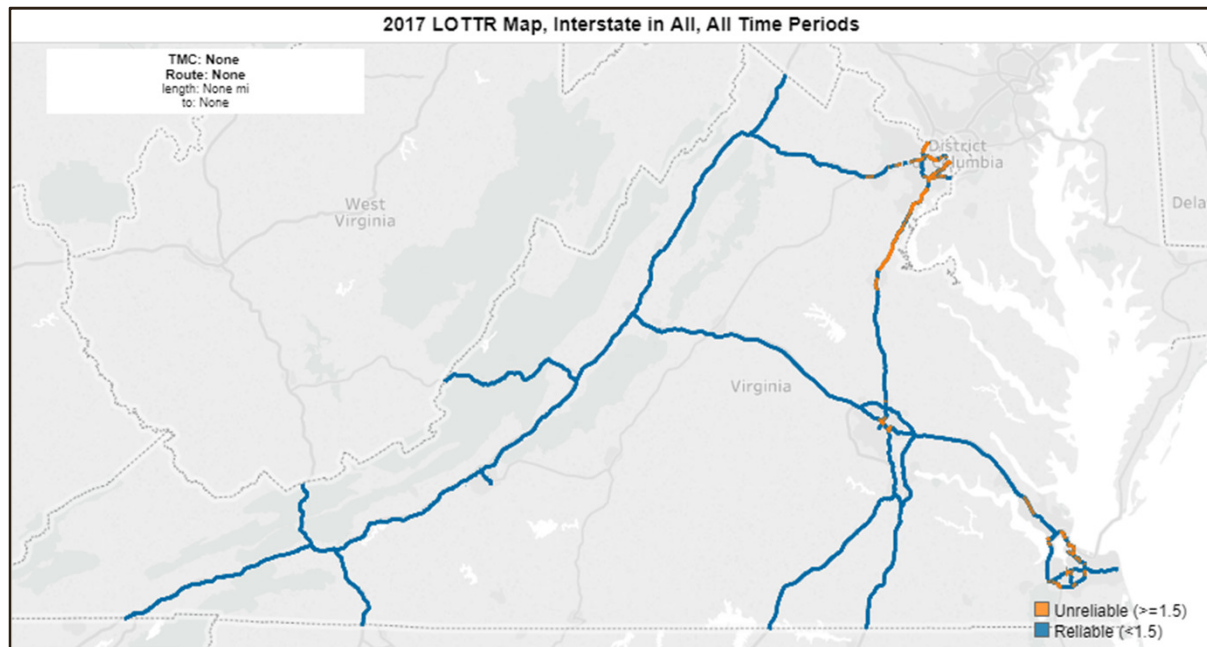
# System Performance Management Performance Measures – Reliability, Congestion and Air Quality

System Performance Measures	Scope
Percentage of Person-Miles Traveled that are Reliable	Interstate
Percentage of Person-Miles Traveled that are Reliable	Non-Interstate NHS
Truck Travel Time Reliability Index	Interstate
Annual Hours of Peak Hour Excessive Delay Per Capita*	NHS
Percentage of Non-SOV Travel*	NHS
Total Emission Reductions for Volatile Organic Compounds (VOC)	CMAQ Projects
Total Emission Reductions for Nitrogen Oxides (NOx)	CMAQ Projects

# System Performance Management Travel Time Reliability - Background Percent Reliable Person Miles Traveled

## Interstate / Non-Interstate NHS Travel Time Reliability Measure:

- Level of Travel Time Reliability (LOTTR): 80<sup>th</sup> % TT/ 50<sup>th</sup> % TT
- A segment is reliable if all time periods are reliable (<1.5)



### Weekdays:

6am - 10am  
10am - 4pm  
4pm - 8pm

### Weekends

6am-8pm

# System Performance Measures

## Travel Time Reliability - Background

### Truck Travel Time Reliability (TTTR) Index

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- **Examines each segment of the Interstate during five time periods**
  - Weekdays 6a to 10a; 10a to 4p; and 4p to 8p
  - Weekends 6a to 8p
  - Overnight (all days) 8p to 6a
- **Objective is to improve reliability for trucking industry in order to predict buffer time needed for “on-time delivery”**
  - Measure looks at the ratio of the truck travel time for the 95<sup>th</sup> % TT to 50<sup>th</sup> % TT
  - utilizes the maximum (worst) TTTR for the 5 time periods for each interstate segment multiplied by the segment length / total length of the interstate

# System Performance Measures

## Travel Time Reliability - Background

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**Measures relate only to the worst time period for a roadway segment**

- **all person miles from a road segment are considered unreliable even if only one of the four time periods is unreliable**
- **utilizes worst truck travel time for each segment from five time periods**
- **time periods may not best represent peak travel conditions**
- **not sensitive to the types of projects, strategies, or policies we want to evaluate**
  - **Improving from 3.2 to 1.7 would still be considered unreliable and not reflective of the improved reliability**

**More time and data are necessary to better understand the measure**

# System Performance Management

## How are we Doing?

Measure	CTB Adopted Targets		Performance			Trend / Target Achievement
	2-yr	4-yr	2017	2018	2019*	
Person-Miles Traveled that are Reliable - Interstate	82.2%	82.0%	82.2%	82.4%	83.5%	Improving/ Meeting Target
Person-Miles Traveled that are Reliable - Non-Interstate NHS**	n/a	82.5%	86.8%	88.0%	88.9%	Improving/ Meeting Target
Truck Travel Time Reliability Index	1.53	1.56	1.48	1.58	1.53	Challenging/ Meeting Target
Annual Hours of Peak Hour Excessive Delay Per Capita***	n/a	26.7	23.0	24.2	23.0	No Change/ Meeting Target
Percentage of Non-SOV Travel***	36.9%	37.2%	36.6%	36.6%	n/a	No Change/ Not Meeting Target

\* Estimated performance

\*\* Source of data is from 2019 OIPI Biennial Report

\*\*\* Northern Virginia only, 2019 Percentage of Non-SOV Travel unavailable until Fall 2020

# System Performance Management Performance Discussion

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- **Percentage Non-SOV Travel performance measure is not meeting targets**
- **No changes are proposed to the CTB adopted 4-year targets for reliability measures and PHED**
- **Data utilized for calculation of reliability measures has been determined to have inconsistencies from year to year**
  - **Inconsistencies in the data and mapping may result in only small changes to the metrics, but these can alter the direction of the trend**
  - **Data quality is improving and variability decreasing**
- **Limited ability to conduct trend analysis**
  - **no historical context**
  - **data availability and variability**

# System Performance Management - Reliability Performance Discussion

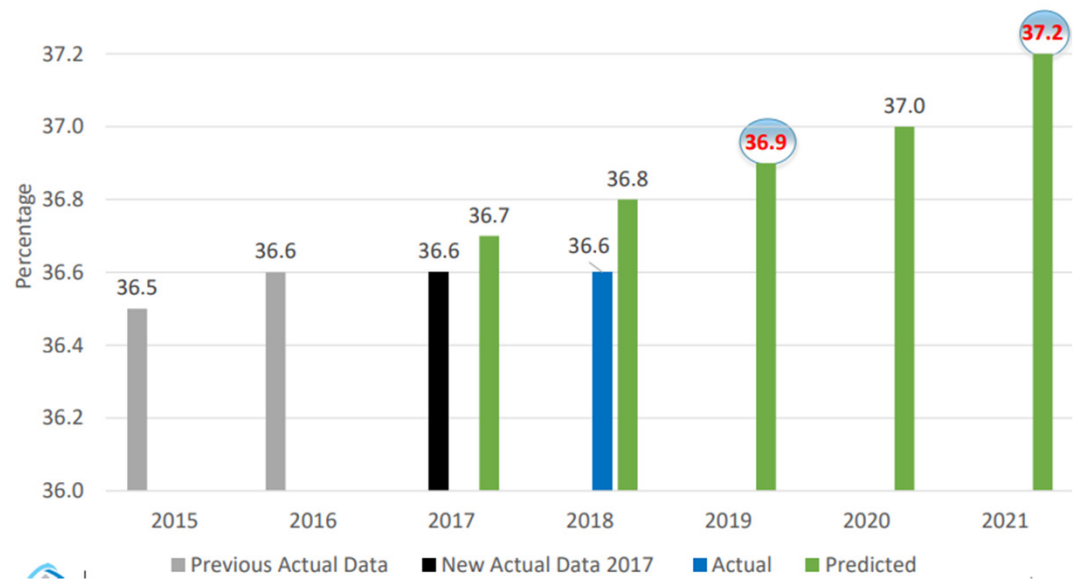
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- **VDOT monitoring and actively managing incidents, workzones and other events to minimize travel time variations.**
- **Research underway to better understand**
  - **causes of unreliable conditions**
  - **investment strategies that can improve reliability**
  - **where performance changed and why**
  - **better predict future performance**
- **Continued work to identify other measures which may be more reflective of desired outcomes**



# System Performance Management - Non-SOV Travel Performance Discussion

- Gas prices have fallen and stayed low, which encourages driving.
- Car ownership is up; particularly for low-income households now having access to at least one vehicle.
- While trends in public transportation ridership appeared to be recovering, ridership had been below projections at WMATA and other transit systems.
- TNC/ride-hailing services have affected transit ridership, these drivers may be adding to SOV travel while in between customers.



# System Performance Management - Air Quality

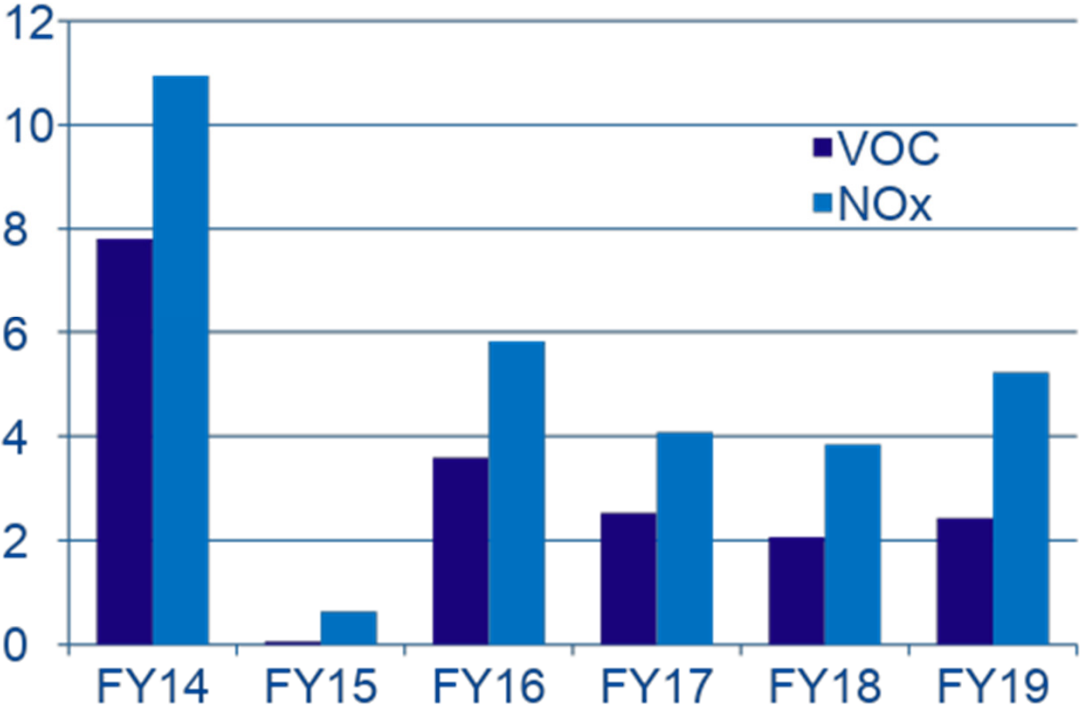
## CMAQ Emissions Reduction Measure

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- **Total Emissions Reduction is the cumulative 2-year and 4-year reported emission reductions for:**
  - **All programmed projects using CMAQ funds**
  - **Applicable criteria for pollutants and or their precursors**
    - Only applies to Northern Virginia (TPB)
    - Applicable Pollutants: volatile organic compounds (VOC) and nitrogen oxides (NOx)
- **Applicable State DOTs and MPOs must coordinate and collectively establish a methodology for developing targets**

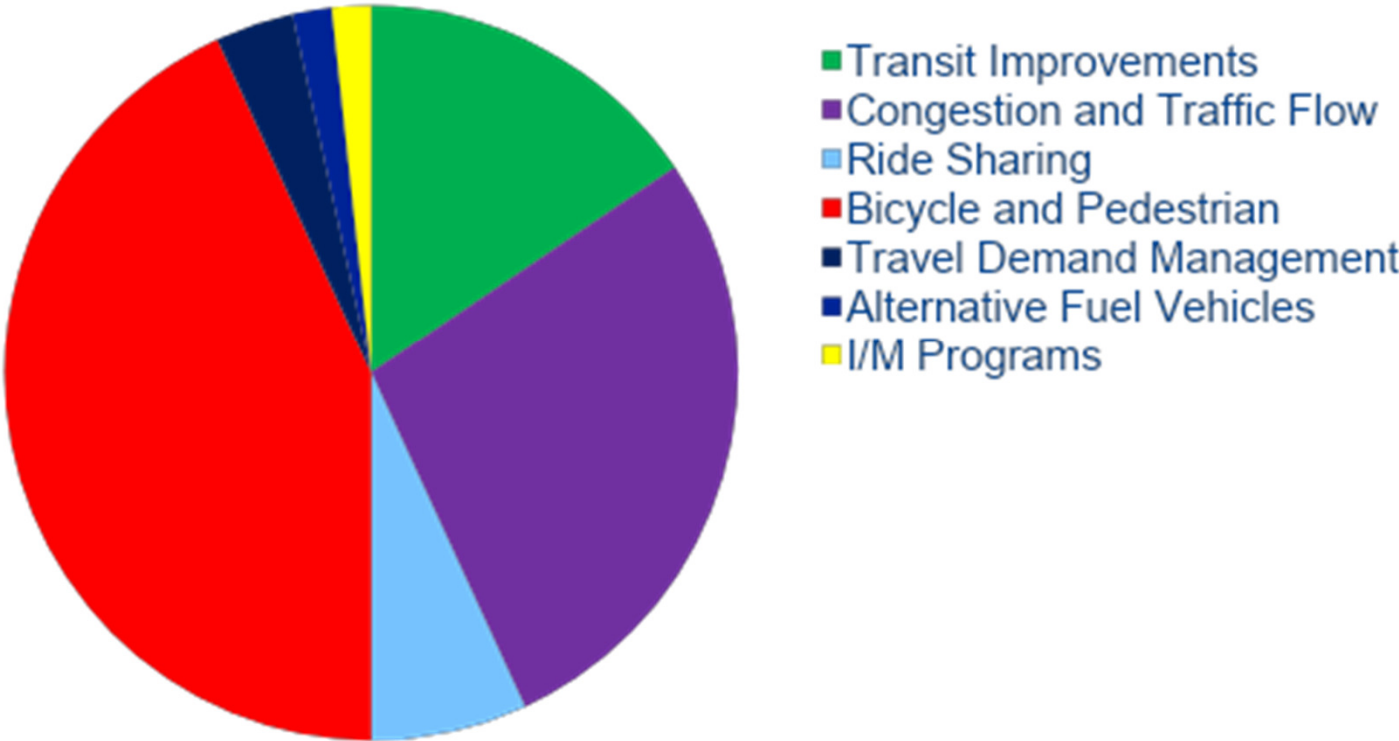
# System Performance Management CMAQ Emissions Reduction How are we Doing?

FY 14-19 Emission Reductions (kg/day)



# System Performance Management CMAQ Emissions Reduction Measure Baseline

FY 14-17 Project Types



# System Performance Management - Air Quality

## How are we Doing?

Measure	CTB Adopted Targets*		Performance				Trend / Target Achievement
	2-yr	4-yr	Baseline* *	2017	2018	2019	
Total Emission Reductions for Volatile Organic Compounds (VOC)	1.721	1.985	3.499	2.532	2.061	2.430	Improving/ Meeting Target
Total Emission Reductions for Nitrogen Oxides (NOx)	3.744	4.230	5.369	4.074	3.843	5.225	Improving/ Meeting Target

\* Based on CMAQ Programmed Projects in Northern Virginia

\*\* Baseline conditions represent average emission reductions for FY 2014-2017

## Next Steps

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- **Provide feedback on proposed target adjustments**
  - Percentage of Deck Area in Good Condition for Bridges
- **Provide update on potential target adjustments**
  - Percentage Non-SOV Travel
- **Adopt changes to targets at the next meeting**
- **Evaluate travel impacts to targets and report back to the CTB, especially as to changes in**
  - meeting adopted targets and
  - affecting performance
- **Evaluate impacts to performance and targets based on implementation of new legislation**



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