PERFORMANCE BASED PLANNING & PROGRAMMING

CMAQ Program Measures:
Draft Targets for 2022–2025

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TPB Technical Committee
May 6, 2022

National Capital Region
Transportation Planning Board

Agenda Item 6

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  - 2018-2021 Targets

  - Performance vs 2018-2021 Targets

  - Draft 2022-2025 Targets

- Next Steps

CMAQ Program Performance Measures

The three CMAQ Program targets are set regionally:

1. Peak Hours of Excessive Delay (PHED)

2. Mode Share (Non-SOV)

3. Emissions Reductions: VOCs and NOx

- TPB staff are coordinating with the State DOTs in developing the 2022-2025 CMAQ Program targets
  - Must be identical targets adopted by the three State DOTs as well as adjoining MPOs (FAMPO, BRTB)
  - Anticipate briefing TPB in May with approval in June
  - Complete draft of two MPO CMAQ Performance Plans in July
    - 2018-2021 Final Report
    - 2022-2025 Baseline Report
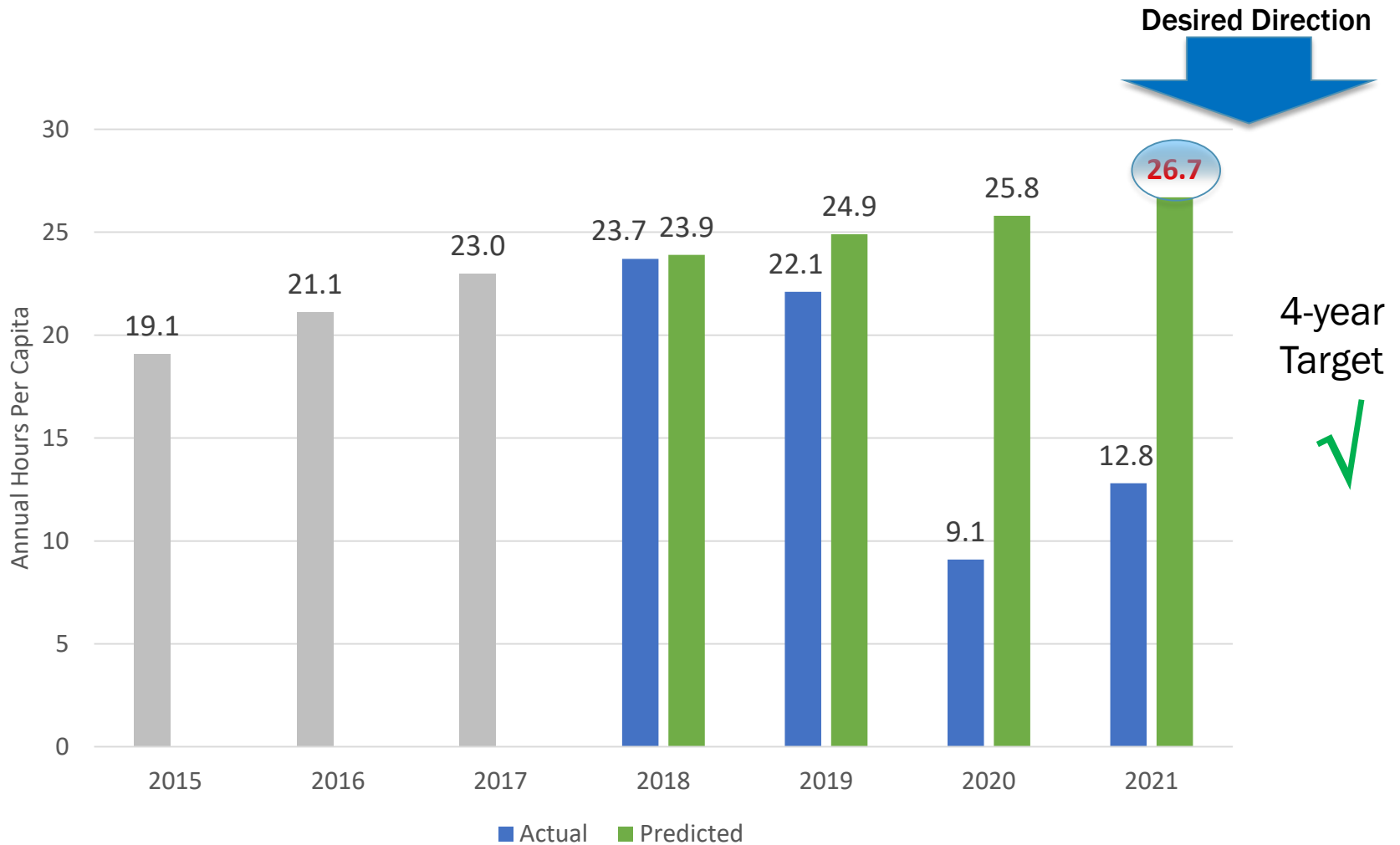
CMAQ Program: Traffic Congestion

	Performance Measures
CMAQ Program: Traffic Congestion	**Peak Hour Excessive Delay (PHED)** – Annual hours of peak hour excessive delay per capita
	Mode Share - Percent of Non-SOV Travel on the National Highway System (NHS)

Performance Measures for the Washington DC-MD-VA urbanized area	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
Peak Hour Excessive Delay (PHED)	Not Required	26.7 Hours
Mode Share (Non-SOV)	36.9%	37.2%

Targets set by the TPB on June 20, 2018

Traffic Congestion: PHED Performance vs. Target

Desired Direction

4-year Target √

Annual Hours Per Capita

- 2015: 19.1
- 2016: 21.1
- 2017: 23.0
- 2018: Actual 23.7, Predicted 23.9
- 2019: Actual 22.1, Predicted 24.9
- 2020: Actual 9.1, Predicted 25.8
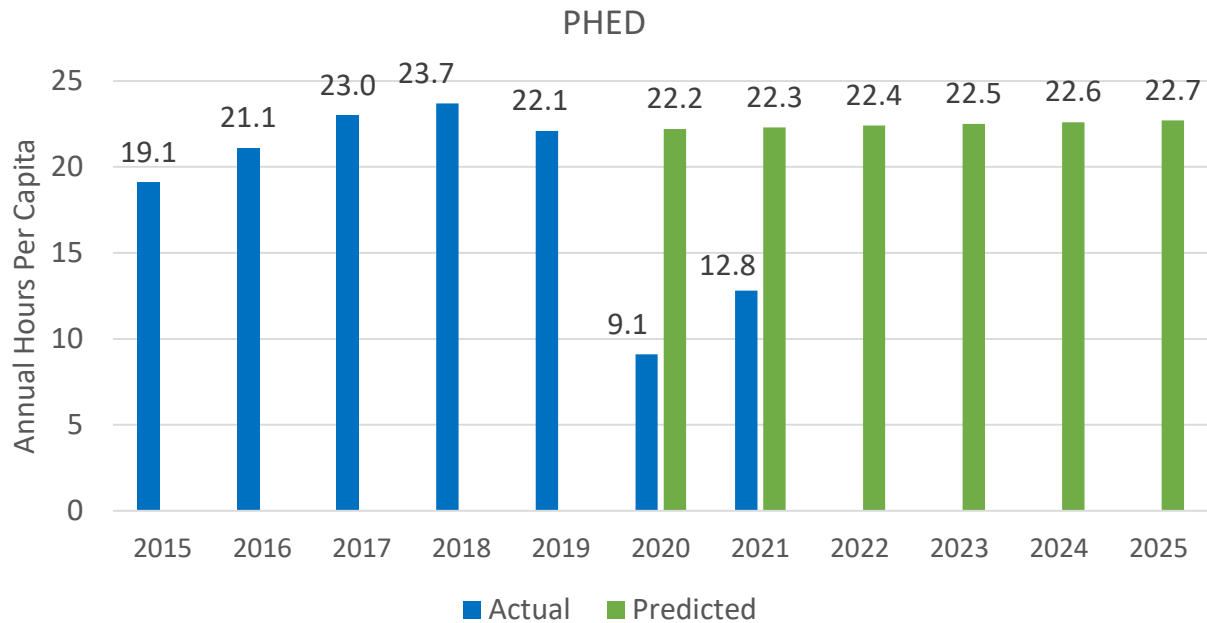- 2021: Actual 12.8, Predicted 26.7

■ Actual ■ Predicted

2022-2025 Draft PHED Target Methodology

- Use same general methodology as used in 2018
  - Average of observed trends and short-term predictions of TPB travel demand model
    - Observed trends captured recent influences
    - Model captures the impacts of increased population and travel demand vs. road and transit changes

  - The impacts of the pandemic on the PHED performance measure is evident
    - Exclude data from pandemic years (2020, 2021)
    - Use trend data for 2016-2019 (four years) and project from 2019

2022-2025 Draft PHED Graph and Target

PHED

Bar chart titled "PHED" showing Annual Hours Per Capita by year. Blue bars (Actual): 2015=19.1, 2016=21.1, 2017=23.0, 2018=23.7, 2019=22.1, 2020=9.1, 2021=12.8. Green bars (Predicted): 2020=22.2, 2021=22.3, 2022=22.4, 2023=22.5, 2024=22.6, 2025=22.7.

DRAFT	CY 2022 – 2023 Two Year Target	CY 2022 – 2025 Four Year Target
Peak Hour Excessive Delay (PHED)	22.5	22.7

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Traffic Congestion: Mode Share (Non-SOV) Performance vs Target
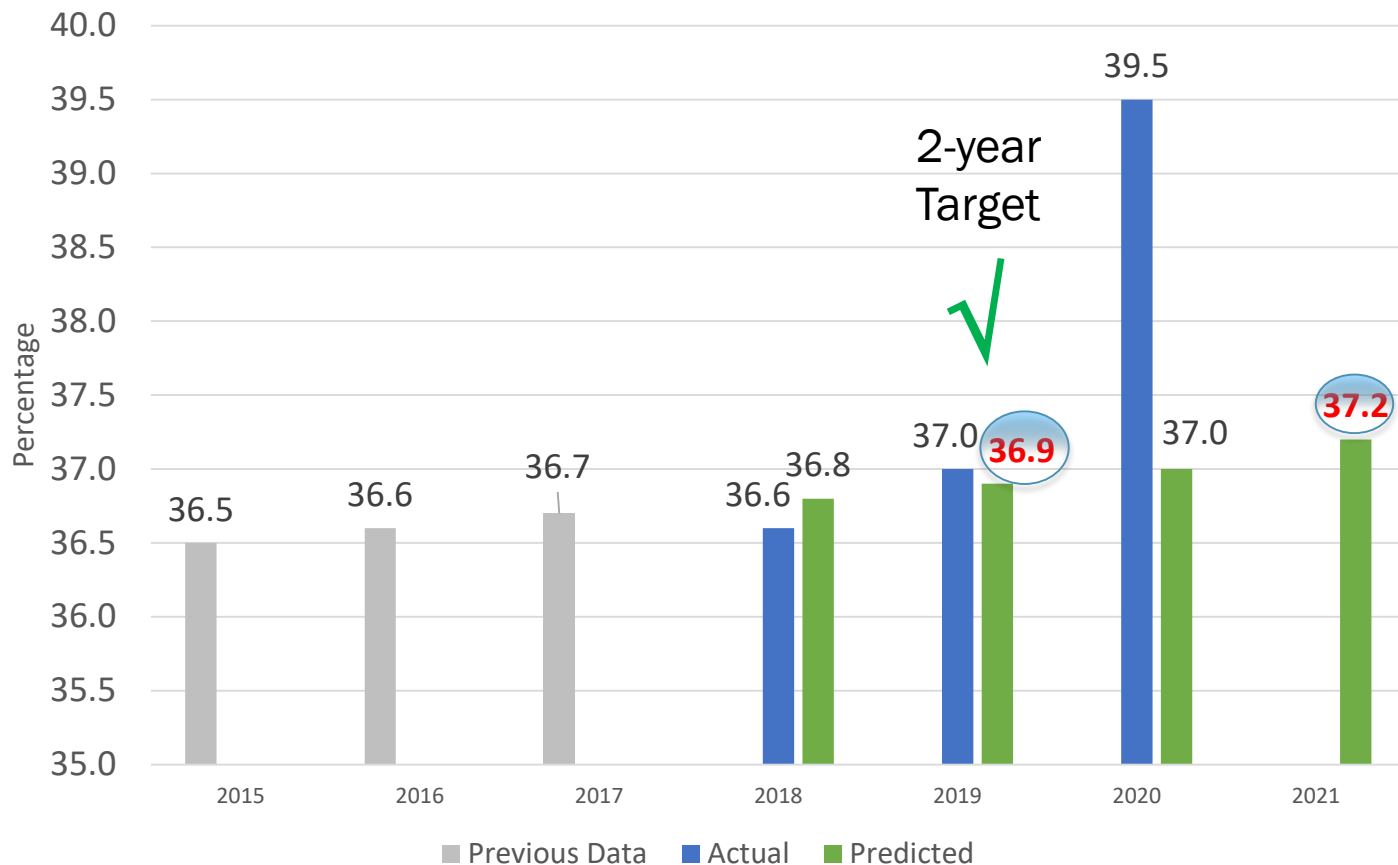
2022-2025 Draft Mode Share Target Methodology

- Recommended methodology:
  - Use only observed trend
    - Uncertainty over impacts of telework and other factors affecting transportation mode choice

  - The impacts of the pandemic on the Mode Share performance measure is evident
    - Exclude data from pandemic year (2020)
      - Note 2021 data not available until early CY 2023
    - Use trend data for 2016-2019 (four years) and project from 2019

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2022-2025 Draft Mode Share Graph and Target
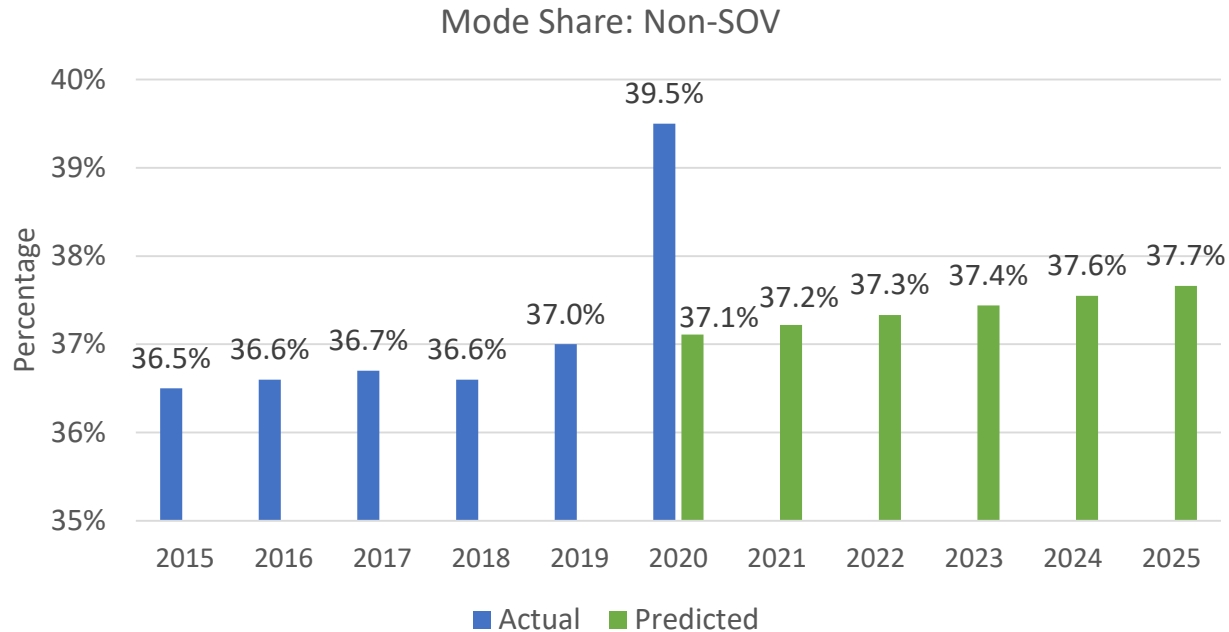
Mode Share: Non-SOV

DRAFT	CY 2022 – 2023 Two Year Target	CY 2022 – 2025 Four Year Target
Mode Share (Non-SOV)	37.4%	37.7%

CMAQ Program: Emissions Reductions

		FFY 2018 – 2019 Two Year Target	FFY 2018 – 2021 Four Year Target
Total Emissions Reductions for the TPB portion of the Washington DC-MD-VA nonattainment area	Volatile Organic Compounds (VOCs)	1.8376 Kg/Day	2.1950 Kg/Day
	Nitrogen Oxides (NOx)	4.0194 Kg/Day	4.7026 Kg/Day

Targets set by the TPB on June 20, 2018

On-road Emissions Reduction - Overview

- Applies to criteria pollutants in non-attainment or maintenance areas[*]

- Emissions reductions data are estimates from projects that have received CMAQ funds

- **Forecast emissions reductions are estimates based on projects anticipated to receive CMAQ funds**

- TPB targets reflect the anticipated cumulative emissions reduction to be reported by MDOT, VDOT, and DDOT for the region
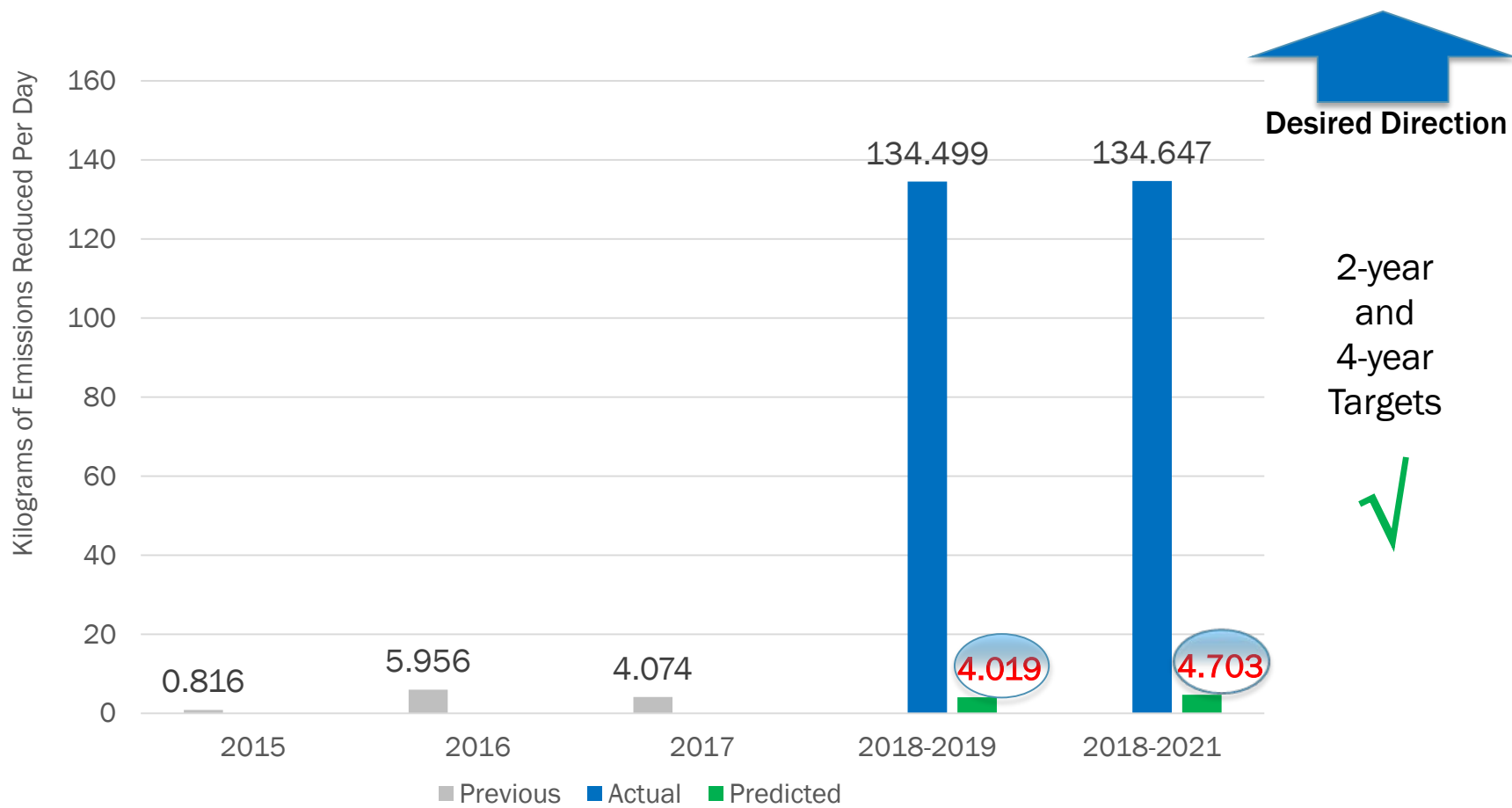
[*] Targets for Calvert County set by Calvert-St Mary's MPO (outside TPB planning area) .

EXHIBIT 1
TPB Transportation Planning Areas

Washington, Carroll, Frederick, Hartford, Baltimore, Jefferson West Virginia, Howard, Montgomery, Clarke, Anne Arundel, Loudoun, Fairfax, DC, Fauquier, Prince George's, Prince William, Calvert, Stafford, Charles, King George, St. Mary's

TPB Model Area
TPB Planning Area
8-Hour Ozone Nonattainment Area
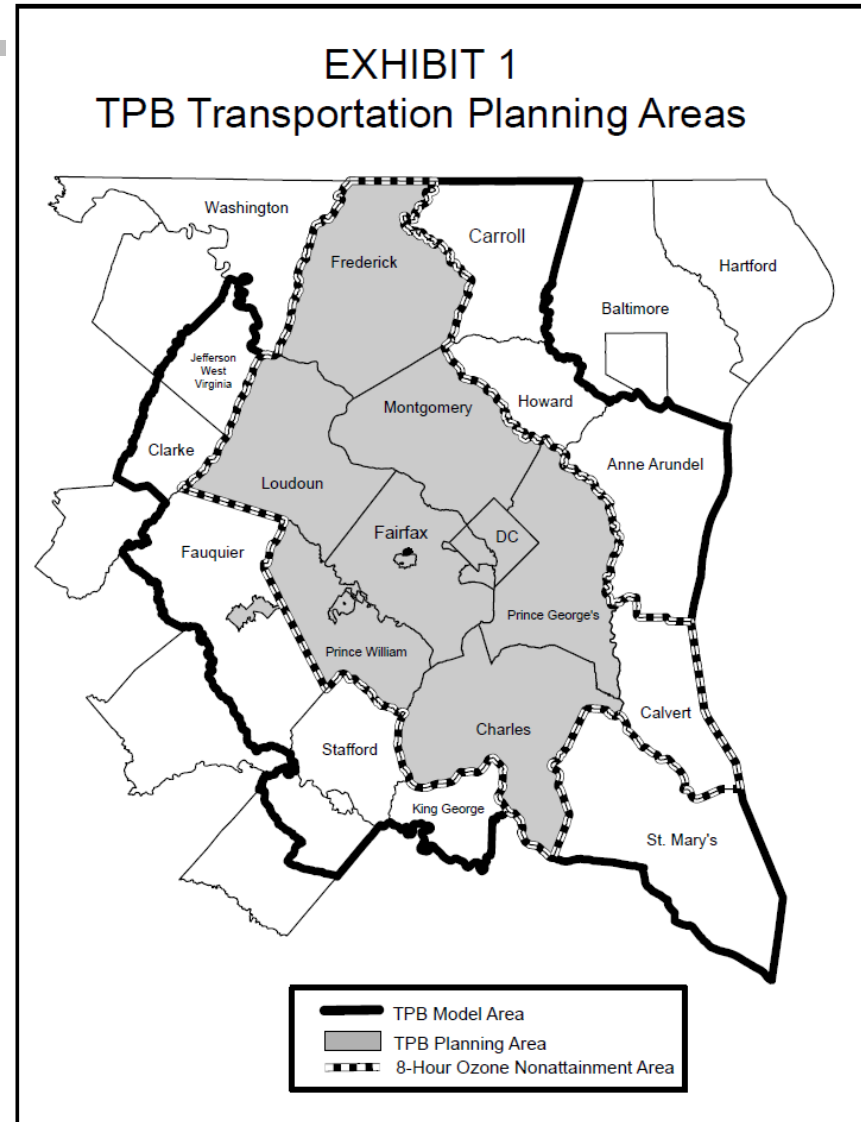
Emissions Reduction (VOC): Performance vs. Targets

Chart: Kilograms of Emissions Reduced Per Day

- 2015: 0.072 (Previous)
- 2016: 3.672 (Previous)
- 2017: 2.532 (Previous)
- 2018-2019: 23.607 (Actual), 1.838 (Predicted)
- 2018-2021: 23.689 (Actual), 2.195 (Predicted)

Legend: Previous, Actual, Predicted

Desired Direction

2-year and 4-year Targets √
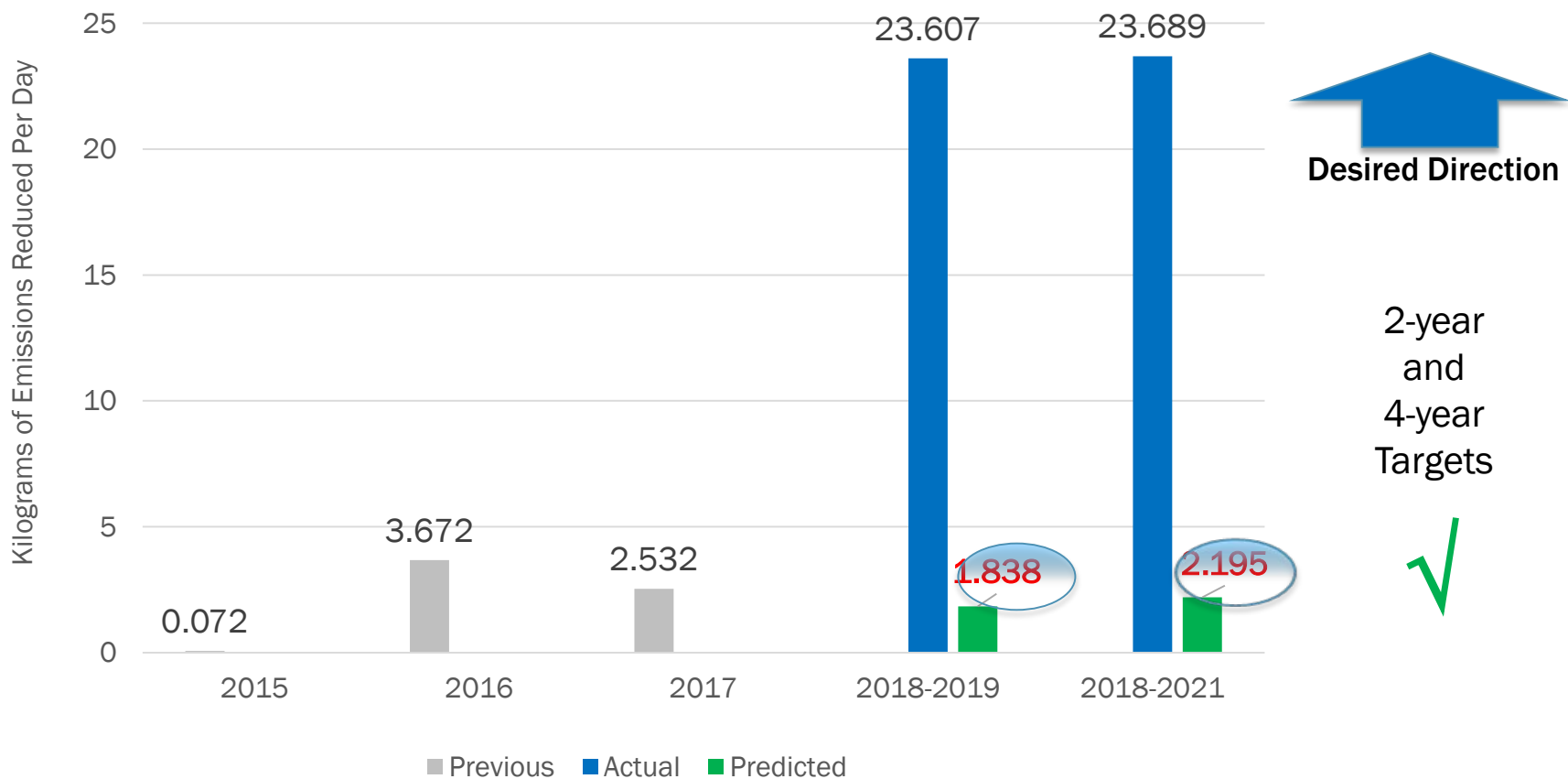
Emissions Reduction (NOx): Performance vs. Targets

Kilograms of Emissions Reduced Per Day

Desired Direction

2-year and 4-year Targets √

Year	Value
2015	0.816
2016	5.956
2017	4.074
2018-2019	134.499 / 4.019
2018-2021	134.647 / 4.703

■ Previous   ■ Actual   ■ Predicted

Observations on CMAQ: Emissions Reduction Performance

- Forecasting / target development based on past trends of CMAQ projects and their quantitatively estimated emissions reductions

- The impact of project selection with emissions reductions quantitative calculations now a major consideration is evident. Targets were vastly exceeded:
  - A single project in MD (SHA Adaptive "Smart" Signal Systemization) accounted for 80% of the reduced emissions

2022-2025 Draft Emissions Reduction Targets

Factors in 2022-2025 CMAQ Emission Reduction forecasting and target-setting

- Northern Virginia CMAQ Projects already selected through 2026
    - Not all have quantitative emissions calculated at this time
- Maryland and DC CMAQ projects still in development

Pending new information, preliminary draft targets would be based on average annual quantitative emissions reductions for 2018-2022 (excluding SHA Smart Signals project)

Draft	FFY 2022 – 2023 Two Year Target	FFY 2022 – 2025 Four Year Target
Volatile Organic Compounds (VOCs)	7.840 Kg/Day	15.680 Kg/Day
Nitrogen Oxides (NOx)	13.312 Kg/Day	26.624 Kg/Day

Next Steps

- Likely that draft targets will undergo refinement changes over next month!
  - Update information as received
  - Collect any comments on (current) draft targets
  - Present final recommended targets in June, along with report
- TPB is scheduled to adopt the CMAQ traffic congestion and emissions reductions targets at the June 15 meeting
- TPB staff complete the MPO CMAQ Performance Plans and submit to State DOTs by September
- State DOTs submit targets and MPO Performance Plans to FHWA by October 1, 2022

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PHED and Mode Share: Adjacent MPO Agreement

TPB needs to approve Baltimore UZA targets

BRTB and FAMPO need to approve Washington UZA targets

MPO
- NCRTPB
- BRTB
- FAMPO
- HEPMPO
- C-SMMPO
- WinFred
- DVRPC
- WILMAPCO
- FCMPO

Urbanized Area
- Washington, DC--VA--MD
- Frederick, MD
- Waldorf, MD
- Baltimore, MD
- Westminster--Eldersburg, MD
- Aberdeen--Bel Air South--Bel Air North, MD
- Fredericksburg, VA
- Hagerstown, MD--WV--PA
- Lexington Park--California--Chesapeake Ranch Estates, MD
- Winchester, VA
- Philadelphia, PA--NJ--DE--MD
- Chambersburg, PA

PHED: Background & Data

- The PHED measure

    - The cumulative hours of excessive delay (travel speed less than 20 miles per hour or 60% of the posted speed limit) experienced by all people traveling through all reporting segments during peak hours in the applicable urbanized area for the full reporting calendar year.

- Peak travel hours are defined as:

    - Weekday morning peak: 6 a.m. to 10 a.m., and;

    - Weekday afternoon peak: **EITHER** 3 p.m. to 7 p.m.* **OR** 4 p.m. to 8 p.m.

        - DOTs and TPB Staff selected the 3 p.m. to 7 p.m. peak hour timeframe

- Data was collected using NPMRDS and MAP-21 widgets created by RITIS

PHED: Data Source - NPMRDS Widget

PHED: 2018 Forecasting and Target Methodology

- Staff identified two basic methods that could be used for forecasting future performance
    1. Extrapolation – Extend current data using a trend line (straight or best fit curve)
    2. TDM Output – Apply the rate of change of a relevant indicator from the TPB Travel Demand Model
- A third approach is to combine or average the two:
    3. Averaging - of Extrapolation and TDM Output Methods

- Staff used **Method #3 – Averaging** to forecast performance and set targets
    - Extrapolation captures recent trends
    - Travel Demand Model captures longer-term predictions based on model factors: population growth, projects completed
    - Combining the two captures short- and long-term indicators

Mode Share: Background, Data & 2018 Methodology

- Measurement of Non-SOV (Non-Single Occupied Vehicle) travel in specific urbanized areas

- Non-SOV travel includes carpooling, using public transit, walking, biking, and teleworking

- Source of data collection:

  - The American Community Survey (ACS), 5-year average, Table DP03

- In 2018, staff applied the same methodology as for the PHED measure to forecast performance and set targets: averaging trends and a travel demand model indicator

Emissions Reductions: Background, Data & 2018 Methodology

- Measure: Total Emissions Reduction

  - Total emissions reduction is calculated by summing 2-and 4-year totals of emissions reductions of applicable criteria pollutant and precursor, in kilograms per day, for all projects funded with CMAQ funds

  - Volatile Organic Compounds (VOCs) and Nitrogen Oxide (NOx)

- Calculation: Cumulative emissions reduction for CMAQ funded projects in federal fiscal years FY 2018-2019 (2-year) and FY 2018-2021 (4-year)

- Targets reflected the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System (PAS)

Emissions Reductions: Data

- CMAQ PAS is a national database containing CMAQ projects emissions reduction benefits

- State DOTs are required to provide FY data by the following March 1

- Data can be summarized by State or MPO area

- Projects are not required to have a quantitative benefit analysis

- Projects with a quantitative analysis list the project's benefits in the first year only

- No required method for conducting quantitative analyses, though there are federal guidebooks