PERFORMANCE BASED PLANNING & PROGRAMMING

CMAQ System Performance Measures: Traffic Congestion and Emissions Reduction

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TPB Technical Committee
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Agenda Item 3

National Capital Region
Transportation Planning Board

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- CMAQ Program: Emissions Reduction
  - Overview of the Measure
  - Requirements
  - Data
  - Methodologies for forecasting targets
  - Targets
- Board Action adopting targets in in June

System Performance: CMAQ Program
(Congestion Mitigation and Air Quality)

	Performance Measures
CMAQ Program: Traffic Congestion	(5) **Peak Hour Excessive Delay (PHED)** – Annual hours of peak hour excessive delay per capita
	(6) **Mode Share** - Percent of Non-SOV Travel on the NHS
CMAQ Program: Emissions Reduction	(7) **Emissions** - CMAQ-funded projects on-road mobile source total emission reductions for each applicable criteria pollutant and precursor

CMAQ Program: PHED & Mode Share (Non-SOV)

- Traffic Congestion measures (PHED, Non-SOV) apply to the urbanized area (UZA)
  - State DOTs and MPOs must coordinate on and collectively establish a single, unified 2-year and 4-year target for each applicable UZA
    - Only a 4-year target for PHED and for UZAs >1 million people are required this first four-year performance period
  - State DOTs must establish targets for both measures by May 20, 2018 and report targets by October 1, 2018
  - MPOs must establish targets within 180 days after State DOTs
- State DOTs must submit a baseline report for the first performance period (2018-2021) to FHWA by October 1, 2018, and must include 2- and 4-year targets and a description of the data collection method used

Roadmap for Setting Targets

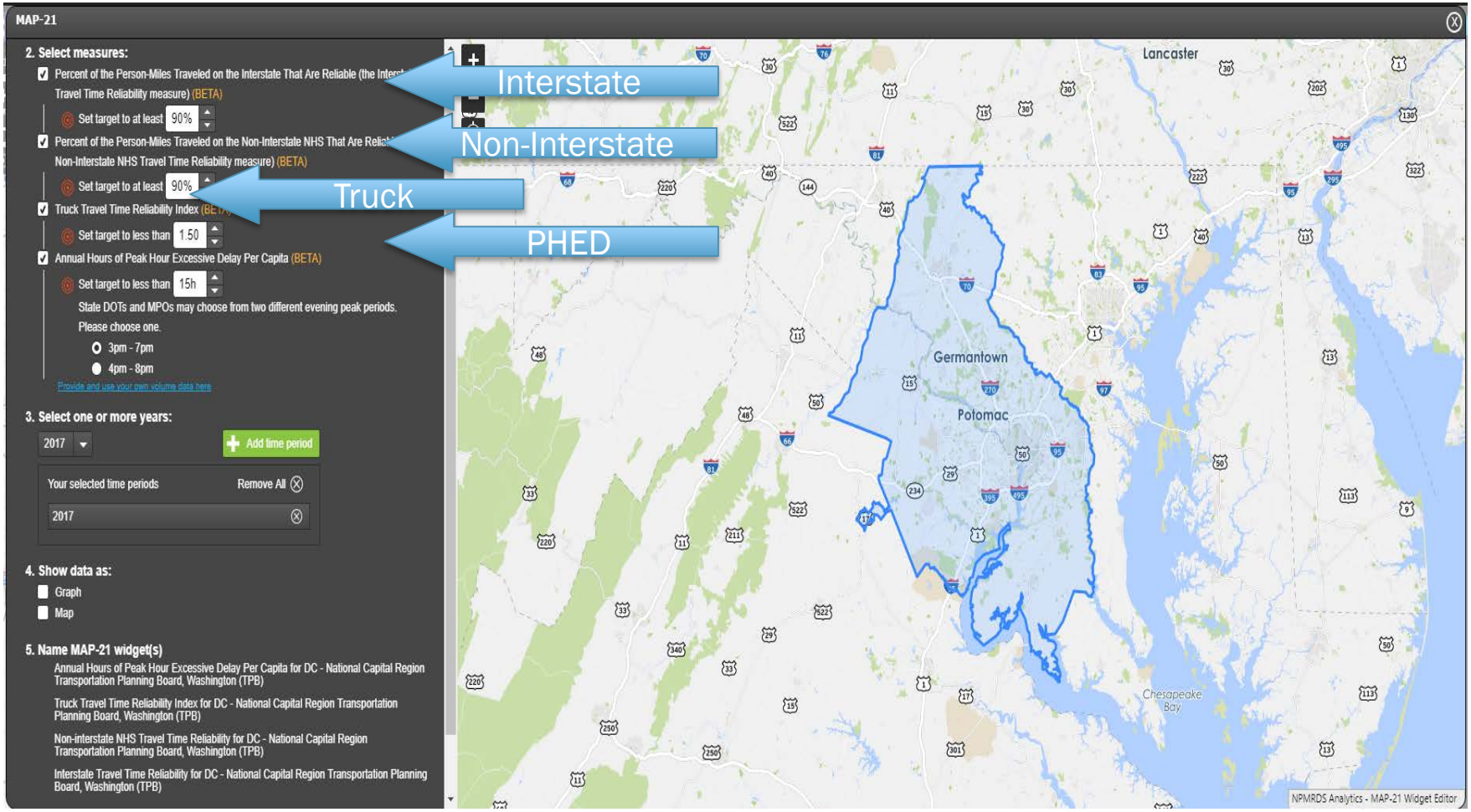
- Step One: Background and Data Collection
- Step Two: Forecasting the Target
- Step Three: The Target
- Step Four (UZA only): Approval of Adjacent MPO Targets

PHED Step One: 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.
- Data was collected using NPMRDS and MAP-21 widgets created by RITIS

*TPB Staff selected the 3 p.m. to 7 p.m. peak hour timeframe.

PHED Step One: Background & Data



PHED Step One: Background & Data

	2014	2015	2016	2017
Peak Hours of Excessive Delay (PHED) for the Washington DC-MD-VA Urbanized Area	13.9	14.1	15.4	16.5

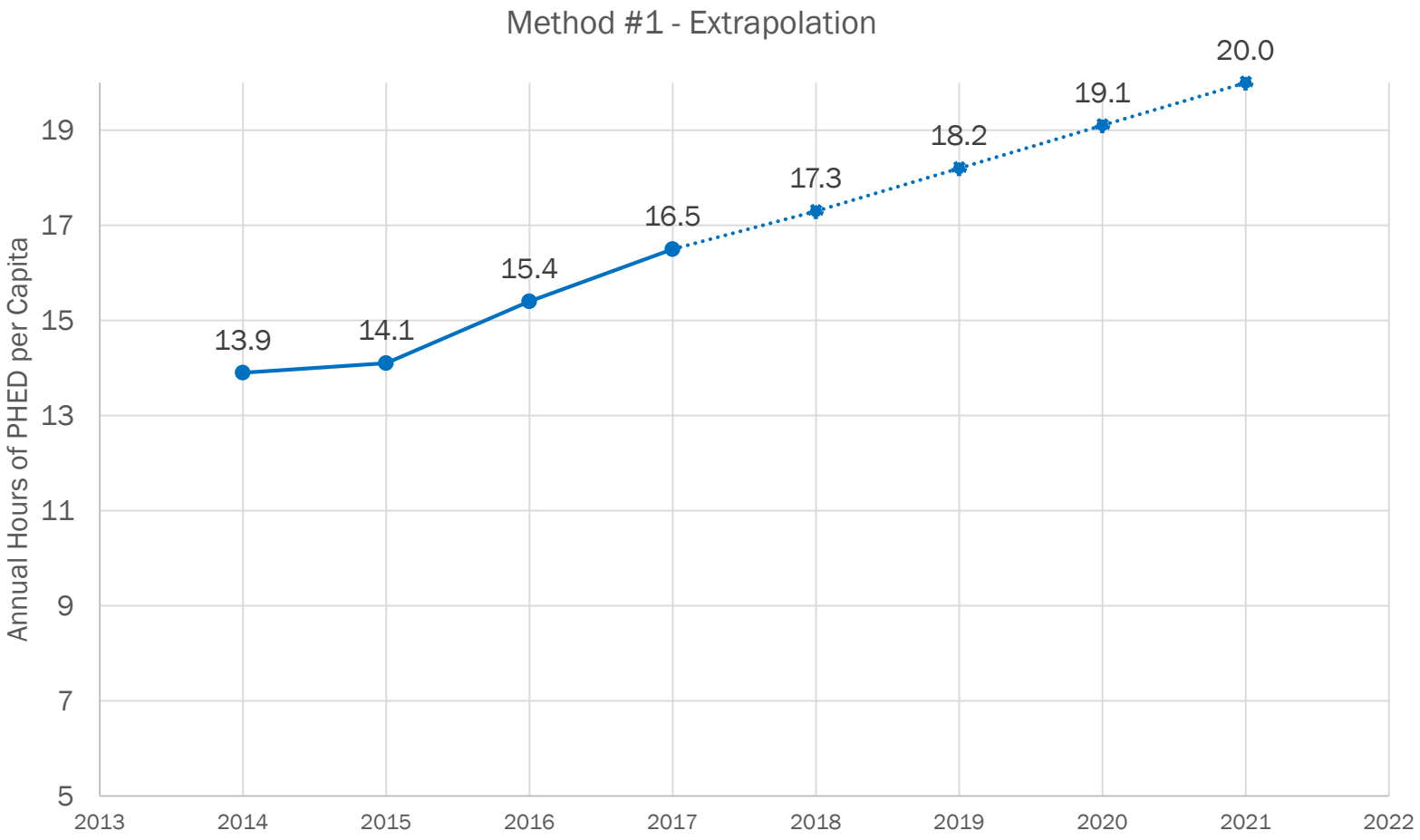
- Annual hours of peak hour excessive delay per capita for the AM Peak (6 AM – 10 AM)and PM Peak (3 PM – 7 PM) periods

PHED Step Two: Forecasting the Target

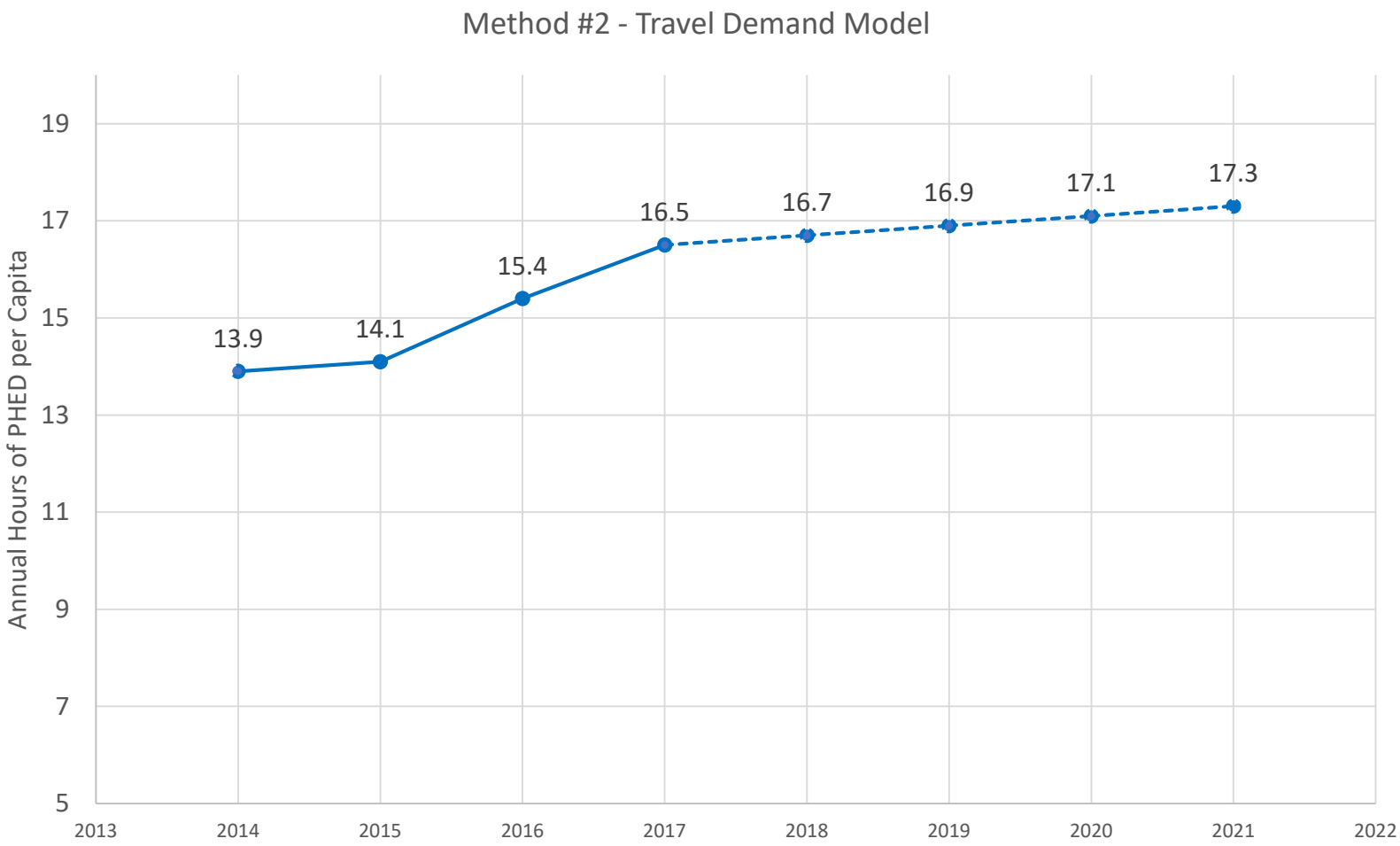
- Staff identified two basic methods that could be used for forecasting future performance
  1. Extrapolation – Extend current data using a trend line (straight or best fit curve)
  2. TDM Output – Apply the rate of change of a relevant indicator from the TPB Travel Demand Model
- A third approach is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

- Staff recommends using **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

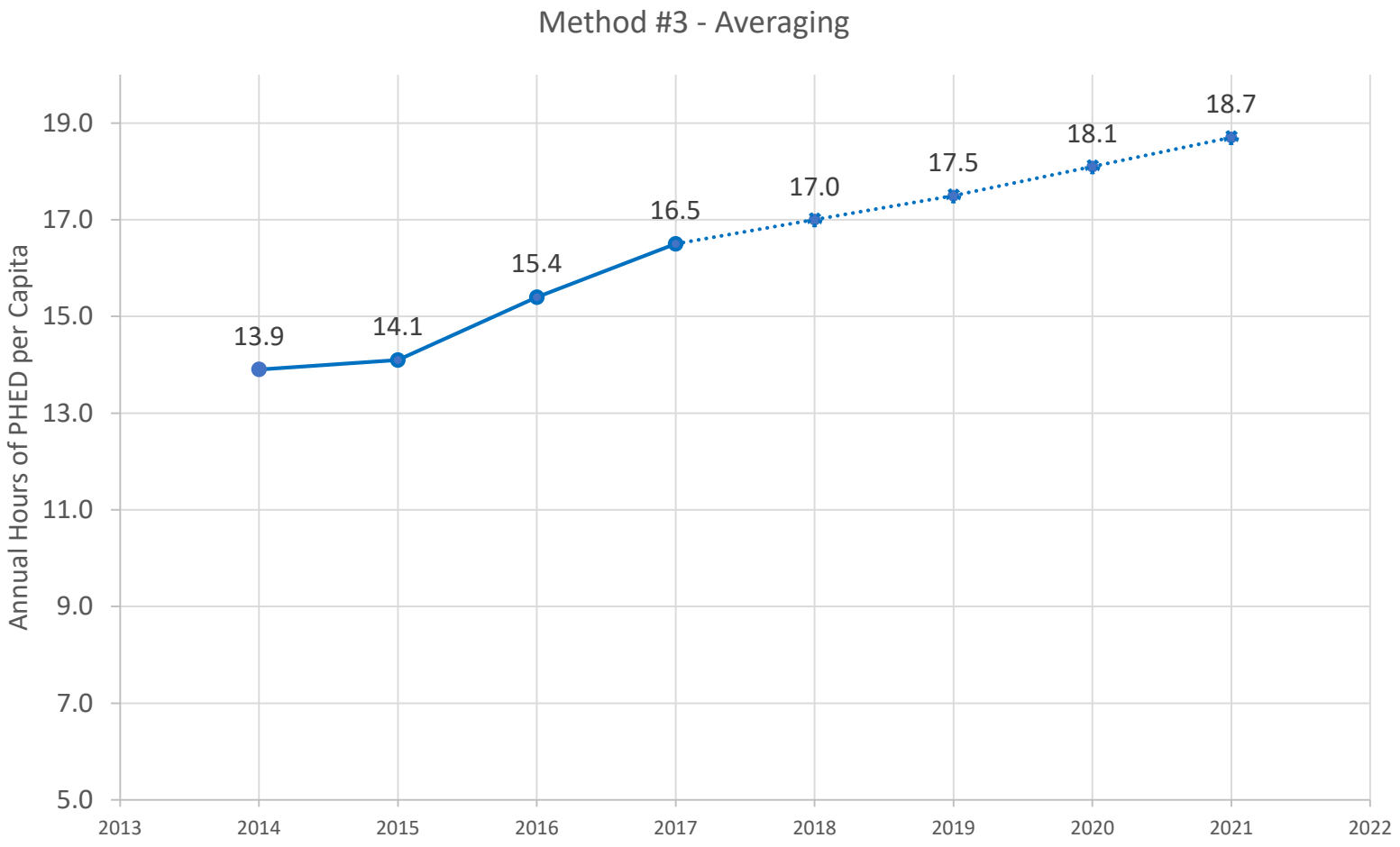
PHED Step Two: Forecasting the Target



PHED Step Two: Forecasting the Target



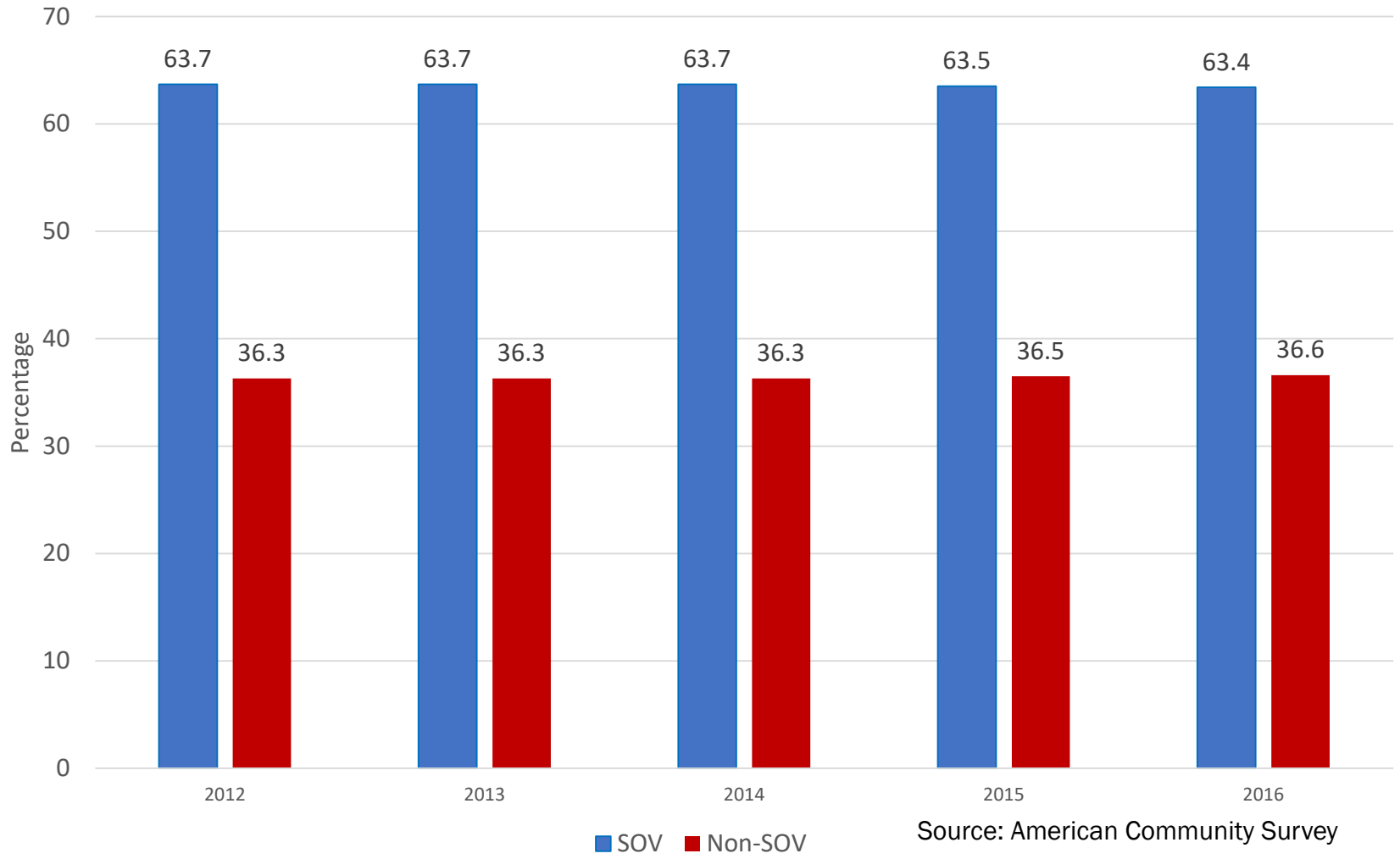
PHED Step Two: Forecasting the Target



Mode Share Step One: Background & Data

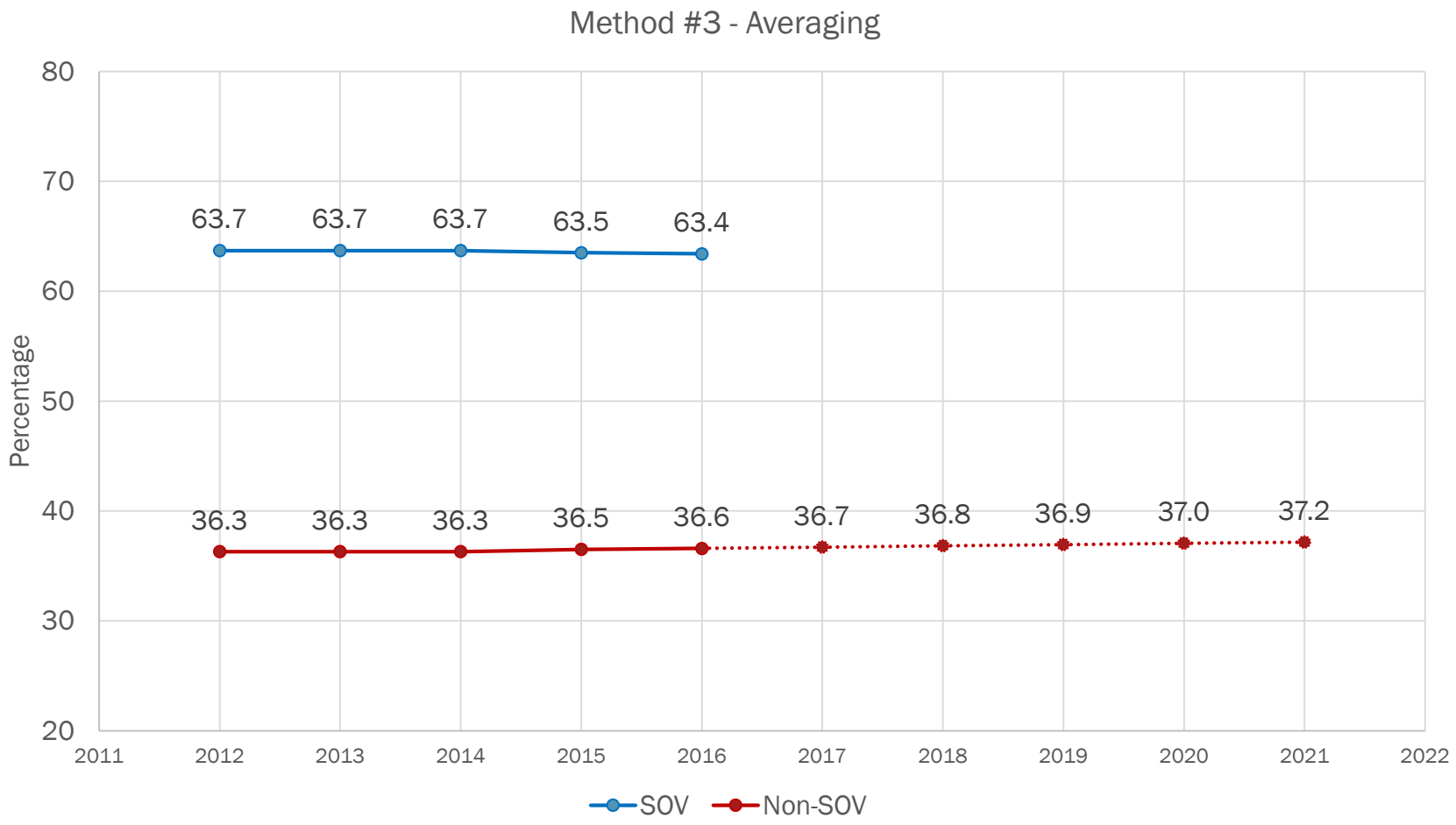
- Measurement of Non-SOV (Non-Single Occupied Vehicle) travel in specific urbanized areas
- Non-SOV travel includes carpooling, using public transit, walking, biking, and teleworking
- Source of data collection:
  - The American Community Survey (ACS)

Mode Share Step One: Background & Data



Source: American Community Survey

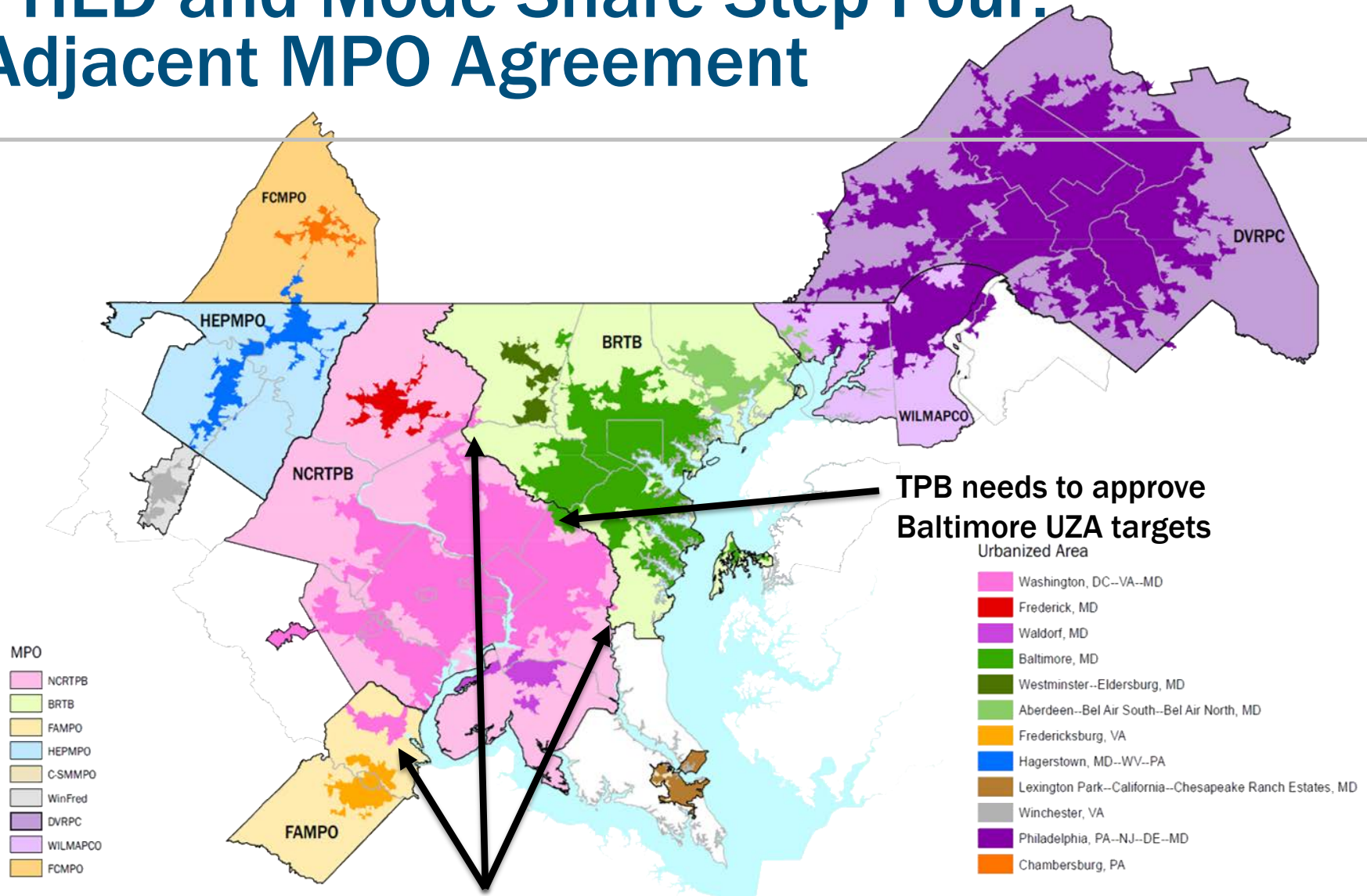
Mode Share Step Two: Forecasting the Target



PHED and Mode Share Step Three: Targets

Performance Measure	CY 2018 – 2019 Two Year Target	CY 2018 – 2021 Four Year Target
Peak Hour Excessive Delay (PHED)	~~Not Required~~	18.7 hours
Mode Share (Non-SOV)	36.9 %	37.2 %

PHED and Mode Share Step Four: Adjacent MPO Agreement



System Performance: CMAQ Program
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	Performance Measures
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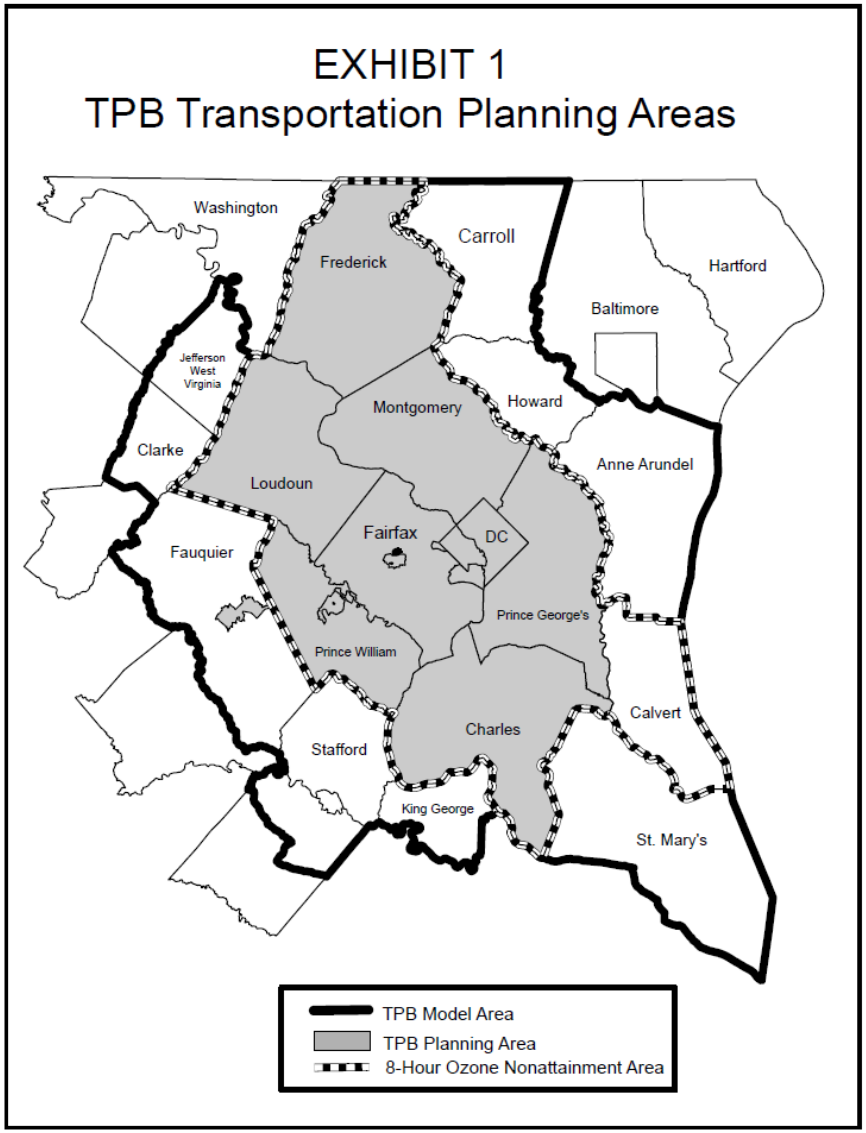
CMAQ Program: Emissions Reduction	(7) **Emissions Reduction** - CMAQ-funded projects on-road mobile source total emissions reduction for each applicable criteria pollutant and precursor

Emissions Reduction Step One: Background & Data

- CMAQ Emissions Reduction measure applies to non-attainment or maintenance areas.
  - Applicable State DOTs and MPOs (serving a TMA with a population over 1 million) must coordinate on and collectively establish a methodology for developing 2-year and 4-year targets for each applicable pollutant and precursor for all non-attainment or maintenance areas
  - State DOTs must develop targets with the coordination from MPOs by May 20, 2018
  - MPOs must establish targets within 180 days after State DOTs
- A baseline report from the DOTs for the first performance period (2018-2021) is due October 1, 2018, and must include baseline data for CMAQ projects from FY2014-2017, 2- and 4-year targets, and a description of the data collection method used

Emissions Reduction Step One: Background & Data

- Ozone precursors Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx) are the only pollutants for which the region needs to report on CMAQ Program Emissions Reduction
- Calvert County is inside the Washington DC-MD-VA nonattainment area, but outside TPB's planning area
    - Responsibility handled by Calvert-St Mary's MPO (C-SMMPO) and MDOT



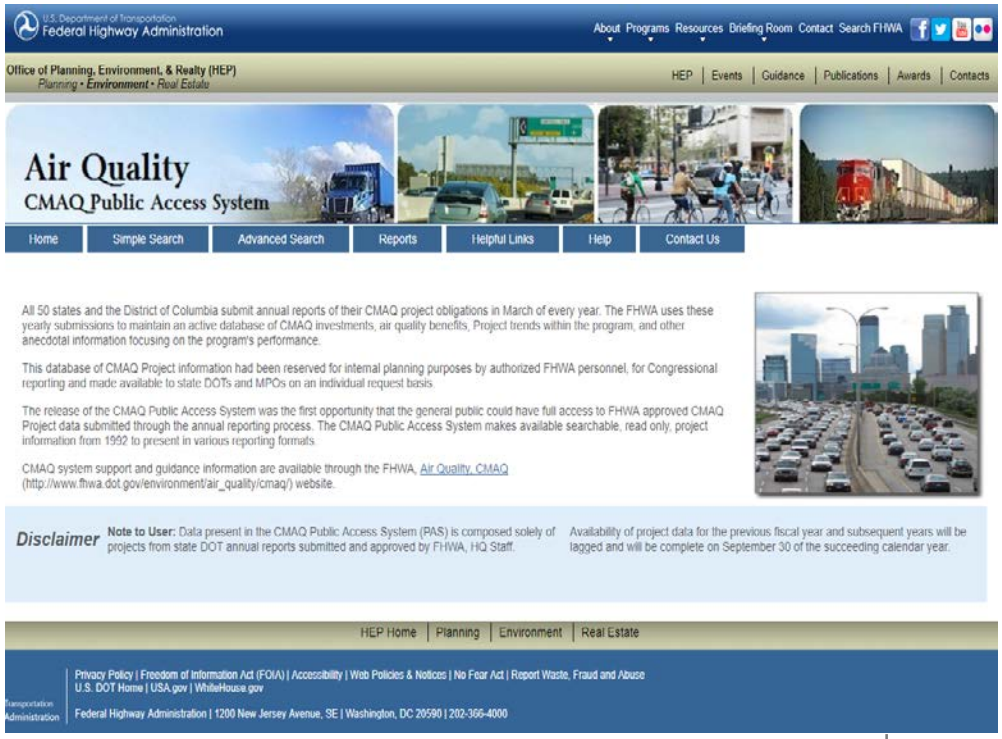
Emissions Reduction Step One: Background & Data

- 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 will reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System (PAS).

Emissions Reduction Step One: Background & 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 quantitative analysis list the project's benefits in the first year only
- No required nor consistent method for conducting quantitative analyses



Emissions Reduction Step One: Background & Data

CMAQ Emissions Reduction from the Public Access System for the TPB portion of the Washington DC-MD-VA Ozone nonattainment area

FISCAL YEAR	VOC (kg/day)	NOx (kg/day)
2014	8.087	11.688
2015	0.072	0.816
2016	3.672	5.956
2017	2.532	4.074

Emissions Reduction Step Two: Forecasting the Target

MDOT: Combined approach of historic trends and anticipated CMAQ projects programmed over the next four years

VDOT: Anticipated CMAQ projects programmed over the next four years

DDOT: Anticipated CMAQ projects programmed over the next four years

TPB staff recommendation:

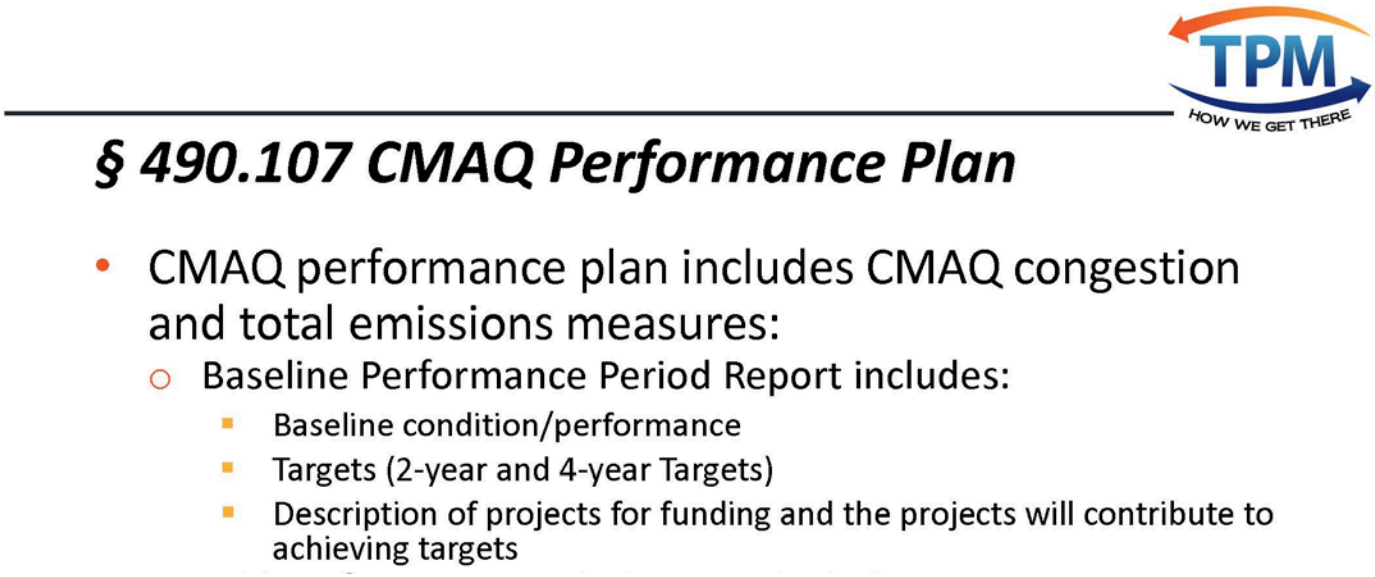
Summation of MDOT, VDOT, and DDOT targets

Emissions Reduction Step Three: Targets

		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)	.1166 Kg/Day	.2100 Kg/Day
	Nitrogen Oxides (NOx)	.2754 Kg/Day	.4726 Kg/Day

VDOT data still pending

MPO CMAQ Performance Plan



Awaiting FHWA guidance for developing CMAQ Performance Plans

Next Steps

- Get final State DOT data and concurrence on targets
- Brief TPB on draft targets at May 16 meeting
- TPB adopts targets at June 20 meeting
- Work with BRTB and FAMPO with the approval of their UZA targets
- Approve BRTB and FAMPO UZA targets at Steering Committee
- TPB staff completes MPO CMAQ Performance Plan with MPO targets and transmits to State DOTs in September
- State DOTs submit State targets and MPO Performance Plan to Feds by October 1, 2018.

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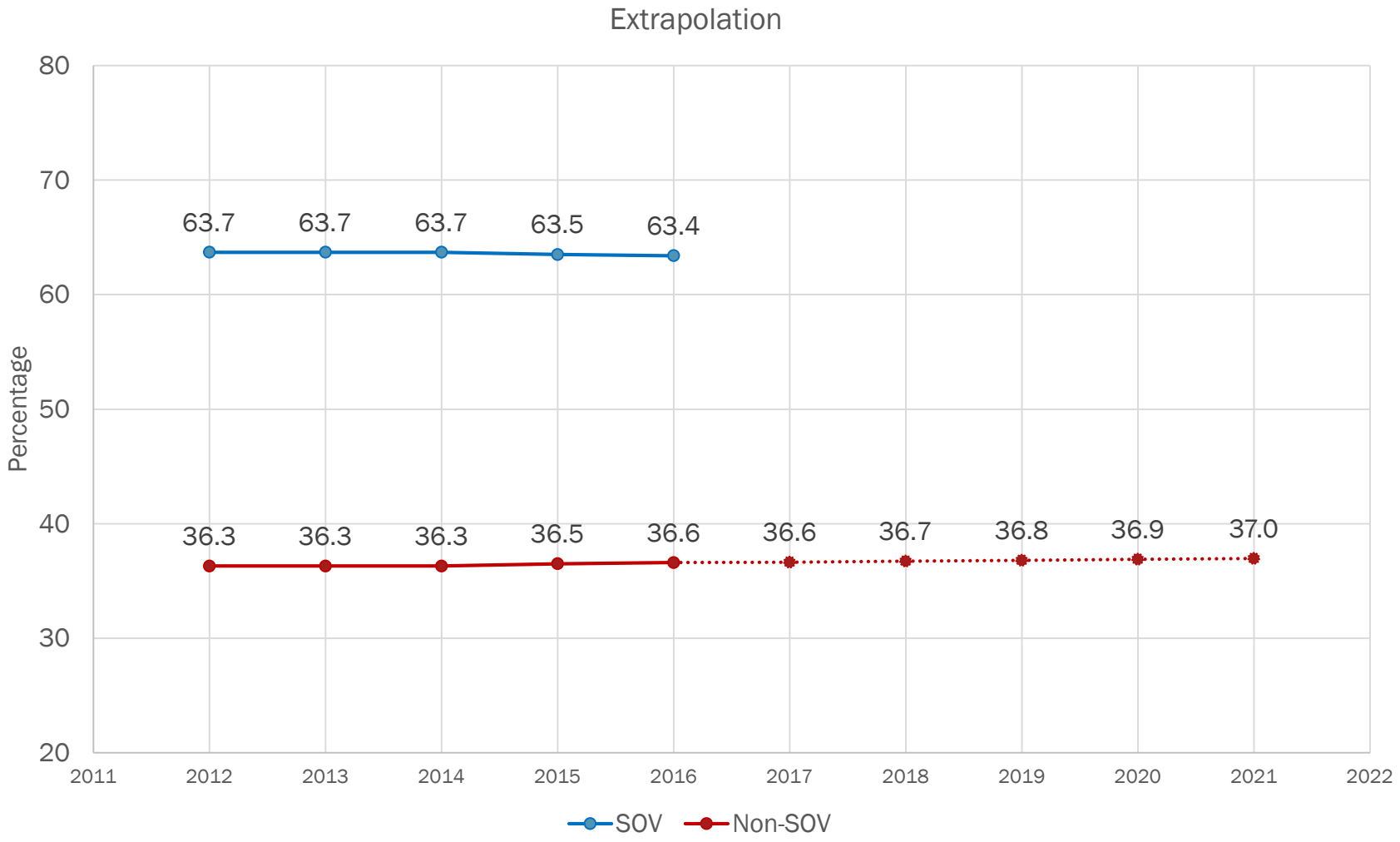
Mode Share Step Two: Forecasting the Target



Mode Share Step Two: Forecasting the Target