

# Transportation Performance Management Webinar Series

## Traffic Congestion and Emissions Reductions Target Setting

Sponsored by the TPM Pooled Fund  
with Support from AASHTO CPBM Leadership and FHWA



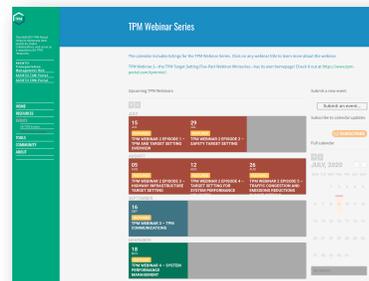
August 26, 2020

TPM Target Setting Miniseries Webinar 5

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# Transportation Performance Management Webinar Series

- Our regular webinar series is held every two months, on topics such as communications, system performance management, data sources, and many more to come!
- Today is the final episode of a special, 5-part Target Setting Webinar Miniseries
- We welcome ideas for future webinar topics and presentations
- Use the webinar Q&A panel during the webinar
  - Submit questions for today's presenters
  - Submit ideas for future webinar topics



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## Welcome

The TPM Pooled Fund, the AASHTO Committee on Performance Based Management, and FHWA are pleased to sponsor this webinar series!

- Sharing knowledge is a critical component of advancing performance management practice



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## Webinar Agenda

- 2:00 Welcome and Introduction and TPM Pooled Fund Overview**  
Christos Xenophontos (Rhode Island DOT), Matt Hardy (AASHTO) and Hyun-A Park (Spy Pond Partners, LLC)
- 2:10 FHWA Perspective on Target Setting for Traffic Congestion and Emissions Reductions Measures**  
Nelson Hoffman and Karen Perritt (FHWA)
- 2:25 Regional Transportation Commission of Southern Nevada: Target Setting for Traffic Congestion and Emissions Reductions**  
Brian Hoeft (Southern Nevada RTC)
- 2:45 Georgia DOT's Approach to Target Setting for Traffic Congestion and Emissions Reductions**  
Habte Kassa (Georgia DOT)
- 3:05 NYC Urbanized Area Congestion Performance Measure Targets**  
Keith Miller (NJTPA)
- 3:25 Q&A and Wrap Up**

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## FHWA Introduction and Overview

Nelson Hoffman, FHWA Transportation Performance Management Team

Karen Perritt, FHWA Office of Natural Environment

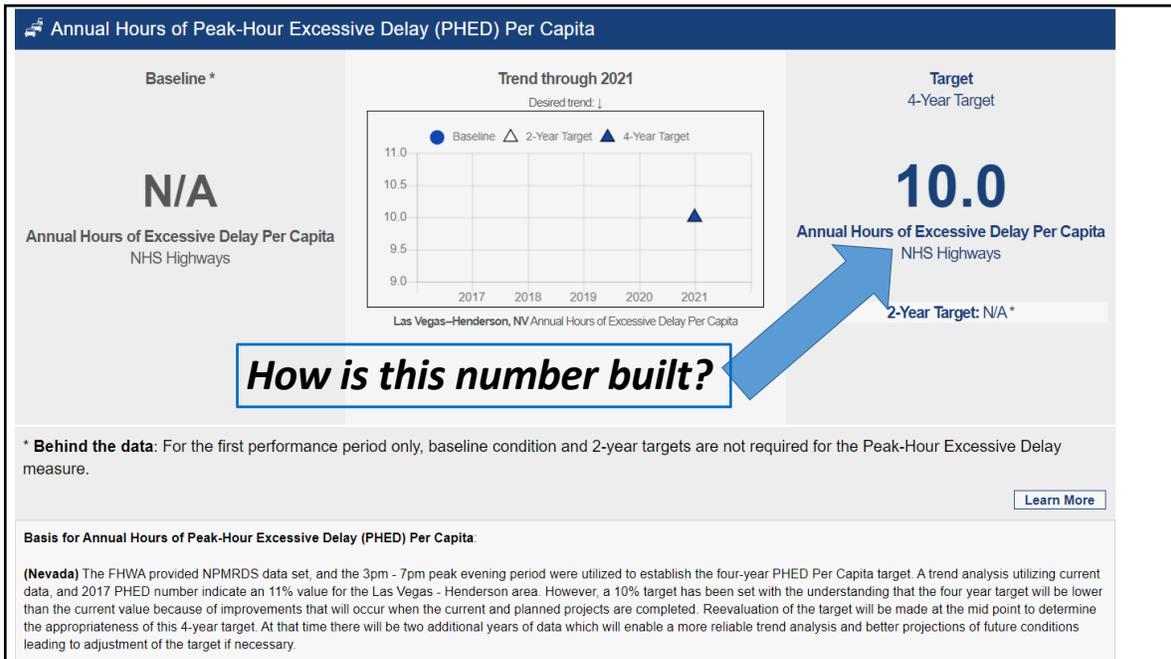




## Accountability

- State DOTs and MPOs work together to set data-informed targets. They are accountable for managing performance to make progress toward the targets they set.
- Collaboration--among FHWA, State DOTs, MPOs, and other stakeholders--is a key to managing performance and making progress toward target achievement.

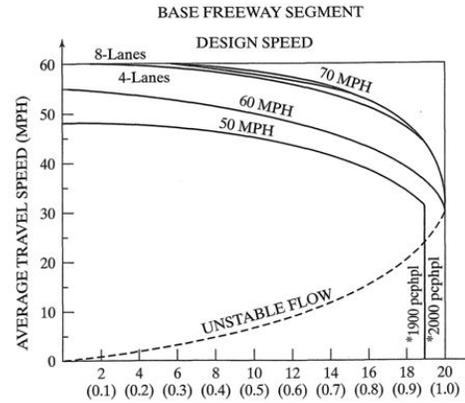
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## Opening Discussion

- Air Quality and Travel Demand Model Components
- What goes into Model capacity, speed, and speed-flow relationships?
- Convert volume and speed forecasts into emissions



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Ways to Travel

About

Projects & Initiatives

Traffic Cams

News

### Improvement Program



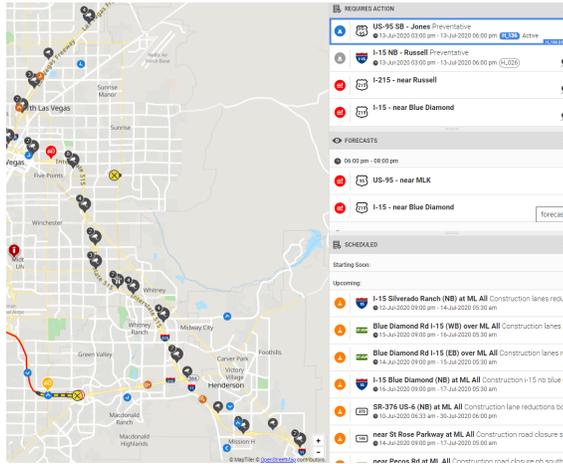
## Air Quality Conformity

The US Environmental Protection Agency (EPA) sets air quality standards, known as National Ambient Air Quality Standards (NAAQS). Areas where monitoring shows that these standards are not met are said to be in “non-attainment”. Within Clark County, the Las Vegas Valley has been designated as a non-attainment area for carbon monoxide (CO) and for particulate matter less than 10 microns in diameter (PM10). PM10 is more commonly known as dust. A larger area, comprising about 60 percent of Clark County, is in non-attainment for ozone.

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## Remaining Slides: Examples of Exciting New Types of Data

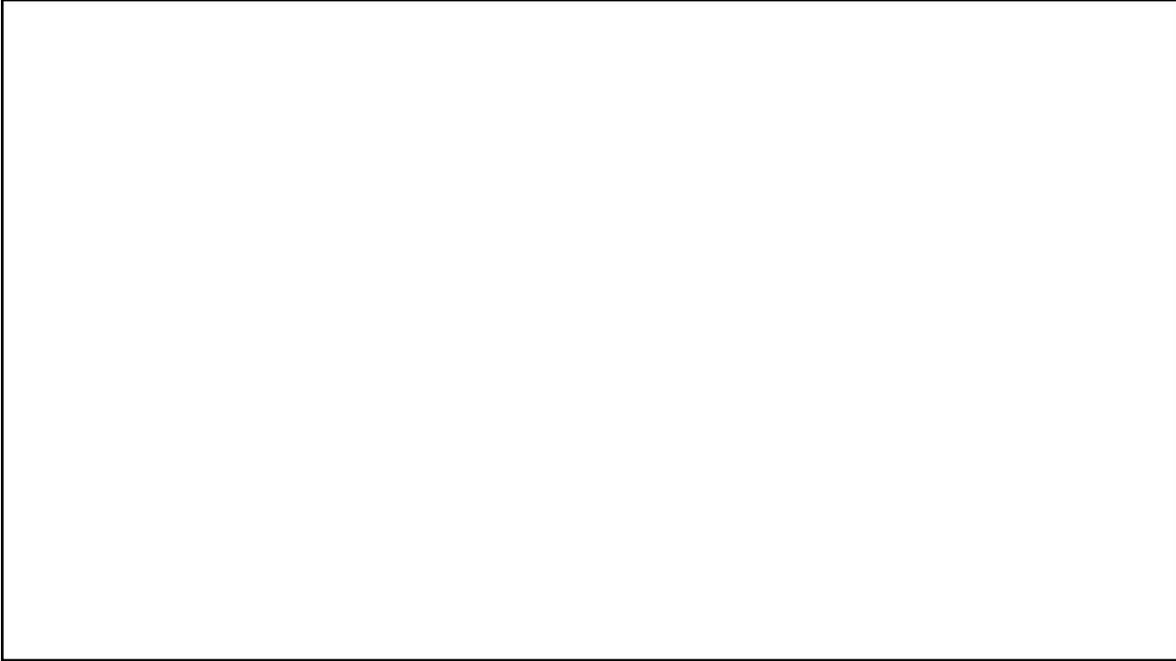
- Freeway
  - Traffic Management Center
  - Active Traffic management
  - Strategic Traffic Monitoring Sites
  - Data Samples
- Signalized Arterials
  - GPS data
  - DSRC and C-V2X
  - Work zones
  - In-Vehicle Signal Data
  - Transit Data and Performance



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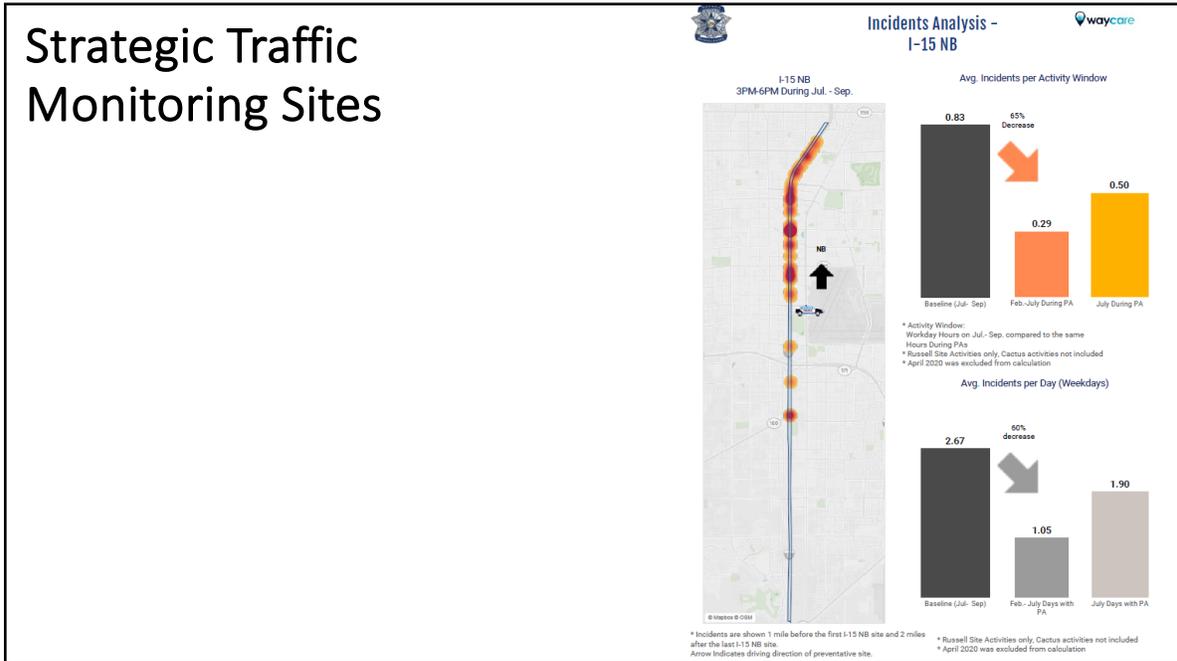


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# Strategic Traffic Monitoring Sites



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Table 1 – WWD Camera Validated Events

Combined Route Exit	Offramp	Date	WWD Event Observed	Subsequent Action	Lighting	Weather	Interchange Type	On-Ramp Configuration	Proximity to On-Ramp	Comments
IR80W-1	WB Exit 1	2020-Jun-18 18:28:39	No	N/A	Daytime	Clear	Partial Diamond	Slip Ramp (Two-Way)	Nonadjacent	Motorcycle on Shoulder
IR80E-4	EB Garson Rd	2020-Jun-18 21:52:05	Yes	Exited Roadway	Nighttime - Spot Lighting	N/A	Other	Diamond	Nonadjacent	
IR80E-2	EB Gold Ranch	2020-Jun-20 23:12:47	Yes	Turned Around	Nighttime - No Lighting	N/A	Partial Diamond	Diamond	Nonadjacent	
IR80W-4	WB Garson Rd	2020-Jun-21 19:44:49	No	N/A	Daytime	Clear	Other	Parclo Loop	Nonadjacent	Construction Vehicle on Shoulder, Stationary
IR80W-4	WB Garson Rd	2020-Jun-21 18:47:16	No	N/A	Daytime	Clear	Other	Parclo Loop	Nonadjacent	Construction Vehicle on Shoulder, Stationary
IR80E-9	EB Robb Rd	2020-Jun-22 16:30:09	No	N/A	Daytime	Clear	Partial Diamond	Diamond	Nonadjacent	Construction Worker
US395N-76	NB Stead	2020-Jun-24 11:54:59	No	N/A	Daytime	Clear	Di			
US395N-76	NB Stead	2020-Jun-24 12:21:35	No	N/A	Daytime	Clear	Di			
US395S-76	SB Stead	2020-Jun-28 15:05:39	No	N/A	Daytime	Clear	Diamond	Diamond	Nonadjacent	Wrong Way, Intentional
US395S-76	SB Stead	2020-Jun-28 15:14:48	No	N/A	Daytime	Clear	Full Diamond	Diamond	Nonadjacent	EMS Vehicle Wrong Way, Intentional
IR80W-4	WB Garson Rd	2020-Jun-29	Yes	Backed Up	Nighttime - Spot	N/A	Other	Parclo Loop	Nonadjacent	

Crash, One Lane Blocked, I-15 in ATM zone								
	Number of Crashes				Duration of recovery (mins)			
	Apr	May	June	July	Apr	May	June	July
2019	62	76	76	75	50	49	51	42
2020	22	13	22	49	43	43	36	38
pct change	-65%	-83%	-71%	-35%	-14%	-12%	-29%	-10%

Data Samples to help with Target Setting

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AT&T 9:56 AM

Click the Start button to begin!

Start

Stop

Send

Map

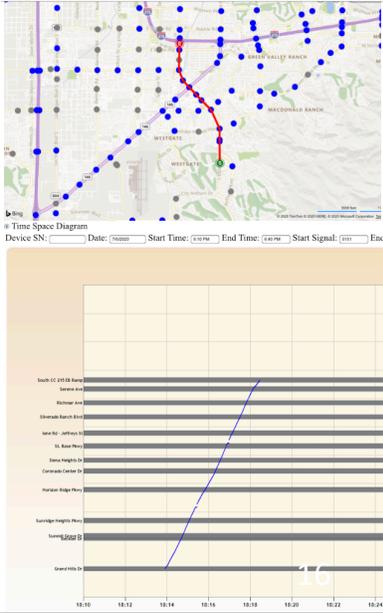
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## Traffic App to Collect Data to Evaluate Traffic Signals

FASTAVL LTE 6:19 PM

Not Secure — challenger.nvfast.org



Time Space Diagram

Device SN: \_\_\_\_\_ Date: (mm/dd/yyyy) Start Time: (mm/dd/yyyy) End Time: (mm/dd/yyyy) Start Signal: (mm/dd/yyyy) End

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Data Sample

4/1/2019 4:22:22 PM: 2188-5086	4/11/2019 4:25:20 PM: 2188-5086	4/22/2019 4:36:38 PM: 2188-5086	5/3/2019 4:30:41 PM: 2188-5086	5/16/2019 4:28:12 PM: 2188-5086
4/2/2019 3:07:35 PM: 2188-5086	4/12/2019 5:12:53 PM: 2188-5086	4/22/2019 5:31:23 PM: 2188-5086	5/4/2019 2:34:30 PM: 2188-5086	5/17/2019 4:38:36 PM: 2188-5086
4/2/2019 4:07:21 PM: 2188-5086	4/12/2019 4:22:09 PM: 2188-5086	4/23/2019 3:00:40 PM: 2188-5086	5/5/2019 5:25:07 PM: 2188-5086	5/19/2019 5:32:30 PM: 2188-5086
4/2/2019 4:21:38 PM: 2188-5086	4/15/2019 4:24:38 PM: 2188-5086	4/23/2019 4:24:43 PM: 2188-5086	5/6/2019 4:30:53 PM: 2188-5086	5/20/2019 4:30:40 PM: 2188-5086
4/3/2019 4:28:32 PM: 2188-5086	4/15/2019 4:36:49 PM: 2188-5086	4/24/2019 4:34:35 PM: 2188-5086	5/6/2019 4:19:32 PM: 2188-5086	5/20/2019 4:31:03 PM: 2188-5086
4/4/2019 2:09:56 PM: 2188-5086	4/16/2019 4:22:34 PM: 2188-5086	4/26/2019 4:34:03 PM: 2188-5086	5/9/2019 4:19:23 PM: 2188-5086	5/21/2019 4:27:53 PM: 2188-5086
4/4/2019 4:22:35 PM: 2188-5086	4/16/2019 4:36:46 PM: 2188-5086	4/29/2019 4:31:04 PM: 2188-5086	5/10/2019 4:16:07 PM: 2188-5086	5/22/2019 4:28:00 PM: 2188-5086
4/5/2019 4:22:25 PM: 2188-5086	4/16/2019 5:04:25 PM: 2188-5086	4/29/2019 4:55:01 PM: 2188-5086	5/10/2019 4:48:45 PM: 2188-5086	5/22/2019 4:28:05 PM: 2188-5086
4/8/2019 3:00:37 PM: 2188-5086	4/17/2019 4:34:01 PM: 2188-5086	4/30/2019 4:49:05 PM: 2188-5086	5/11/2019 5:16:49 PM: 2188-5086	5/23/2019 4:28:05 PM: 2188-5086
4/8/2019 4:24:48 PM: 2188-5086	4/18/2019 4:51:39 PM: 2188-5086	4/30/2019 5:49:09 PM: 2188-5086	5/12/2019 1:59:12 PM: 2188-5086	5/23/2019 4:34:29 PM: 2188-5086
4/9/2019 4:22:24 PM: 2188-5086	4/18/2019 5:55:00 PM: 2188-5086	5/1/2019 4:23:40 PM: 2188-5086	5/12/2019 5:59:29 PM: 2188-5086	5/24/2019 4:28:09 PM: 2188-5086
4/9/2019 5:31:01 PM: 2188-5086	4/19/2019 2:19:21 PM: 2188-5086	5/2/2019 4:31:10 PM: 2188-5086	5/13/2019 4:31:07 PM: 2188-5086	5/28/2019 4:00:50 PM: 2188-5086
4/10/2019 4:40:09 PM: 2188-5086	4/19/2019 4:31:13 PM: 2188-5086	5/2/2019 5:34:02 PM: 2188-5086	5/14/2019 4:34:15 PM: 2188-5086	5/28/2019 4:28:17 PM: 2188-5086
4/10/2019 4:40:09 PM: 2188-5086	4/19/2019 4:31:21 PM: 2188-5086	5/3/2019 4:25:19 PM: 2188-5086	5/15/2019 4:34:27 PM: 2188-5086	5/30/2019 4:18:46 PM: 2188-5086

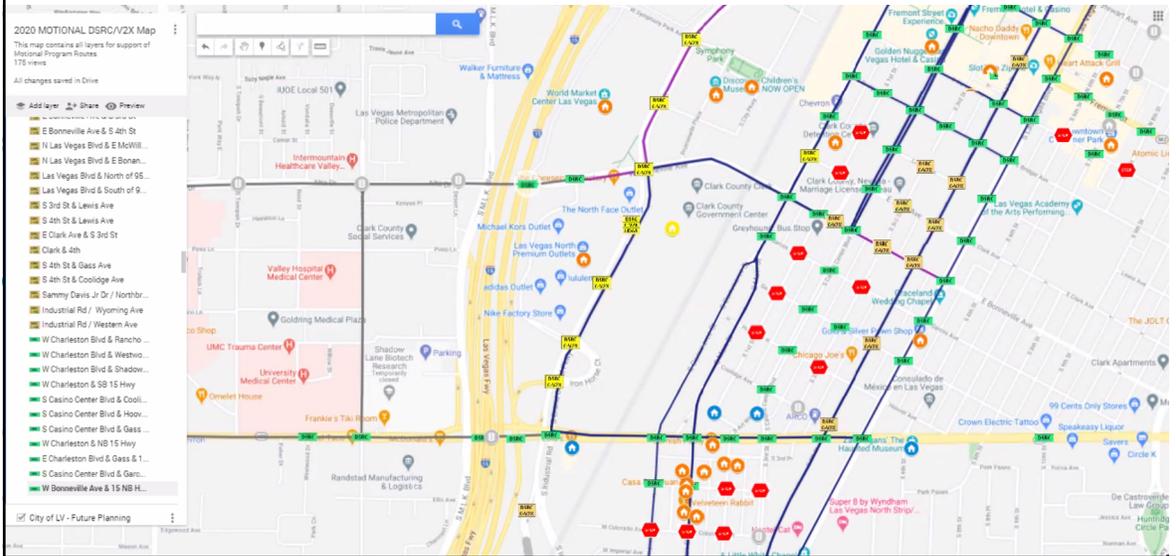


Period	Speed (mph)	Travel Time (s)	Distance (ft)	Speed Ratio	# of Stops	Stop%	Stop Time (s)	Speed Variance (Standard Deviation)	Travel Time Index (TTI)	Planning Time Index (PI)	Buffer Index (BI)
Speed Limit	45.0	123	8144	1	0	0%	0				
All	21.4	278	8144	0.48	2.2	27.0%	90	6.4	2.26	2.80	0.24
Before	20.9	286	8144	0.47	2.1	25.7%	94	6.4	2.31	2.84	0.23
After	22.0	270	8144	0.49	2.3	28.5%	84	6.4	2.19	2.77	0.26
Difference	1.1	-16	0	0.02	0.2	2.8%	-10	0.0	-0.13	-0.07	0.04
Difference%	5.2%	-5.5%	0%	5.2%	11.1%	11.1%	-10.5%	0.2%	-5.5%	-2.6%	16.2%

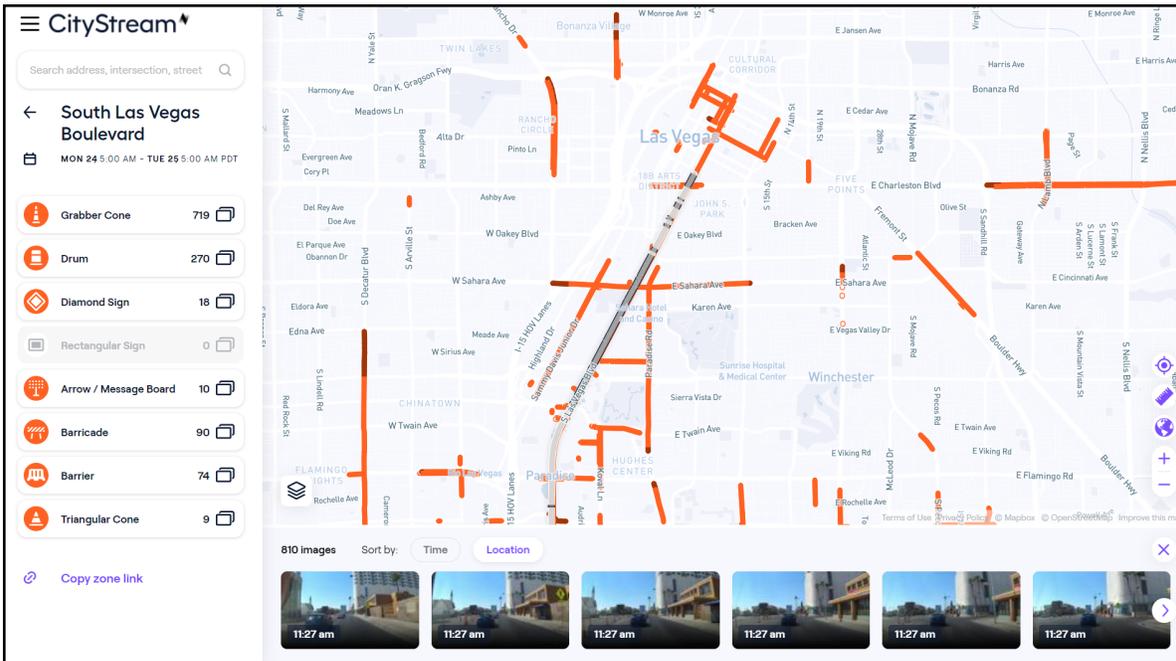


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# Roadside Unit Deployment



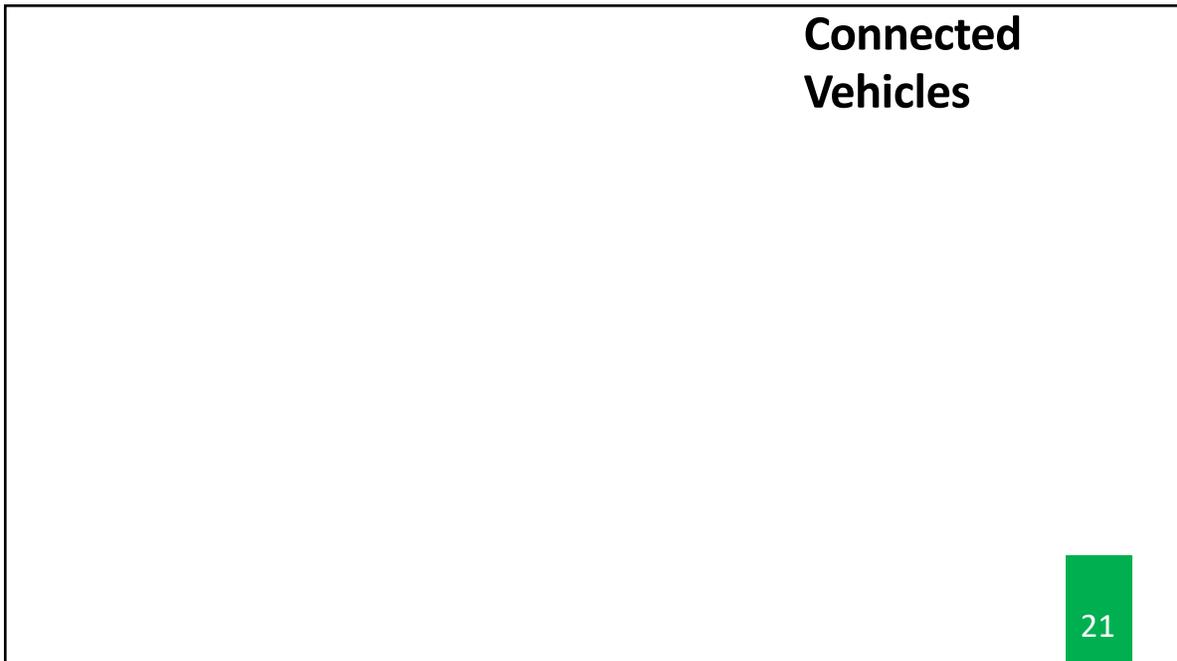
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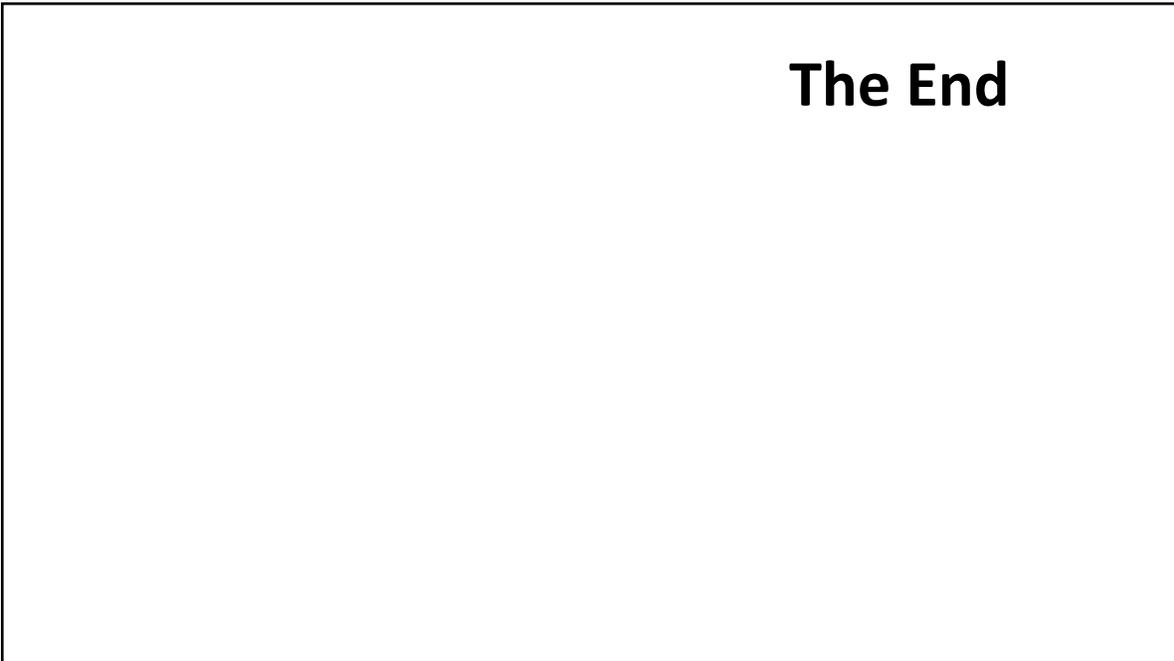
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# Transportation Performance Management (TPM)

*TPM Target Setting Miniseries Webinar 5 - Traffic Congestion and Emissions Reductions Target Setting*

**Habte Kassa**  
**Technical Services & Air Quality Branch Chief**  
**GDOT Office of Planning**  
**August 26, 2020**

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## Agenda

- Background
- Transportation Performance Management (TPM) Overview
- PM3 GDOT Approach
- Summary

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**GDOT**  
Georgia Department of Transportation

## Background - Georgia Profile and Facts



8<sup>th</sup> in the US in Population: 10.6 Million



1,250 Miles of Interstates

159 Counties and 15 MPOs



15 Georgia MPOs



#1 Busiest Airport in the World



4<sup>th</sup> Busiest Container Port in the US

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**GDOT**  
Georgia Department of Transportation

## TPM – PM3 Measures



**PM3: System Performance, Freight, and Congestion Mitigation and Air Quality Improvement (CMAQ)**

- % person-miles traveled on interstate and non-interstate NHS that are reliable
- Truck Travel Time Reliability (TTTR) index
- Annual hours of peak hour excessive delay (PHED) per capita
- % non-single occupancy vehicle travel
- Total emission reductions

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## TPM - Purpose

- Support investment strategies
- Establish system performance measures to assess the NHPP
- Establish freight performance measure to assess the NHFP
- Establish traffic congestion and on-road mobile source emissions to assess the CMAQ Program

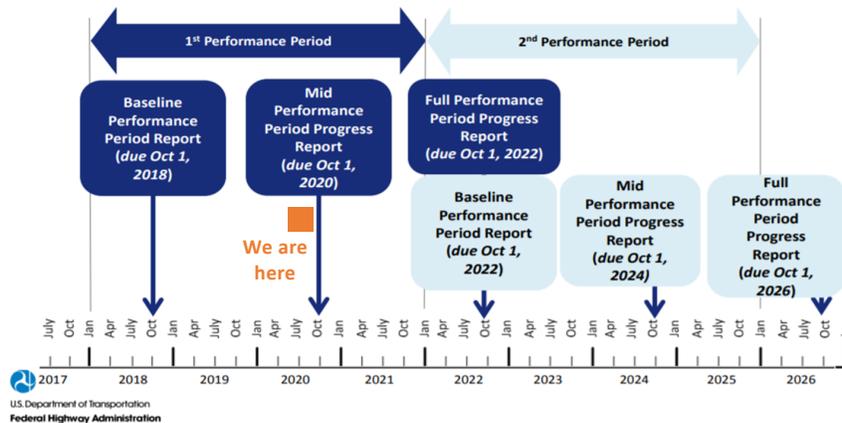


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## TPM - Schedule

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



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## Congestion Mitigation and Air Quality (CMAQ) – Performance Measures

Performance Measure	Geographic Extent	Applicable Roadways	Timeframe for Targets
Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita*	Atlanta Urbanized Area	Entire NHS	4-year target
Percent of Non-Single Occupancy Vehicle (SOV) Travel*	Atlanta Urbanized Area	All Roads	2-year and 4- year targets
Total Emissions Reduction	Statewide	All Roads	2-year and 4- year targets

\*GDOT, Atlanta Regional Commission and Cartersville-Bartow Metropolitan Planning Organization are required to establish and report single targets

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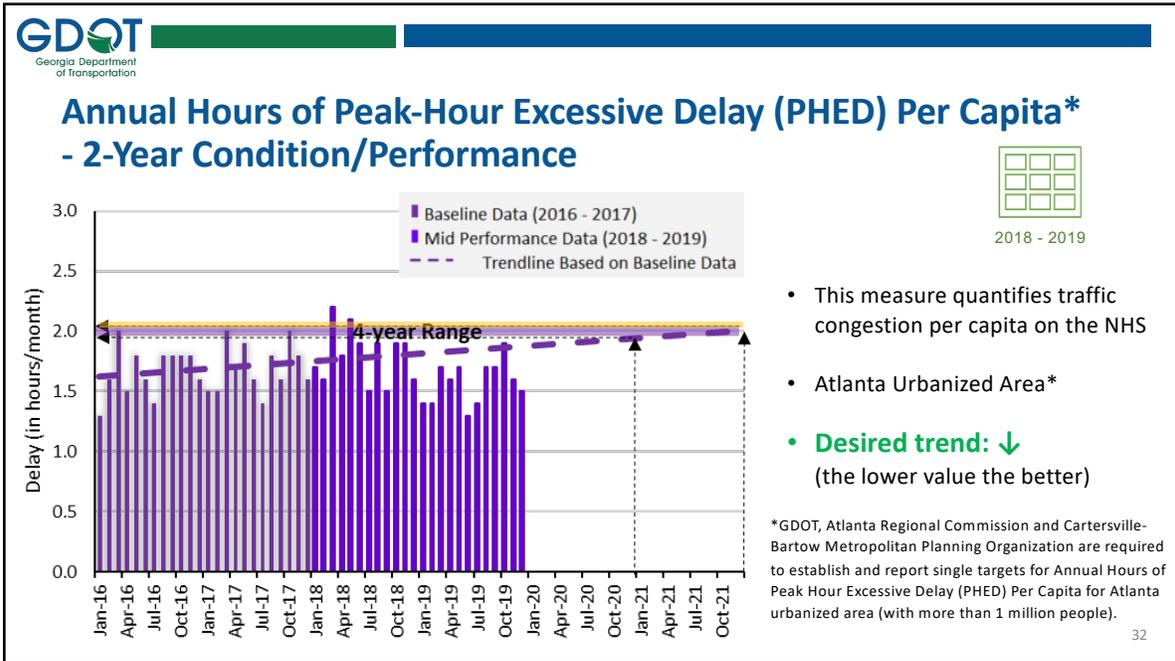


## PM3 GDOT Approach - Process and Key Elements

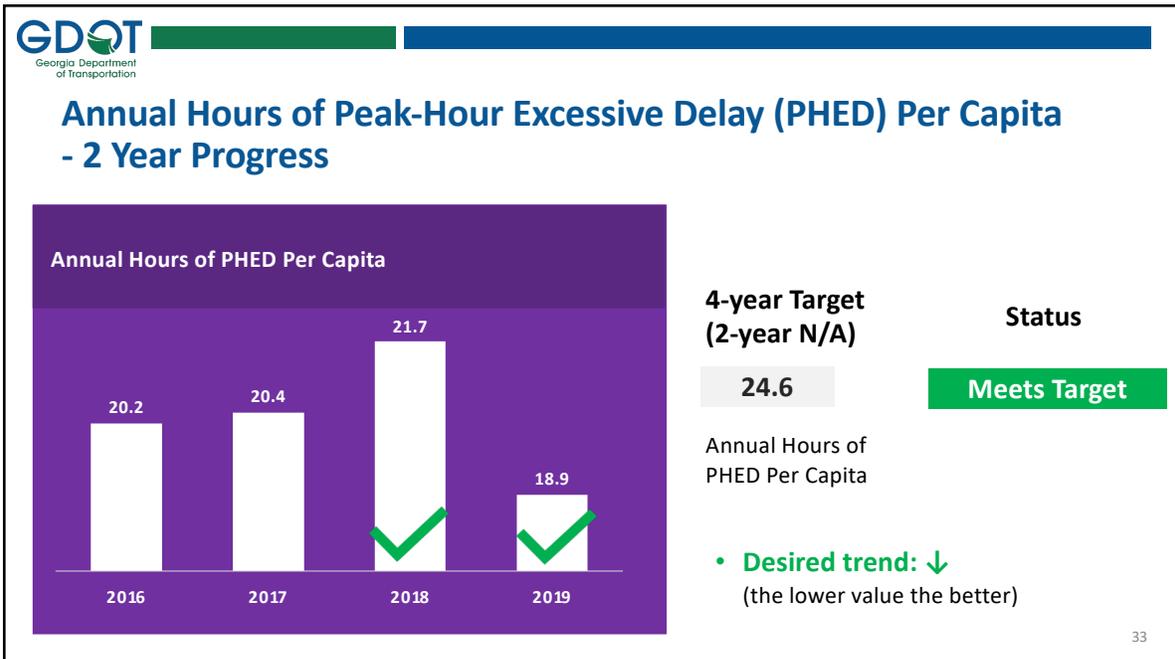


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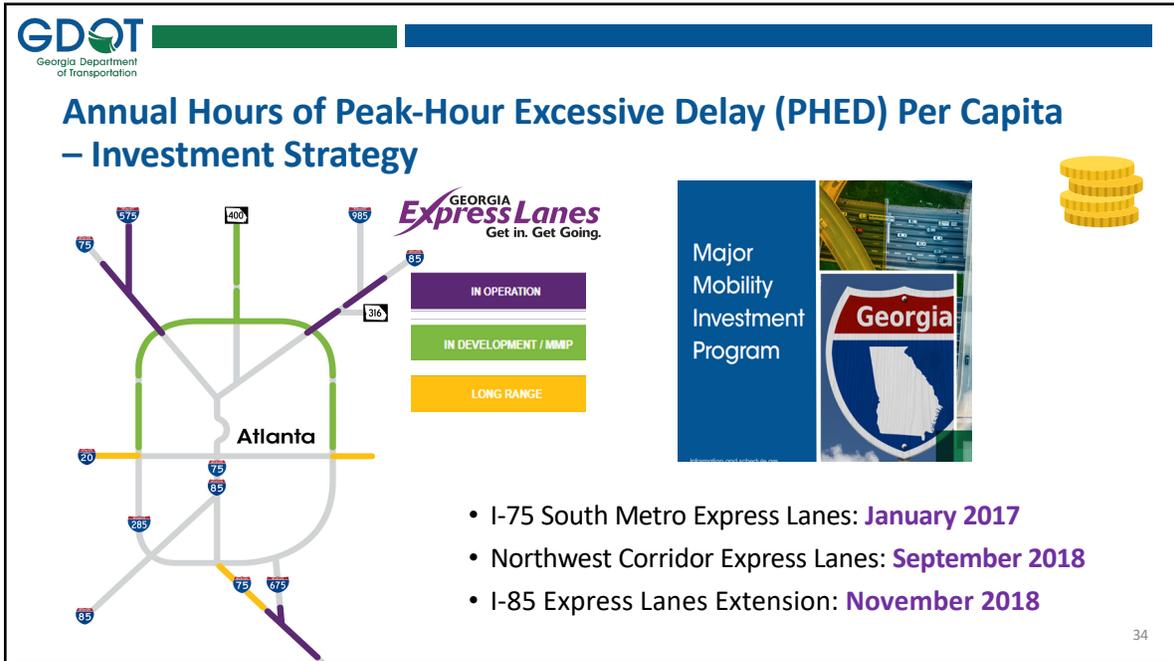
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**Non-SOV Measure – 2-Year Condition/Performance and Progress**

	2009-2013 ACS	2012-2016 ACS	2014-2018 ACS
Total Estimate of commuters	2,440,839	2,615,735	2,778,238
Drove Alone	1,900,270	2,037,421	2,144,913
% SOV	77.9%	77.9%	77.6%
<b>% Non-SOV</b>	<b>22.1%</b>	<b>22.1%</b>	<b>22.4%</b>

- This measure quantifies non-SOV travel
- Atlanta Urbanized Area\*
- Utilized American Community Survey (ACS)
- Desired trend: ↑**  
(the higher value the better)

2-year Target: 22.1%      Status: **Meets Target**

4-year Target: 22.1%

\*GDOT, Atlanta Regional Commission and Cartersville-Bartow Metropolitan Planning Organization are required to establish and report single targets for Percent of Non-Single Occupancy Vehicle (SOV) Travel for Atlanta urbanized area (with more than 1 million people).

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**GDOT**  
Georgia Department of Transportation

## Total Emissions Reduction – 2-Year Condition/Performance

- Utilized project information from CMAQ Public Access System

- This measure quantifies the cumulative 2- and 4-year totals of emissions reductions of applicable criteria pollutants and precursors, in kilograms per day, for all projects funded with CMAQ funds.
- Statewide

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## Total Emissions Reduction – 2-Year Progress

Category	2-Yr (2018-2019) Target	2-Yr (2018-2019) Total	Status	Desired Trend
Total Emissions Reductions – NOx (kg/day)	563.0	631.9	Meets Target	↑ (the higher value the better)
Total Emissions Reductions – VOC (kg/day)	205.7	216.4	Meets Target	↑ (the higher value the better)

ARC Atlanta Regional Commission

GDOT Georgia Department of Transportation

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## Total Emissions Reduction - 2-Year Progress and Target Setting

- Data Used for Mid-Performance Calculations
  - ARC’s 5-Year TIP (2020-2025) project list and type
  - ARC’s CMAQ Calculation Spreadsheet Results
  - Air Quality CMAQ Public Access System – data through 2019
- Post-Processing adjustments were made in the Baseline Target Setting by collaborating with ARC
- Concurrence on the Target Setting Methodology for 2020

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## Total Emissions Reduction – Investment Strategy



### Transit Expansion/Enhancement



### Roadway, ITS and Transportation Demand Management Programs



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## CMAQ Measures – Mid-Performance Target Re-Evaluation

- Adjustment of 4-year targets is optional
- Performed sensitivity analysis using additional two-year data
- **Recommend not changing the 4-year target**



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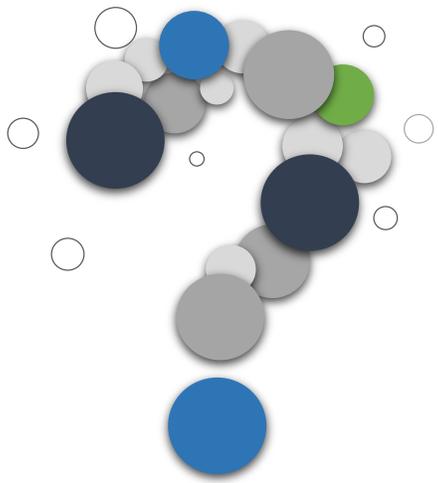


## SUMMARY – CMAQ Performance Measures

Annual Hours of PHED Per Capita	Desired Trend	Actual Trend	Meets Target?	Recommending Target Change?
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">20.2 <small>2016</small></div> <div style="text-align: center;">20.4 <small>2017</small></div> <div style="text-align: center;">21.7 <small>2018</small></div> <div style="text-align: center;">18.9 <small>2019</small></div> </div>	↓	Varies	✓	No
<b>Non-SOV Measure (percentage)</b> 22.1% <small>2009-2013 ACS 2012-2016 ACS</small> 22.4% <small>2014-2018 ACS</small>	↑	↑	✓	No
<b>Total Emissions Reductions – NOx (kg/day)</b> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">563.3 <small>2-Yr (2018 -2019) Target NOx</small></div> <div style="text-align: center;">631.9 <small>2-Yr (2018 -2019) Total NOx</small></div> </div>	↑	↑	✓	No
<b>Total Emissions Reductions – VOC (kg/day)</b> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">205.7 <small>2-Yr (2018 -2019) Target VOC</small></div> <div style="text-align: center;">216.4 <small>2-Yr (2018 -2019) Total VOC</small></div> </div>	↑	↑	✓	No

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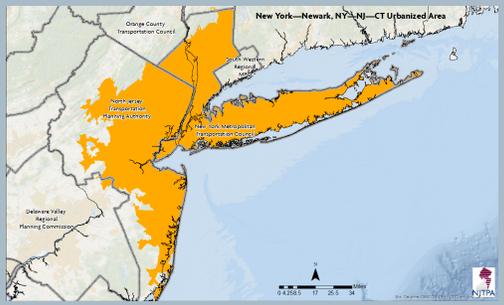
# Thank you!

**Habte Kassa**  
Technical Services and Air Quality Branch Chief  
GDOT Office of Planning  
hkassa@dot.ga.gov  
404-631-1797

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## NYC Urbanized Area Congestion Performance Measure Targets

**TPM Webinar**  
Traffic Congestion and  
Emissions Reductions  
Target Setting  
August 26, 2020



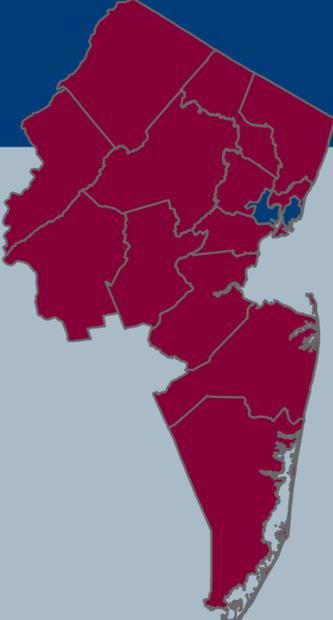
**Keith Miller**  
North Jersey Transportation Planning Authority



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## About the NJTPA

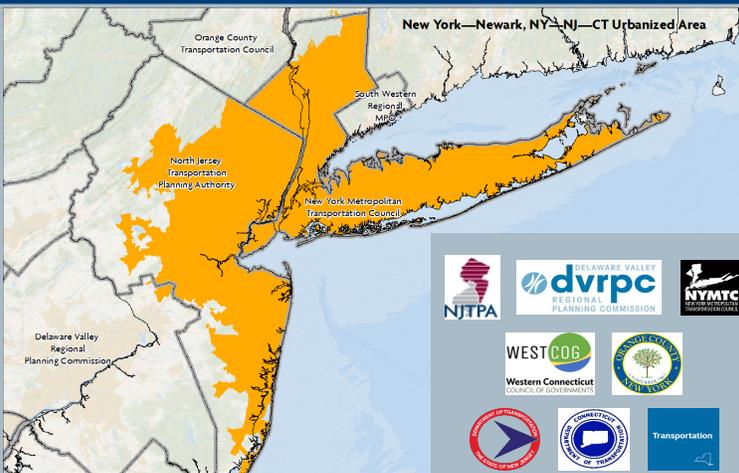
- 13 counties, 2 cities
- 7 million people
- 4 million jobs
- 150 million daily vehicle miles
- 732,000 daily transit trips
- 13% of commuters ride transit




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## New York–Newark, NY–NJ–CT Urbanized Area



- Pop: 19 million
- Area: 3,450 sq.mi.  
–5,443 per/sq.mi.
- Avg TT: 37.7 min.
- 5 MPOs
- 3 DOTs











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## Traffic Congestion Performance Measures

- **Percent of non-single occupant vehicle travel (non-SOV)**
  - Census ACS journey-to-work (5-yr)
  - All but drive-alone (carpool, transit, taxi, walk/bike, telecommute, etc.)
- **Annual hours of peak hour excessive delay per capita (PHED)**
  - National Performance Measures Research Data Set (NPMRDS)
  - NHS, <60% PSL or 20mph, 6-10am & 3-7pm



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## Target-Setting Considerations

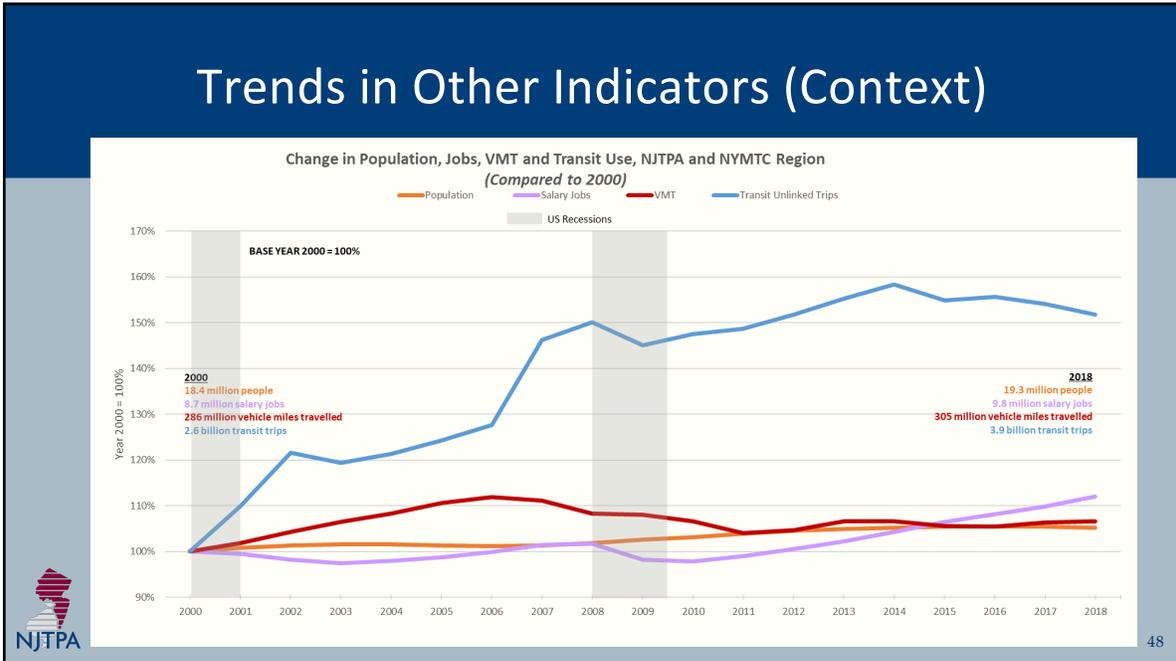
- **Policy Goals**
  - Manage congestion, decrease SOV mode share
- **Trends**
  - National performance measures (non-SOV, PHED)
  - Other (context) indicators (pop, jobs, VMT, transit)
- **Constraints**
  - Funding/competing priorities (“Fix it First”, safety, reliability...)
  - Limited impacts from current projects (in 2 and 4 years)
- **Uncertainties**
  - Data, transportation network companies, travel behavior, economy...



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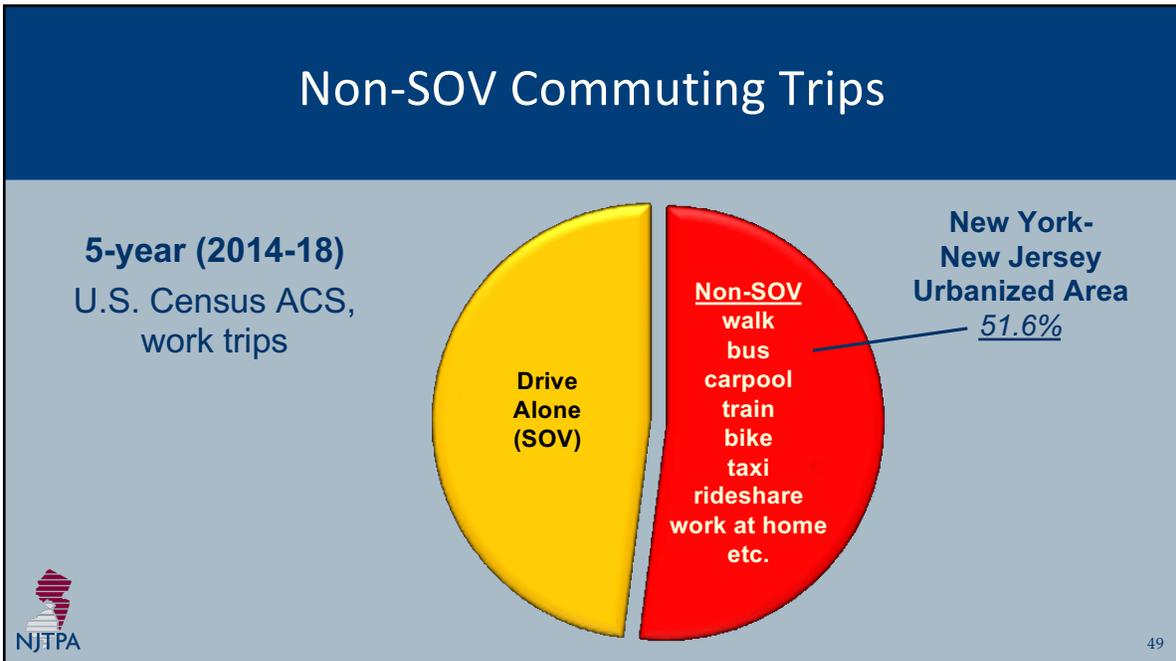
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## Trends in Other Indicators (Context)



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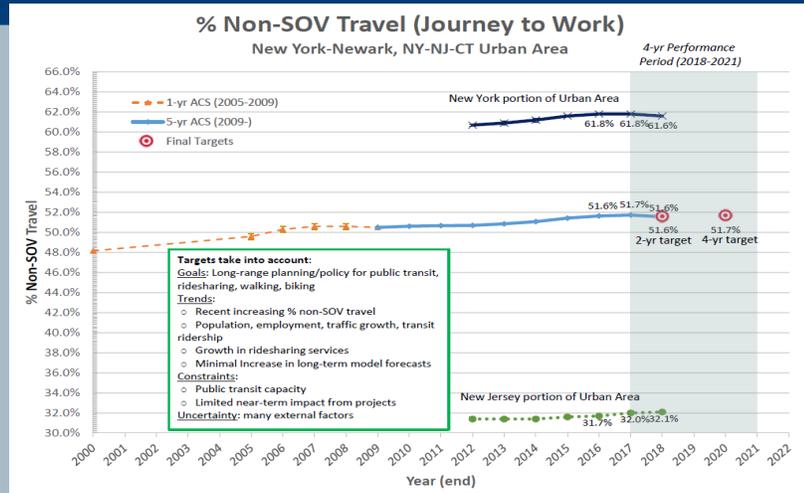
## Non-SOV Commuting Trips



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## Non-SOV Trends & Existing Targets

- 2-yr target
  - maintain baseline (2012-2016)
  - Met (2014-2018)
- 4-yr target
  - slight increase
  - within reach?



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## PHED Per Capita Performance Measure

- **Peak Hour:** Weekdays from 6-10 a.m. & 3-7 p.m.
- **Excessive Delay:** Extra time spent in extreme congestion (<60% speed limit or 20mph)
- **Per Capita:** Divided by entire population, not just auto users
- On National Highway System (NHS): not all delay
- Annual Delay: Over entire calendar year
- Person Delay: Experienced by people, not vehicles

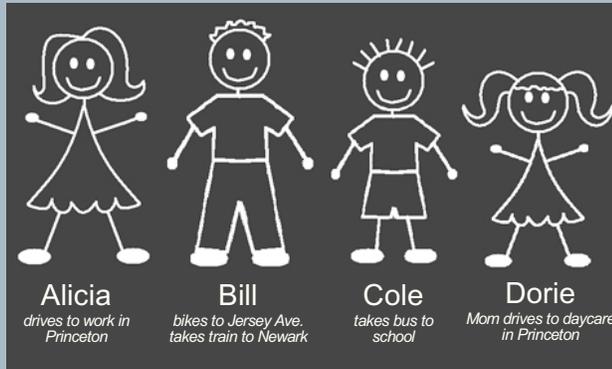


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## Example of PHED per Capita

A family of four living in North Brunswick, NJ



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## Family's Daily Trips



- Alicia: Drives Dorie to daycare in Princeton (along congested US 1), then to work. **Contributes** to peak hour excessive delay.



- Bill: Bikes to Jersey Avenue NJ TRANSIT station and takes train to Newark. Does **not** contribute to peak hour excessive delay.



- Cole: Takes school bus on local (non-NHS) roads. Does **not** contribute to peak hour excessive delay.



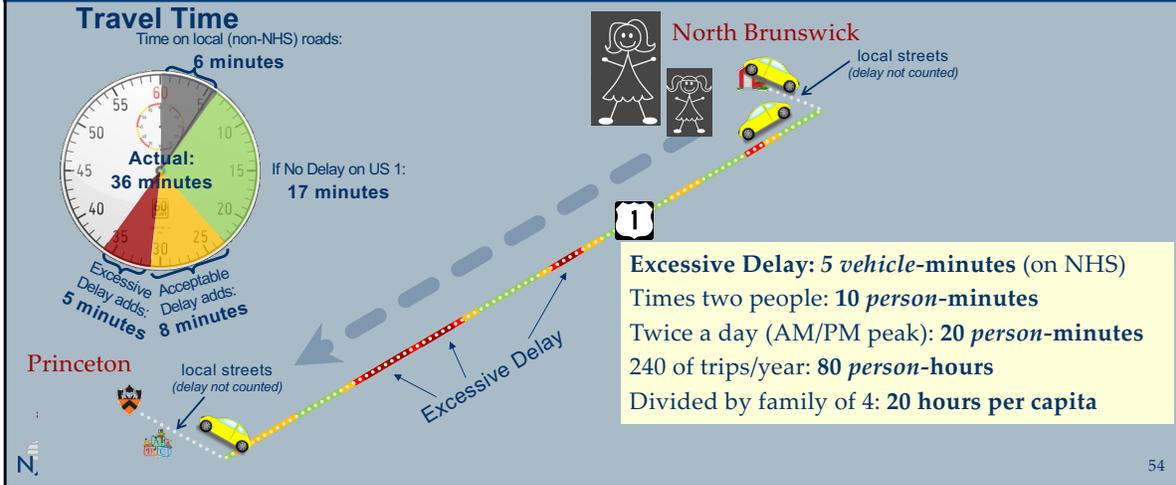
- Dorie: Rides with Mom to daycare. **Contributes** to peak hour excessive delay.



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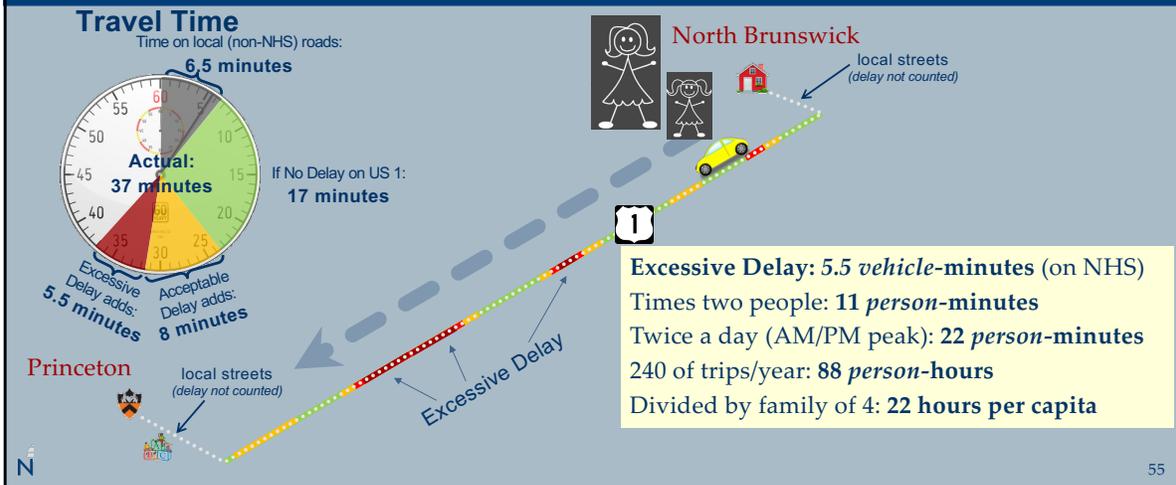
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## Alicia's Drive Takes 36 Minutes Calendar Year 2017



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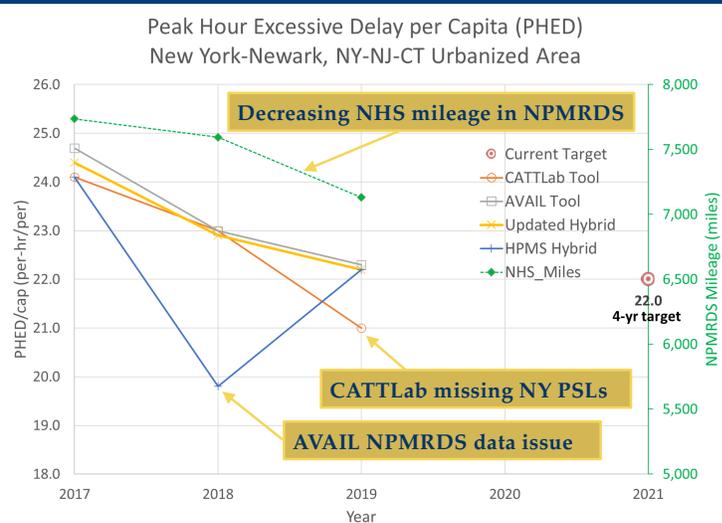
## 4-year target: ~2% annual increase in PHED Calendar Year 2021



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## PHED Trends & Existing Target

- **4-yr target**
  - 2017 PHED = ~20
  - +2% annual = 22.0
- **“Hybrid”:**  
NJ from CATTLab,  
NY from AVAIL
- **“HPMS”:**  
reported to FHWA
- **Close agreement for 2019 (+/- 0.1)**



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## Important Uncertainties



- **COVID-19 impacts**
  - ↑ work-from-home (↓ PHED, ↑ non-SOV)
  - ↓ transit use (↑ PHED, ↓ non-SOV)
  - Not enough data/information to judge long-term impacts
- **Other uncertainties**
  - PHED: data/calculation/coverage
  - Non-SOV measure: 2016-2020 5-yr ACS, <20% post-COVID



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## Decisions/Next Steps



- **4-yr Target Adjustment**
  - No adjustments in 4-yr targets for non-SOV and PHED
  - Agreement from NJTPA, NYMTC, DVRPC, NJDOT, NYSDOT
- **Next Steps**
  - Additional FHWA guidance on COVID-19 impacts
  - Use 1-yr ACS (non-SOV) to monitor COVID-19 impacts
  - Continue work on reconciling PHED (AVAIL & CATTLab)
  - Working group to examine bus/truck volume data (NYSDOT, DVRPC, AVAIL, NJTPA, others?)



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## Contact Information

*Defining the Vision. Shaping the Future.*



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## Webinar 4: Communicating TPM

- This webinar focuses on approaches, noteworthy practices and the evolution of communication practice.
- Presentations will address:
  - TPM communications in support of strategic priorities
  - Experiences of agencies in determining what story to tell and selecting communication channels
- When: September 16, 2020 2:00 Eastern Time

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*Communicating TPM*

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