Connecticut Department of Transportation
Bureau of Policy & Planning
Performance Management Unit

PM3 2022 Target Setting Activities

April 5th, 2023

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Target Setting Approach and Methodology

Variables for target setting

Philosophy

Photo Credit: CTDOT

Variables for Target Setting

Variable	Metric Impacted	Current Trend	Why?
COVID-19: Telework/commuting; general travel patterns	Vehicle Miles Traveled (VMT)	Decrease ↓	*COVID-19 created new traveling patterns for people. Work commutes vary in time and day. Telework reduces VMT, and PHED. Non-SOV decreases (less carpooling). Leisure travel is increasing, which will increase VMT and PHED. However, trends can change based on the COVID-19 infection rates.*
	Peak Hour Excessive Delay (PHED)	Decrease ↓	
	Travel Time Reliability (TTR- interstates & non-interstates)	Increase ↑	
	Truck Travel Time Reliability (TTTR)	Increase ↑	
	Non-SOV Measure	Increase ↑	
Vehicle Registrations	Vehicle Miles Traveled (VMT)	Increase ↑	*Connecticut vehicle registrations are increasing in the upcoming years. COVID-19 did not impact vehicle registration in 2020 and 2021. As a result of more vehicles registered, VMT and PHED will increase. Non-SOV would decrease from less carpooling as people would drive their vehicles.*
	Peak Hour Excessive Delay (PHED)	Increase ↑	
	Non-Single Occupancy Vehicle (Non-SOV)	Decrease ↓	
Weather	Travel Time Reliability (TTR- interstates & non-interstates)	Decrease ↓	*Weather in Connecticut varies by year. Relating to snow events, the state could experience mild to busy seasons (based on number of snow events).*
	Truck Travel Time Reliability (TTTR)	Decrease ↓	
Gas Prices	Vehicle Miles Traveled (VMT)	Decrease ↓	*Gas prices influence how people utilize their vehicles. Currently, VMT & PHED would increase as gas prices are declining. Non-SOV would decrease (less carpooling).*
	Peak Hour Excessive Delay (PHED)	Decrease ↓	
	Non-SOV Measure	Increase ↑	

Philosophy

- Be conservative- set targets that are achievable.
- Account for factors that influence performance by adjusting overall target.
  - Even if not explicitly in the model.
- Omit 2020 and 2021 from trends analysis.
- More of a forecast than a target.
  - Besides the CMAQ program, congestion and system reliability do not have comprehensive, performance-based programs targeting the measures specifically.

Statewide Performance Measures

Congestion Mitigation and Air Quality (CMAQ)

Travel Time Reliability for interstate and non-interstate

Truck Travel Time Reliability

Photo Credit: CTDOT

Congestion Mitigation & Air Quality (CMAQ)

Overview of the two & four-year targets

Photo Credit: CTDOT

What is CMAQ?

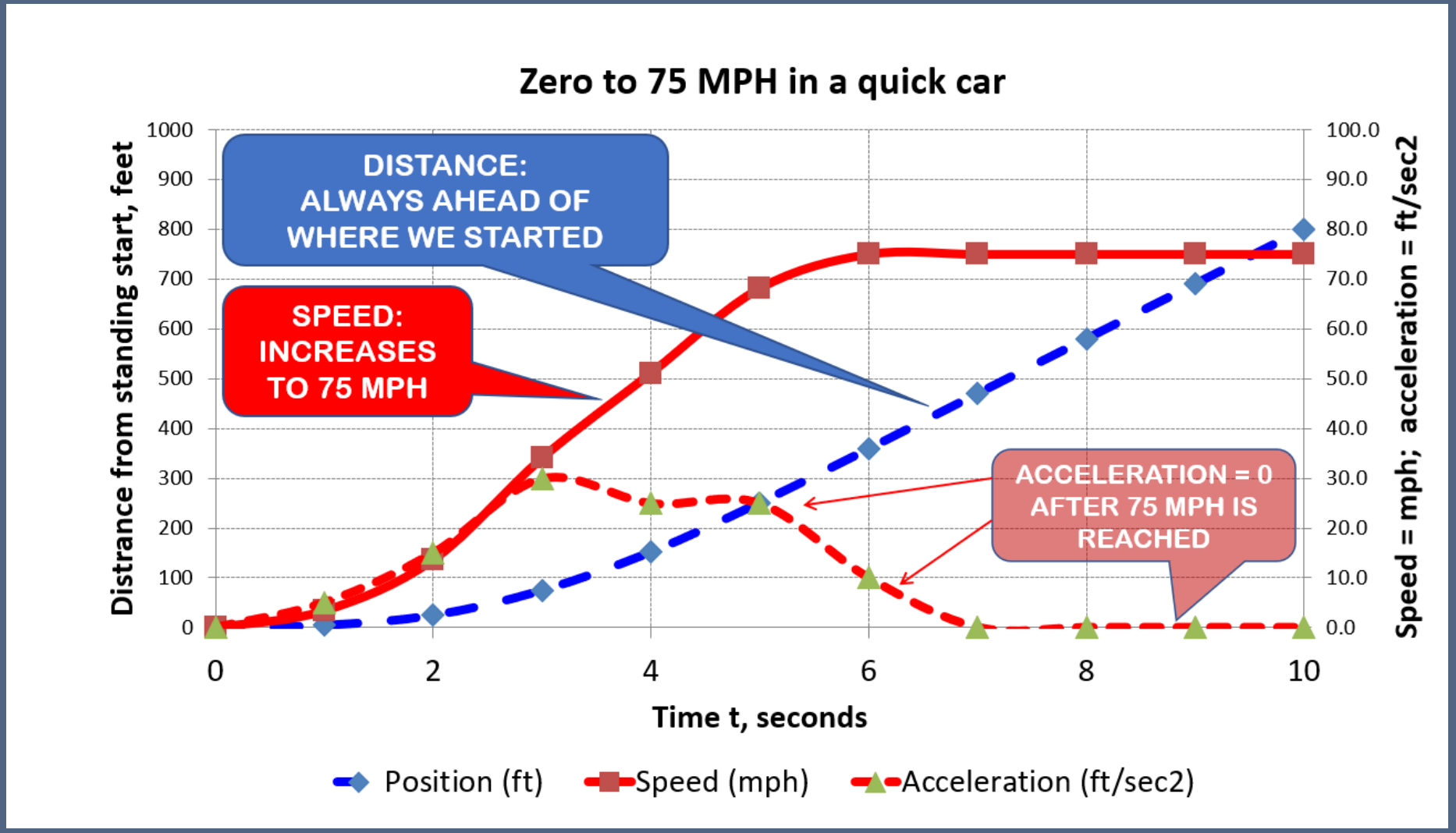
- CMAQ is a Congestion Mitigation & Air Quality improvement program.
- We measure three air quality measures for emissions reduction:
  - VOC
  - Nox
  - PM2.5
- Emissions reduction is cumulative.
  - Ability to achieve continual reductions is possible, as long improvement projects are in place.

Emissions Reduction

- Emissions (kg):
  - If emissions are reduced in a project, there will be a lower quantity of pollutants in the project. **(*x*)**
- Emission reduction (kg/day):
  - Each day the project is in place, then emissions are lower by x number of kilograms of pollutants. **(*dx/dt*)**

- Rate of change emission reduction (kg/day/time):
  - The measure for CMAQ. A positive number signifies CTDOT is reducing pollutants faster than in a previous period. **(*d2x/dt2*)**

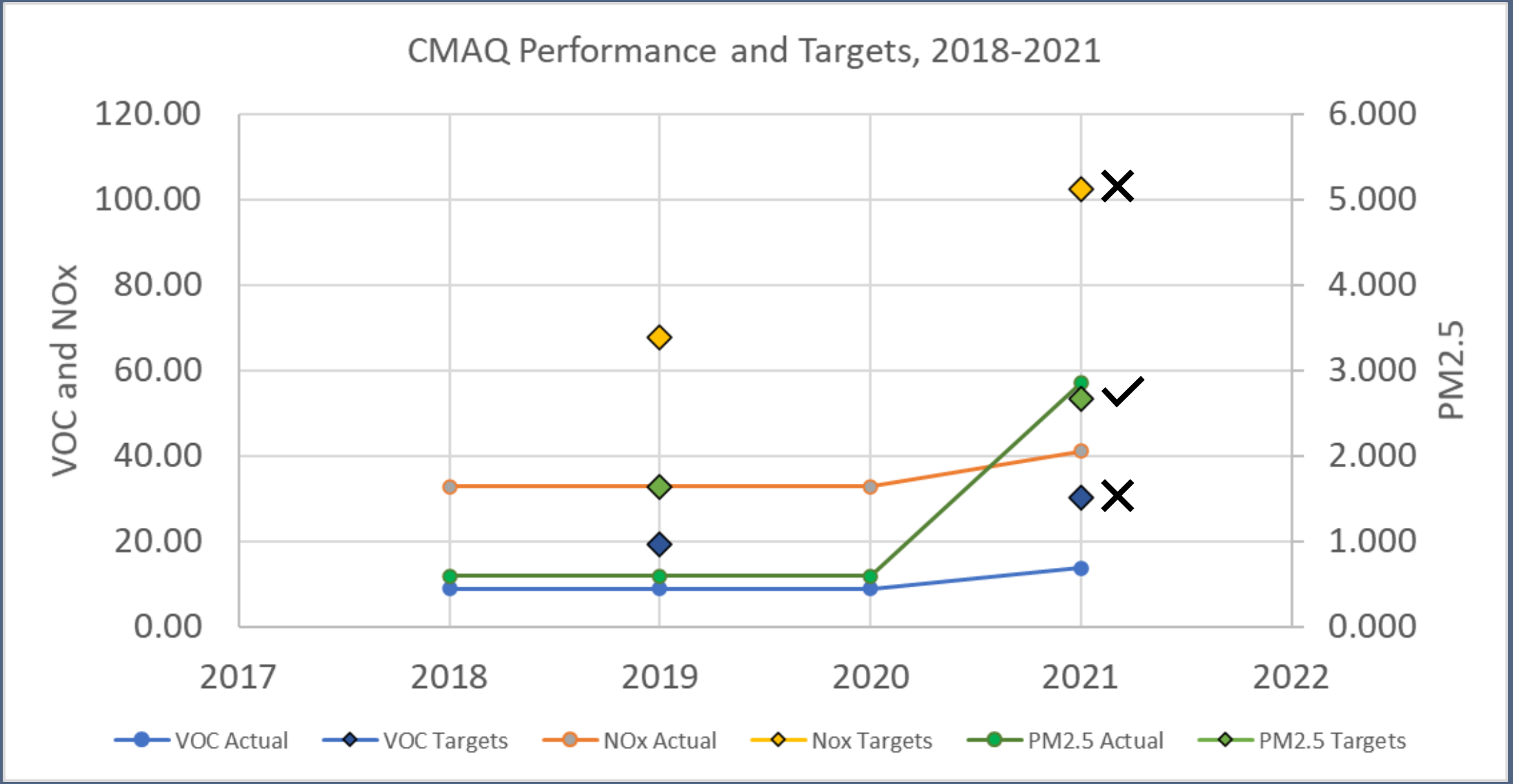
CMAQ Analogy



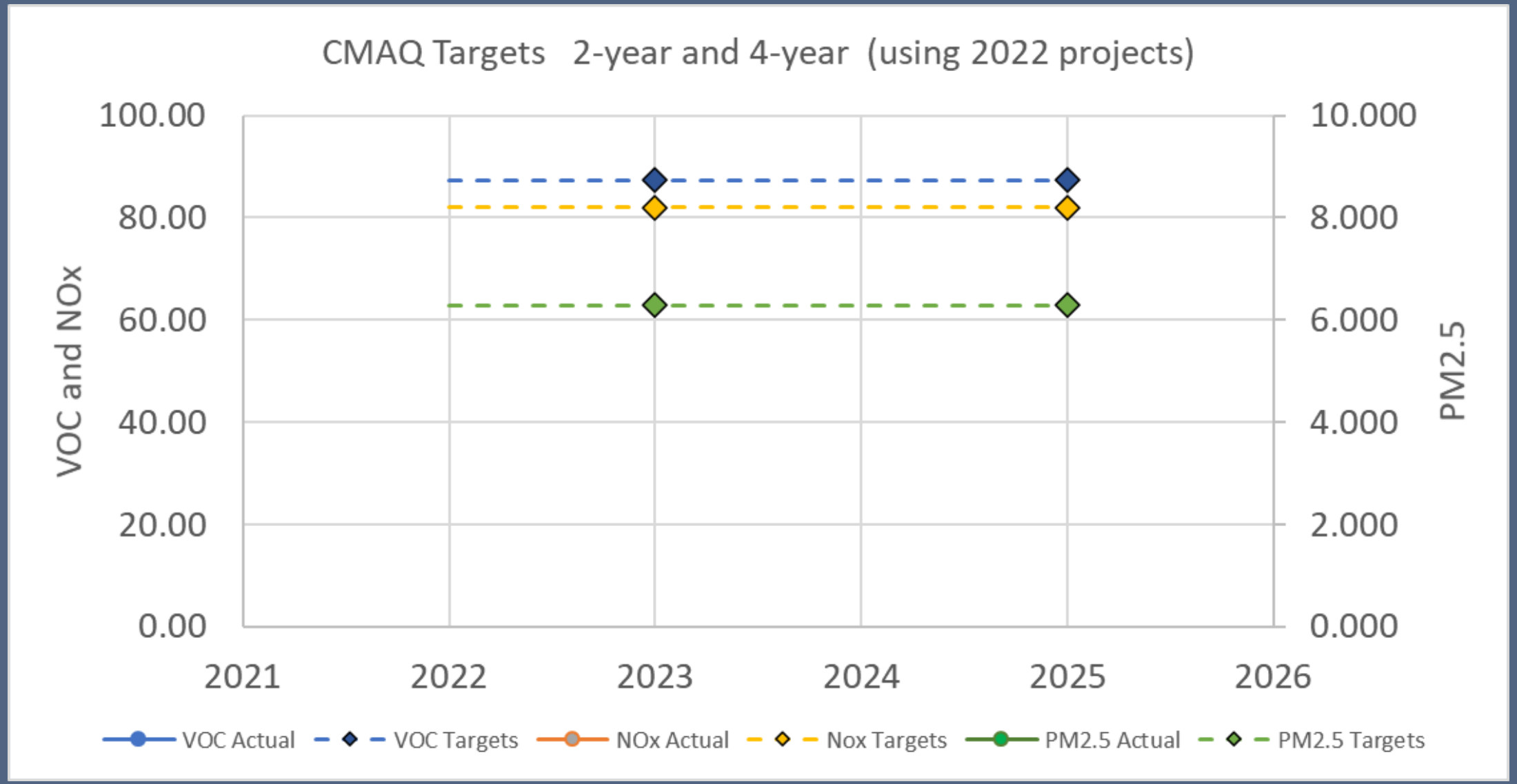
CMAQ Performance and Target Setting

- CMAQ program has emphasized project with qualitative benefits only, plus periodic large projects since 2016.
- Target setting consists of including CMAQ projects that are scheduled to be obligated within the performance period.
- 2018-2021: Met PM2.5 4-year adjusted target, missed NOx and VOC targets.
  - One project that was expected to be obligated was not ("New Haven various signal improvements").
- For next performance period, including projects that we are certain are taking place (2022).
  - Waterbury Rail Service Expansion.
  - Once new projects are obligated, they will be added at the two-year mark and targets will be adjusted.

CMAQ Performance 2018-2021



CMAQ Targets (2023, 2025)

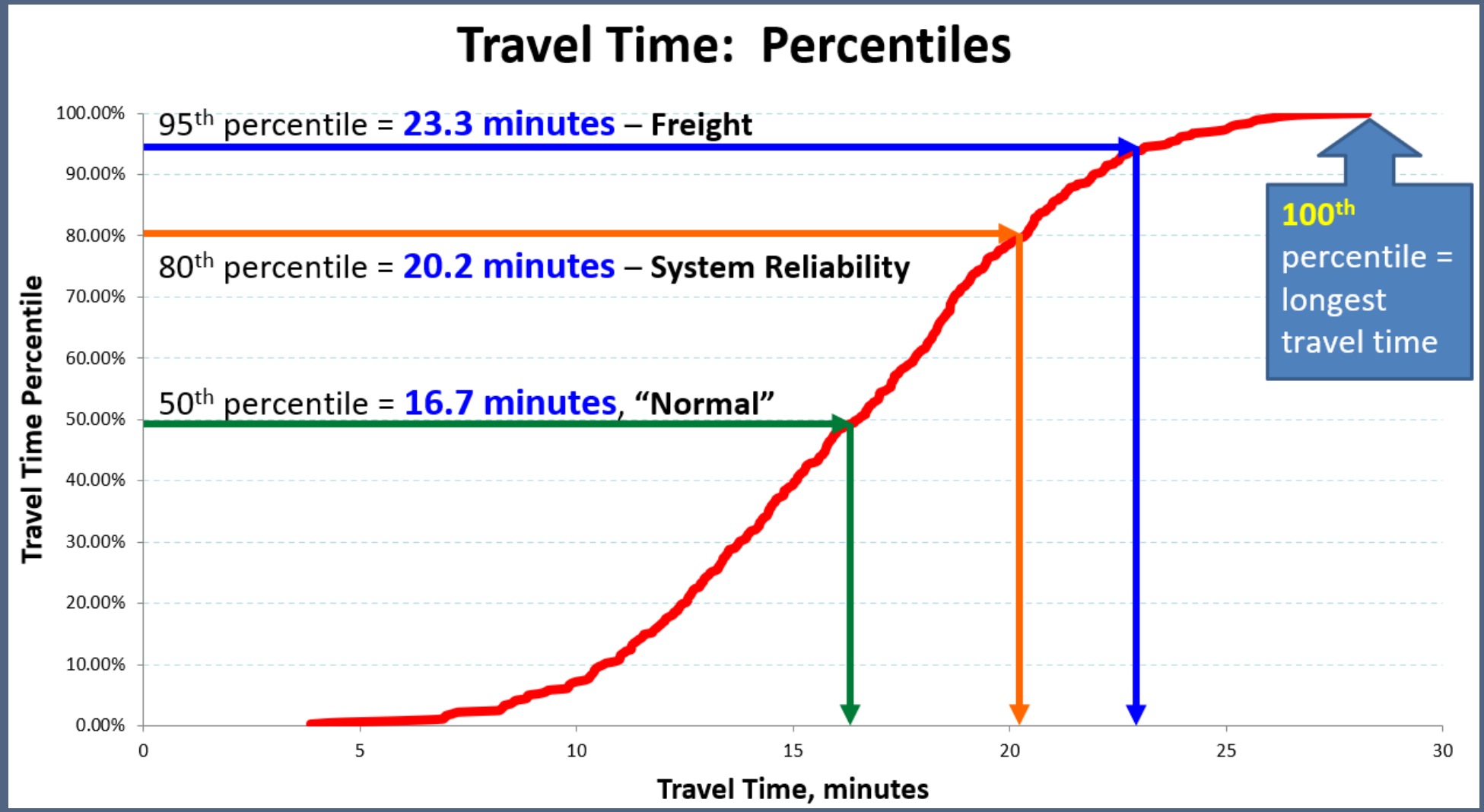


Travel Time Reliability (TTR)

Overview of the two & four-year targets

Photo Credit: CTDOT

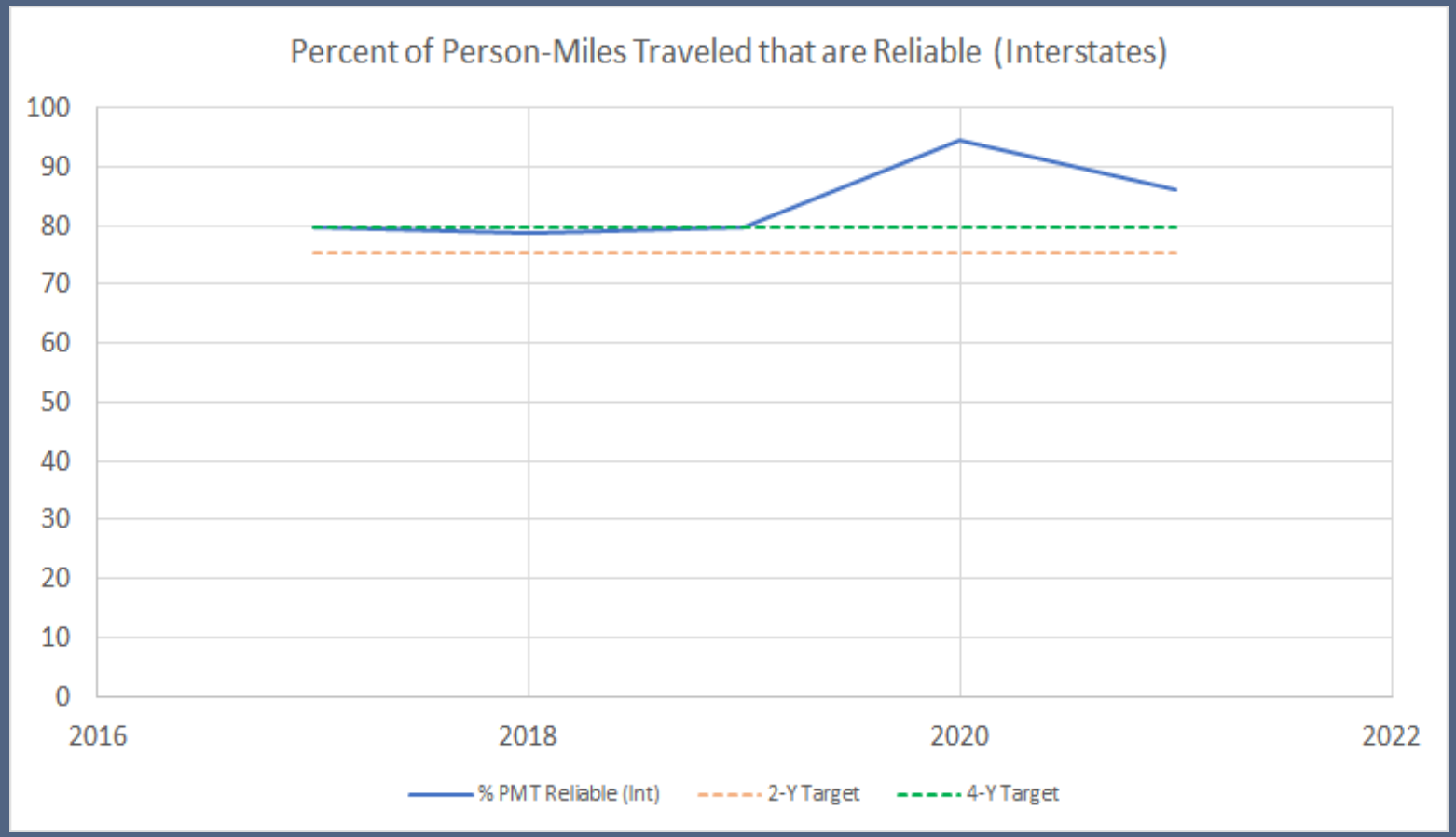
Level of Travel Time Reliability



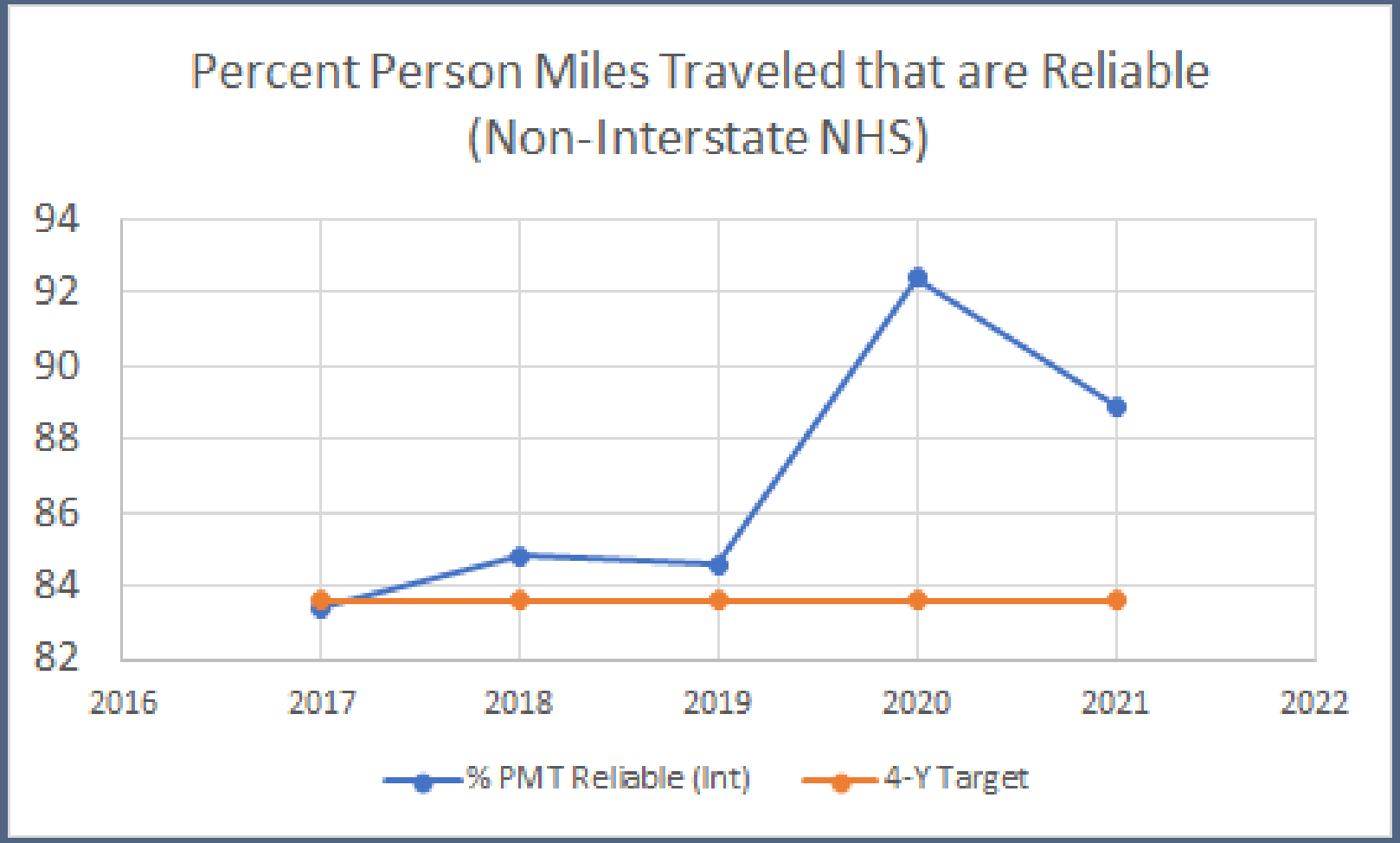
What is Travel Time Reliability?

- Travel Time Reliability (TTR) measures the extent of unexpected delays for drivers on interstates and non-interstates.
- The level of TTR as follows:
  - Median travel time: 50th percentile.
  - Longest travel time: 100th percentile.
  - The 80th percentile travel time: worse (longer) than 80% of travelers.
- Level of Travel Time Reliability (LOTTR) equation: 80th percentile / 50th percentile
  - A reliable LOTTR: 80th / 50th percentile travel time is less than 1.5.
- Data is collected in 15-minute segments from 6am – 8pm on NPMRDS.

Level of Travel Time Reliability – Interstates (met target)



Level of Travel Time Reliability – Non-Interstates NHS (met target)



Travel Time Reliability Forecast (Interstates)

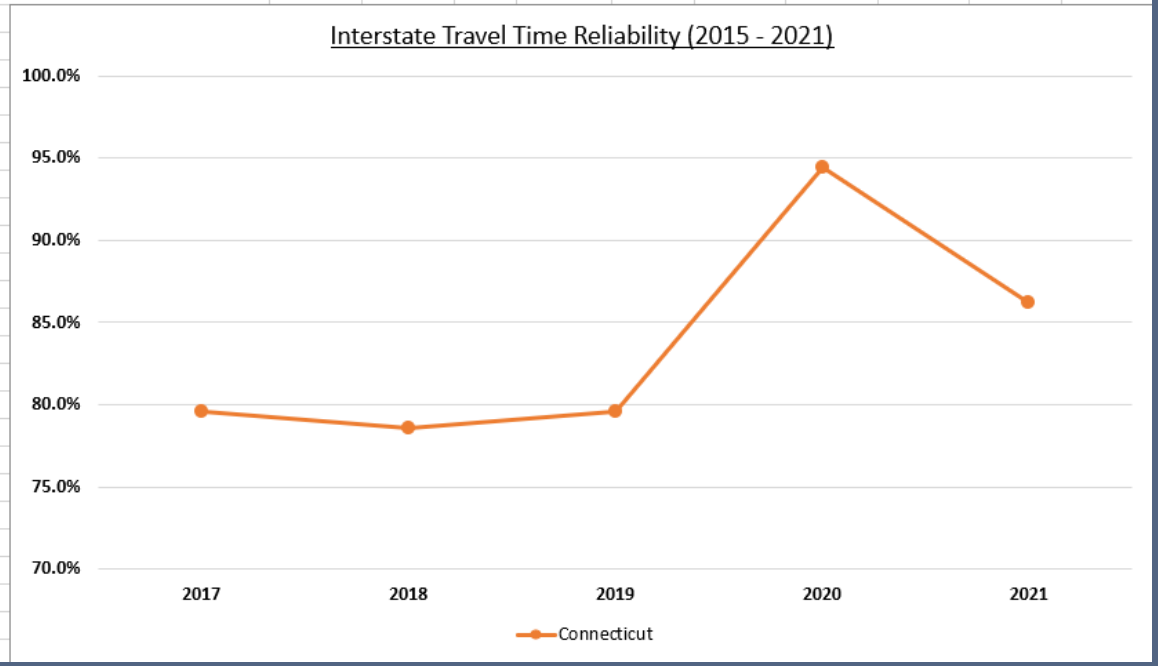
- Measure: "Percent of Person-Miles Traveled that are Reliable"
  - Higher is better
- The calculated targets exclude 2020 and 2021.
  - Forecast identifies no increase (flat) to travel time reliability interstates.

Target Setting: Interstate Travel Time Reliability

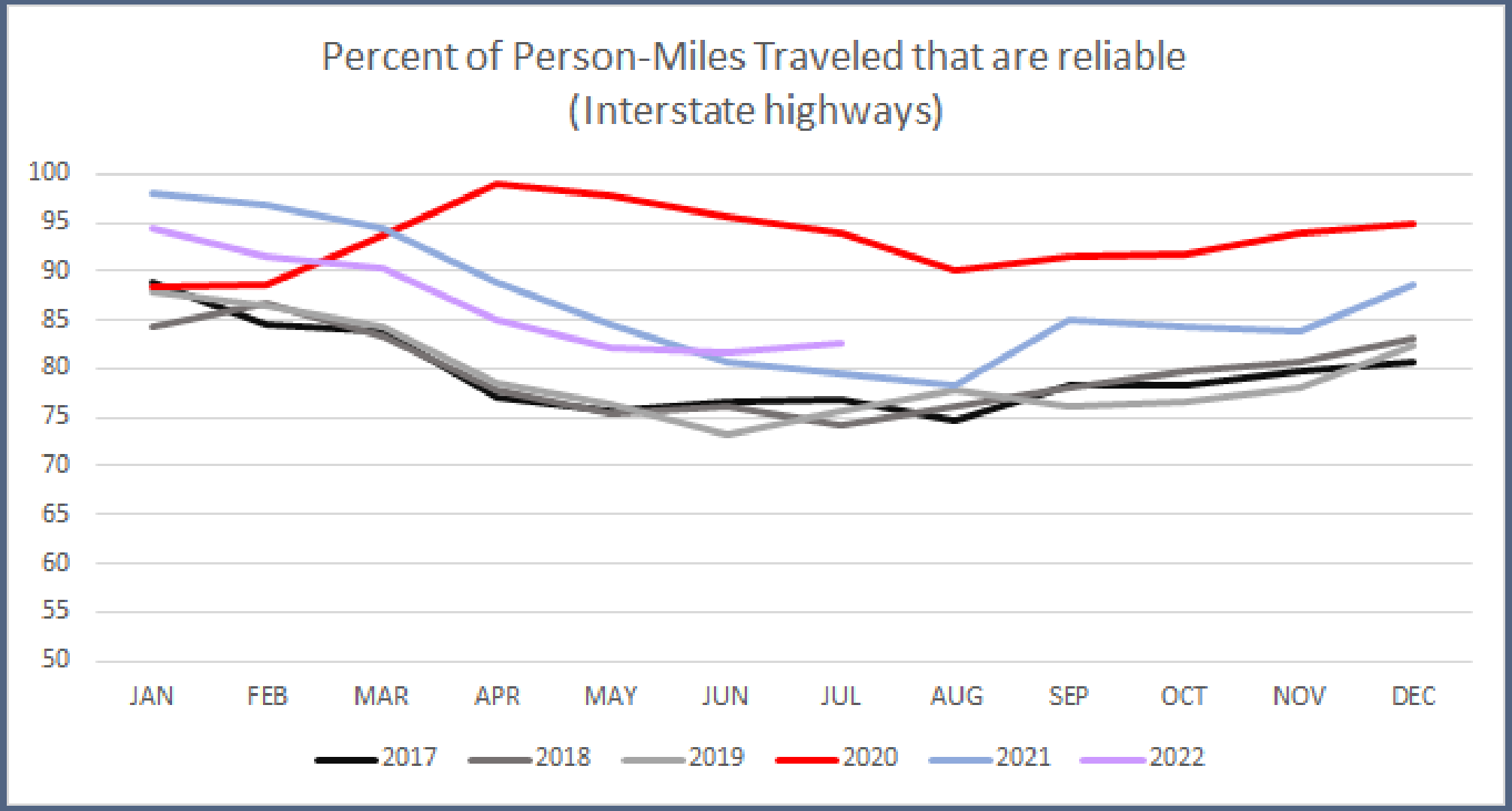
Data Source: *NPMRDS INRIX*
Forecast Method: *Linear*

Website	Description
https://npmrds.ritis.org/analytics/	Provide yearly and monthly data of interstate travel time reliability. We use the "Map-21" widget to generate data for Connecticut and each UZA. Data is for interstates only.

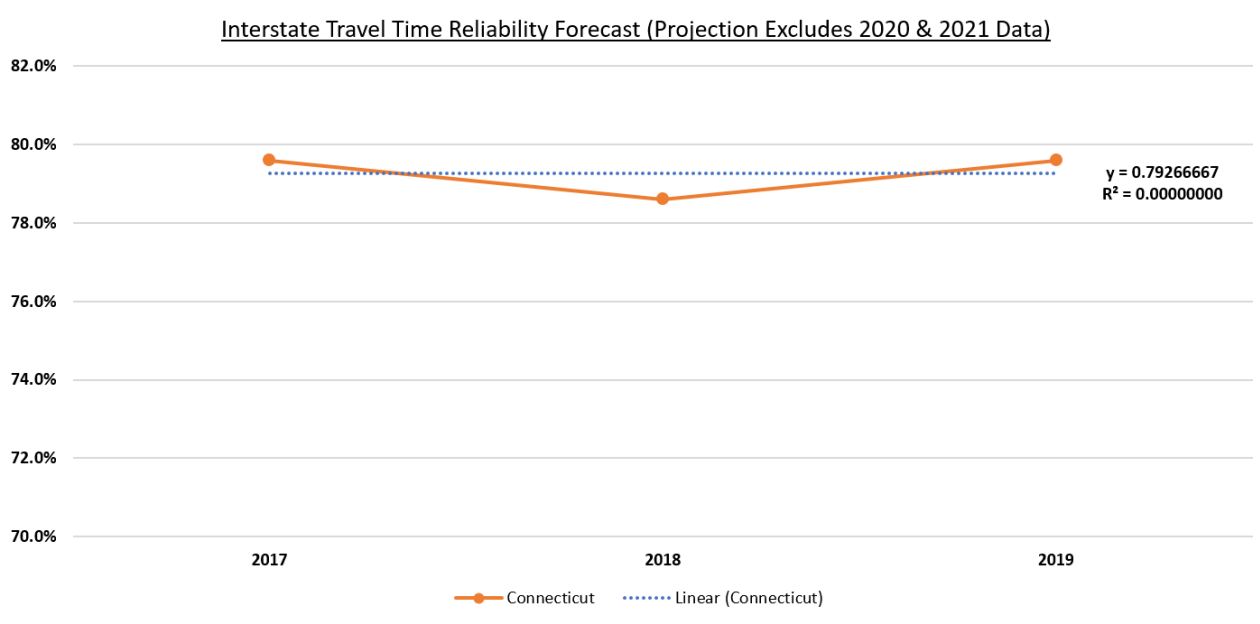
		Last Three Years			Baseline	EXEMPT	2Y Target	FORECAST (Excludes 2020 & 2021)		4Y Target	
Yearly TTTRI		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Statewide	*Connecticut*	79.6%	78.6%	79.6%	94.4%	86.2%	*79.3%*	*79.3%*	*79.3%*	*79.3%*	*79.3%*

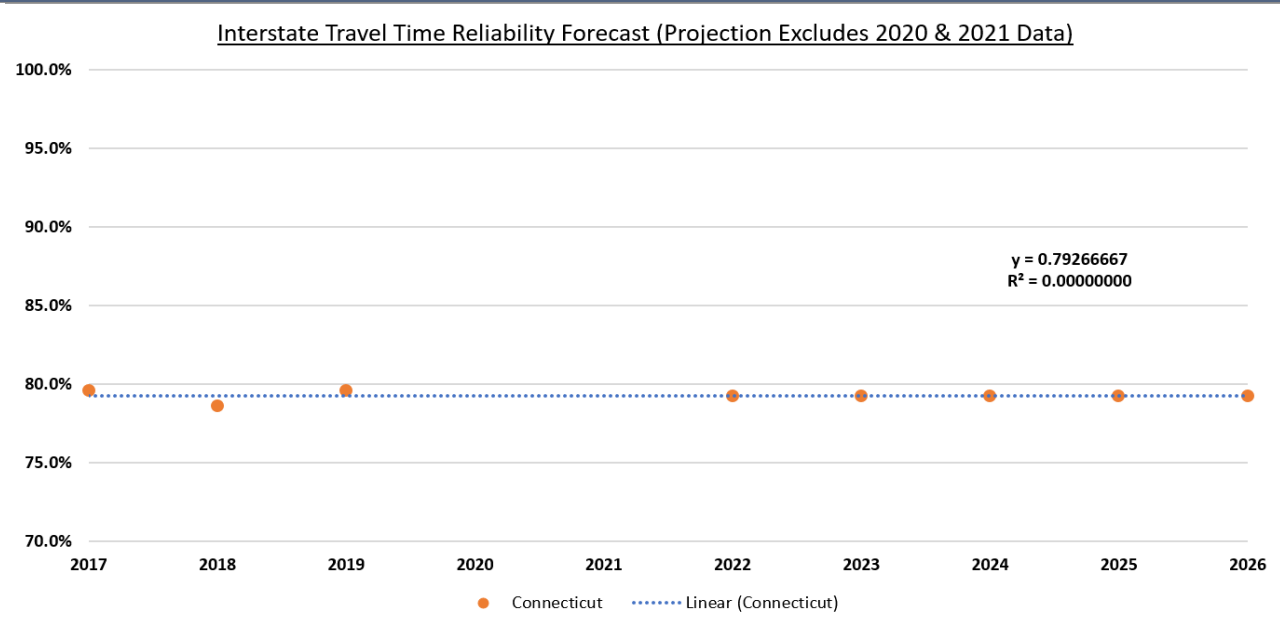


Travel Time Reliability Monthly Trends (Interstates)



Travel Time Reliability Forecast Model (Interstates)





Travel Time Reliability Targets (Interstates)

Interstate Travel Time Reliability								
Forecast Method: *Linear*			Data Source: *NPMRDS*					
					Baseline			
Yearly PHED	**Last Three Years**			**Exempt**		**2-Year Target**	**4-Year Target**	
Statewide	2017	2018	2019	*2020*	*2021*	**2023**	**2025**	**Reason for Recommended Targets**
Connecticut	79.6%	78.6%	79.6%	94.4%	86.2%	79.3%	79.3%	We propose to select a number on the low range of the observed trends prior to COVID-19. The p-value in the regression is 0.95, which signifies low confidence in the equation. The coefficient is 0.7, which correlates to the low confidence in the value. PHED and VMT will be increasing in the trends, as this should follow suit as well.
			Recommended Targets			***78.6%***	***78.6%***	

Travel Time Reliability Forecast (Non-Interstates)

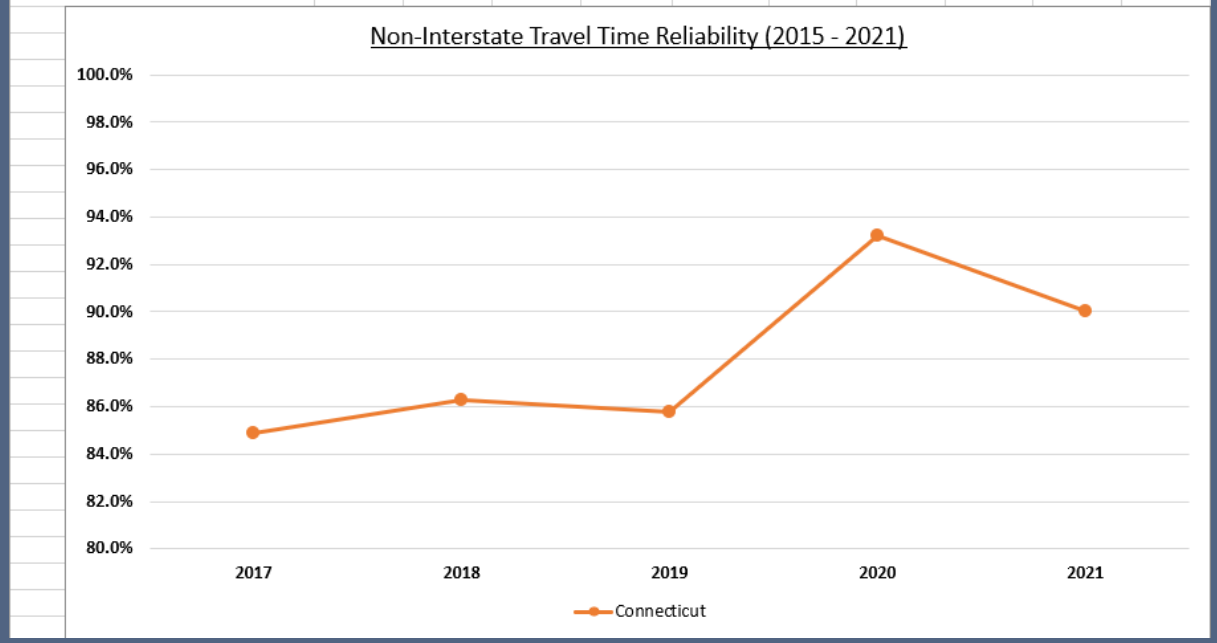
- Measure: "Percent of Person-Miles Traveled that are Reliable"
  - Higher is better
- The calculated targets exclude 2020 and 2021.
  - Forecast identifies a gradual increase to TTR non-interstates.

Target Setting: Non-Interstate Travel Time Reliability

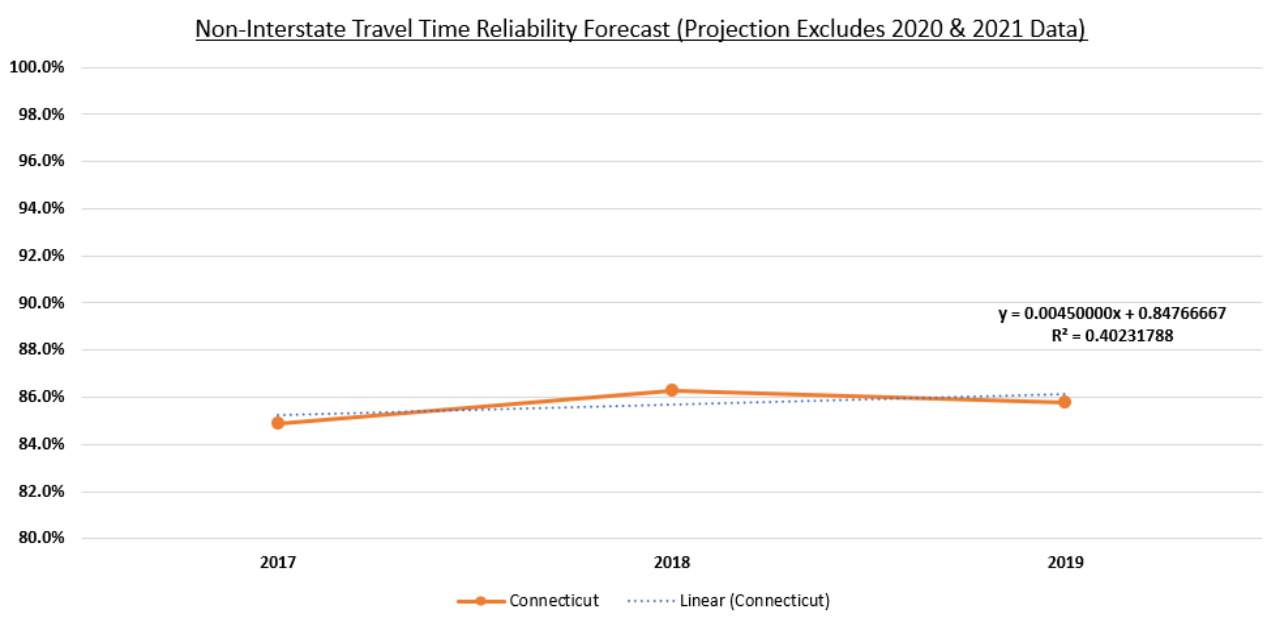
Data Source: *NPMRDS INRIX*
Forecast Method: *Linear*

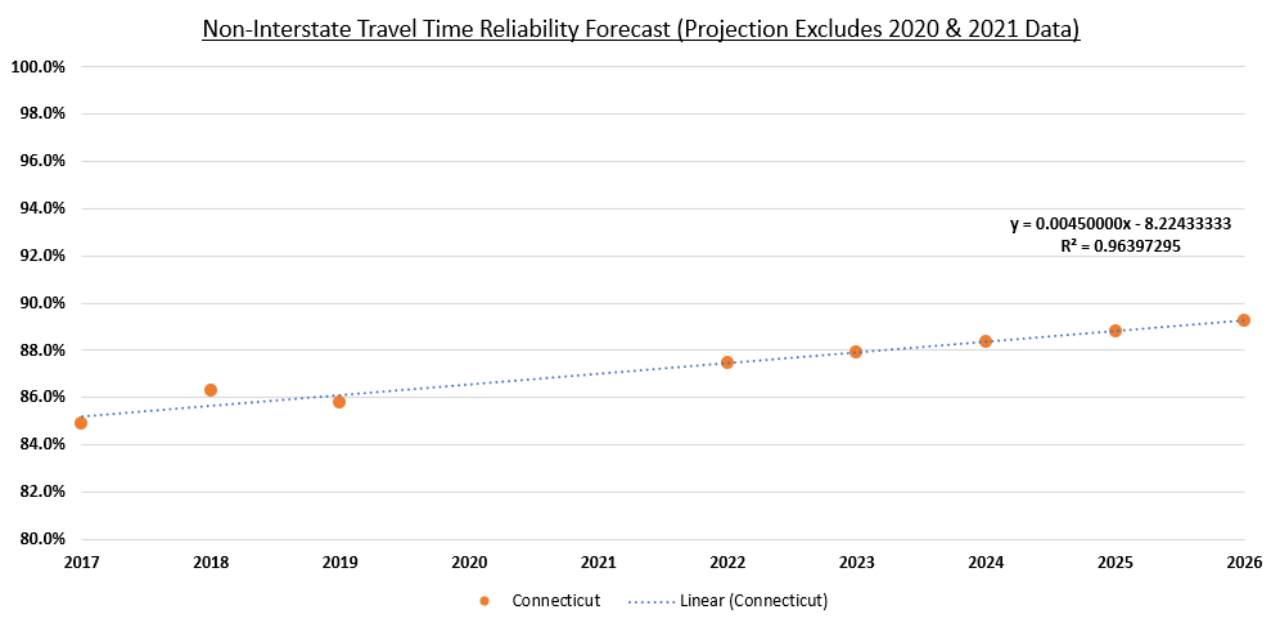
Website	Description
https://npmrds.ritis.org/analytics/	Provide yearly and monthly data of non-interstate travel time reliability. We use the "Map-21" widget to generate data for Connecticut and each UZA. Data is for non-interstates only.

		Last Three Years			Baseline	EXEMPT	2Y Target	FORECAST (Excludes 2020 & 2021)		4Y Target	
	Yearly TTTRI										
	Statewide	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025*	*2026*
	Connecticut	84.9%	86.3%	85.8%	93.2%	90.0%	*87.5%*	*87.9%*	*88.4%*	*88.8%*	*89.3%*



Travel Time Reliability Forecast Model (Non-Interstates)





Travel Time Reliability Targets (Non-Interstates)

Non-Interstate Travel Time Reliability								
Forecast Method: *Linear*			Data Source: *NPMRDS*					
					Baseline			
Yearly PHED	**Last Three Years**			**Exempt**		**2-Year Target**	**4-Year Target**	
Statewide	2017	2018	2019	*2020*	*2021*	**2023**	**2025**	**Reason for Recommended Targets**
Connecticut	84.9%	86.3%	85.8%	93.2%	90.0%	87.9%	88.8%	We propose to select a number on the low range of the observed trends prior to COVID-19. The linear regression has a low confidence projection (p-value is 0.59). Commuting trends will show increase to VMT and PHED. As a result, TTR should reflect that.
			Recommended Targets			***84.9%***	***84.9%***	

Truck Travel Time Reliability (TTTR)

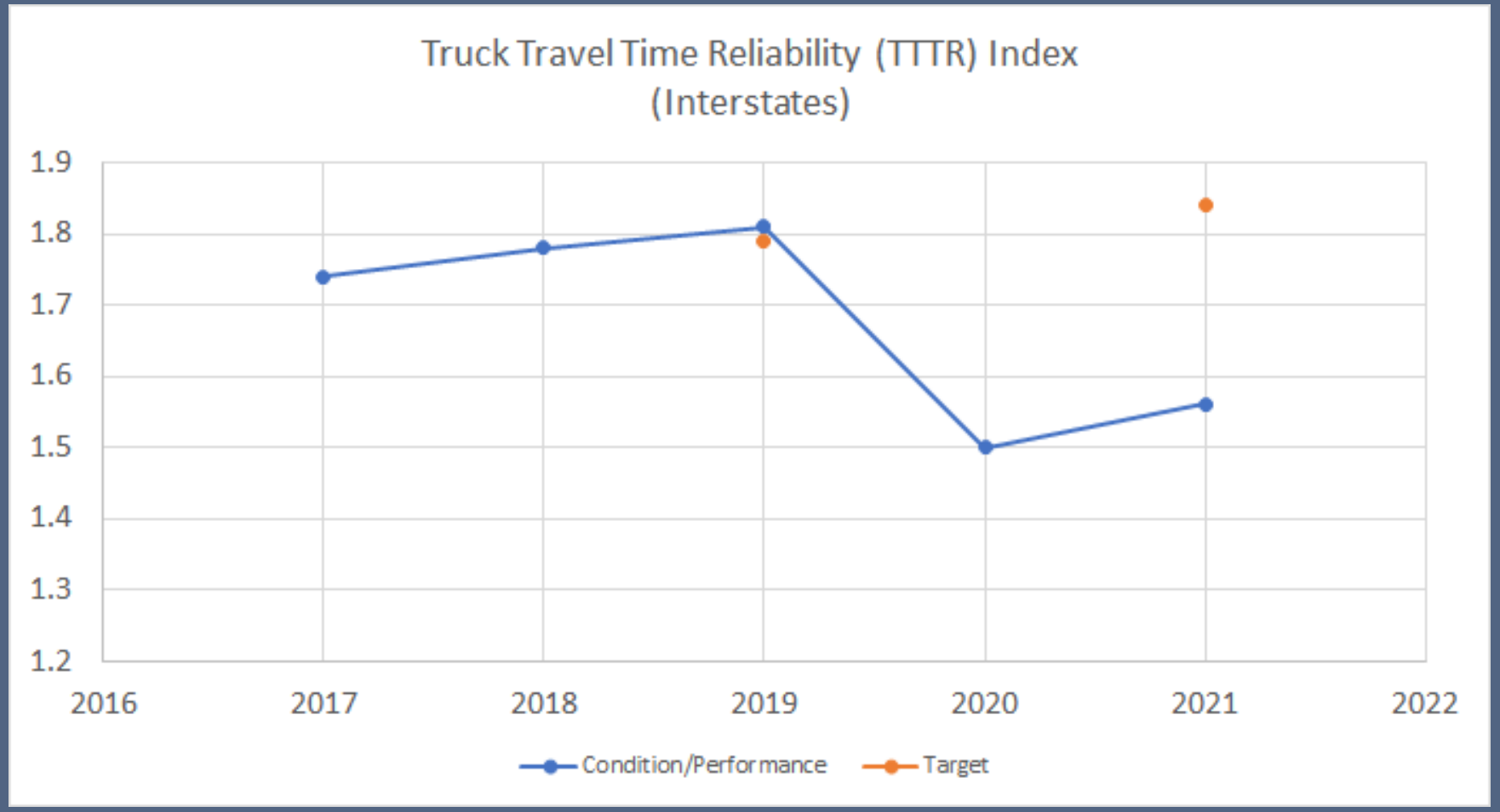
Overview of the two & four-year targets

Photo Credit: JJBers, Flickr

What is Truck Travel Time Reliability?

- Truck Travel Time Reliability (TTTR) index is the measure of travel time reliability on the interstate system.
- The measure focuses on freight movement through five periods:
  - Weekday
    - AM Peak (6am – 10am)
    - Midday (10am – 4pm)
    - PM Peak (4pm – 8pm)
  - Weekend
    - Day (6am – 8pm)
    - Overnight (8pm – 6am)
- Truck Travel Time Reliability (TTTR) index is a ratio: 95th percentile / 50th percentile.
  - Calculated for each segment.
  - Higher is worse

Truck Travel Time Reliability - Interstate (met target)



Truck Travel Time Reliability Forecast

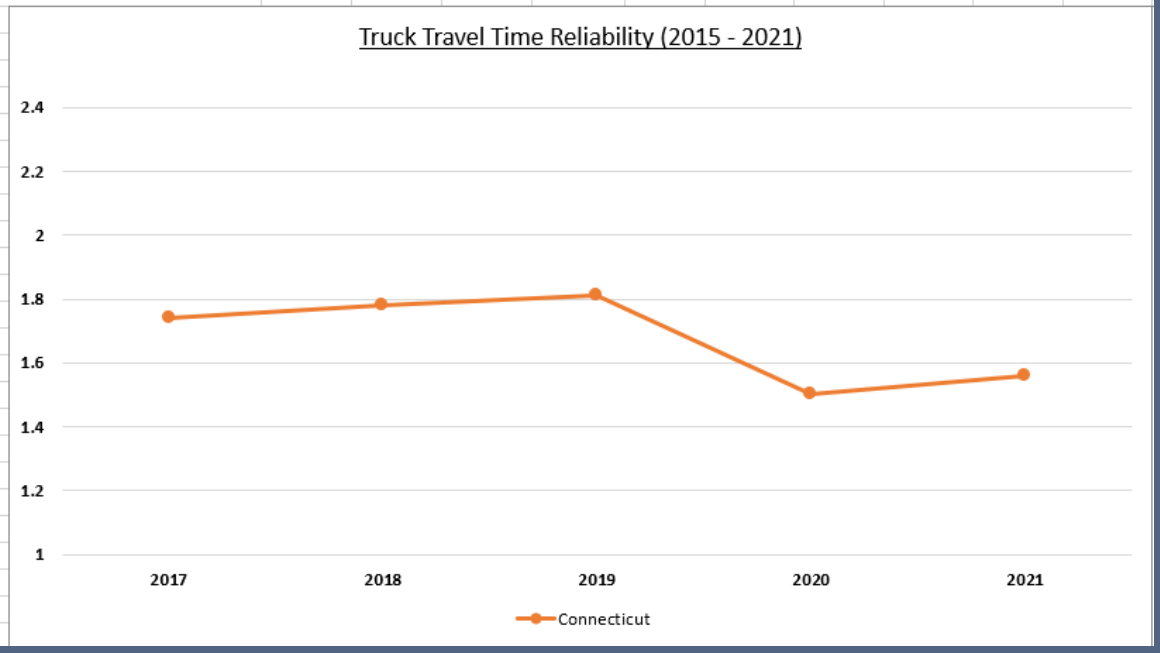
- The calculated targets exclude 2020 and 2021.
  - Forecast identifies an increase to Truck Travel Time Reliability.

Target Setting: Truck Travel Time Reliability

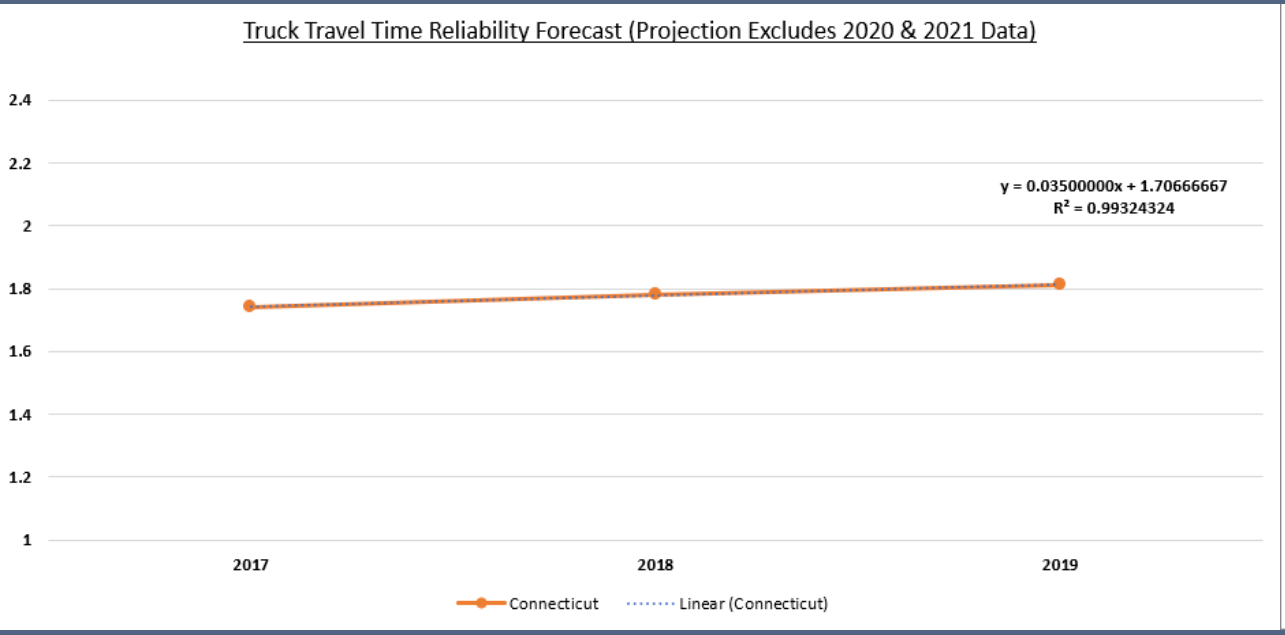
Data Source: *NPMRDS INRIX*
Forecast Method: *Linear*

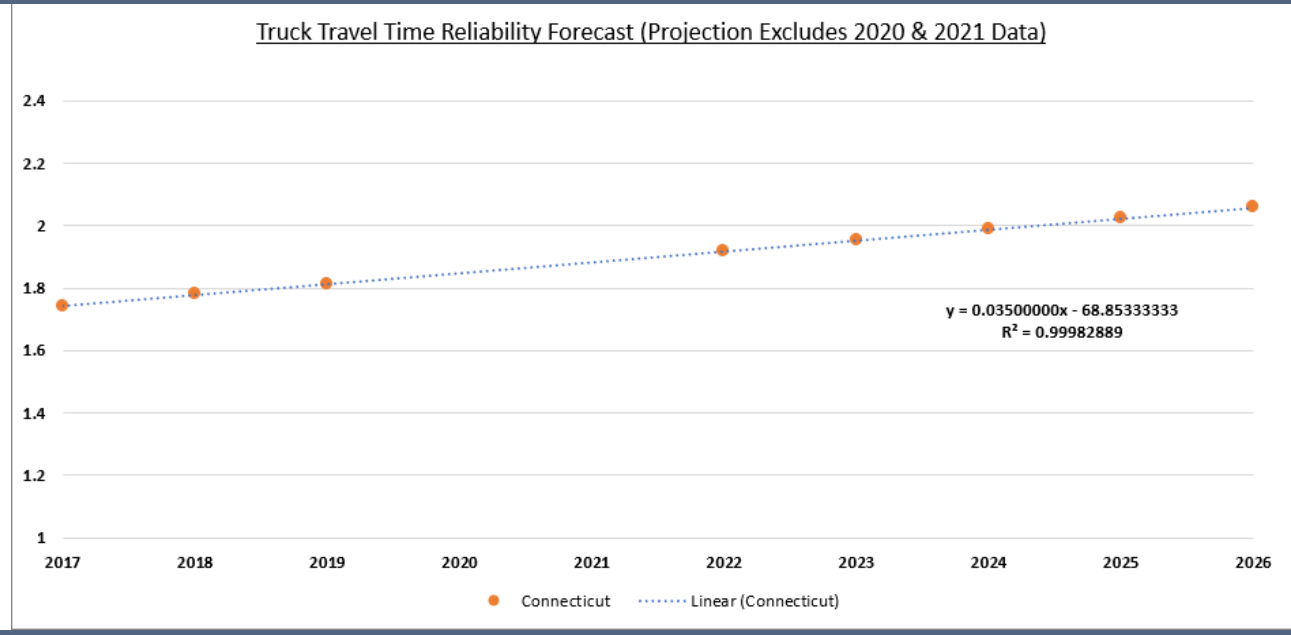
Website	Description
https://npmrds.ritis.org/analytics/	Provide yearly and monthly data of truck travel time reliability. We use the "Map-21" widget to generate data for Connecticut and each UZA. Data is for interstates only.

				Baseline		2Y Target			4Y Target	
Yearly TTTRI	Last Three Years			EXEMPT		FORECAST (Excludes 2020 & 2021)				
Statewide	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025*	*2026*
Connecticut	1.74	1.78	1.81	1.50	1.56	*1.92*	*1.95*	*1.99*	*2.02*	*2.06*



Truck Travel Time Reliability Forecast Model





Truck Travel Time Reliability Targets

Truck Travel Time Reliability

Forecast Method: *Linear* | Data Source: *NPMRDS*

						Baseline		
Yearly PHED	**Last Three Years**			**Exempt**		**2-Year Target**	**4-Year Target**	
Statewide	2017	2018	2019	*2020*	*2021*	**2023**	**2025**	**Reason for Recommended Targets**
	1.74	1.78	1.81	1.5	1.56	1.95	2.02	We propose to keep this target as the p-value is 0.05 and the coefficient is less than 0.01 on the regression. Despite the improvements on the interstate system, there will be truck bottlenecks in southwestern and southeastern Connecticut. Construction delays will occur at Gold Star Bridge and in Waterbury (mixmaster). VMT and PHED increasing also signifies additional delays trucks will face when traveling in the state.
Connecticut			***Recommended Targets***			***1.95***	***2.02***	

UZA Performance Measures

Summary of Connecticut's six Urbanized Areas

Peak Hour Excessive Delay

Non-Single Occupancy Vehicle

Photo Credit: CTDOT

The Six UZAs

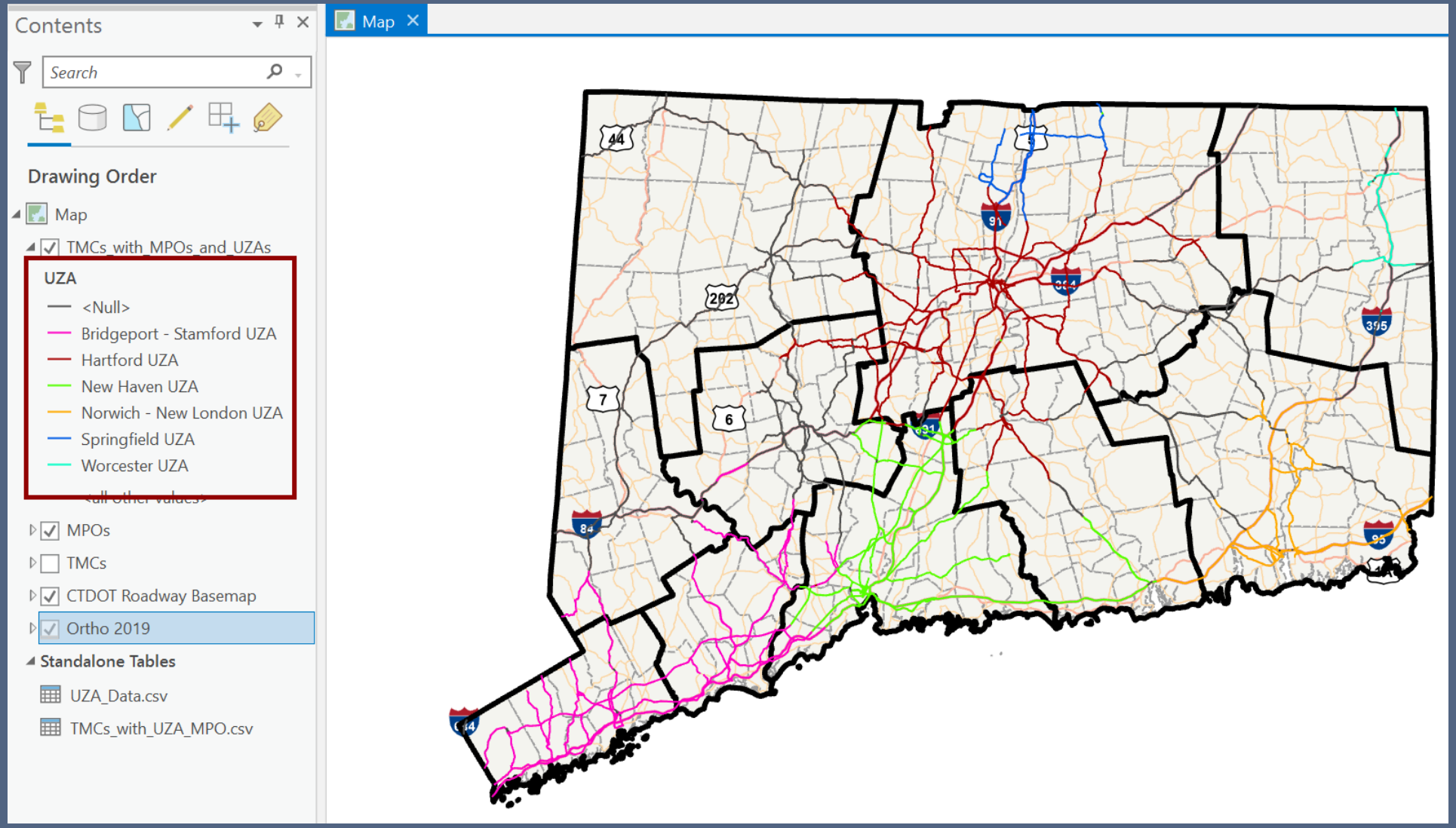
Overview of the six urbanized areas

Photo Credit: CTDOT

Connecticut's Six Urbanized Areas

- Connecticut has six urbanized areas with a population of 200,000 or more:
  - Hartford
  - New Haven
  - Bridgeport – Stamford
  - Norwich – New London (includes portion of RI)
  - Springfield (shared with MASSDOT)
  - Worcester (shared with MASSDOT)

Connecticut's Six Urbanized Areas



Peak Hour Excessive Delay (PHED)

Overview of the two & four-year targets

Photo Credit: Alex Azabache, Pexels

What is Peak Hour Excessive Delay?

- Peak Hour Excessive Delay (PHED) is the measurement of additional delay over the regular delay in rush hour.
  - PHED is calculated by per capita.
    - We analyze Connecticut's peak hours of:
      - 6 – 10am
      - 3 – 7pm
- Reporting of PHED in urbanized areas are applicable in areas with a population of 200,000 and above.

PHED Forecast

- The calculated targets exclude 2020 and 2021.
- MASSDOT is taking the lead for the Springfield and Worcester UZAs.
- CTDOT created a Dashboard for each UZA containing:
  - PHED by speed limit.
  - PHED by TMC segments.

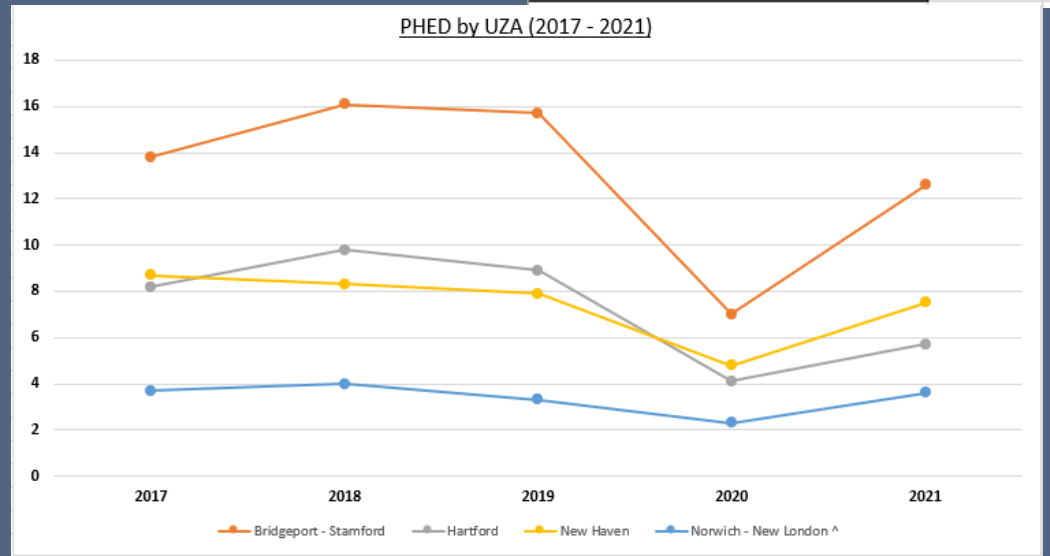
Target Setting: Peak Hour Excessive Delay (PHED)

Data Source: *NPMRDS INRIX*
Forecast Method: *Linear*

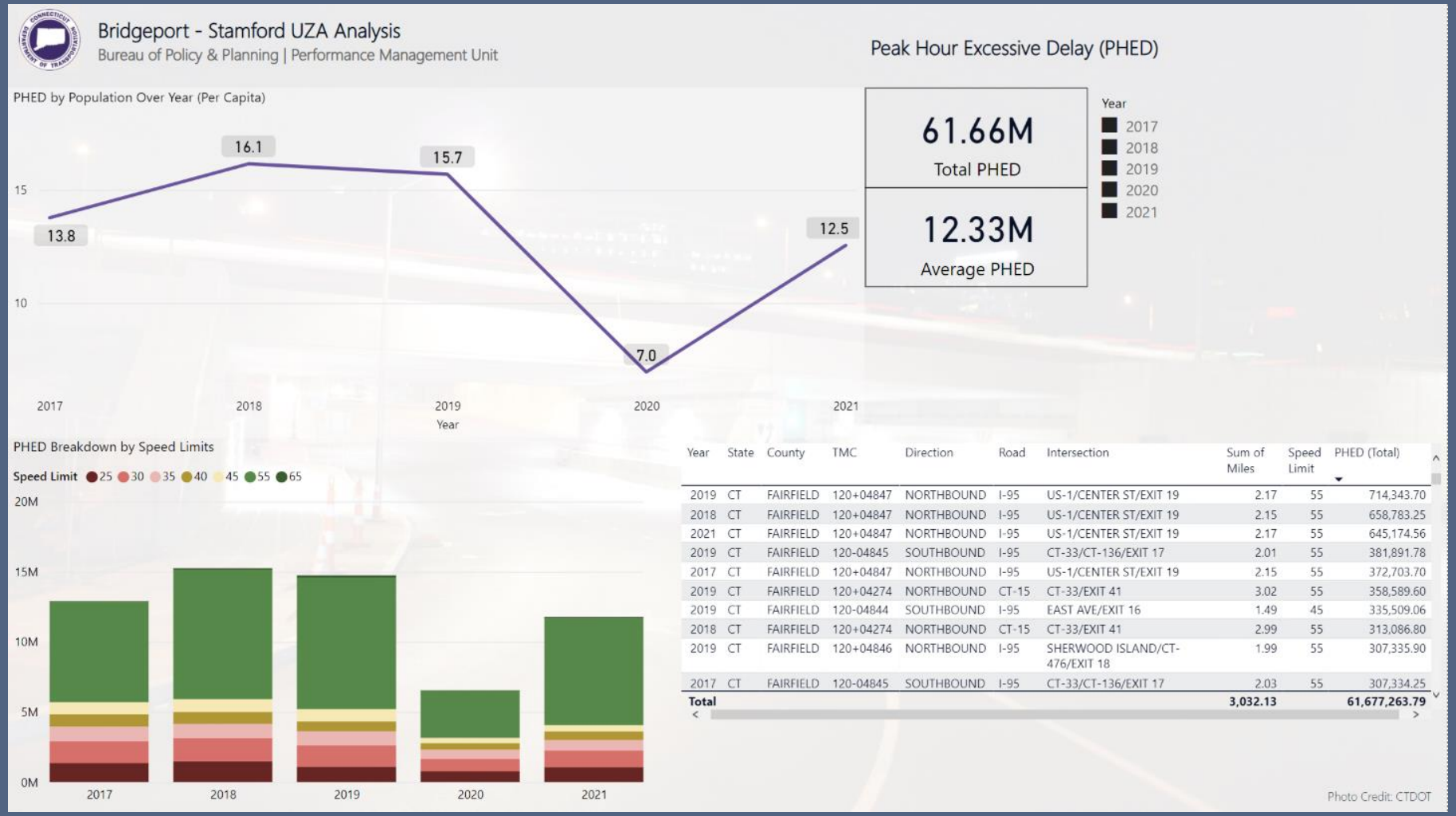
Website	Description
https://npmrds.ritis.org/analytics/	Provide yearly and monthly data for PHED. We use the "Map-21" widget to generate data for each UZA. Data is only for urbanized areas only.

				Baseline		2Y Target		4Y Target		
Yearly PHED	Last Three Years			EXEMPT		FORECAST (excludes 2020 & 2021)				
Urbanized Areas	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025*	*2026*
Bridgeport - Stamford	*13.8*	*16.1*	*15.7*	*7.0*	*12.6*	*19.0*	*20.0*	*20.9*	*21.9*	*22.8*
Hartford	*8.2*	*9.8*	*8.9*	*4.1*	*5.7*	*10.4*	*10.7*	*11.1*	*11.4*	*11.8*
New Haven	*8.7*	*8.3*	*7.9*	*4.8*	*7.5*	*6.7*	*6.3*	*5.9*	*5.5*	*5.1*
Norwich - New London ^	*3.7*	*4.0*	*3.3*	*2.3*	*3.6*	*2.9*	*2.7*	*2.5*	*2.3*	*2.1*

Legend
^ = Shared UZA with RIDOT



PHED Example Analysis by UZA

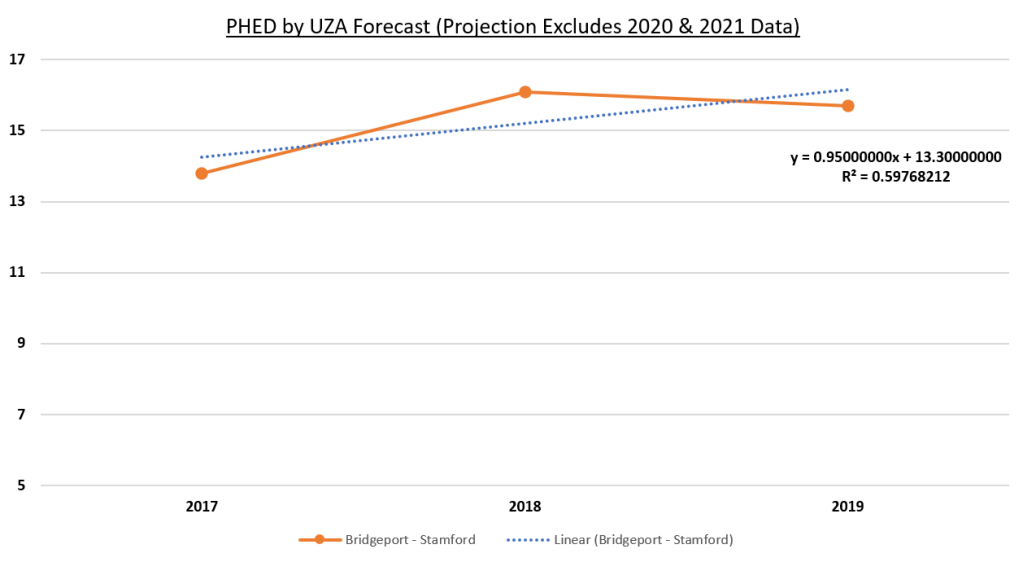


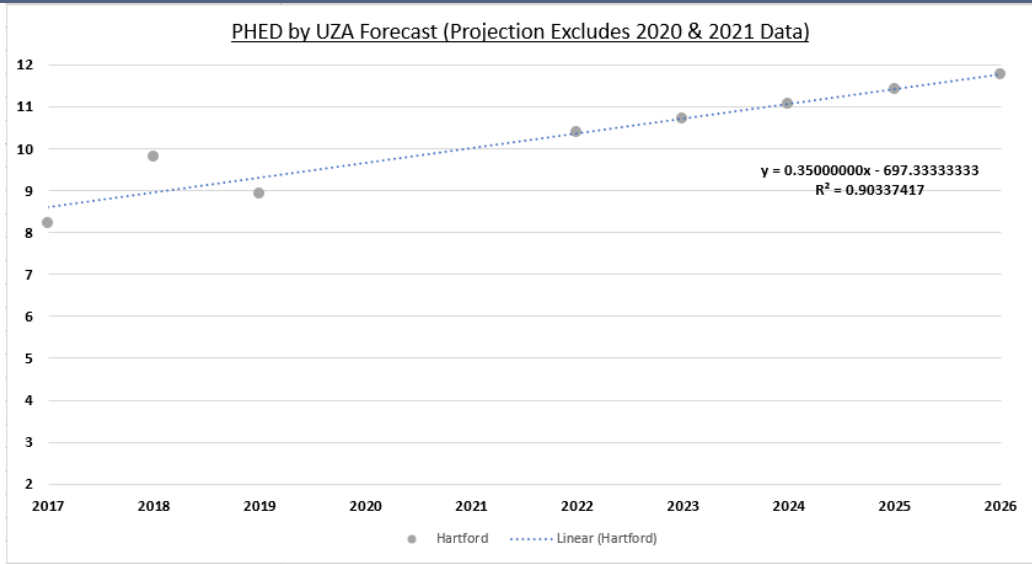
Year	State	County	TMC	Direction	Road	Intersection	Sum of Miles	Speed Limit	PHED (Total)
2019	CT	FAIRFIELD	120+04847	NORTHBOUND	I-95	US-1/CENTER ST/EXIT 19	2.17	55	714,343.70
2018	CT	FAIRFIELD	120+04847	NORTHBOUND	I-95	US-1/CENTER ST/EXIT 19	2.15	55	658,783.25
2021	CT	FAIRFIELD	120+04847	NORTHBOUND	I-95	US-1/CENTER ST/EXIT 19	2.17	55	645,174.56
2019	CT	FAIRFIELD	120-04845	SOUTHBOUND	I-95	CT-33/CT-136/EXIT 17	2.01	55	381,891.78
2017	CT	FAIRFIELD	120+04847	NORTHBOUND	I-95	US-1/CENTER ST/EXIT 19	2.15	55	372,703.70
2019	CT	FAIRFIELD	120+04274	NORTHBOUND	CT-15	CT-33/EXIT 41	3.02	55	358,589.60
2019	CT	FAIRFIELD	120-04844	SOUTHBOUND	I-95	EAST AVE/EXIT 16	1.49	45	335,509.06
2018	CT	FAIRFIELD	120+04274	NORTHBOUND	CT-15	CT-33/EXIT 41	2.99	55	313,086.80
2019	CT	FAIRFIELD	120+04846	NORTHBOUND	I-95	SHERWOOD ISLAND/CT-476/EXIT 18	1.99	55	307,335.90
2017	CT	FAIRFIELD	120-04845	SOUTHBOUND	I-95	CT-33/CT-136/EXIT 17	2.03	55	307,334.25
Total							**3,032.13**		**61,677,263.79**

[Link to PHED Dashboard]

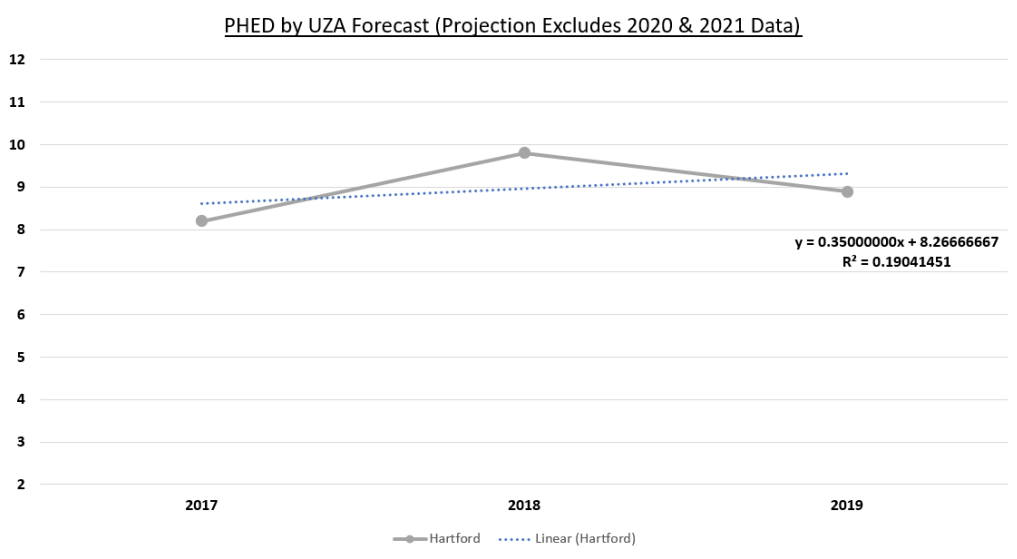
PHED Forecast Model

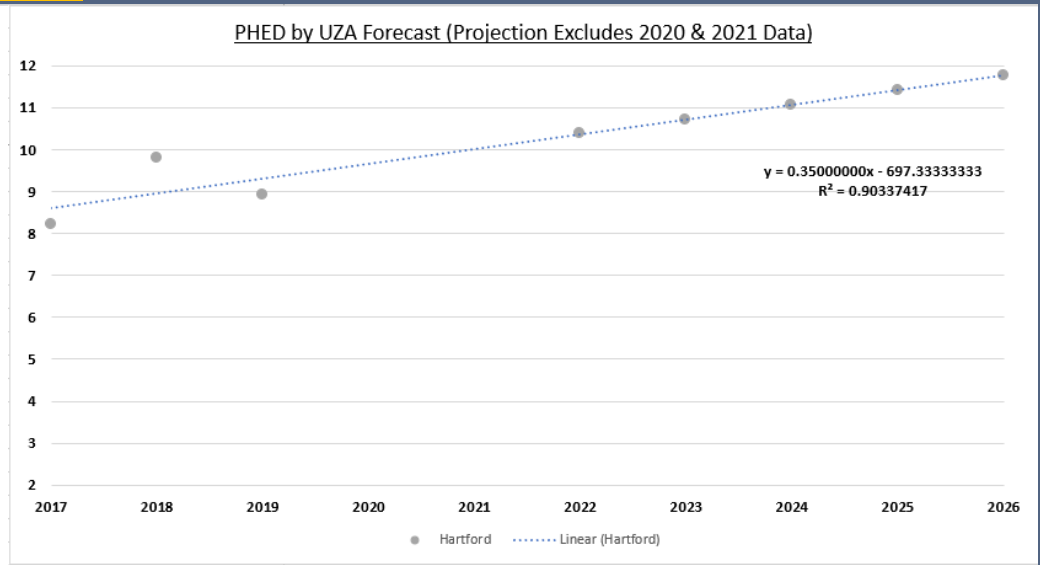
Bridgeport - Stamford





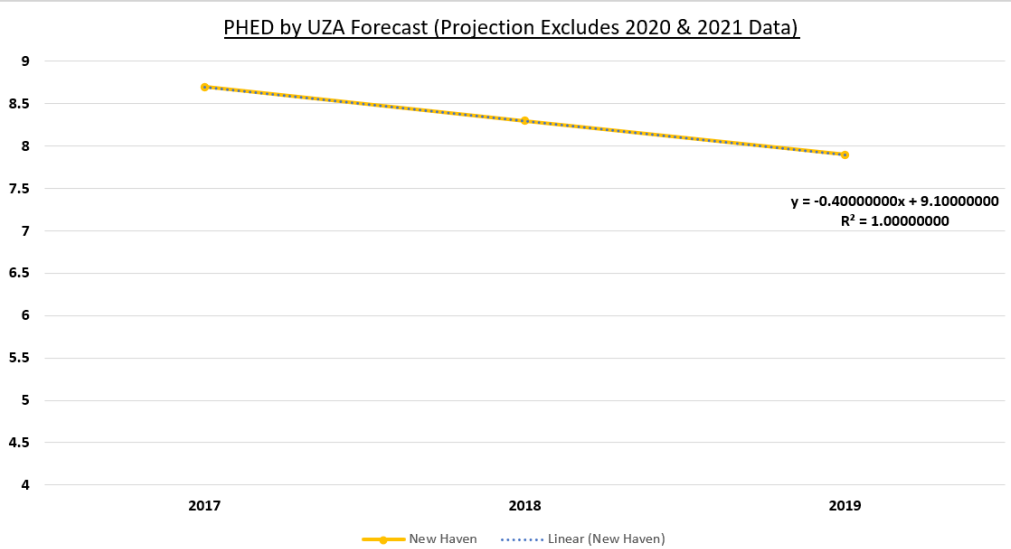
Hartford

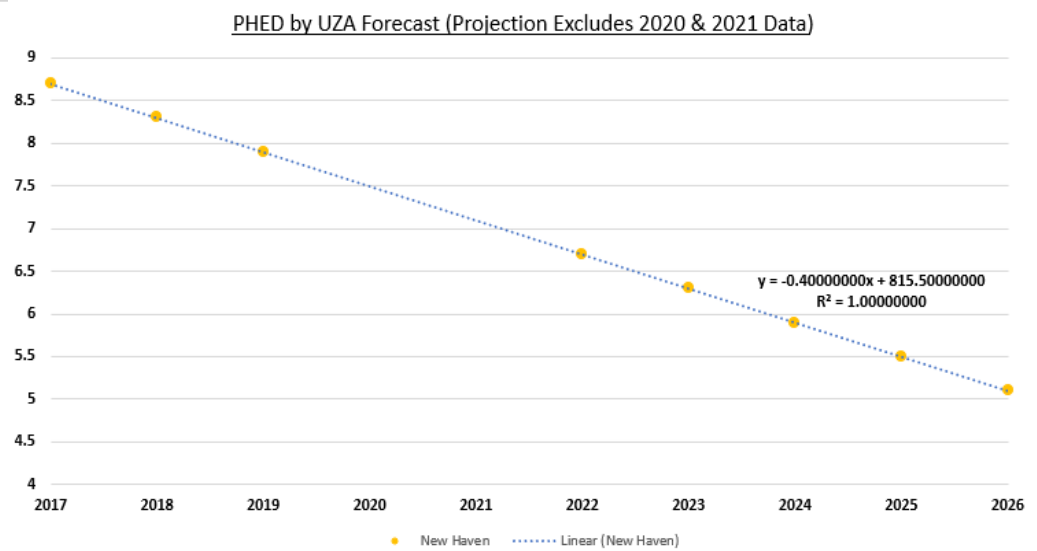




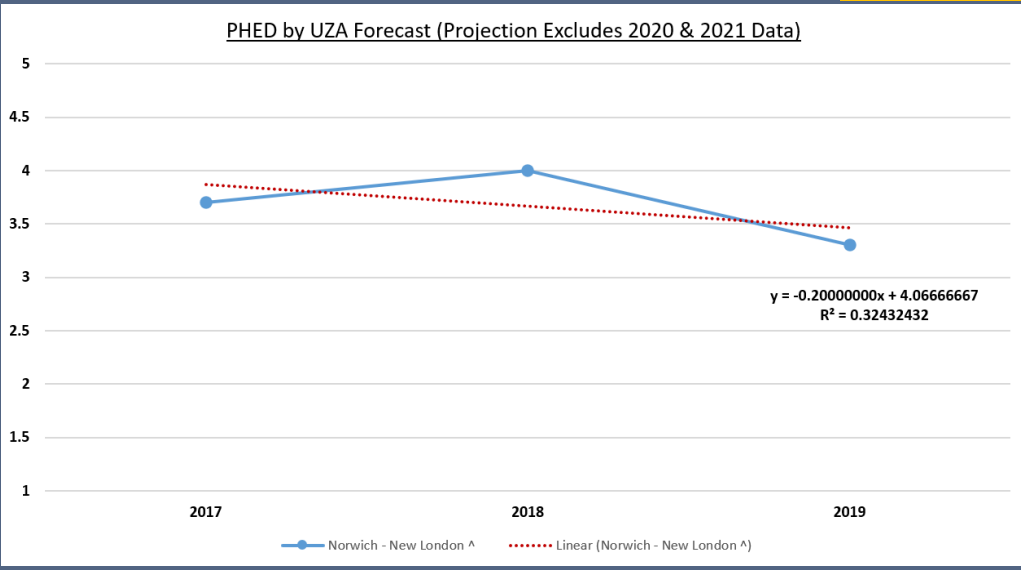
PHED Forecast Model

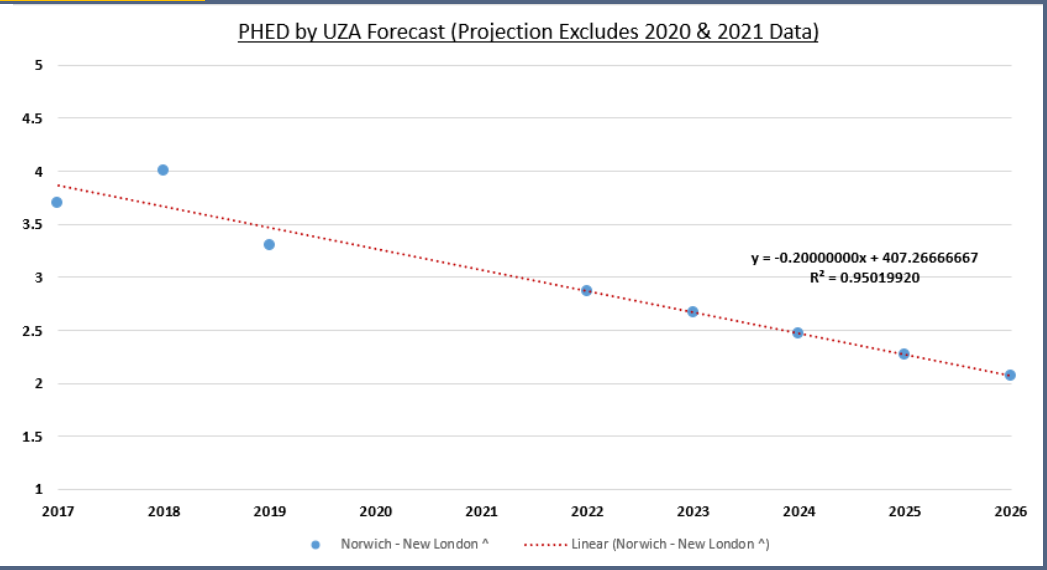
New Haven





Norwich - New London





PHED Targets

Peak Hour Excessive Delay (PHED)

Forecast Method: *Linear* | Data Source: *NPMRDS*

Yearly PHED	Last Three Years			Exempt		Baseline 2-Year Target	4-Year Target	Reason for Recommended Targets
Urbanized Area	2017	2018	2019	*2020*	*2021*	**2023**	**2025**	
Bridgeport - Stamford	13.8	16.1	15.7	7.0	12.6	20.0	21.9	We propose 20 and 21.9 for the targets. The trend is increasing in PHED. In addition, the calculated p-value is 0.43 for the regression analysis. We expect further congestion along I-95 and the Merritt Parkway.
			Recommended Targets			***20.0***	***21.9***	
Hartford	*8.2*	*9.8*	*8.9*	*4.1*	*5.7*	10.7	11.4	Despite the signifcant decrease to PHED in 2020 and 2021, our approach is to select a number on the high range of the observed trends prior to COVID-19. The calculated p-value for the regression is 0.71, which gives us a low confidence in the model's projection of the 10.7 and 11.4 targets.
			Recommended Targets			***9.8***	***9.8***	
New Haven	*8.7*	*8.3*	*7.9*	*4.8*	*7.5*	6.3	5.5	We propose 7.9. We do not think the decreasing trends will continue despite a definitive decreases. The Hartford line opened in 2018, which caused a decrease into 2019. In addition, the completion of the "Q" bridge project influenced the PHED.
			Recommended Targets			***7.9***	***7.9***	
Norwich - New London ^	*3.7*	*4.0*	*3.3*	*2.3*	*3.6*	2.7	2.3	Approach is to consider a zero slope (flat) projection. Given factors influencing performance, we would select a number on the high range of the observed trends prior to COVID-19.
			Recommended Targets			***4.0***	***4.0***	

Legend

^ = Shared UZA with RIDOT

MassDOT PHED Methodology

Peak Hour Excessive Delay (PHED)

- For 2024 and 2026 Targets:

- Boston UZA – use trendline approach similar to TTR measures, with 3 data points from 2018, 2019 and 2021 (omitting 2020/pandemic outlier)

- Springfield and Worcester UZAs – use the same trendline approach as above. Given data limitations, estimate PHED for 2018 and 2019 based on comparisons with Boston value for 2021
  (assumption that Springfield and Worcester congestion levels have remained at approximately the same proportions relative to Boston).

MassDOT PHED Methodology

Peak Hour Excessive Delay (Springfield UZA)

Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2018 Total UZA PHED	4,991,623
Mass.	798	756	42	5.3%	Springfield UZA pop. (latest US Census est.)	626,594
CT	144	132	12	8.3%	2018 PHED per capita	7.97
All	942	888	54	5.7%		

Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2019 Total UZA PHED	4,794,329
Mass.	880	814	66	7.5%	Springfield UZA pop. (latest US Census est.)	624,531
CT	166	152	14	8.4%	2019 PHED per capita	7.68
All	1,046	966	80	7.6%		

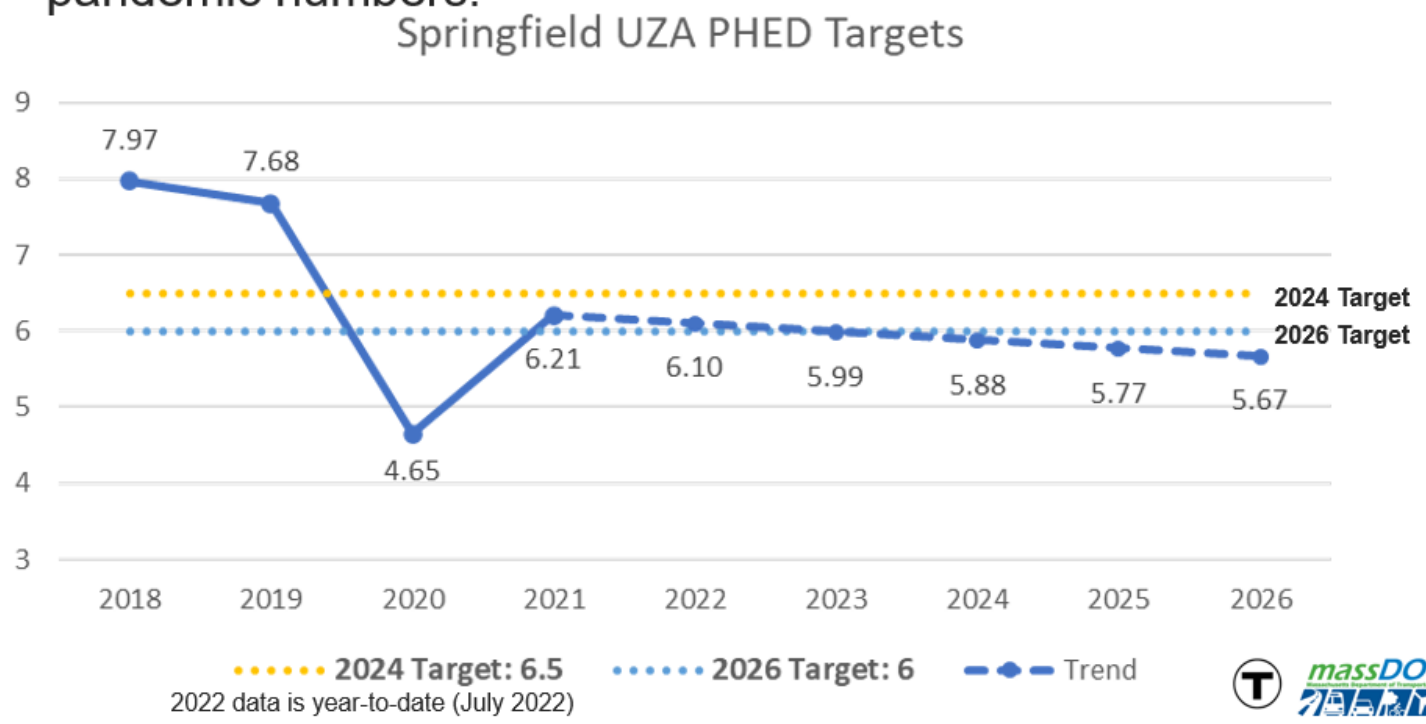
Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2020 Total UZA PHED	2,903,725
Mass.	901	837	64	7.1%	Springfield UZA pop. (latest US Census est.)	623,816
CT	160	146	14	8.8%	2020 PHED per capita	4.65
All	1,061	983	78	7.4%		

Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2021 Total UZA PHED	3,875,700
Mass.	905	847	58	6.4%	Springfield UZA pop. (latest US Census est	623,816
CT	162	143	19	11.7%	2021 PHED per capita	6.21
All	1,067	990	77	7.2%		

MassDOT PHED Methodology

Peak Hour Excessive Delay (Springfield UZA)

- The targets are proposed considering the uncertainty of the trend post-pandemic. A 2024 target of 6.5 sets a target that accounts for uncertainty. A 2026 target of 6 is proposed to both establish an improving target and one that is below pre-pandemic numbers.



MassDOT PHED Methodology

Peak Hour Excessive Delay (Worcester UZA)

Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2018 Total UZA PHED	5,319,662
Mass.	772	729	43	5.6%	Worcester UZA pop. (latest US Census est.)	500,780
CT	74	72	2	2.7%	2018 PHED per capita	10.62
All	846	801	45	5.3%		

Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2019 Total UZA PHED	4,460,548
Mass.	759	711	48	6.3%	Worcester UZA pop. (latest US Census est.)	501,658
CT	75	73	2	2.7%	2019 PHED per capita	8.89
All	834	784	50	6.0%		

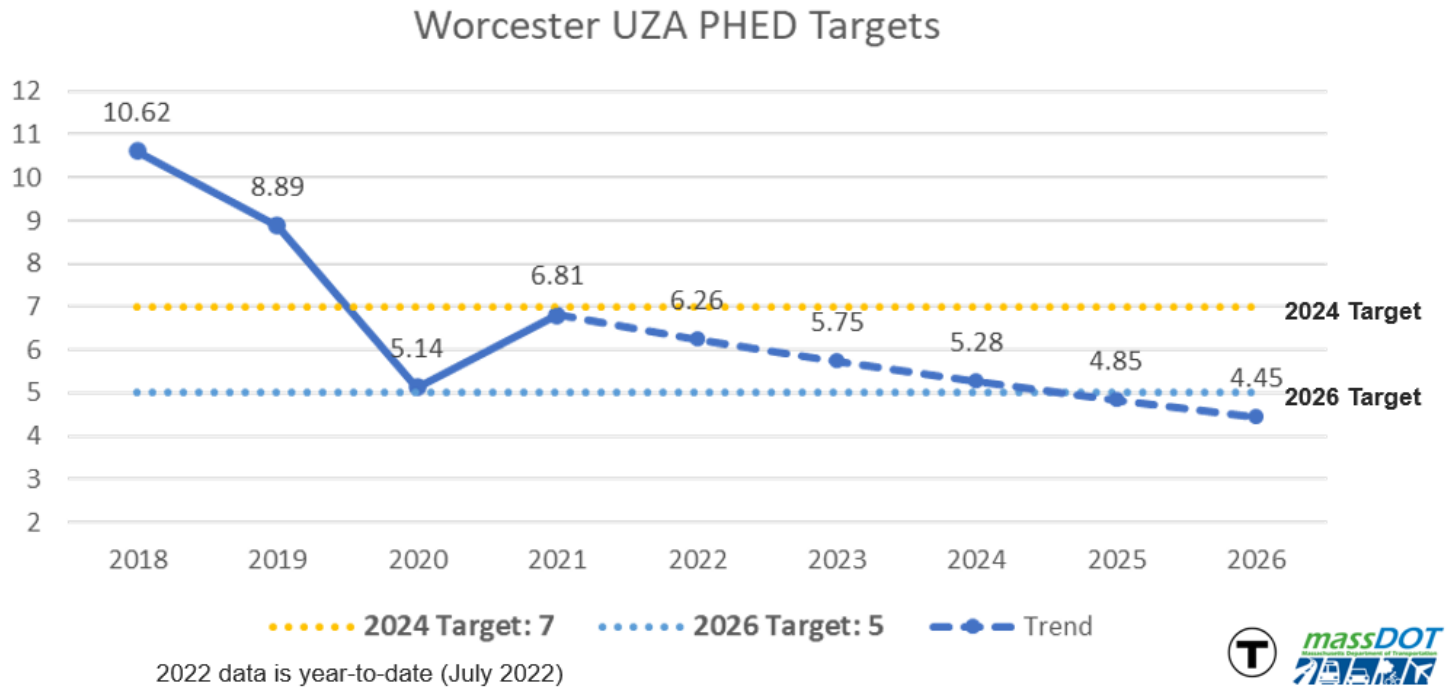
Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2020 Total UZA PHED	2,585,697
Mass.	756	704	52	6.9%	Worcester UZA pop. (latest US Census est.)	502,832
CT	76	68	8	10.5%	2020 PHED per capita	5.14
All	832	772	60	7.2%		

Based on total segments:		PHED status:				
	total	with	0 or null	% 0 or null	2021 Total UZA PHED	3,425,295
Mass.	767	715	52	6.8%	Worcester UZA pop. (latest US Census est.	502,832
CT	75	56	19	25.3%	2021 PHED per capita	6.81
All	842	771	71	8.4%		

MassDOT PHED Methodology

Peak Hour Excessive Delay (Worcester UZA)

- The targets are proposed considering the uncertainty of the trend post-pandemic. A 2024 target of 7 sets a target that accounts for uncertainty. A 2026 target of 5 is proposed to both establish an improving target and one that is below pre-pandemic numbers.



Non-Single Occupancy Vehicle (Non-SOV) Measure

Overview of the two & four-year targets

Photo Credit: Pixabay

What is Non-Single Occupancy Vehicle (non-SOV)?

- Non-SOV is the measure of people commuting to work utilizing the following means, excluding driving alone:
  - Public transportation
  - Carpooling
  - Walking
  - Telework
  - Other means
- To calculate the measure:
  - We use the American Community Survey (ACS 5-Year Estimates).
  - Formula: Non-SOV Travel = 100% - % SOV

Non-SOV Forecast

- The calculated targets exclude 2020.
- MASSDOT is taking the lead for the Springfield and Worcester UZAs.

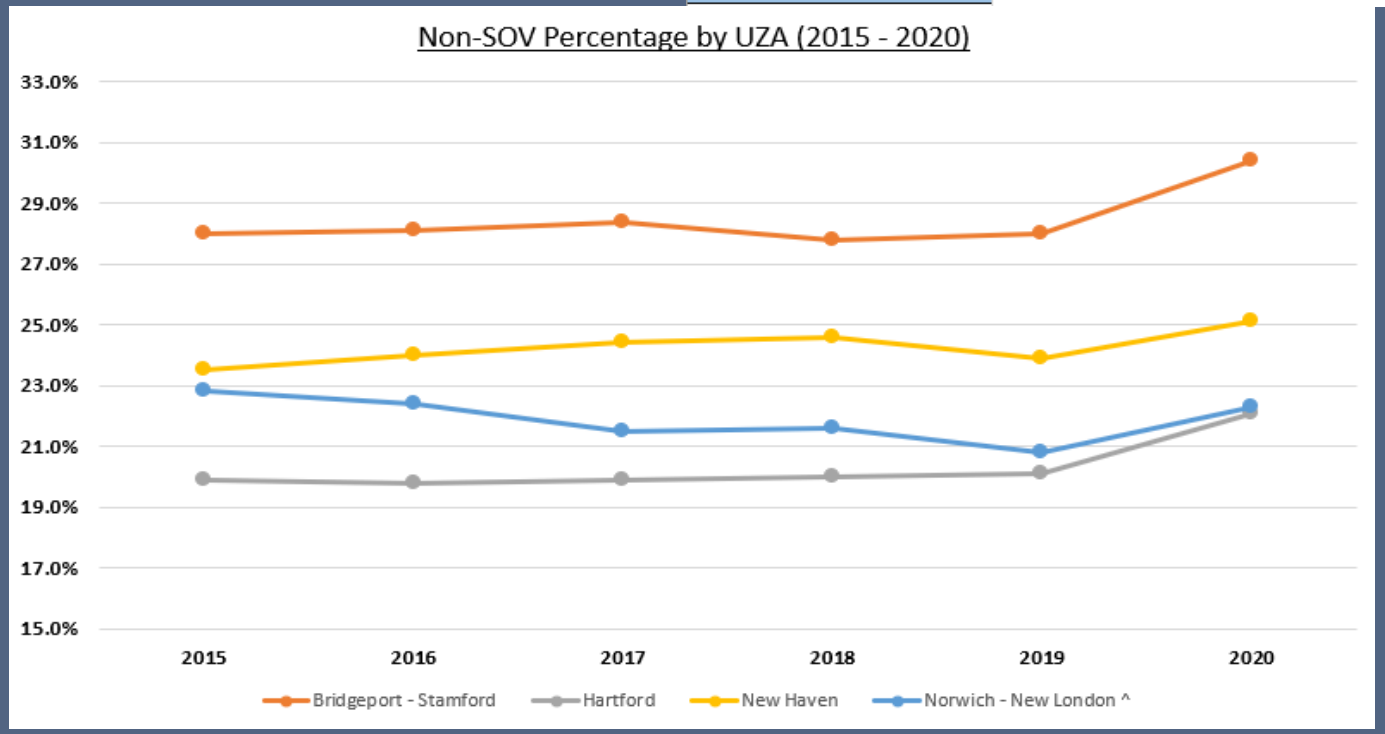
Target Setting: Non-Single Occupancy Vehicle (Non-SOV)

Data Source: *American Community Survey*
Forecast Method: *Linear*

Website	Description
https://data.census.gov/cedsci/	Utilizes the American Community Survey. We use the "DP03" data source for the 5-year estimates. Latest data available to use is 2020.

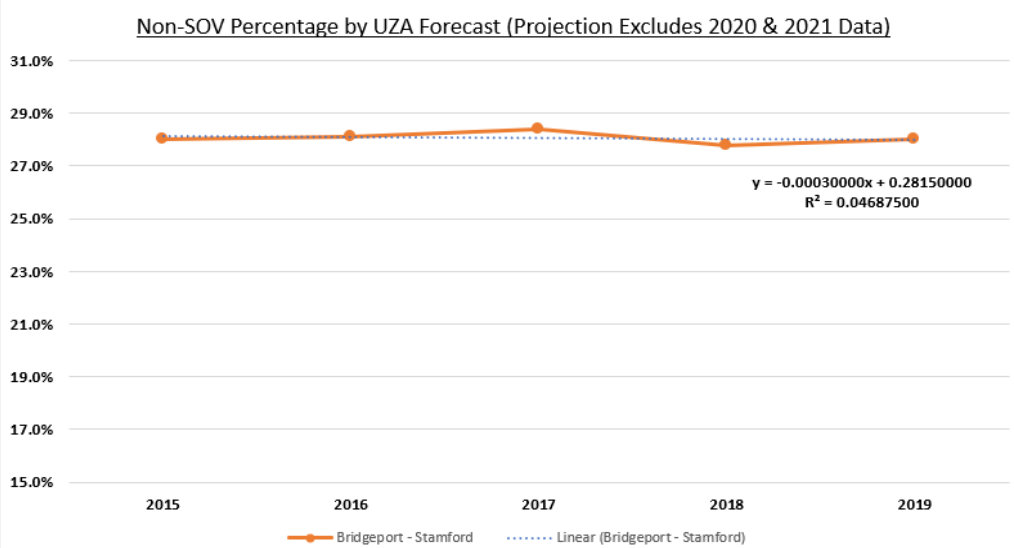
Yearly Non-SOV	Last Five Years					Baseline EXEMPT	FORECASTED	2Y Target FORECAST		4Y Target (Excludes 2020 & 2021)		
Urbanized Areas	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Bridgeport - Stamford	28.0%	28.1%	28.4%	27.8%	28.0%	30.4%	27.9%	27.9%	27.9%	27.9%	27.8%	27.8%
Hartford	19.9%	19.8%	19.9%	20.0%	20.1%	22.1%	20.2%	20.2%	20.3%	20.4%	20.4%	20.5%
New Haven	23.5%	24.0%	24.4%	24.6%	23.9%	25.1%	24.6%	24.8%	24.9%	25.1%	25.2%	25.3%
Norwich - New London ^	22.8%	22.4%	21.5%	21.6%	20.8%	22.3%	19.9%	19.4%	18.9%	18.5%	18.0%	17.5%

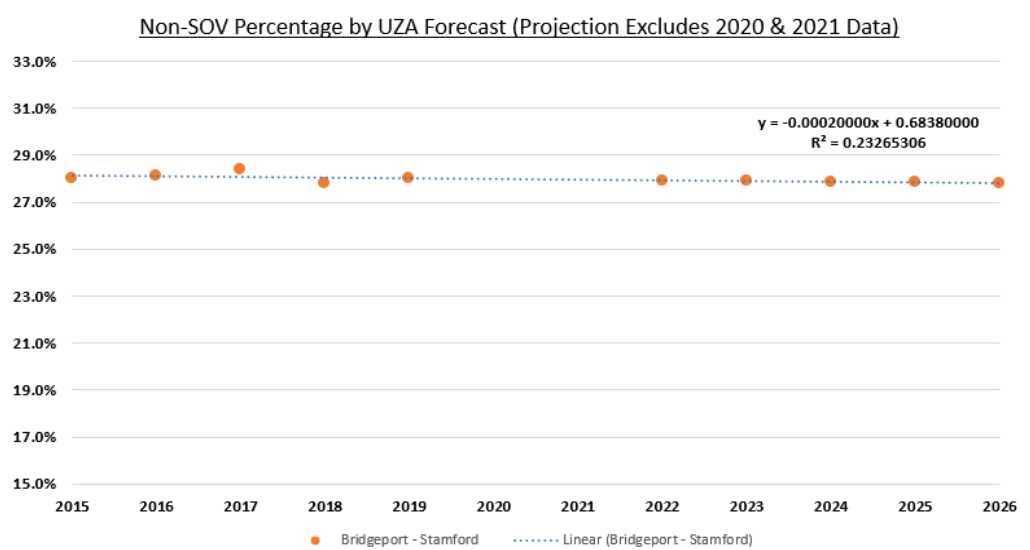
Legend
^ = Shared UZA with RIDOT



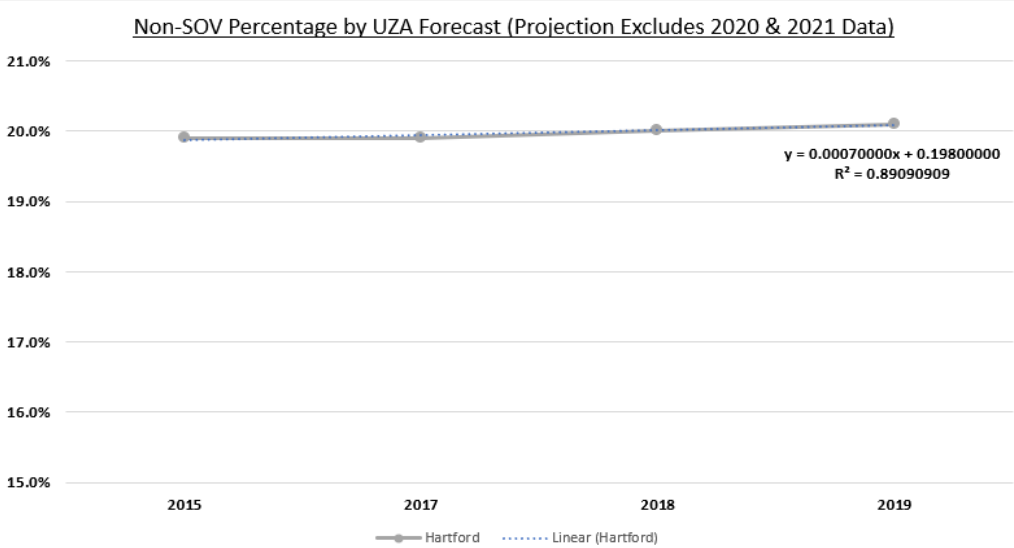
Non-SOV Forecast Model

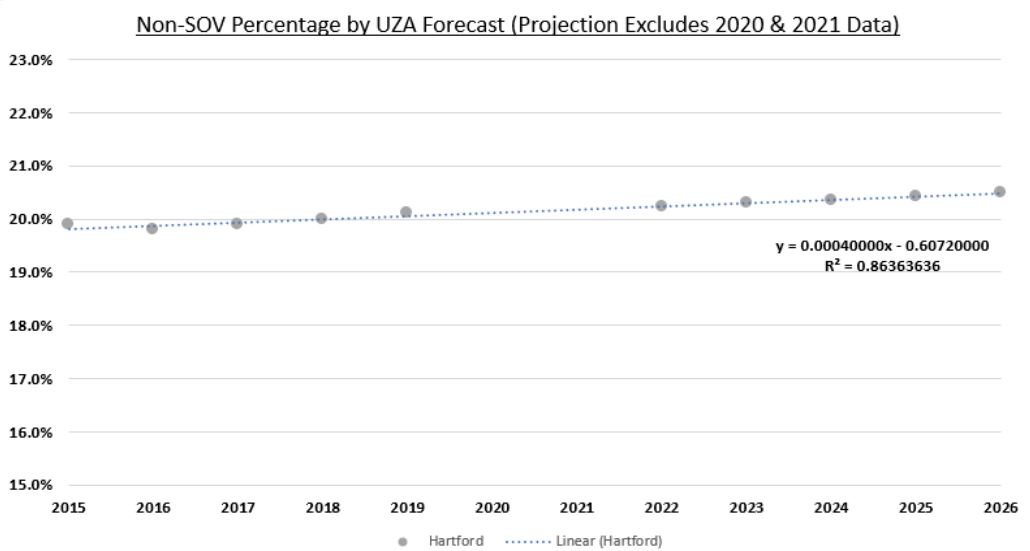
Bridgeport - Stamford





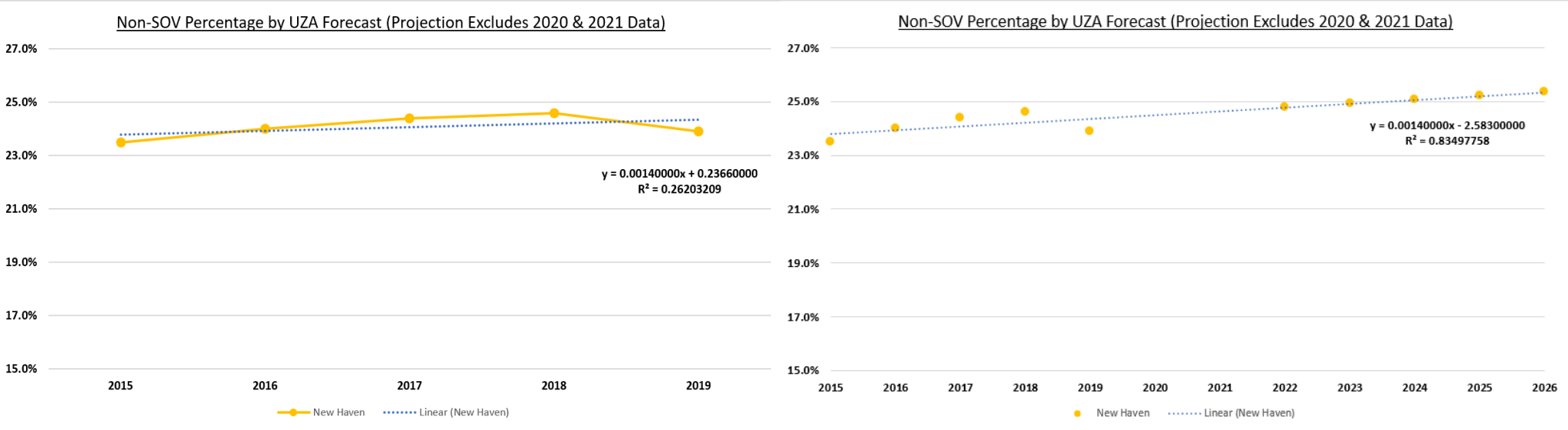
Hartford



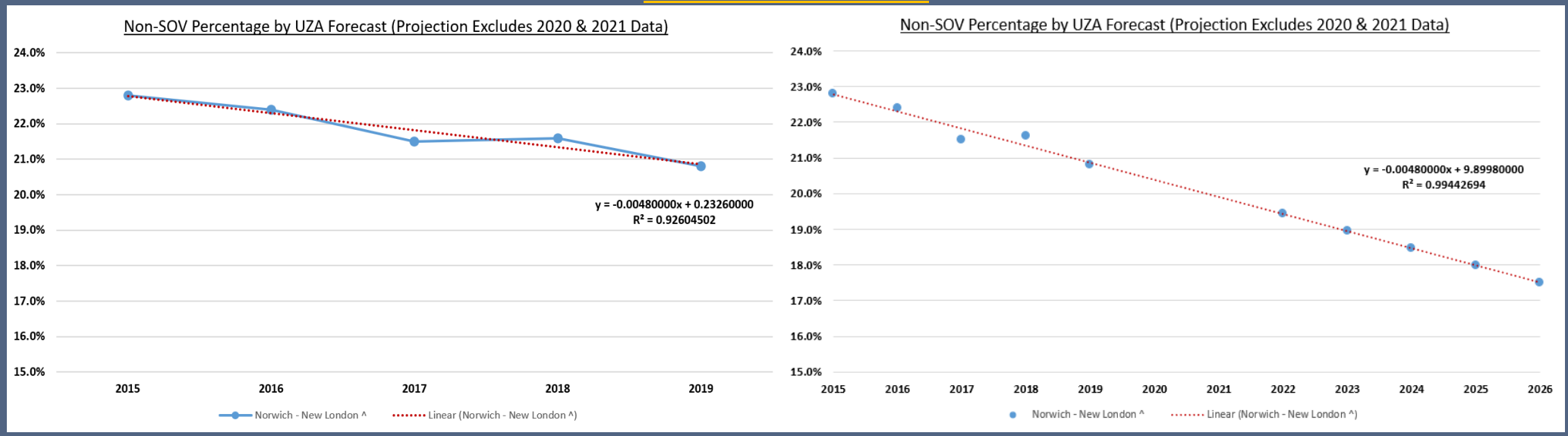


Non-SOV Forecast Model

New Haven



Norwich - New London



Non-SOV Targets

Non-Single Occupancy Vehicle (Non-SOV)

Forecast Method: *Linear* | Data Source: *ACS*

Yearly PHED	Last Five Years					Baseline Exempt	Forecasted Exempt	2-Year Target	4-Year Target	Reason for Recommended Targets		
Urbanized Area	2015	2016	2017	2018	2019	*2020*	*2021*	2022	2024	*P-Value*	*Confidence*	*Why?*
Bridgeport - Stamford	28.0%	28.1%	28.4%	27.8%	28.0%	30.4%	28.0%	27.9%	27.9%	*0.81*	*Low*	• Approach is to select a number on the low range of the observed trends prior to COVID-19 • Based on commuting trends, people are utilizing their vehicles more, which results in PHED and VMT increasing.
					Recommended Targets			***27.8%***	***27.8%***			
Hartford	*19.9%*	*19.8%*	*19.9%*	*20.0%*	*20.1%*	*22.1%*	*20.1%*	20.2%	20.2%	*0.33*	*High*	• Approach is to use a flat (zero) slope projection. • We selected a number on the low range of the observed trends prior to COVID-19.
					Recommended Targets			***19.8%***	***19.8%***			
New Haven	*23.5%*	*24.0%*	*24.4%*	*24.6%*	*23.9%*	*25.1%*	*24.6%*	24.6%	25.1%	*0.37*	*High*	Our approach is to select a number on the low range of the observed trends prior to COVID-19. The calculated p-value is 0.41, however, does not reflect current trends in commuting in the urbanized area.
					Recommended Targets			***23.5%***	***23.5%***			
Norwich - New London ^	*22.8%*	*22.4%*	*21.5%*	*21.6%*	*20.8%*	*22.3%*	*19.9%*	19.4%	18.5%	*0*	*High*	We propose to keep this target as it is a conservative estimate and the p-value coefficient and intercept is less 0.01. We have high confidence in the coefficients.
					Recommended Targets			***19.4%***	***18.5%***			

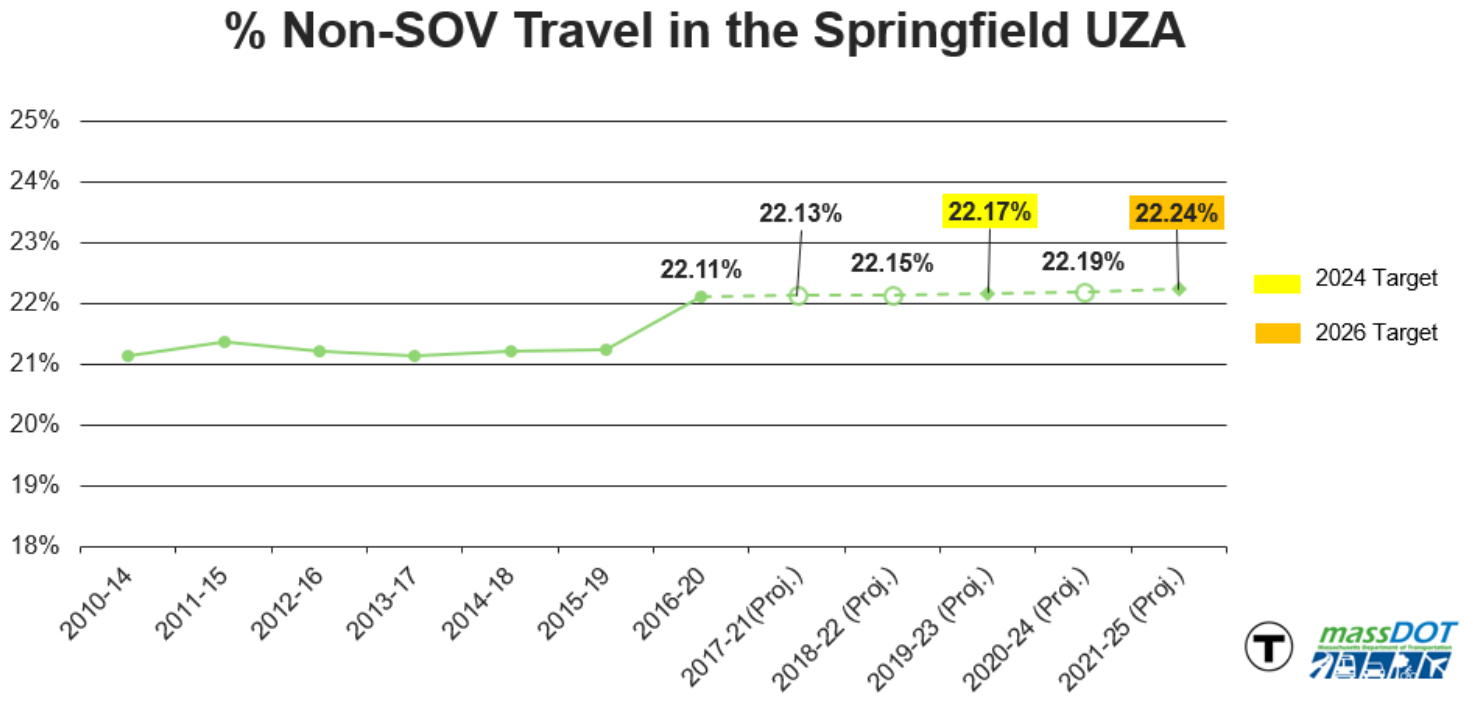
Legend

^ = Shared UZA with RIDOT

MassDOT Non-SOV Methodology

Percentage of Non-SOV Travel – Springfield

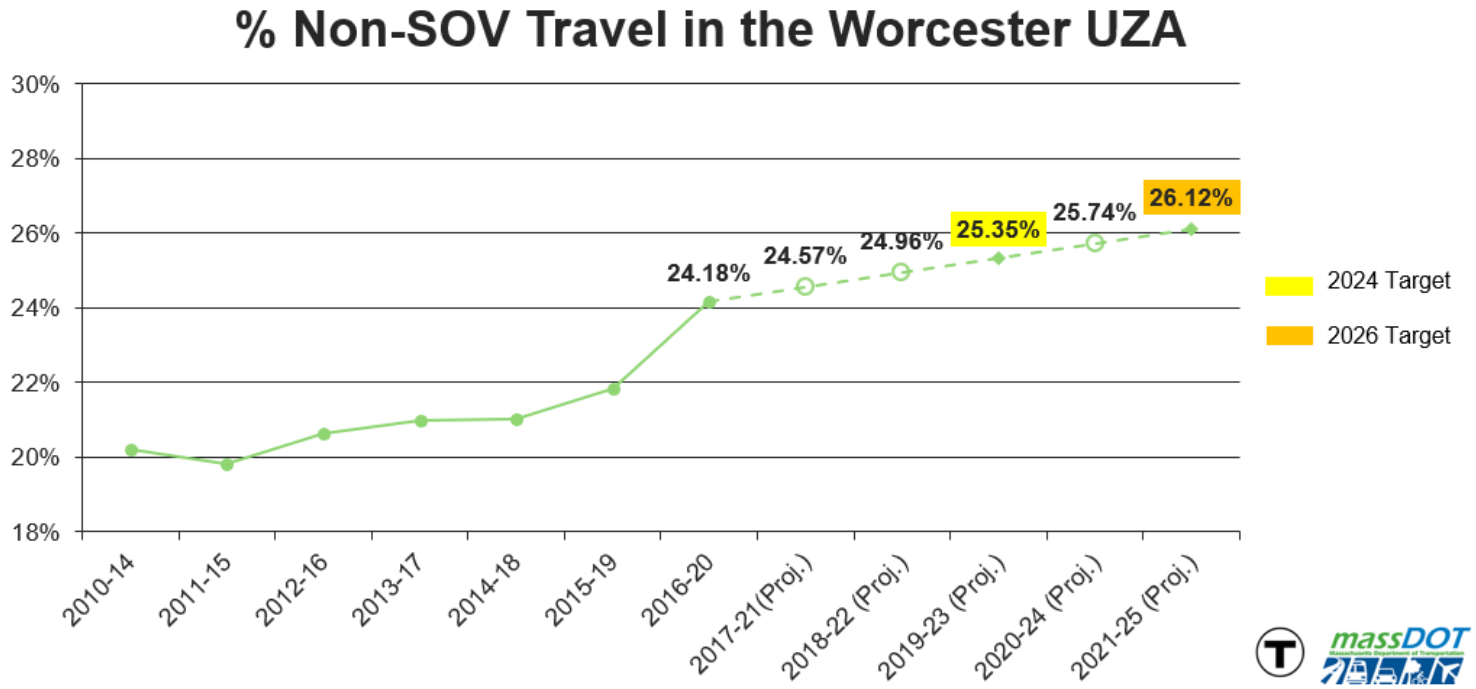
- Current data shows that non-SOV travel increased at an average rate of .056% between 2010-2014 and 2015-2019. By multiplying this rate by the 2016-2020 estimate, we expect the following:



MassDOT Non-SOV Methodology

Percentage of Non-SOV Travel – Worcester

- Current data shows that non-SOV travel increased at an average rate of 0.8% between 2010-2014 and 2015-2019. By multiplying this rate by the 2016-2020 estimate, we expect the following:



Thank you!