The Role of Interstate Transport of Air Pollutants in Achieving Ozone NAAQS Attainment

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for the

Midwest Ozone Group

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"Air Pollution Knows No Bounds"

OVERVIEW

- Legal framework
- Emission reductions
- Non-attainment status
- Source apportionment
- Proposed ozone NAAQS change

LEGAL FRAMEWORK

Upwind states must further reduce emissions if:

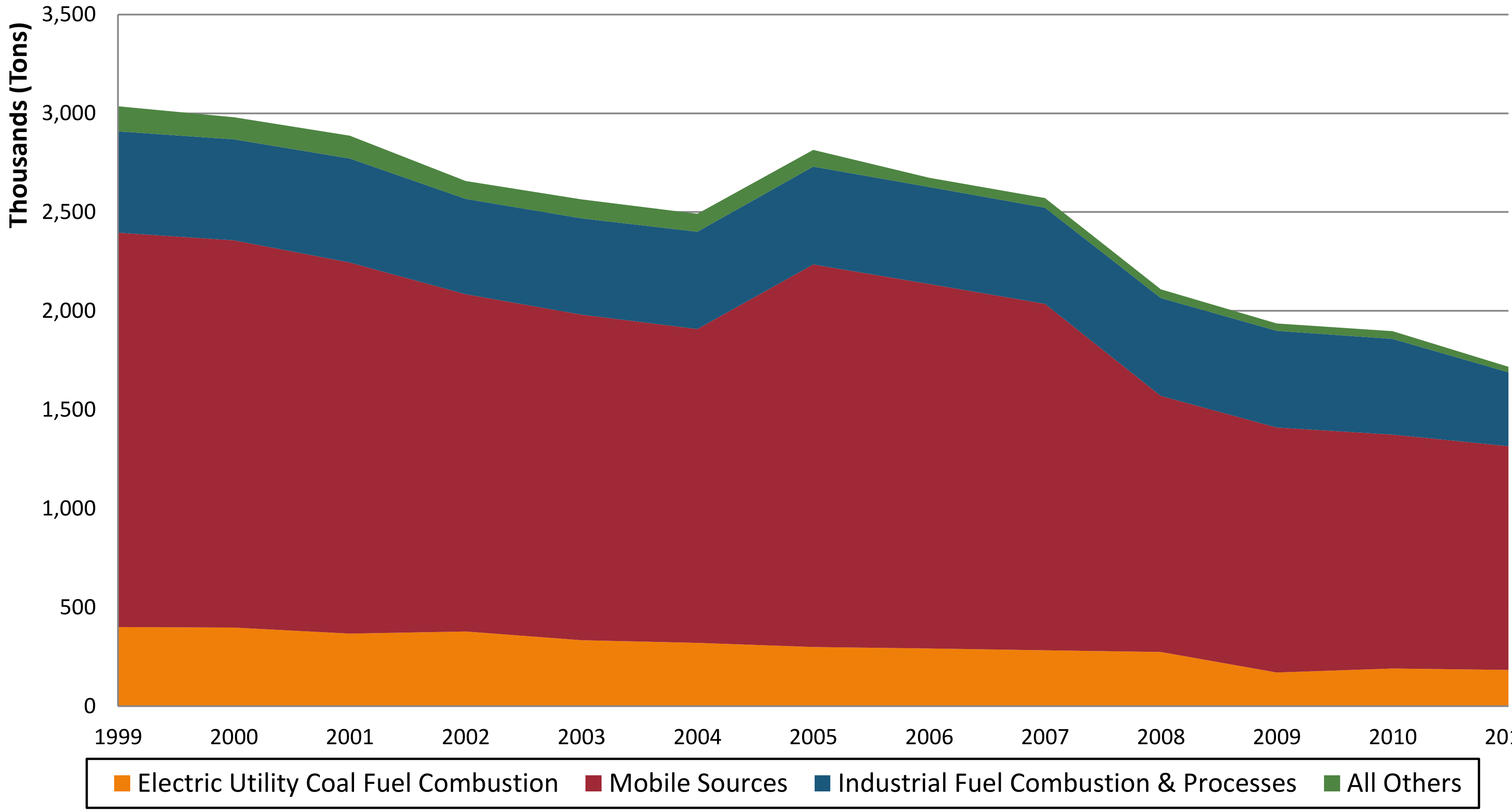
1. Residual nonattainment in downwind states.
2. Downwind states responsible for NAAQS violations not attributable to upwind states.
3. An upwind state is a significant contributor to remaining nonattainment (if greater than 1%).
4. Upwind state requirements do not result in over-control or elimination of more than their own significant contribution.

(Homer v. EPA)

EMISSION REDUCTIONS

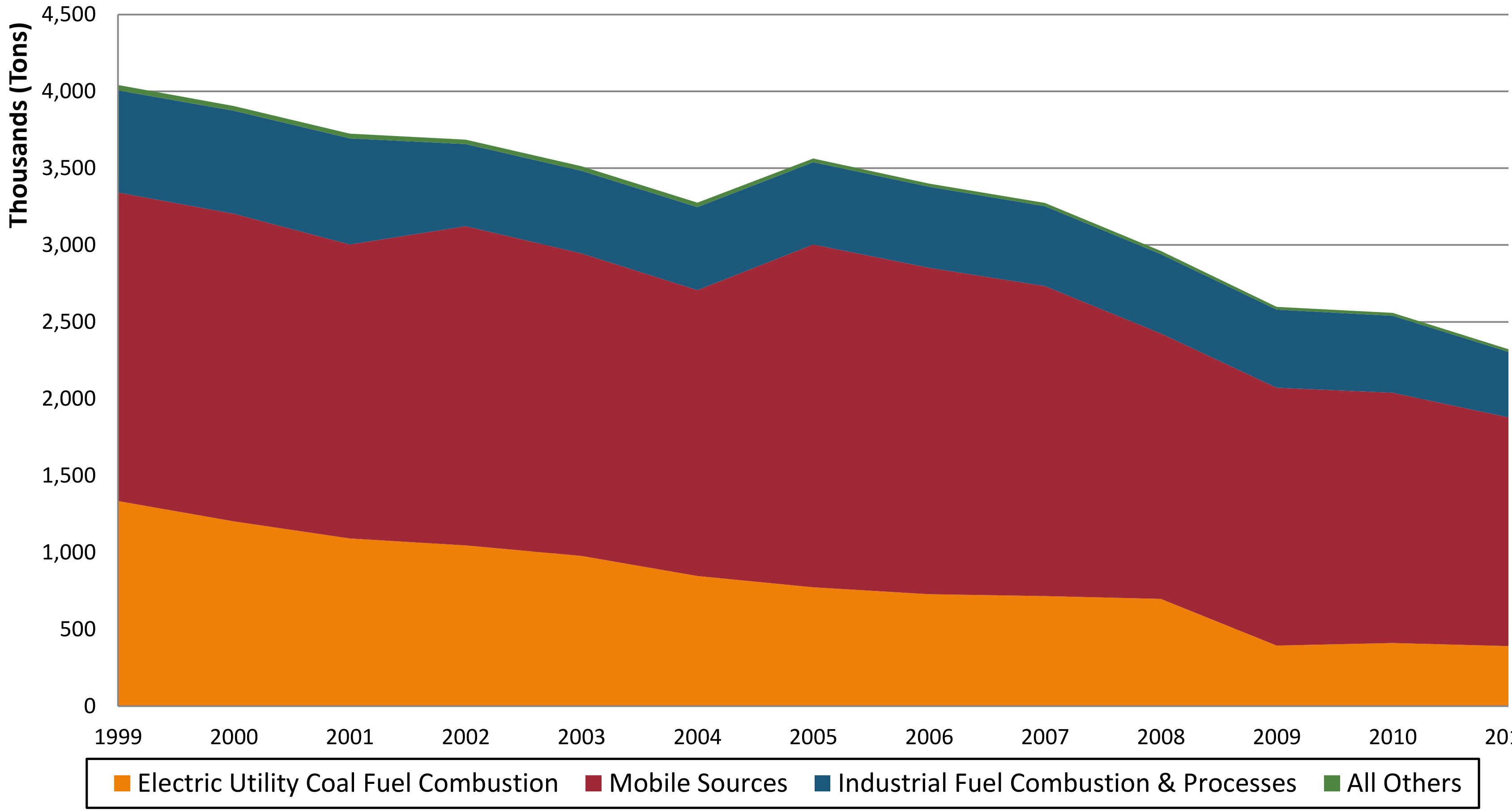
- Emission reduction data show that Midwest and Southeast states have achieved substantially larger reductions in emissions (1999-2011 and 2005-2011), than Northeast states.
- EPA's modeling indicates continued reduction in NOx emissions as a result of promulgated regulations.
- Actual EGU NOx emissions reported to CAMD in 2012 are already significantly lower in upwind states (and marginally lower in downwind states) than the estimates used in EPA source apportionment modeling to determine significant contribution.

NORTHEAST EMISSION TRENDS (NOX)



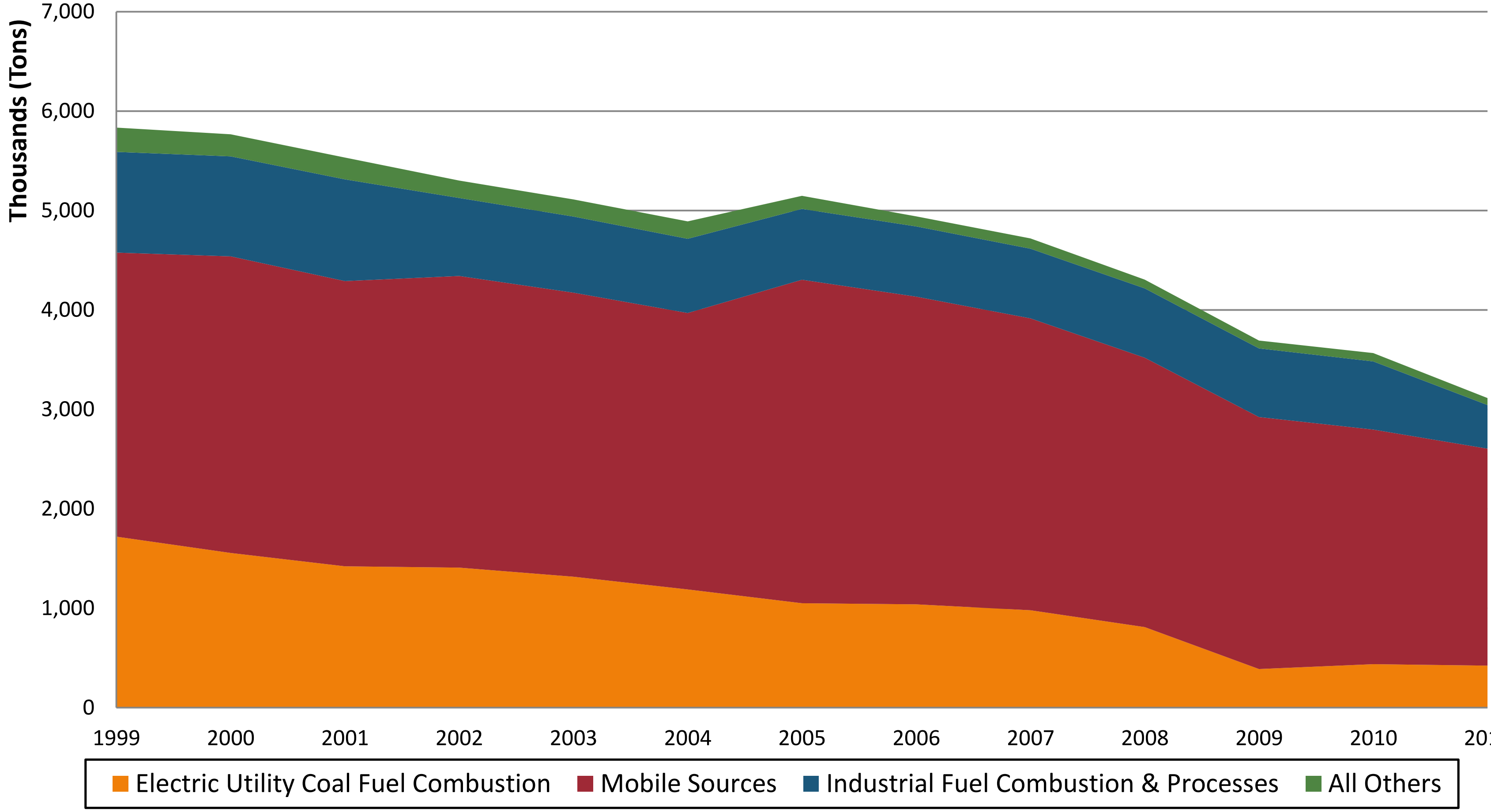
Northeastern Coal-Fired EGUs with 57% reduction from 1999 through 2011

MIDWESTERN EMISSION TRENDS (NOX)



Midwestern Coal-Fired EGUs with 71% reduction from 1999 through 2011

SOUTHEAST EMISSION TRENDS (NOX)



Southeastern Coal-Fired EGUs with 75% reduction from 1999 through 2011

EPA NOX EMISSION PROJECTIONS

	All Source NOx Emissions (Tons/Yr)*			EGU NOx Emissions (Tons/Yr)		
State	**2011**	**2018**	**% Difference**	**2012 Base (IPM)****	**2012 CAMD**	**Difference**
Connecticut	77,962	48,486	-37.81%	2,603	1,332	-1,271
Delaware	32,612	19,944	-38.84%	2,639	2,266	-373
District of Columbia	9,622	5,567	-42.14%	-	96	96
Maine	62,495	47,421	-24.12%	4,864	511	-4,353
Maryland	166,810	104,240	-37.51%	16,706	18,334	1,628
Massachusetts	143,234	93,008	-35.07%	4,954	3,238	-1,716
New Hampshire	35,307	21,641	-38.71%	4,068	2,480	-1,588
New Jersey	162,066	108,018	-33.35%	7,534	2,480	-5,054
New York	425,226	289,897	-31.83%	20,909	24,954	4,045
Pennsylvania	569,151	423,861	-25.53%	130,738	132,094	1,356
Rhode Island	21,309	15,019	-29.52%	449	633	184
Vermont	19,221	12,794	-33.44%	379	125	-254
OTR State Total	**1,725,015**	**1,189,897**	**-31.02%**	**195,842**	**188,543**	**-7,299**
Illinois	502,859	332,640	-33.85%	52,481	57,684	5,203
Indiana	421,153	300,250	-28.71%	120,593	105,713	-14,880
Kentucky	313,165	221,063	-29.41%	88,195	80,299	-7,896
Michigan	459,131	329,249	-28.29%	63,266	66,804	3,539
North Carolina	391,963	256,255	-34.62%	54,463	51,057	-3,405
Ohio	579,106	359,585	-37.91%	103,192	84,280	-18,912
Tennessee	295,719	188,104	-36.39%	37,694	26,182	-11,511
Virginia	321,181	211,007	-34.30%	38,820	26,219	-12,601
West Virginia	176,127	160,232	-9.02%	62,434	52,771	-9,663
Target State Total	**3,460,404**	**2,358,384**	**-31.85%**	**621,136**	**551,009**	**-70,127**

* Source: EPA 2011v6 Modeling Platform

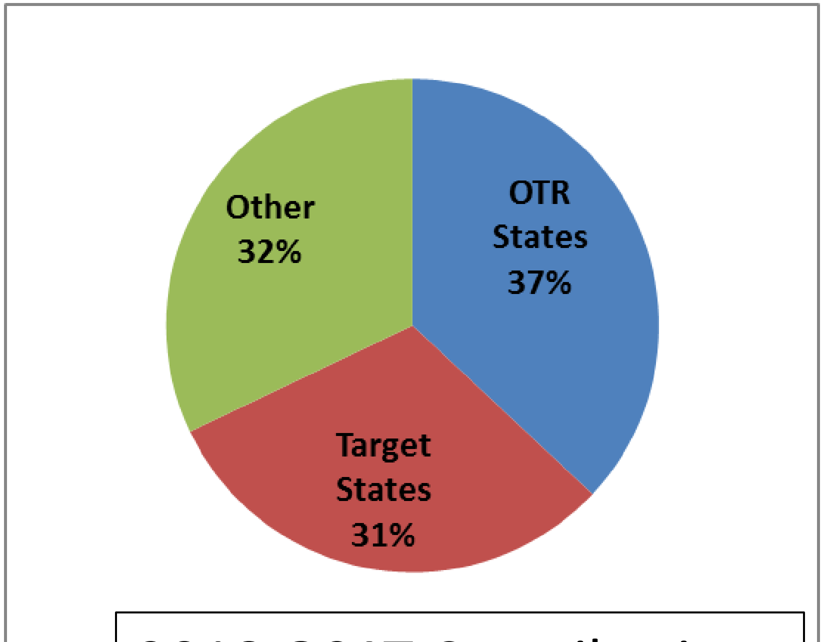
** Source: CSAPR Base Case Modeling

Ozone Nonattainment in NE

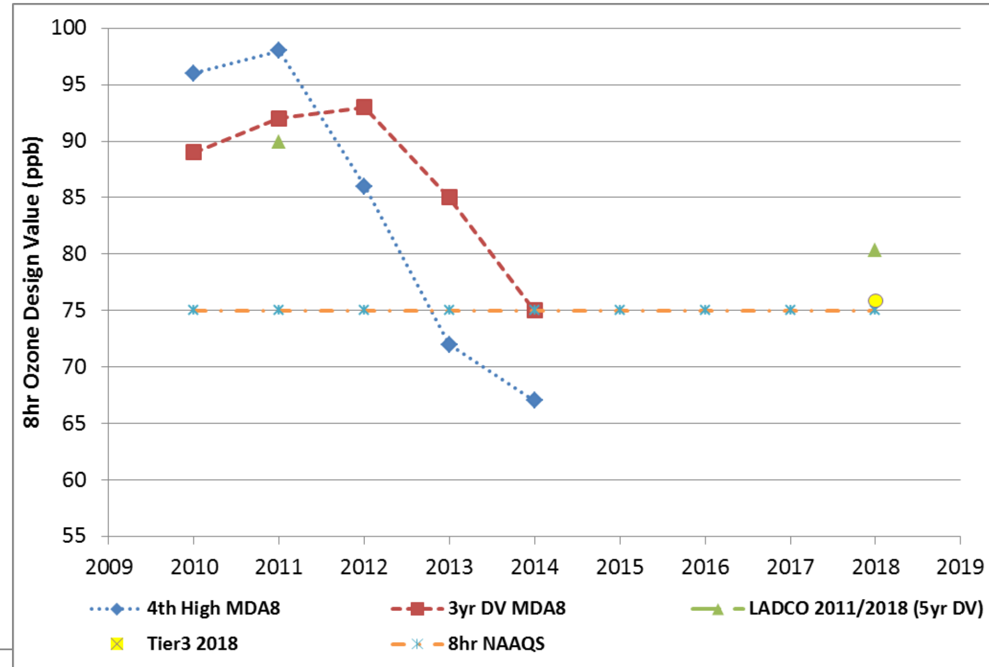
		4th Highest MDA8 (ppb)				3yr Design Value (ppb)			
Monitor	**County**	**2011**	**2012**	**2013**	**2014***	**2011**	**2012**	**2013**	**2014***
240251001	Harford, Maryland	98	86	72	67	92	93	85	75
361030002	Suffolk, New York	89	83	72	61	84	85	87	72
90019003	Fairfield, Connecticut	87	89	86	61	79	85	87	79
421010024	Philadelphia, Pennsylvania	89	85	68	66	83	87	80	73
340150002	Gloucester, New Jersey	92	87	73	66	82	87	84	75
250070001	Dukes, Massachusetts	78	82	65	58	76	80	75	68
440090007	Washington, Rhode Island	74	82	79	60	73	78	78	74
100031007	New Castle, Delaware	78	82	62	71	75	80	74	72
330074001	Coos, New Hampshire	68	71	69	65	69	70	87	68
500030004	Bennington, Vermont	59	67	62	50	65	64	62	60

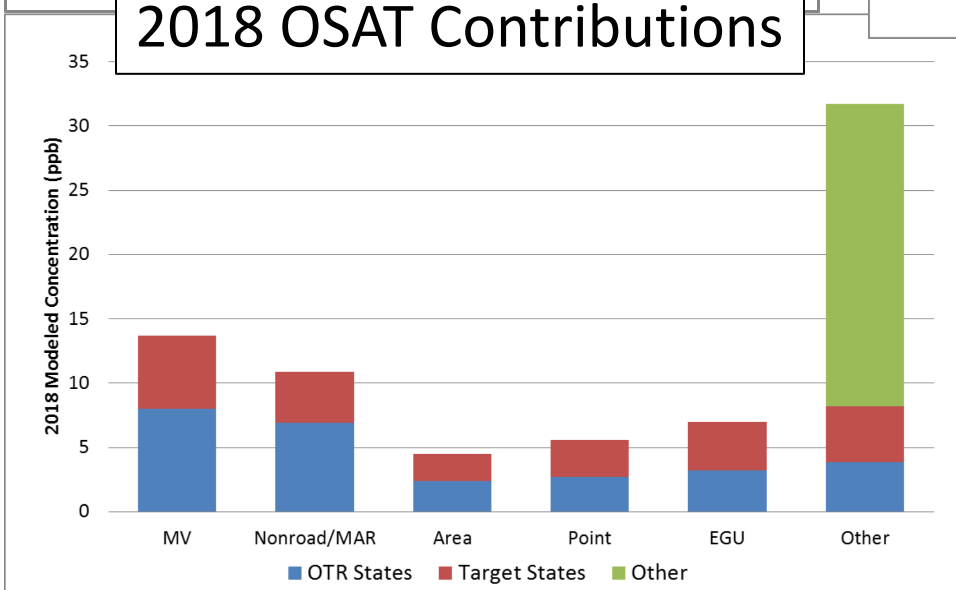
*** As of 30 Sept 2014**

Ozone Metrics - Harford, MD



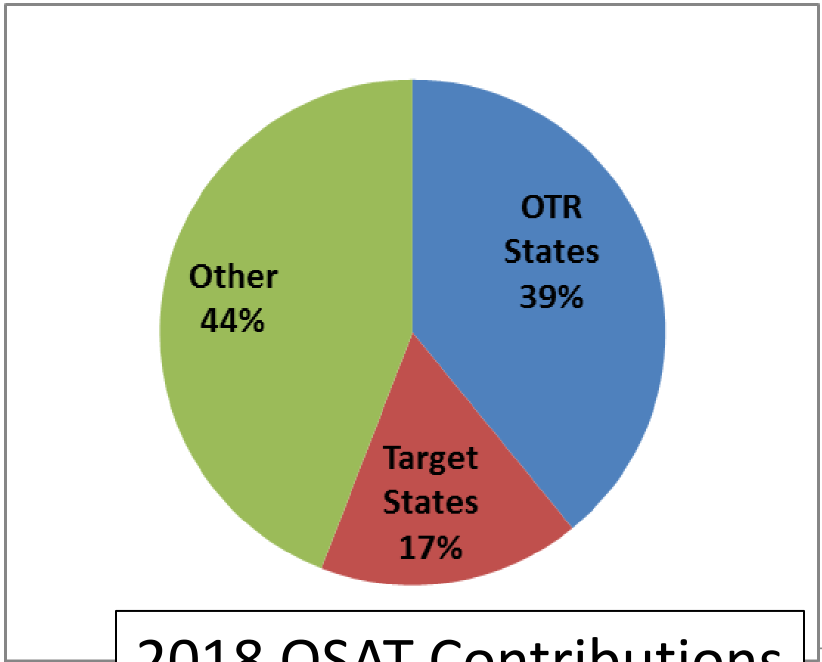
2018 OSAT Contributions



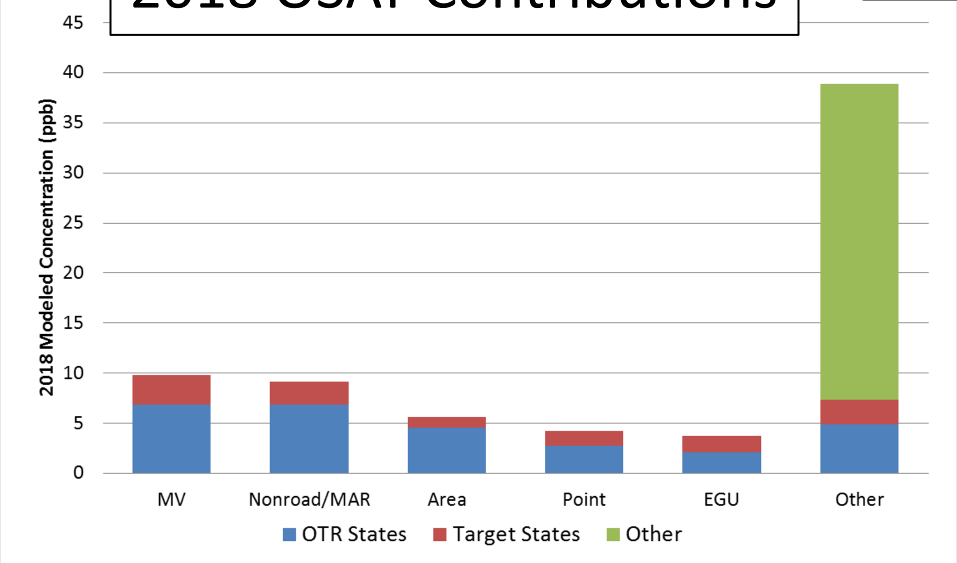


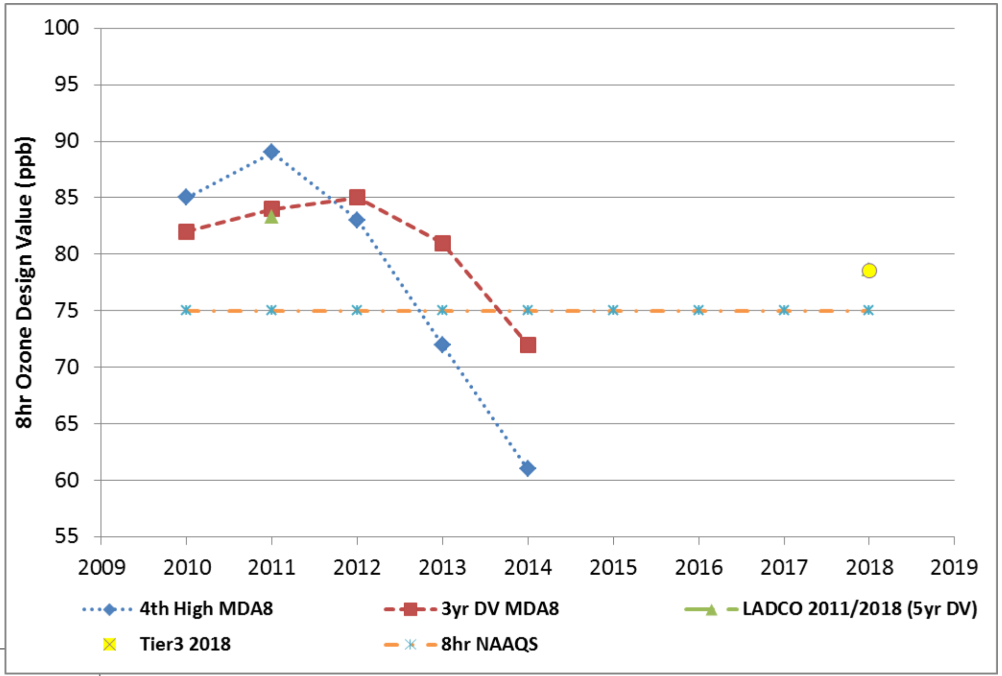
Results based on EPA published ozone 8-hr ozone design values and ozone source apportionment modeling from LADCO/IPM 2018 air quality simulations

Ozone Metrics – Suffolk, NY



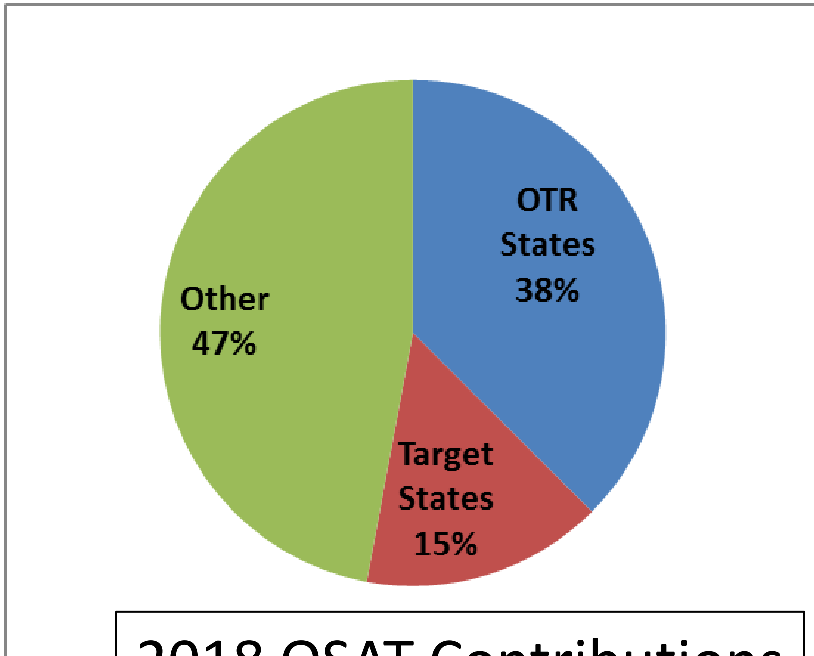
2018 OSAT Contributions

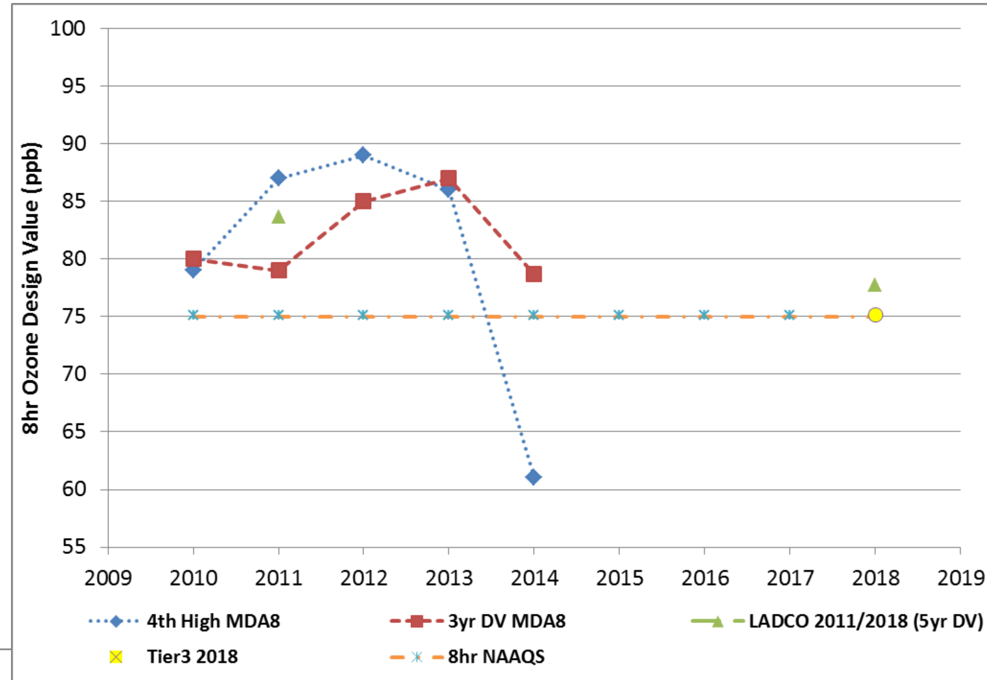




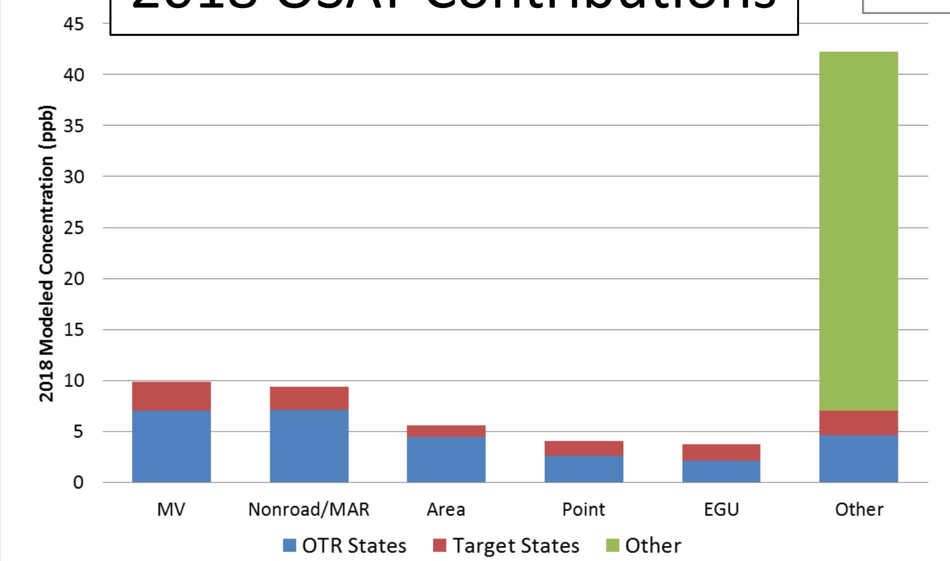
Results based on EPA published ozone 8-hr ozone design values and ozone source apportionment modeling from LADCO/IPM 2018 air quality simulations

Ozone Metrics – Fairfield, CT



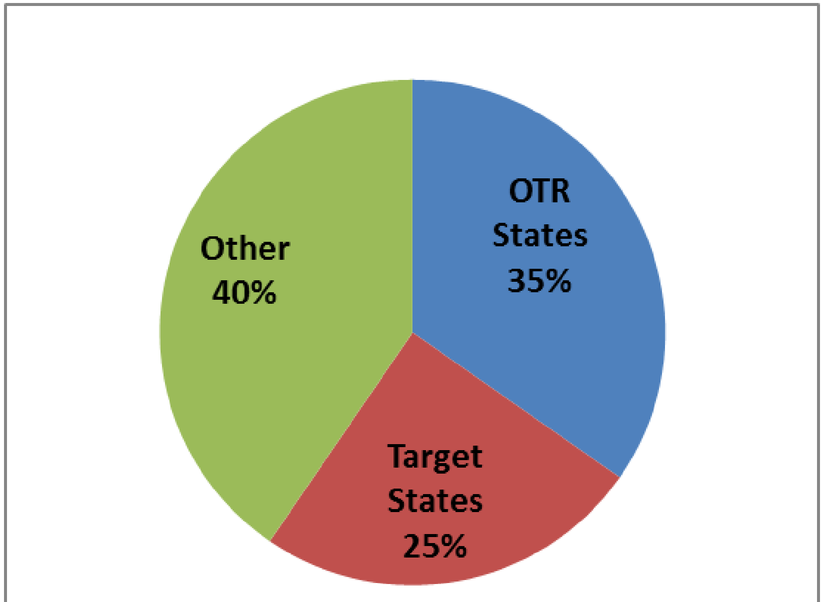


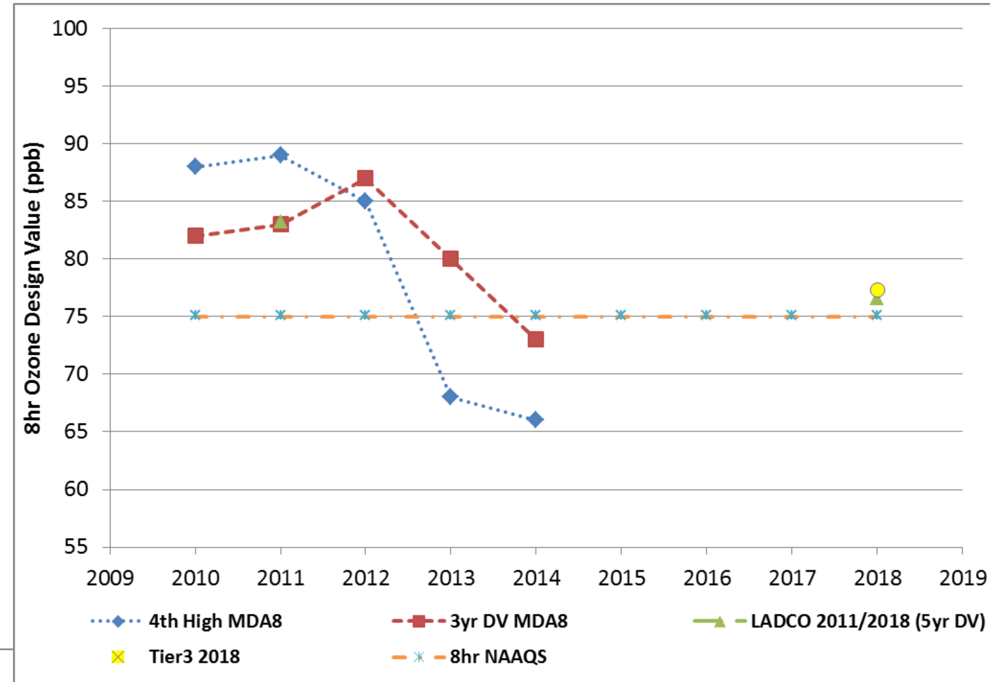
2018 OSAT Contributions



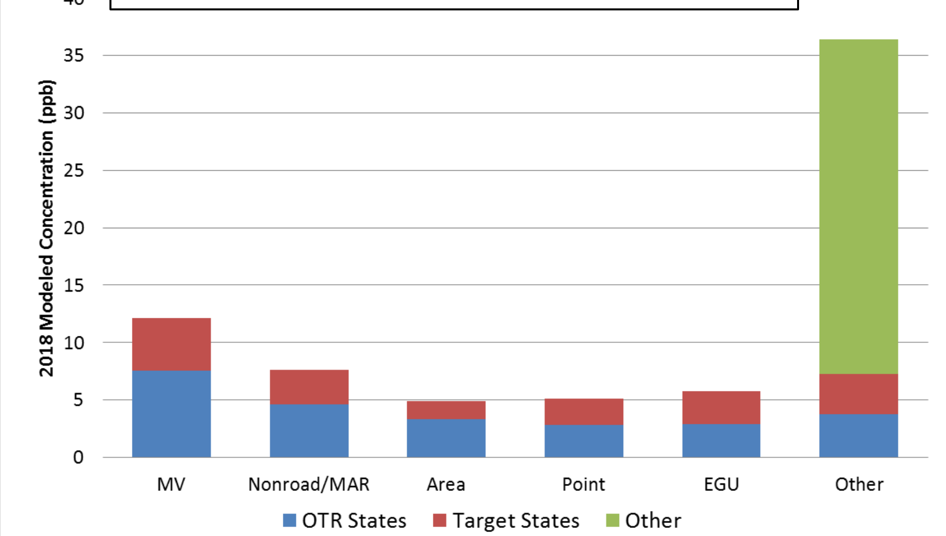
Results based on EPA published ozone 8-hr ozone design values and ozone source apportionment modeling from LADCO/IPM 2018 air quality simulations

Ozone Metrics – Philadelphia, PA



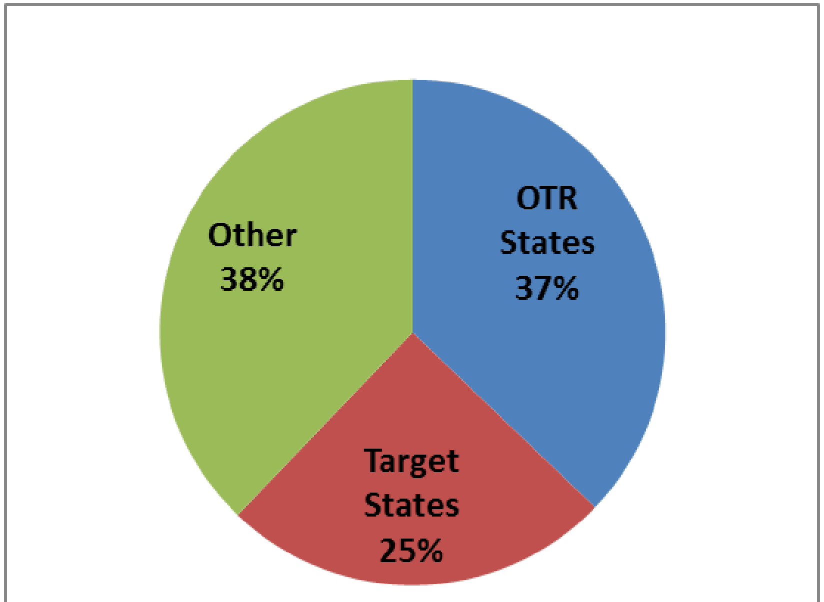


2018 OSAT Contributions

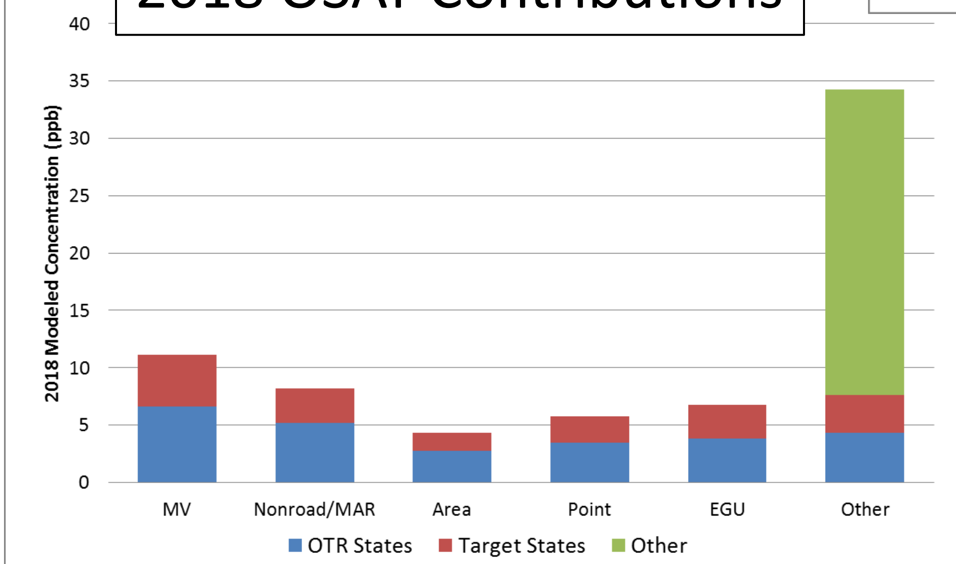


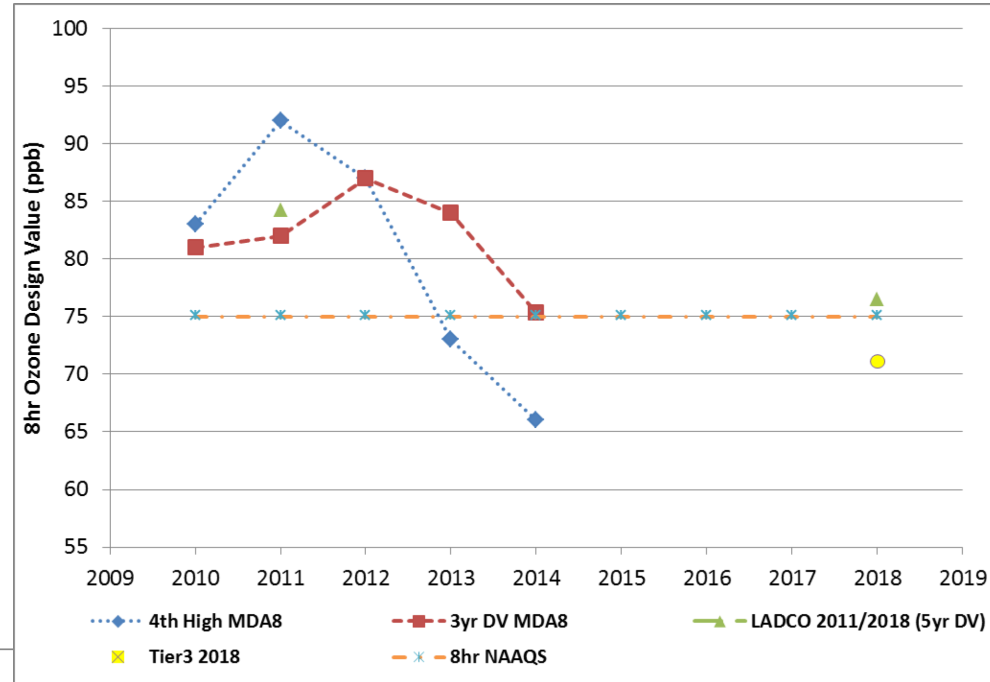
Results based on EPA published ozone 8-hr ozone design values and ozone source apportionment modeling from LADCO/IPM 2018 air quality simulations

Ozone Metrics – Gloucester, NJ



2018 OSAT Contributions





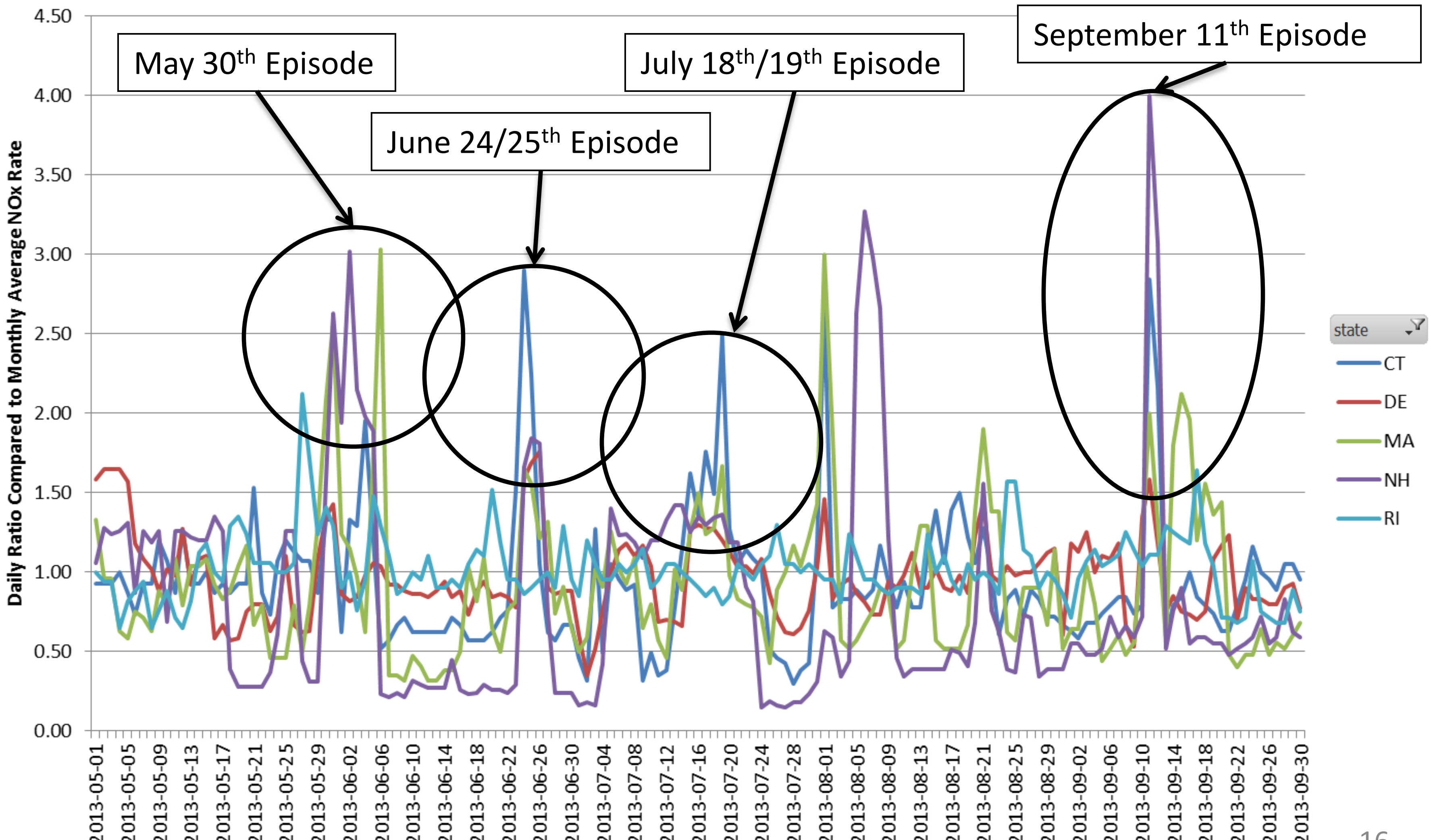
Results based on EPA published ozone 8-hr ozone design values and ozone source apportionment modeling from LADCO/IPM 2018 air quality simulations

NE UPSET EVENTS

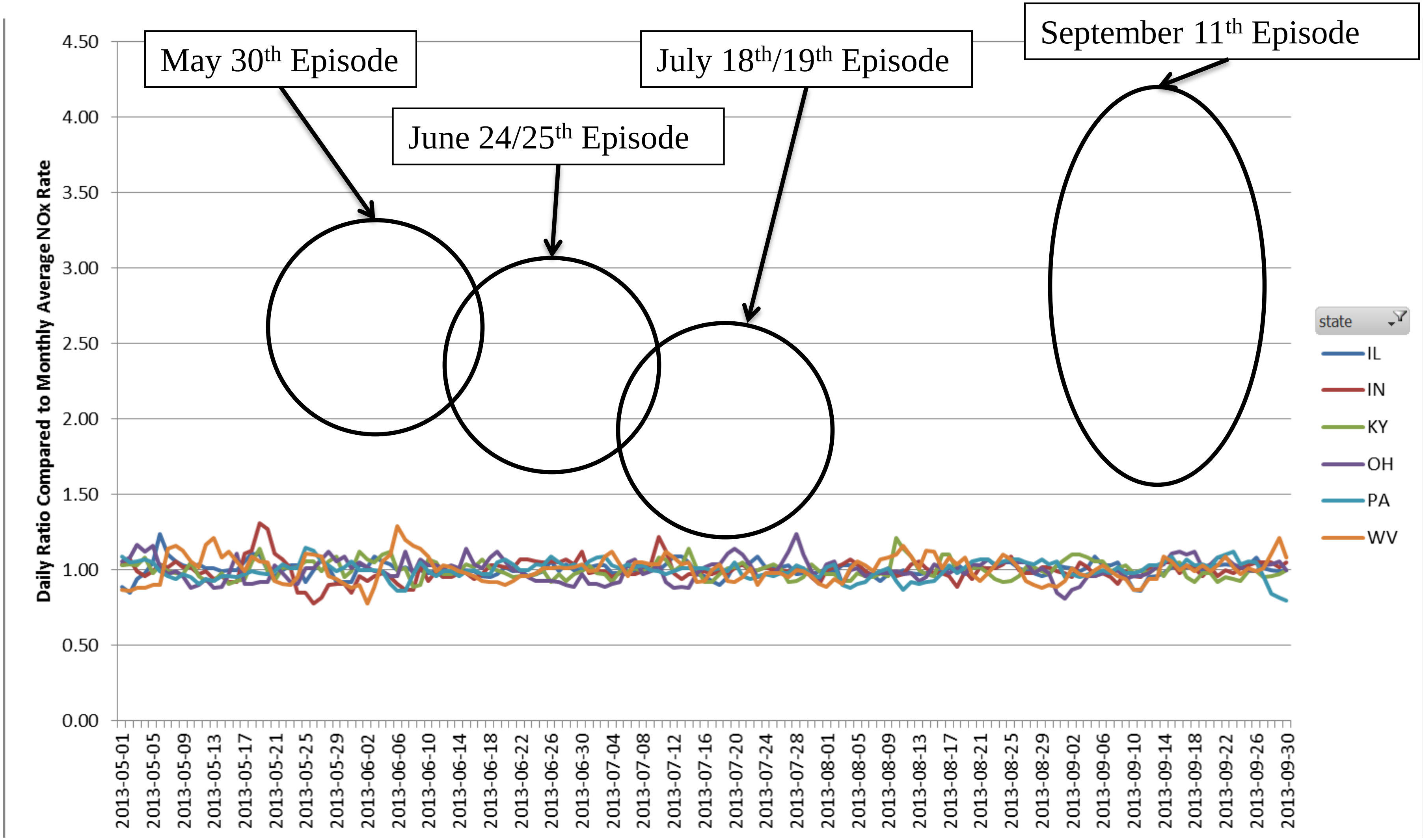
- Data indicates that it is not EGU emissions from outside of NE that appear to contribute to high episode ozone concentrations within the NE

- On multiple high ozone days in 2013 EGUs located in NE states had NOx emissions that were more than double their normal monthly emission rate

STATE LEVEL EGU NOX EMISSION RATE RATIOS DAILY VS. AVERAGE MONTHLY RATE



STATE LEVEL EGU NOX EMISSION RATE RATIOS DAILY VS. AVERAGE MONTHLY RATE

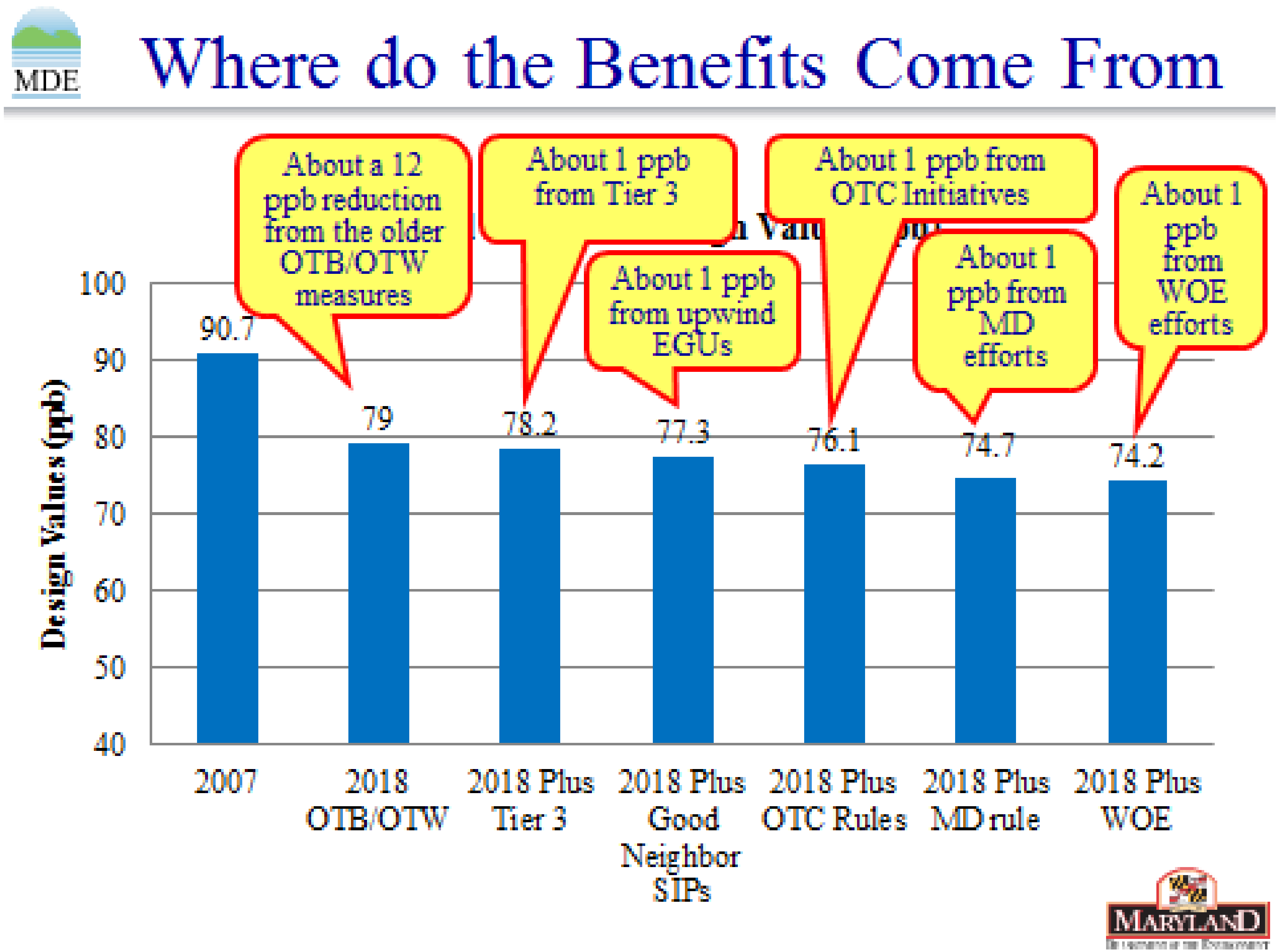


Reductions from OTC Measures

OTC Model Control Measures	Regional Reductions (tons per year)	Regional Reductions (tons per day)
Aftermarket Catalysts	14,983 (NOx) 3,390 (VOC)	41 (NOx) 9 (VOC)
On-Road Idling	19,716 (NOx) 4,067 (VOC)	54 (NOx) 11 (VOC)
Nonroad Idling	16,892 (NOx) 2,460 (VOC)	46 (NOx) 7 (VOC)
Heavy Duty I & M	9,326 (NOx)	25 (NOx)
Enhanced SMARTWAY	2.5%	
Ultra Low NOx Burners	3.669 (NOx)	10 (NOx)
Consumer Products	9,729 (VOC)	26 (VOC)
AIM	26,506 (VOC)	72 (VOC)
Auto Coatings	7,711 (VOC)	21 (VOC)

- Just in the OTC states
- Thanks to OTC SAS and Mobile Source Committees
- Thanks to Joseph Jakuta and Julie McDill
- These emission reduction estimates are being updated as we speak

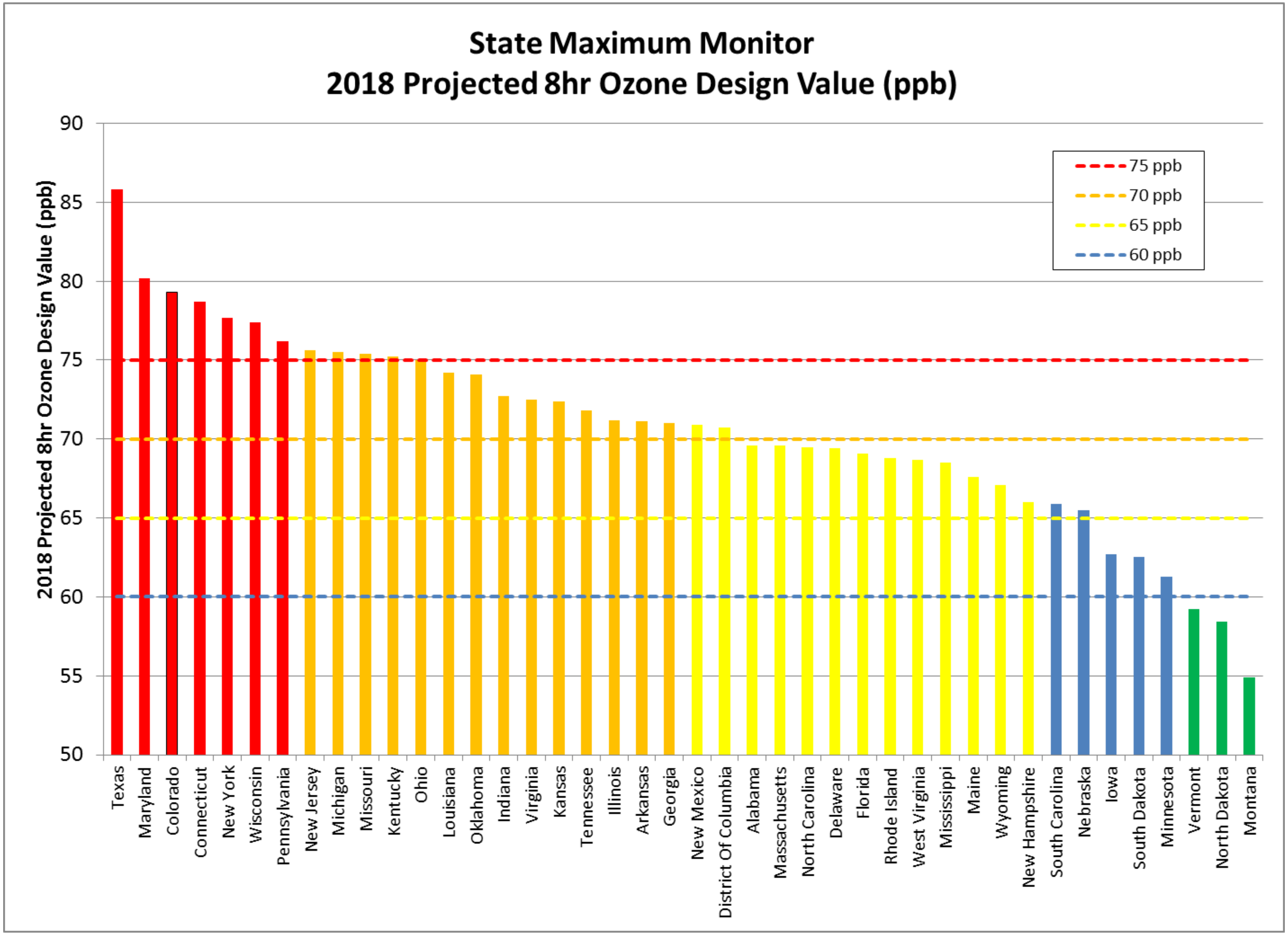
MD's Path to Attainment



“The Bottom Line”

Case / Strategy	Reduction	Ozone dv		
MD 2018 DV		*79 ppb*		
Tier 3	~ 0.8 ppb	78.2		
Add'l OTR Measures	~ 1.2	77.0		
Add’l MD Only Controls	~ 1.4	75.6	<- Already Attainment	
EGU Optimized (MD/PA)	~ 0.5	**75.1**	58% of Total Optimization	
Attainment achieved without Upwind State Controls				
EGU Optimized (Upwind)	~ 0.4	74.7		
MD 2018 Scenarios DV		*74.7*		
WOE	~ 0.5			
MOVES2014/MEGAN	Lower			
PA NOx RACT	Lower			
Unit Retirements	Lower			

Figure 4. State Maximum Monitor - Projected 8-hr Ozone Design Values (Descending Design Value Sorted).



CONCLUSIONS

- Air quality is significantly improving in much of the NE making it unnecessary to impose additional controls.
- Emission reductions by EGUs in the Midwest and Southeast are greater than reductions that have occurred in the Northeast.
- The significant reduction in emissions projected by EPA to occur over the next several years will result in continued improvement in air quality throughout the OTR.
- Anticipated controls on NE sources should be all that is needed to achieve attainment.
- The SCOOT process may result in additional controls.
- Any change in the ozone NAAQS will require additional analysis of source controls.

CONTACT INFORMATION

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