Emissions and Modeling Update

OTC Fall Meeting

November 10th, 2010

Sheraton Hotel Boston, MA

Overview

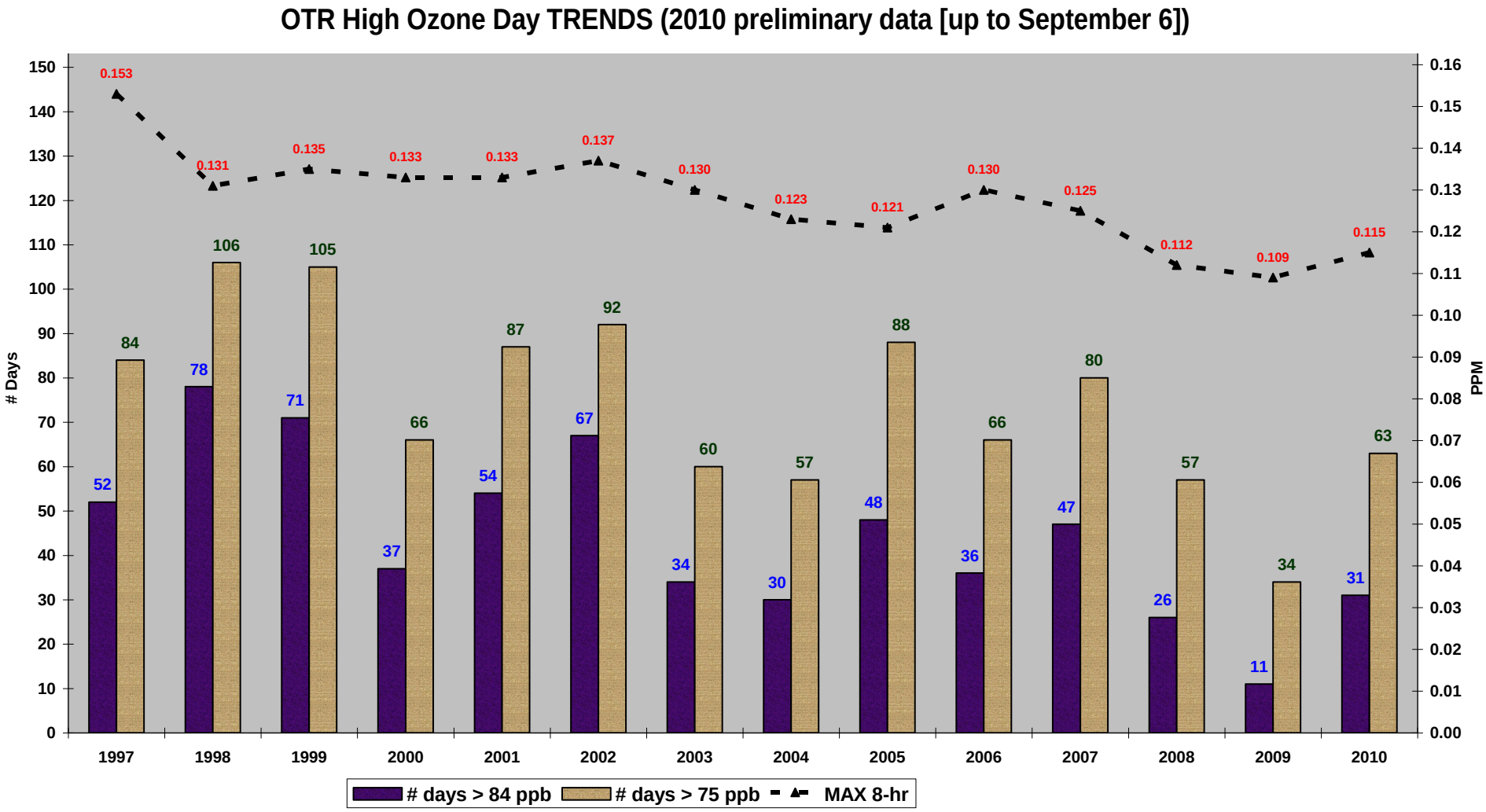
1. Ozone NAAQS
2. Modeling
3. Emissions Inventory

Ozone NAAQS

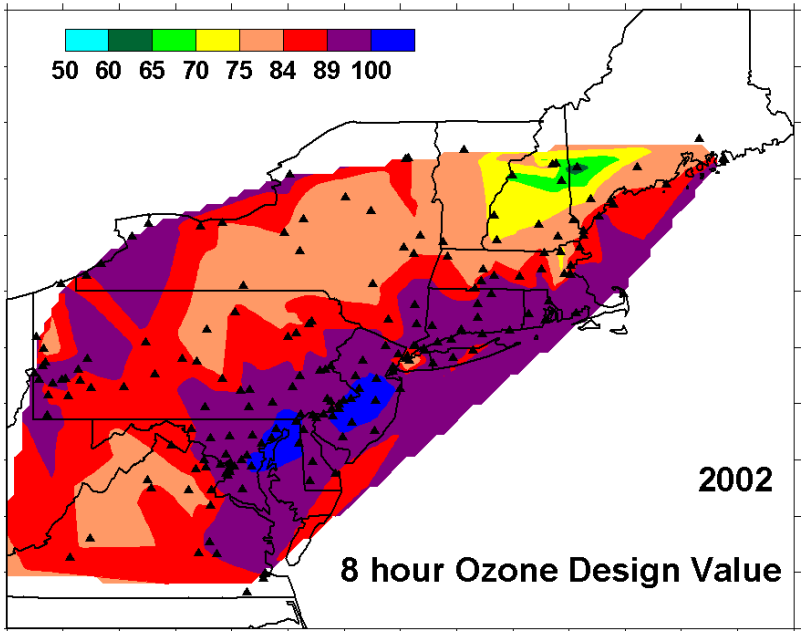
- 2008 NAAQS = 75ppb
  - Has not been revoked, nor implemented
  - Form = 3 year average of 4th maximum
  - Secondary NAAQS equal to Primary

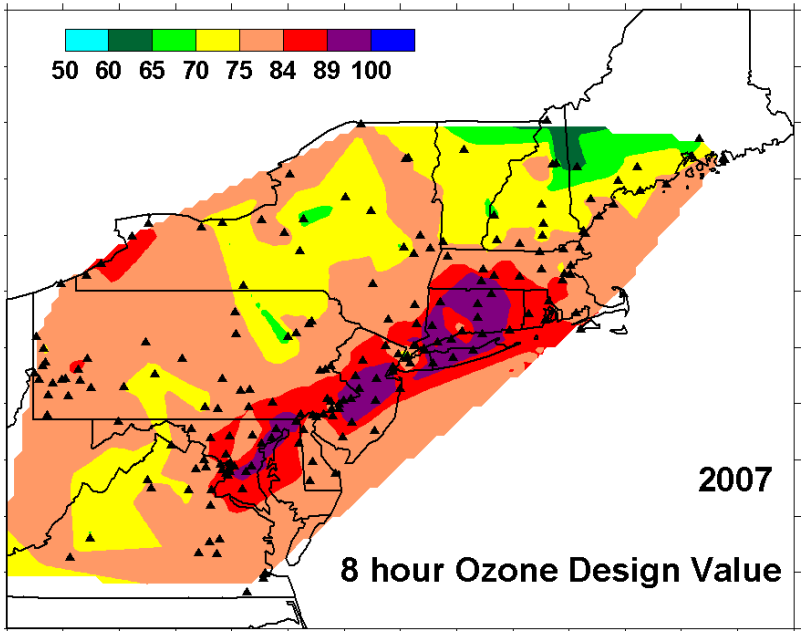
- 2010 NAAQS = 60 – 70ppb (TBD)
  - Now set for announcement by 12/31/2010
  - Form = 3 year average of 4th maximum
  - Secondary NAAQS 7-15ppm-hours (Also TBD)

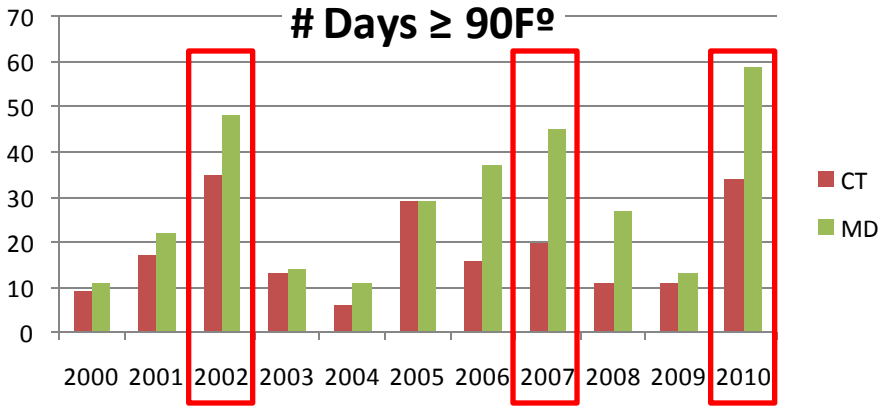
OTR Ozone Trends (1997-2010)

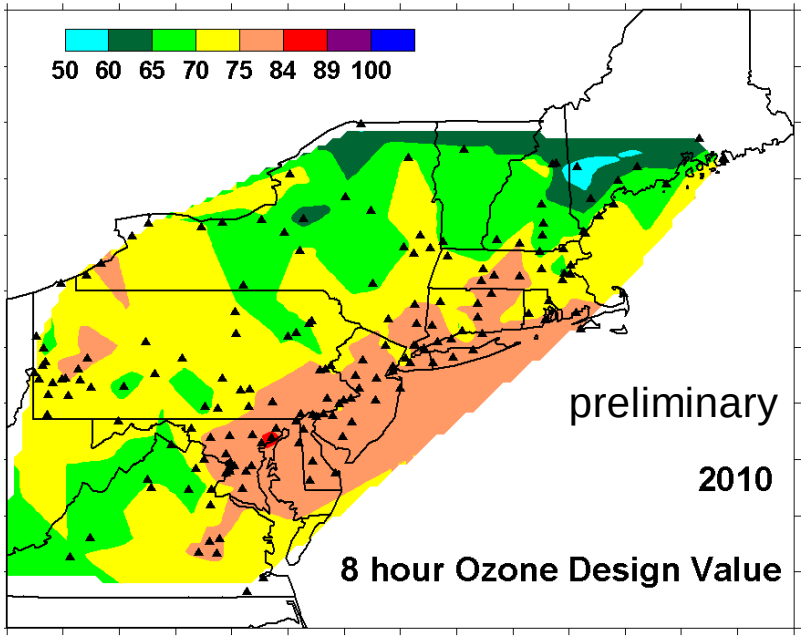


8-hour O_3 Monitored Design Value



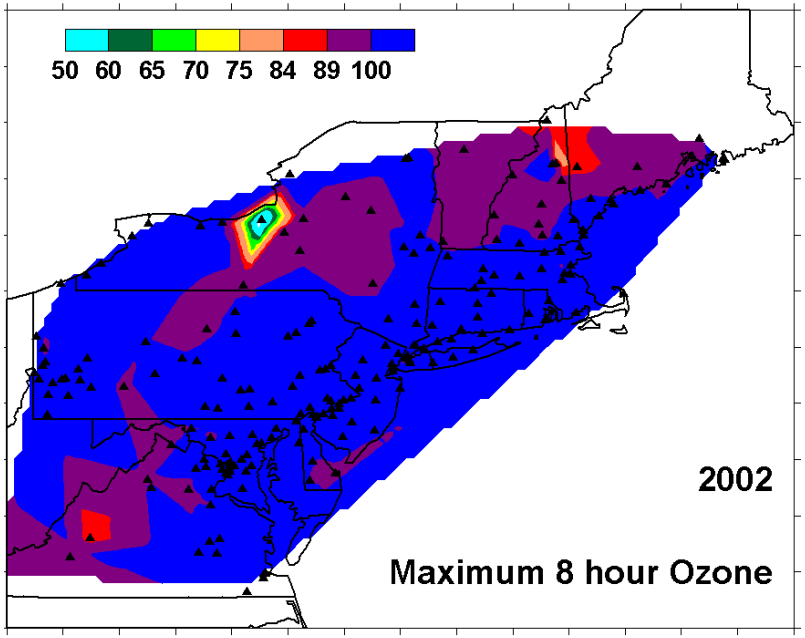


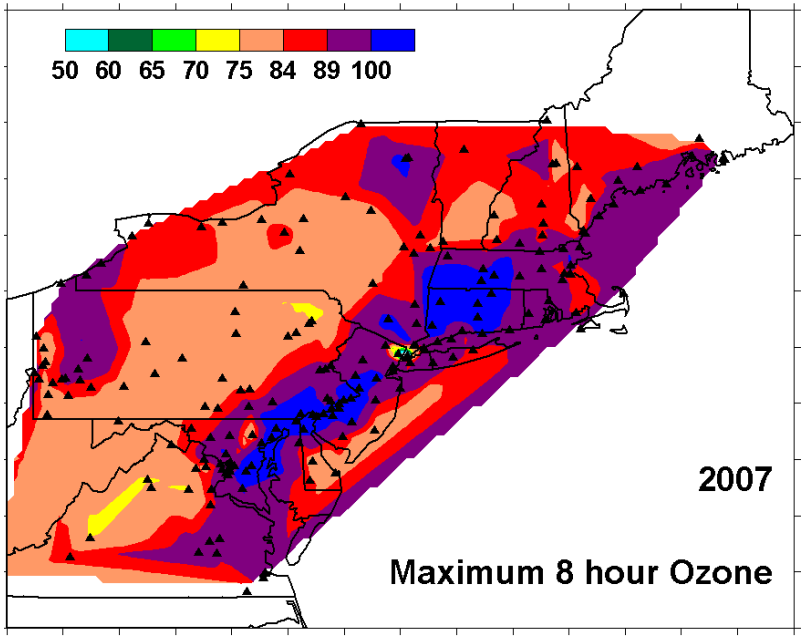


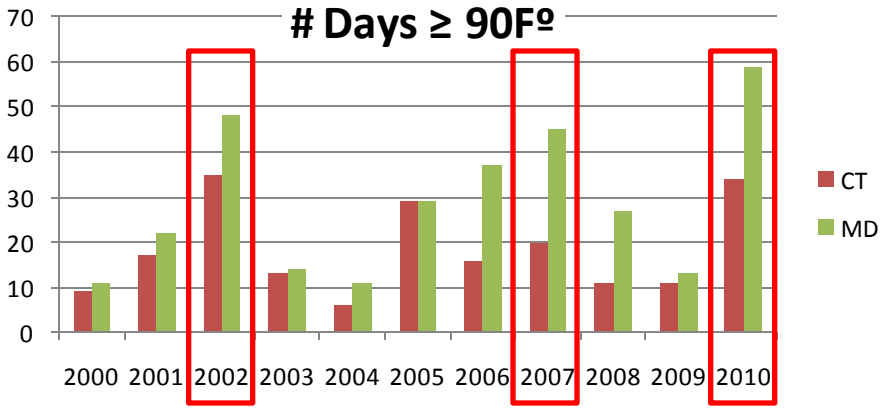


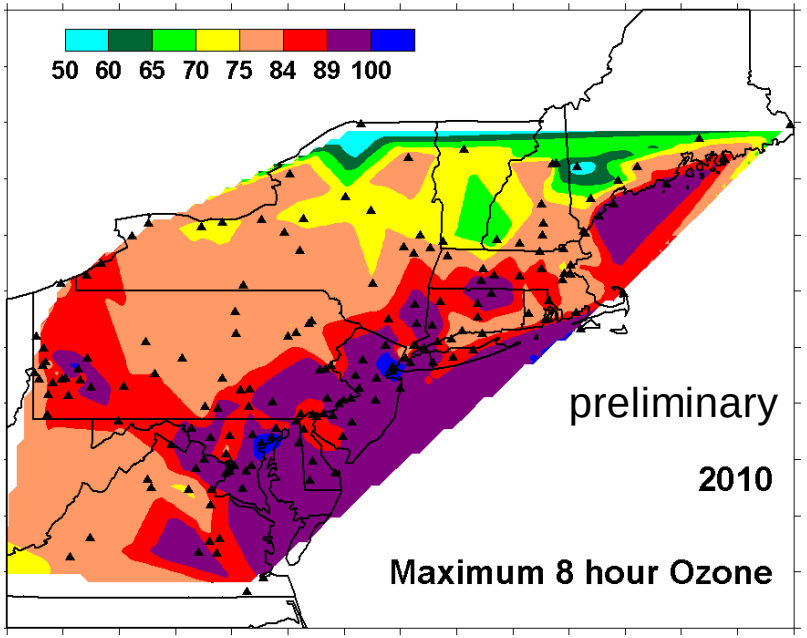
2002 – SIP base year for 1997 8-hour O_3 Standard
2007 – SIP base year for next round of O_3 Standard
2010 – the latest Ozone season

Maximum Monitored 8-hour O_3









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Ozone Standard Timelines

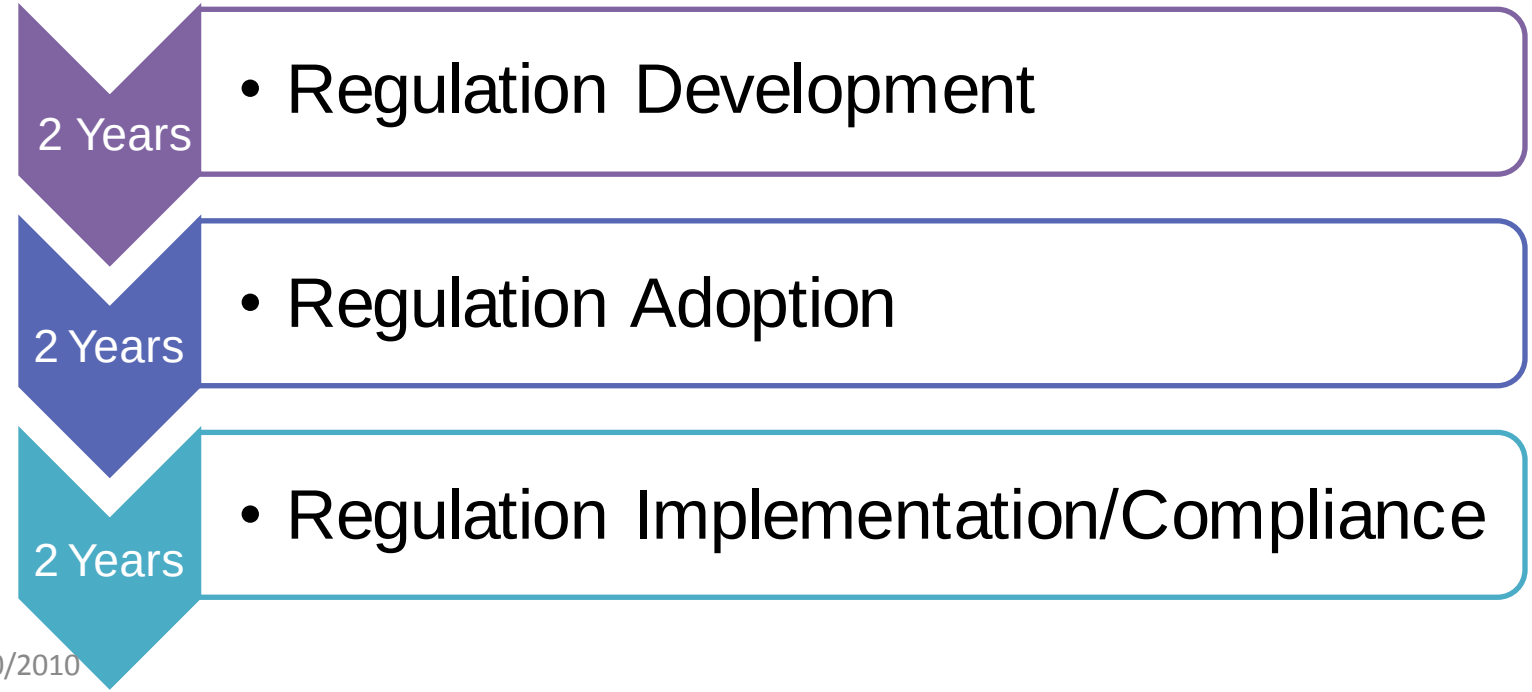
• 75 ppb Standard Final	03/2008
• Proposed New Standard	01/2010
• Final New Standard	~12/31/2010
• Proposed Implementation Rule	~12/31/2010
• State Recommendations	05/2011 – 12/2011
• Final New Designation	12/2011 – 12/2012
• 75 ppb Standard Date SIPs Due	03/2013
• New Date SIPs Due	04/2014 – 12/2015

Potential Attainment Timeline for New Std.

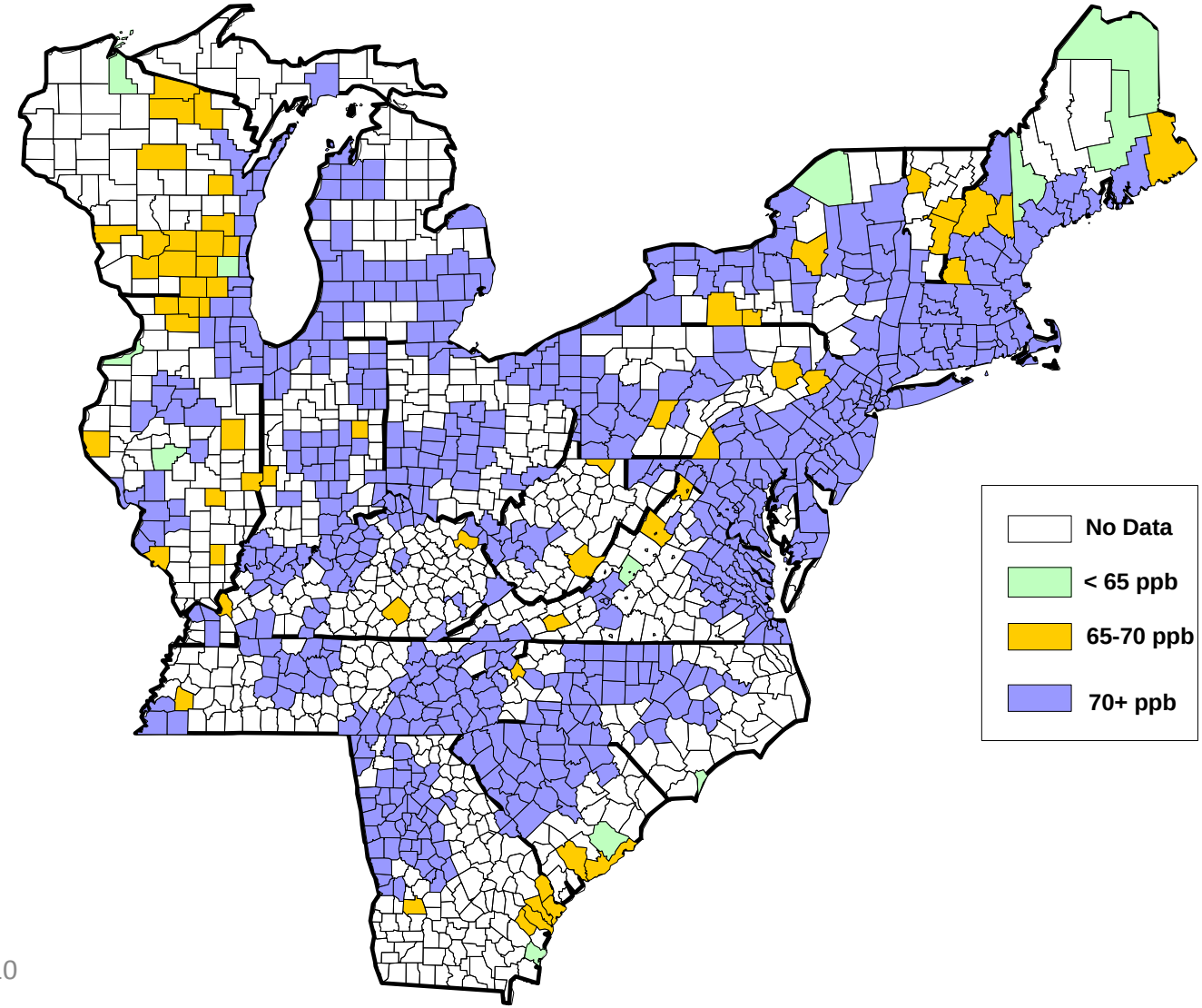
Status	Clean data years	Show attainment by
Marginal	2012-2014	12/2014
Moderate	2015-2017	12/2017
Serious	2018-2020	12/2020
Severe	2024-2026	12/2026

Regulation Schedule

- 6 Years needed from start to full compliance date
- 4 Years to adopt and implement



Potential Nonattainment by CSA (2007-09 DV)



Modeling Overview

1. Ozone NAAQS
2. Screening Runs/Proxy Inventory
3. Emissions Inventory

Screening Runs

- Purpose: Investigate the level of emissions reductions needed to achieve
  - Current NAAQS of 75 ppb
  - Potentially lower new NAAQS of 60 - 70 ppb

- Design: Screening simulations in a 12km eastern U.S. domain that use existing data.

Caveats

- These screening runs use proxy emissions through interpolated inventories for many sectors and regions
- Simplified “MOVES-like” adjustment to MOBILE6 emissions have not been fully tested
- Screening simulations are based on simplified across-the-board emission reduction approaches

Across-The-Board Runs

- Two simulations with domain-wide reductions on all man-made sectors:

N50/V30	• 50% NO_X reductions • 30% VOC reductions
N70/V30	• 70% NO_X reductions • 30% VOC reductions

Performed for April 1 – October 31, 2007

"Scenario 3" Run

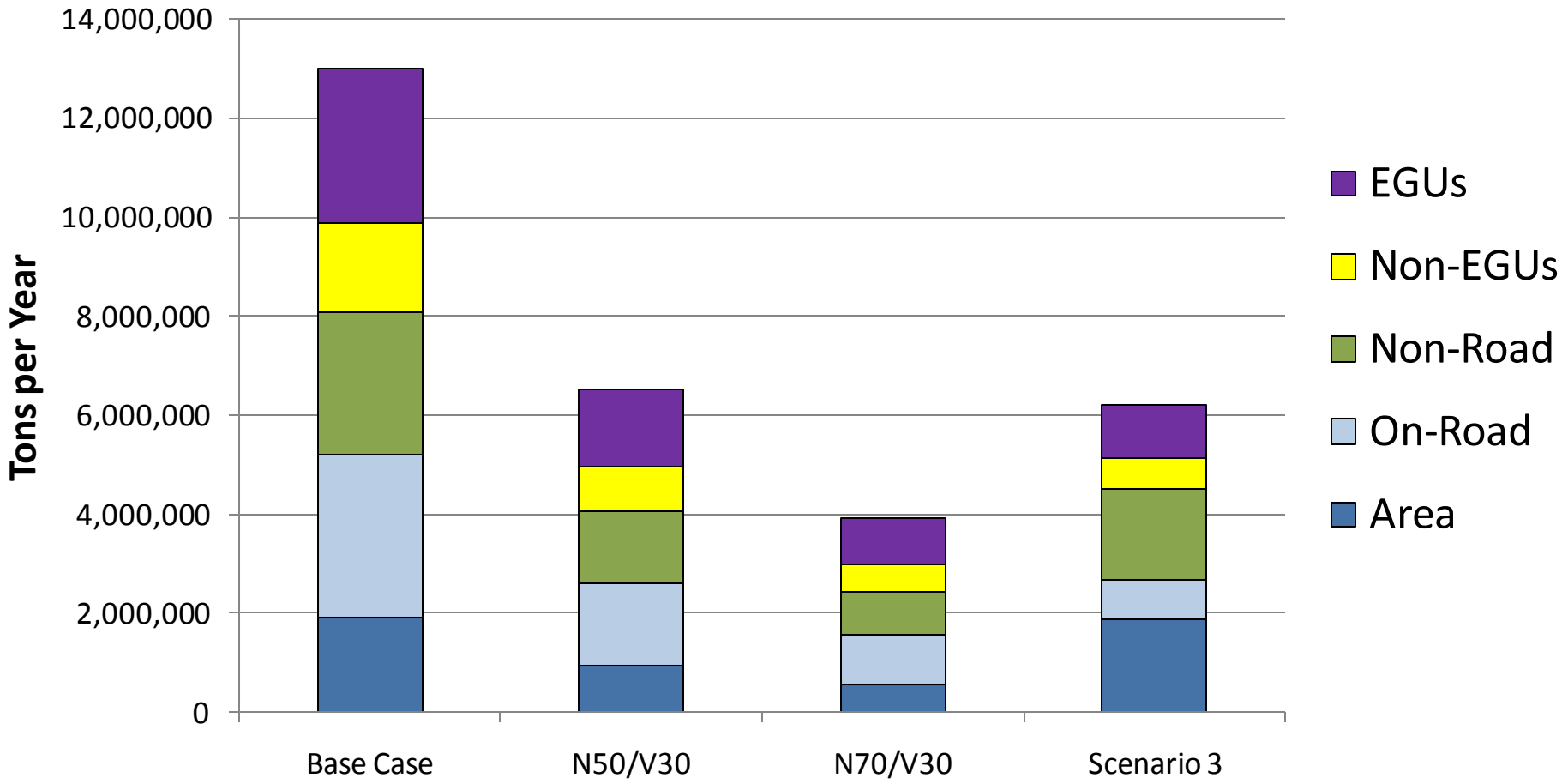
- Approximates OTC's recommendation for critical national & OTR measures

NO_X Domain-wide	• Point: 65% reduction
	  • Reductions from ICI boilers/cement kilns
	  • 900,000 ton regional trading cap on EGUs
	• On-road: 75% reduction
	  • Approximates a 2020 national LEV 3
	• Non-road: 35% reduction
	  • Reductions from marine/locomotive engines

NO_X in OTR States	• Additional 5% reduction across all sectors in the OTR
VOC	• 30% reduction for man-made sectors across entire domain

Performed for May 15 – August 31

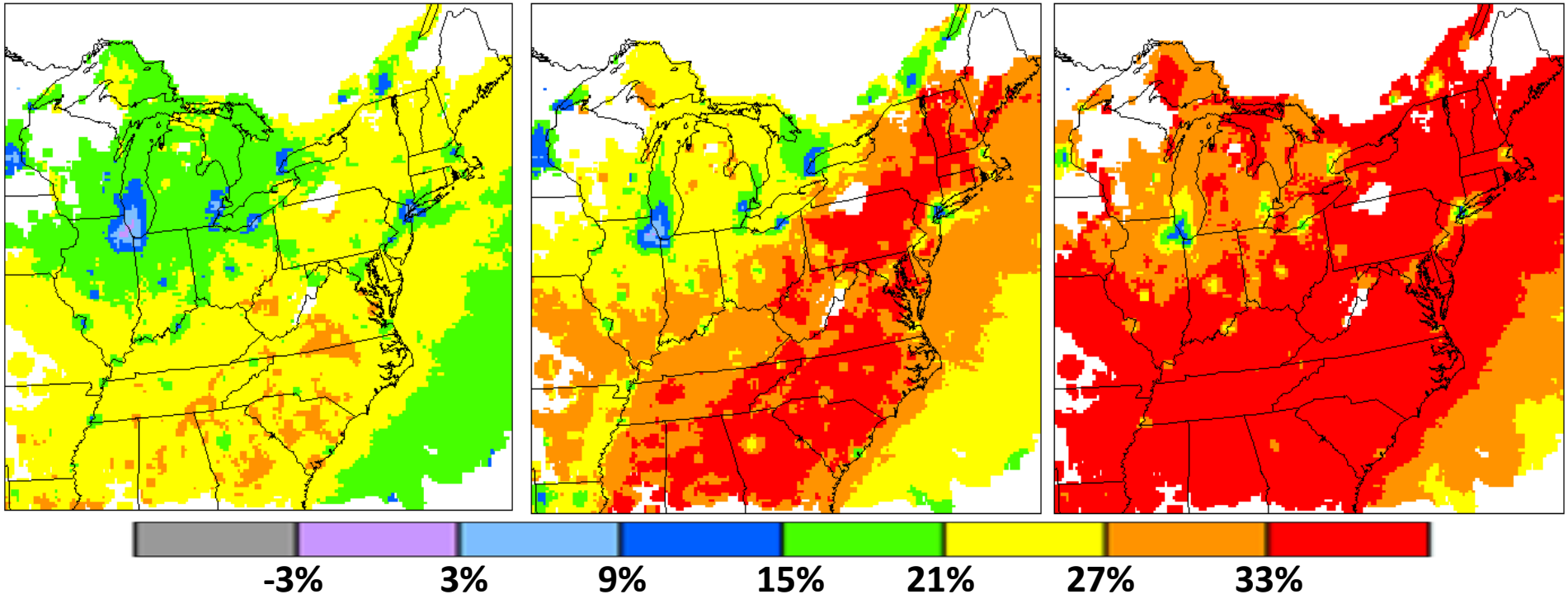
Domain Wide NO_X Emissions by Run



- "Scenario 3" approximates an overall 55% NO_X reduction
- Includes MOVES adjustments to MOBILE6 emissions

Relative Ozone Reductions

N50/V30 **"Scenario 3"** **N70/V30**



- Ozone reductions from "Scenario 3" run fall between those from the across-the-board reduction simulations
- NO_X focused emission reductions show less benefit for urban core areas

Monitors at Nonattainment Levels

	Base Case	N50/V30	"Scenario 3"	N70/V30
84 ppb	34	0	0	0
75 ppb	125	2	1	0
70 ppb	167	16	1	1
65 ppb	186	55	12	4
60 ppb	191	101	29	15
Monitors in OTR	194	190	190	190

- In N50/V30 hot spots remain in urban areas
- Hot spots are further reduced in "Scenario 3" and N70/V30
- Hot spots remain near New York and Philadelphia

Screening Run Design Values by Monitor

Monitor		2005 – 09	N50/V30	"Scenario 3"	N70/V30
Bayonne	NJ	85	81	**78**	74
White Plains	NY	86	75	**70**	66
Camden	NJ	88	75	**68**	65
Bristol	PA	90	76	**67**	64
Greenwich	CT	86	73	**67**	61
Holtsville	NY	88	73	**66**	61
NEA	PA	88	74	**65**	62
Clarksboro	NJ	86	72	**64**	61
Rutgers U	NJ	86	72	**63**	60
McMillan Reservoir	DC	85	71	**63**	60
Edgewood	MD	91	68	**59**	55

Conclusions from Screening Runs

- "Scenario 3" shows a pathway to attainment, through national reduction programs and local actions
- All simulations show **lower** ozone levels region wide
- All simulations show **less** relative benefit for urban core areas

Emissions Inventory Overview

1. Ozone NAAQS
2. Modeling
3. Emissions Inventory
   - Current SIP Inventory Progress
   - MOVES
   - ERTAC

Modeling Inventory

2007 Baseline

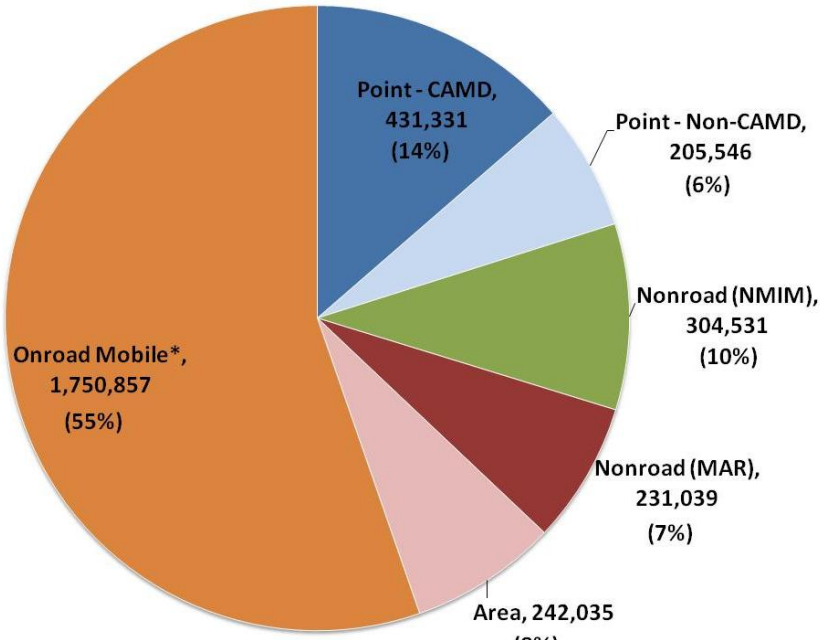
- All sectors complete except Onroad Mobile

2013 $PM_{2.5}$ & 2017/20 for O_3

- MANE-VU
  - Nonroad: Final in November
  - Non-EGU Point & Area Sources: Stakeholder review in November
  - EGU Point: Probably mid-2011
  - Onroad Mobile: TBD
- Other RPOs: TBD

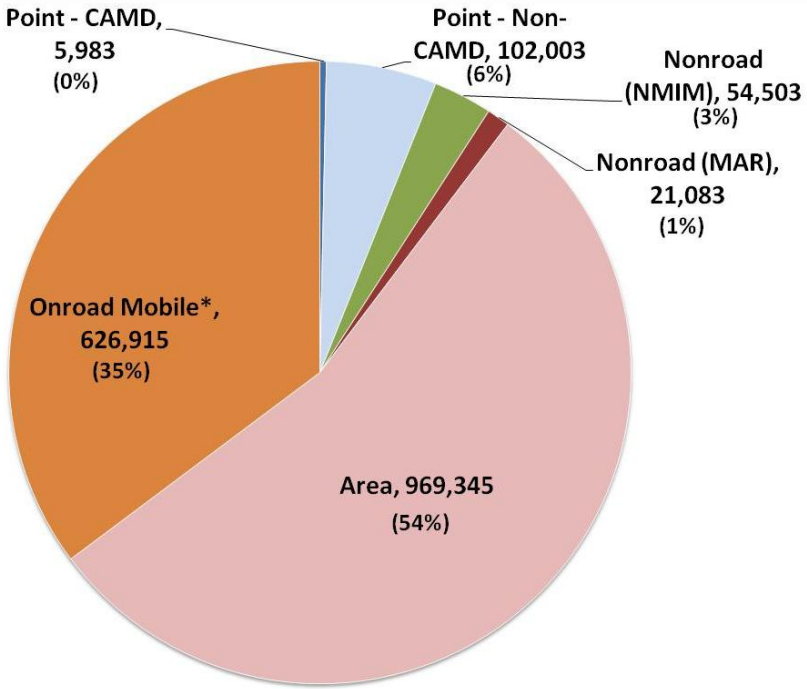
2007 Annual Emissions by Sector (OTR+VA)

NOx



Total 3,165,340 tpy

VOC



Total 1,779,832 tpy

- Onroad Mobile Estimates are interpolated 2007 emissions using MOBILE6.2 and MOVES Adjustment Factors

MOVES

- Purpose: to complete the onroad mobile emissions inventory using EPA's Mobile Vehicle Emission Simulator

- Issues:
  - EPA continues to revise required tools
  - MOVES requires enormous computing power
  - Scenario analysis difficult due to long runtimes
  - Revision needed to evaluate the effect of LEV3 & heavy-duty CAFE
  - Reporting tools inadequate for SIP submittals

ERTAC

- Eastern Regional Technical Advisory Committee
  - NE, Mid-Atlantic, SE, and Lake Michigan area
  - States, Industry, & Regional Organizations

- Purpose: Develop a methodology to create future year EGU emissions inventories that involve EPA and
  - Are transparent, inexpensive, regionally stable, and flexible unlike the proprietary IPM®
  - IPM® requires hiring a contractor for each different run adding significant cost

Next Steps for ERTAC

November-January, 2010

- Contractors write the programs
- Initiate database Q/A by states to ensure unit inclusion
- State ID of new/retired units

February/March, 2011

- Alpha version available for review

Next Steps

- Complete Base Year Inventory
- SIP Model Performance Evaluation for 2007
- SIP Modeling Protocol Development
- Additional Screening Runs
- Identification of OTB/OTW/BOTW Controls

Questions

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