

Making Progress on Cleaner Air

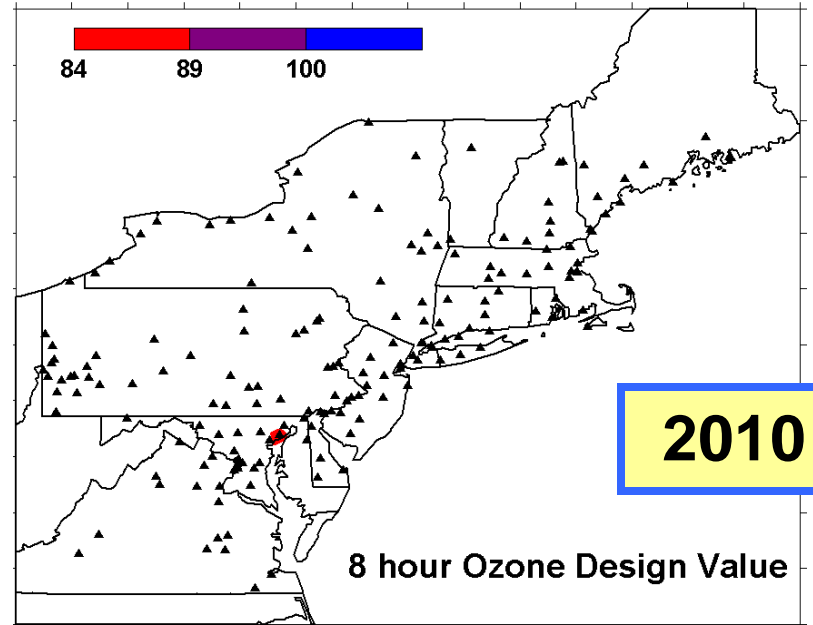
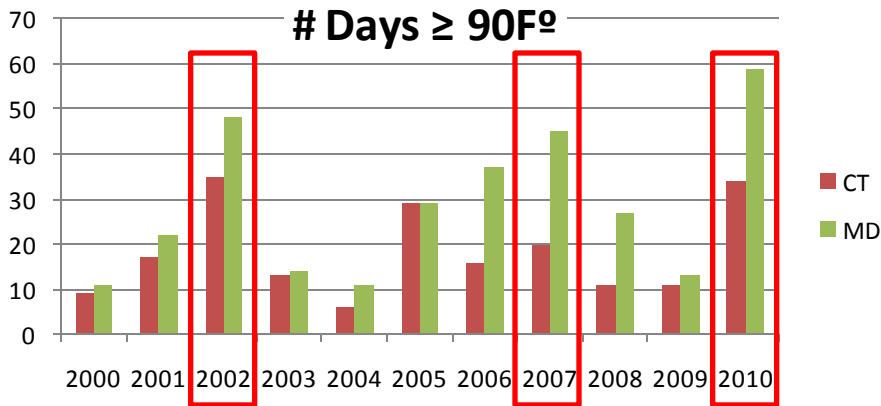
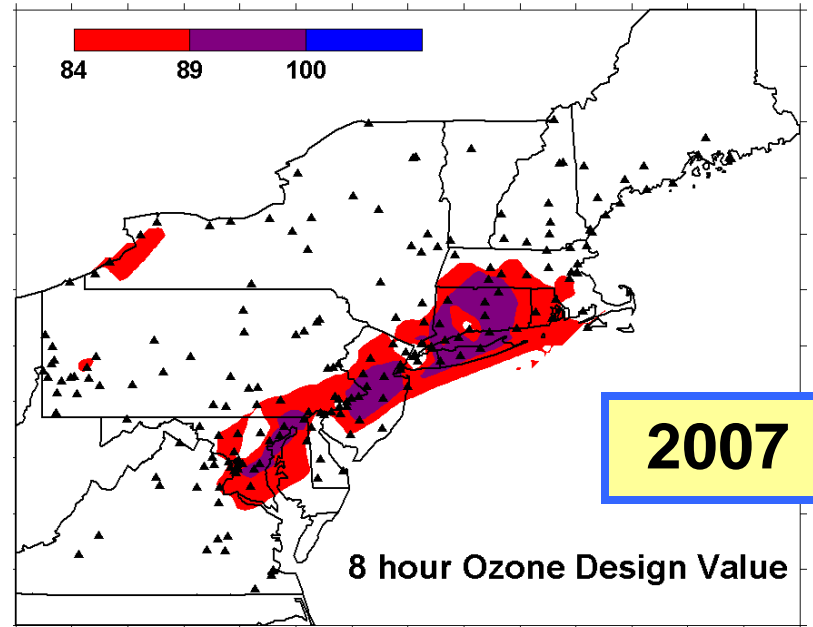
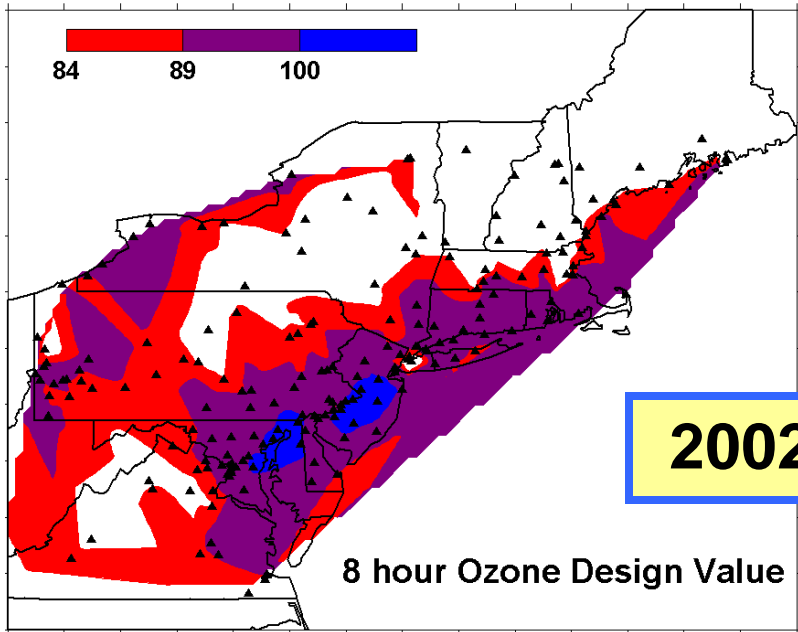
What We've Achieved Under the Clean Air Act Amendments of 1990, and Where We Need to Go

*Getting to the New Ozone Standards
A Pathway Forward*

November 10th, 2010
Sheraton Hotel Boston, MA



The Bottom Line



Topics Covered

- Brief history of the OTC
- Progress in cleaning the air
- Challenges of the next decade
- The ozone challenge
- Some good news
 - We understand the science of ozone very well
 - We have real world experience in what works
 - We have a clear path forward



OTC Control Priorities – 80's to Early 90's

- Focus was on Volatile Organic Compound (VOC) reductions
 - Stationary sources
 - Manufacturing more than the power sector
 - Mobile source tailpipe standards
 - Mobile source fuels
 - OTC LEV as an example
 - Paved the way for a National LEV Program



OTC Control Priorities – 1990's



- Adding nitrogen oxides (NO_x) to the equation
- Beginning to push super-regional controls
 - Power plants
 - Other stationary sources
 - Mobile source fuels
 - Tailpipe standards
 - “OTC NO_x Budget Program” as an example
 - Paved the way for the NO_x SIP Call and the Transport Rule

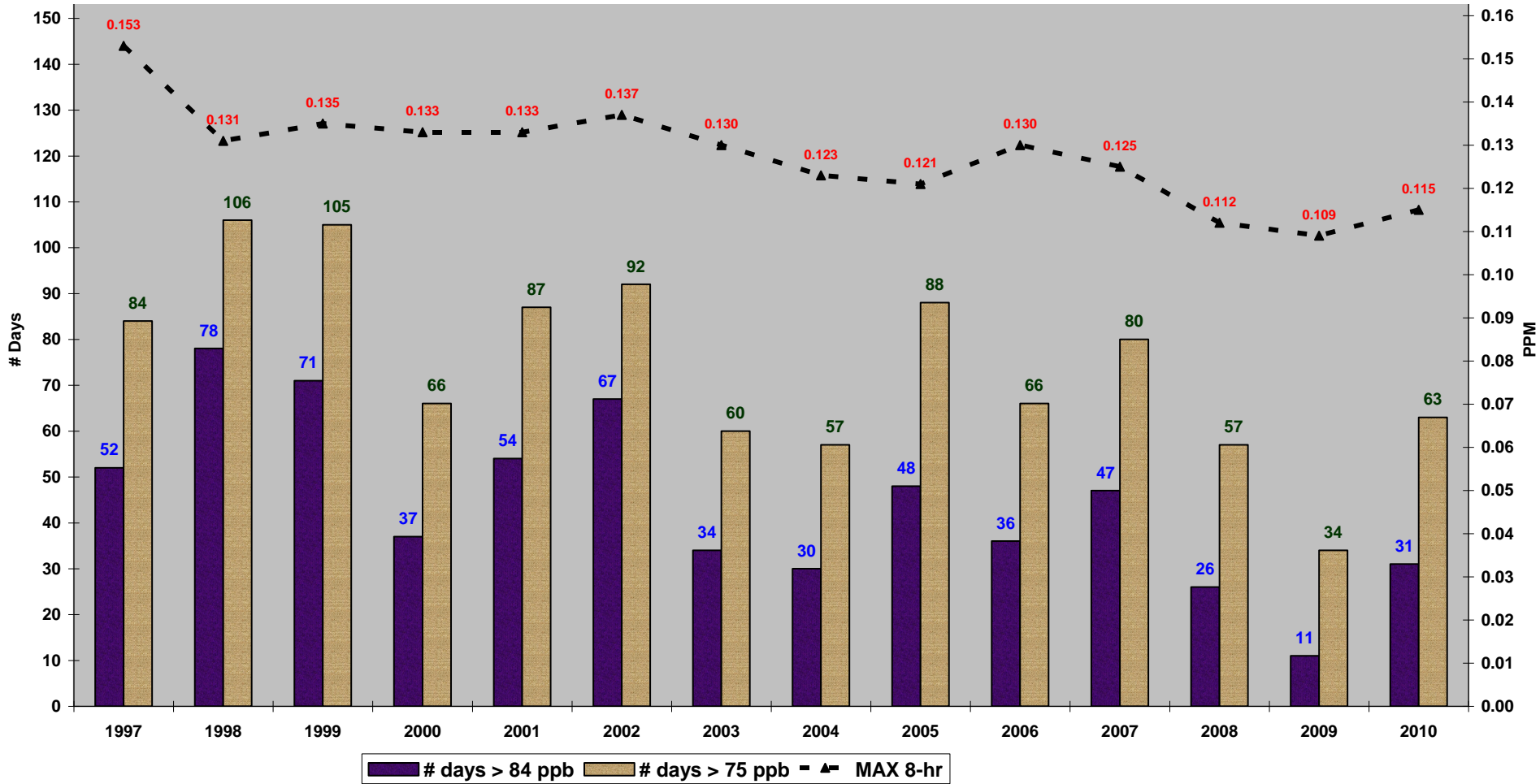
OTC Control Priorities – 2000's

- Area sources/VOC and NOx
- More power plants/NOx
- More stationary source/NOx
- More mobile source tailpipe and fuel standards/NOx
- Major focus on “National” programs to reduce transport
 - Ozone improvements resulting from the 2003/2004 NOx SIP Call were dramatic
 - More later

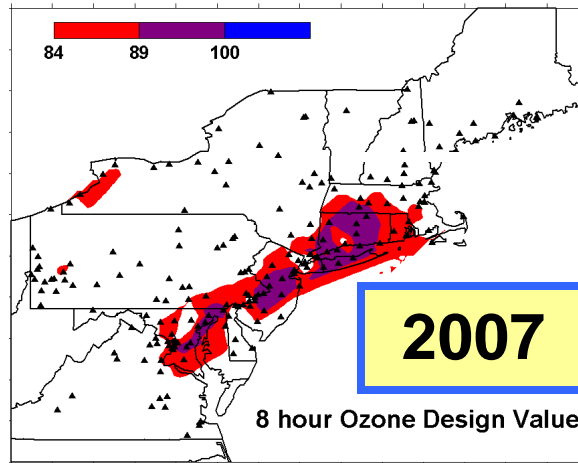
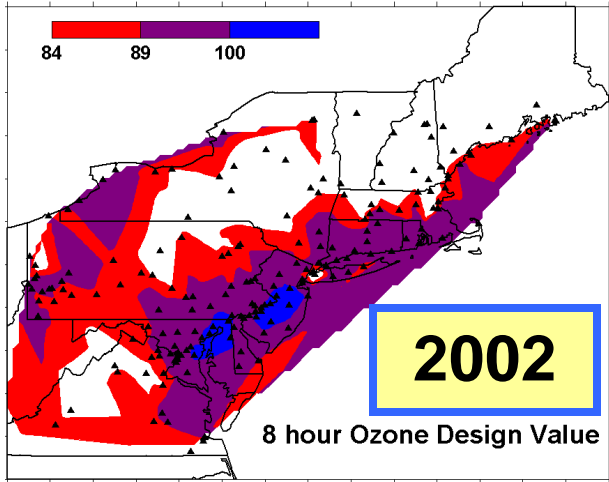


Ozone Levels Continue to Drop

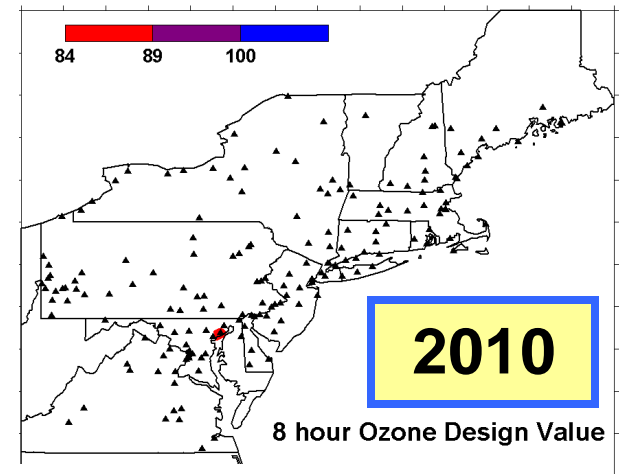
OTR High Ozone Day TRENDS (2010 preliminary data [up to September 6])



The Ozone Plans for 2010 Worked !!!

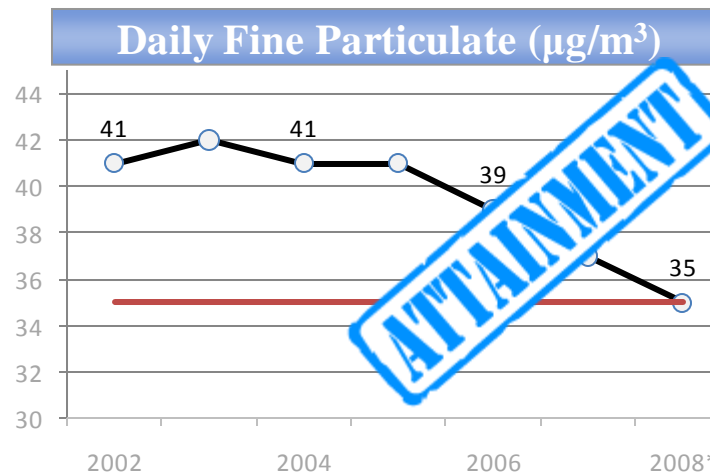
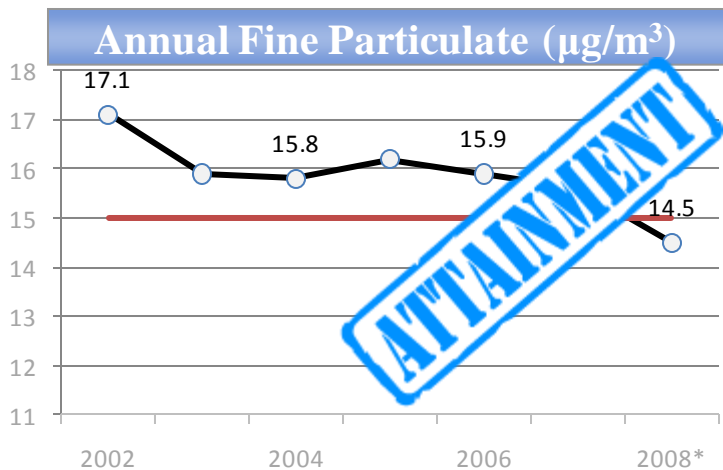
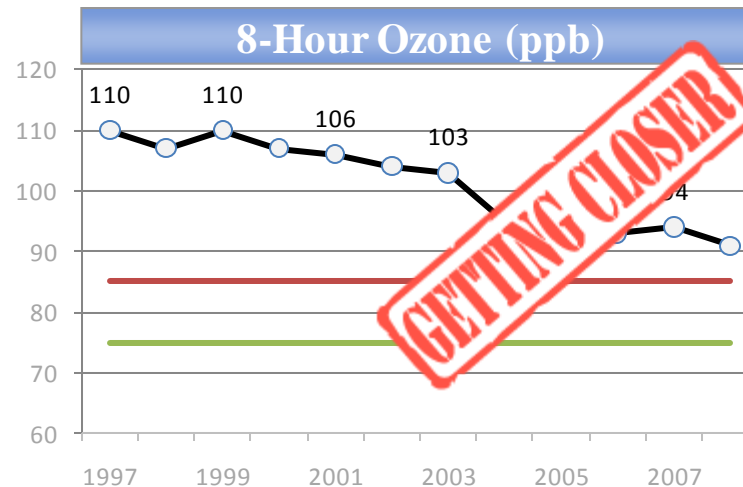
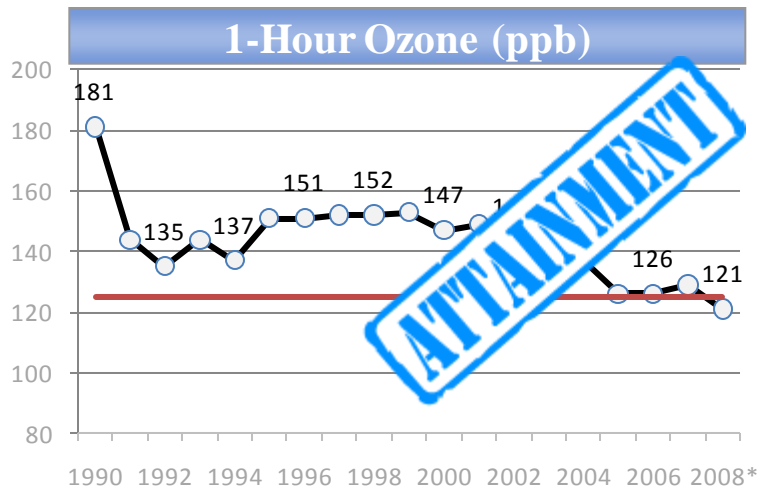


**The Plan for the
old 1-hour standard
(2005) also
worked**

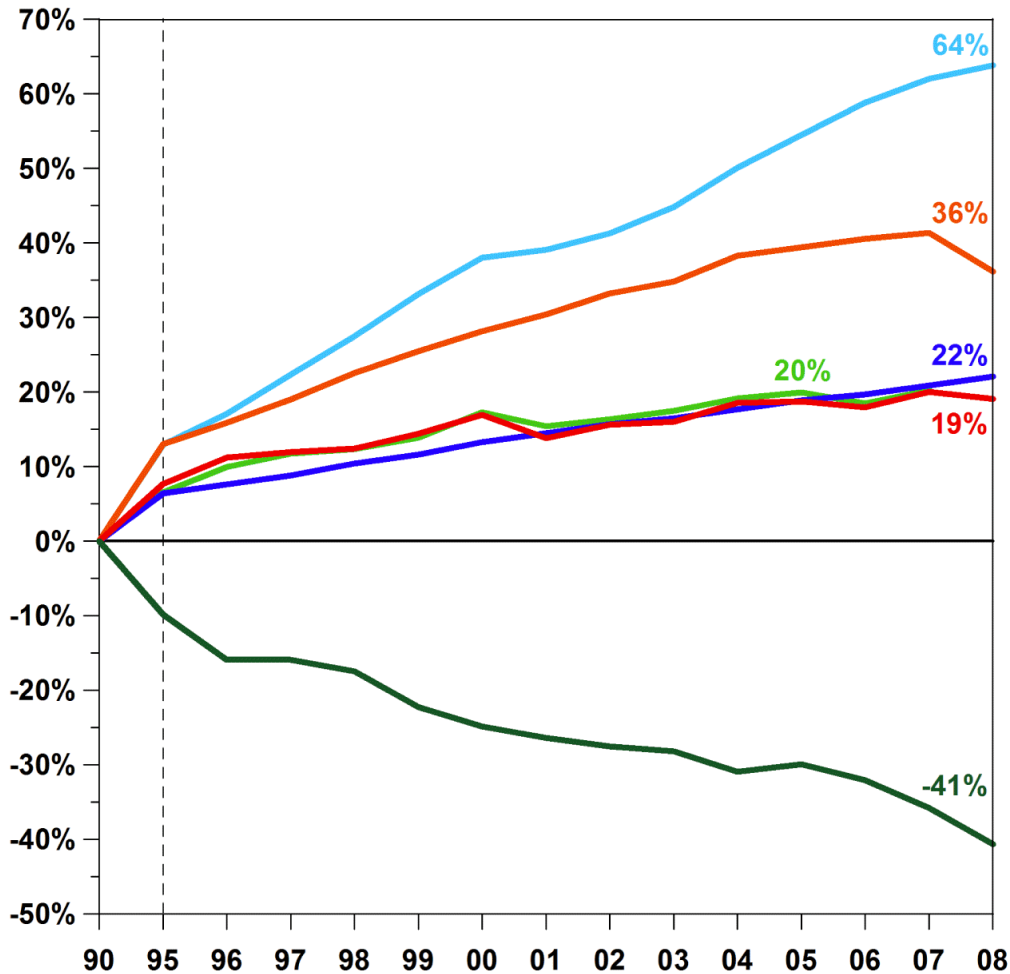


PM Levels Have Also Dropped

Maryland as an Example



Growth and Emission Reductions



Gross Domestic Product



Vehicle Miles Traveled



Population



CO₂ Emissions



Energy Consumption



Aggregate Emissions
(Six Common Pollutants)

Health Benefits Of Clean Air

- According to EPA, the 1990 CAA Amendments were modeled, nation-wide, for 2010 to annually prevent:

160,000	54,000	45,000	41,000
premature deaths (aged 30+)	cases of chronic bronchitis	cardiovascular hospitalizations	respiratory hospitalizations
\$1.2 trillion	\$24 billion	\$1.3 billion	\$640 million

economic valuations in 2006 dollars

<http://www.epa.gov/oar/sect812/prospective2.html>

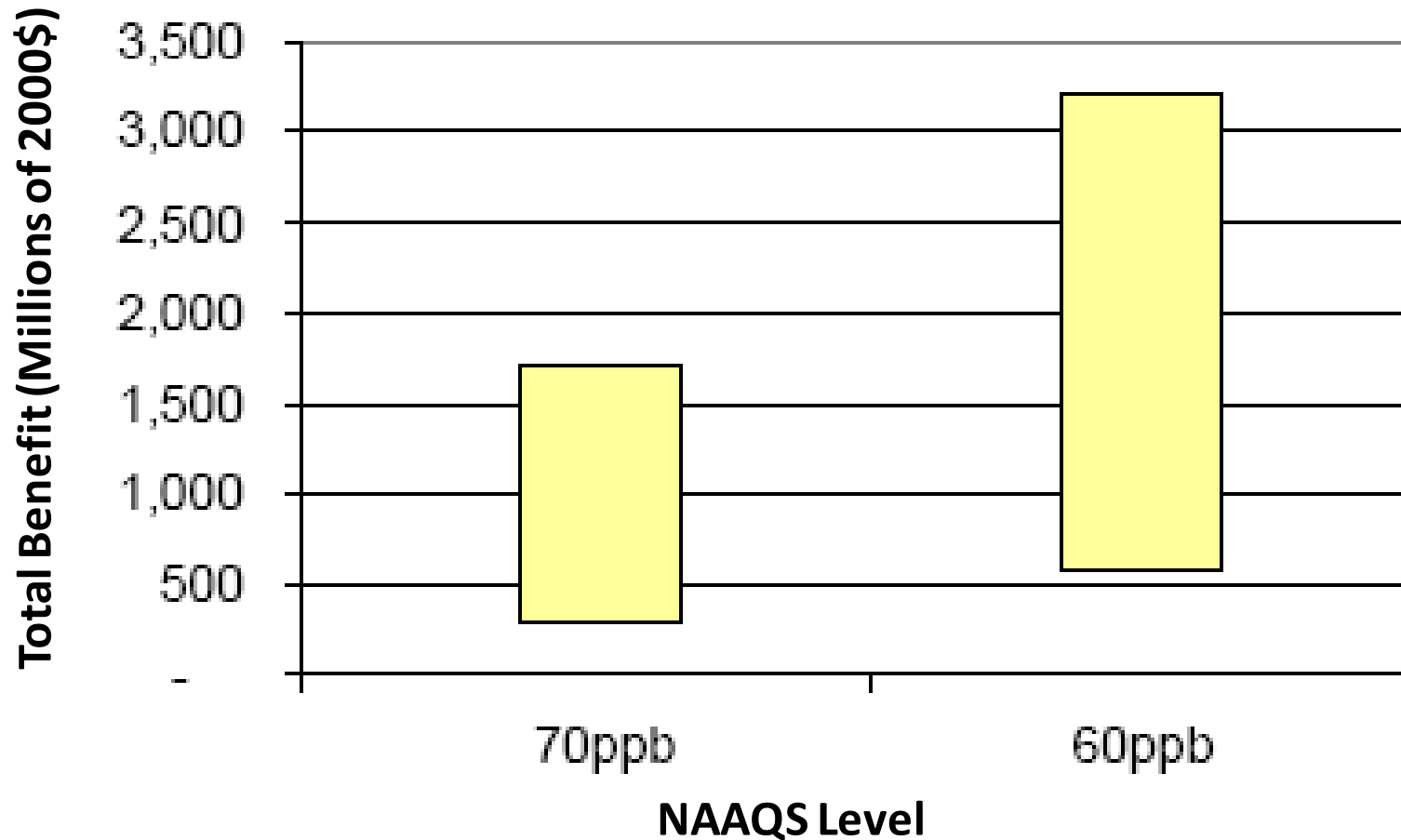
Health Benefits – New Ozone Standard

- 2007 NESCAUM study of potential health benefits in the OTR associated with a lower ozone NAAQS

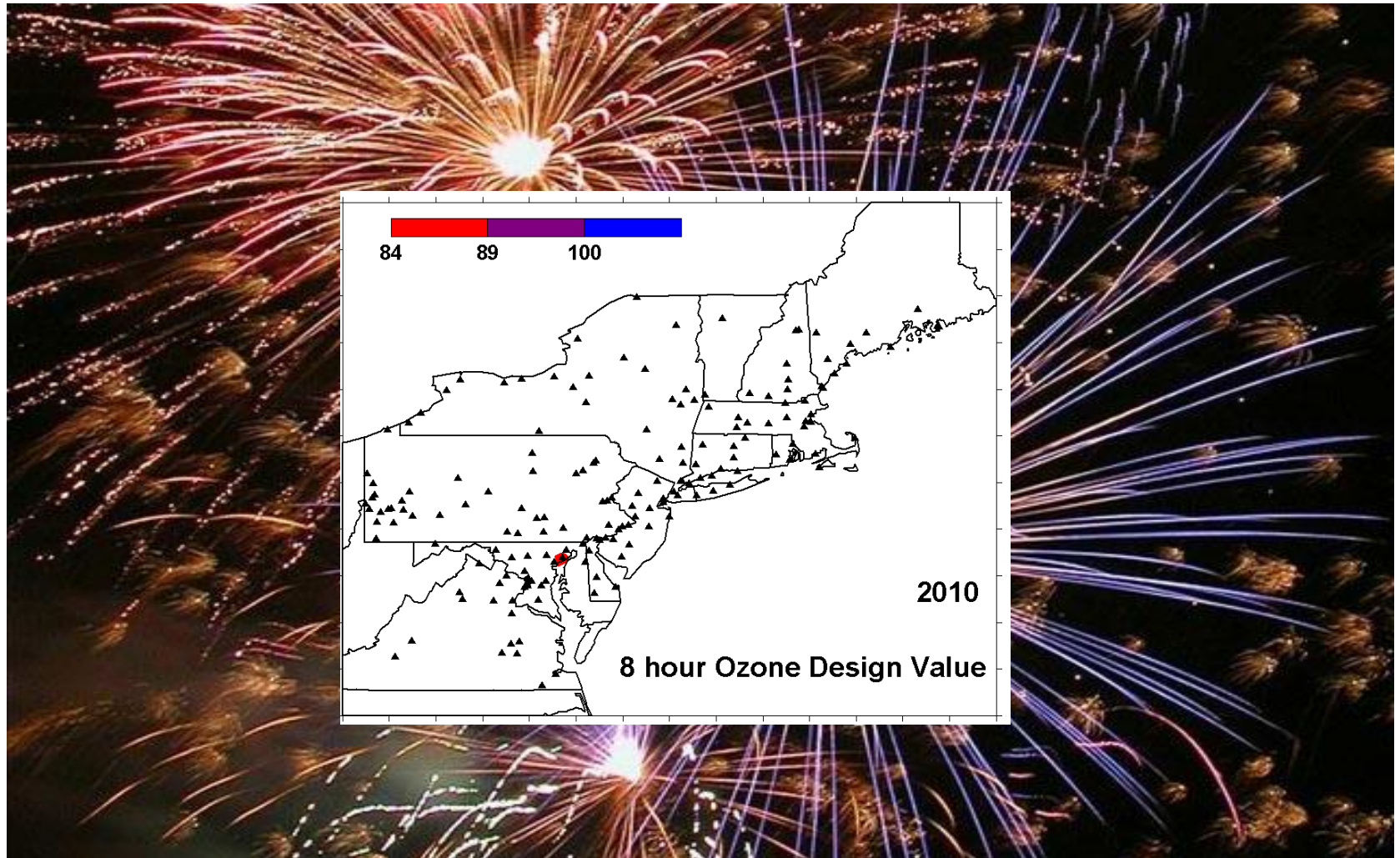
	Reduced Annual Incidences in the OTR	
	70ppb	60ppb
ER Visits for Asthma	90	180
Hospital Admissions for All Respiratory Conditions (Elderly and Infants)	910	1,700
School Loss Days	234,000	435,000
Loss of Income due to Decreased Worker Productivity	1,350,000	2,770,000
Deaths	43 – 220	84 – 407

Benefits Significantly Outweigh Costs

- *New Ozone Standard – Estimated Total Net Monetary Benefit Across the OTR*



A Ten Second Celebration



Significant New Air Quality Challenges

- New lower ozone standard
- Regional transport now a dominant factor
 - Incoming ozone will be higher than the new standard
- Controls – Low and Mid-hanging fruit is all but gone
 - Will need to test nontraditional programs
- Other new standards
- Resource constraints



National Ambient Air Quality Standard - Ozone

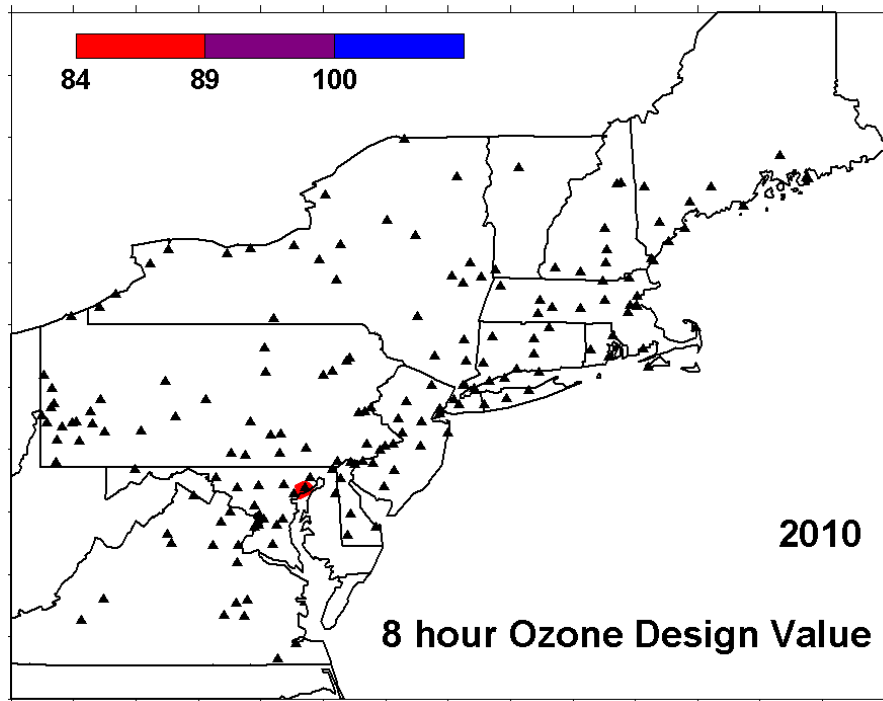
- 1997 NAAQS = 85ppb
 - OTC states very close to complying by 2010 attainment date
- 2008 NAAQS = 75ppb
 - The reconsideration
 - Has not been revoked, nor implemented
- 2010 NAAQS = 60 to 70ppb (TBD)
 - Now set for announcement by 12/31/2010
 - New Secondary NAAQS = 7 to 15ppm-hours (Also TBD)



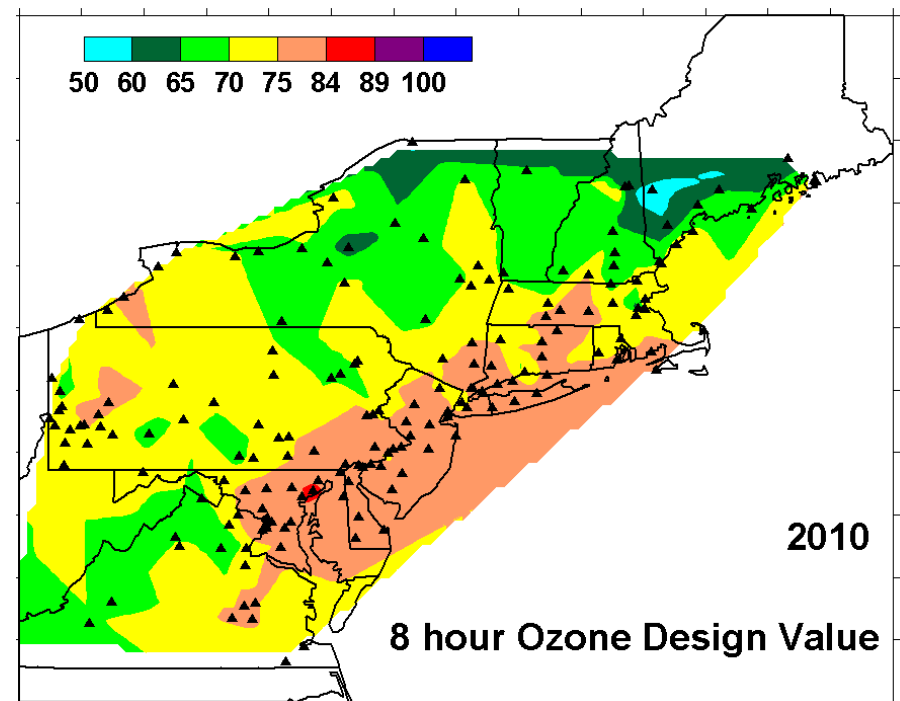
No Rest for the Weary

Comparing the Old and New Ozone Standards

Who is in nonattainment under the old standard?

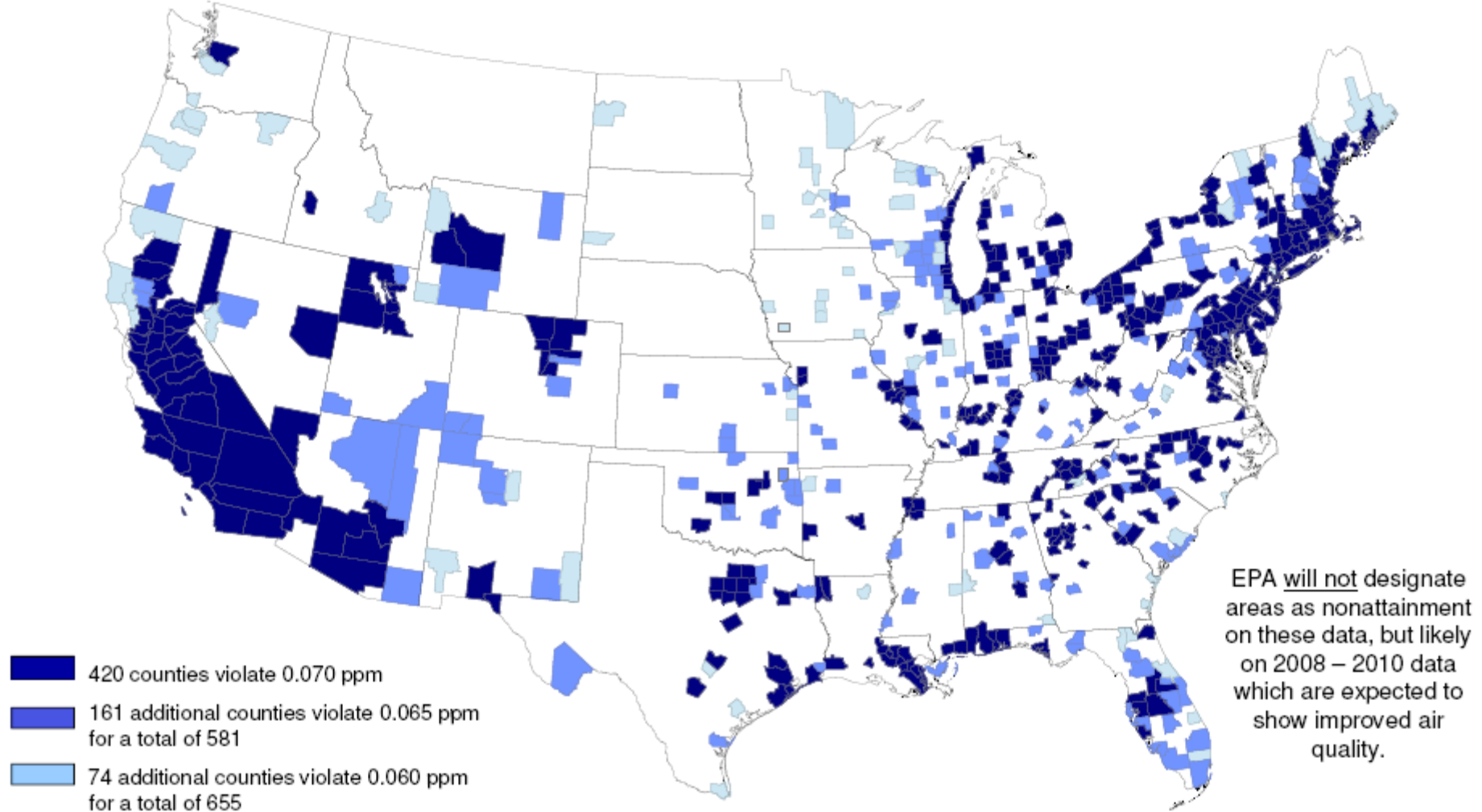


Who might be nonattainment under the new standard?



Counties With Monitors Violating Proposed Primary 8-hour Ground-level Ozone Standards

0.060 - 0.070 parts per million (Based on 2007 – 2009 Air Quality Data)

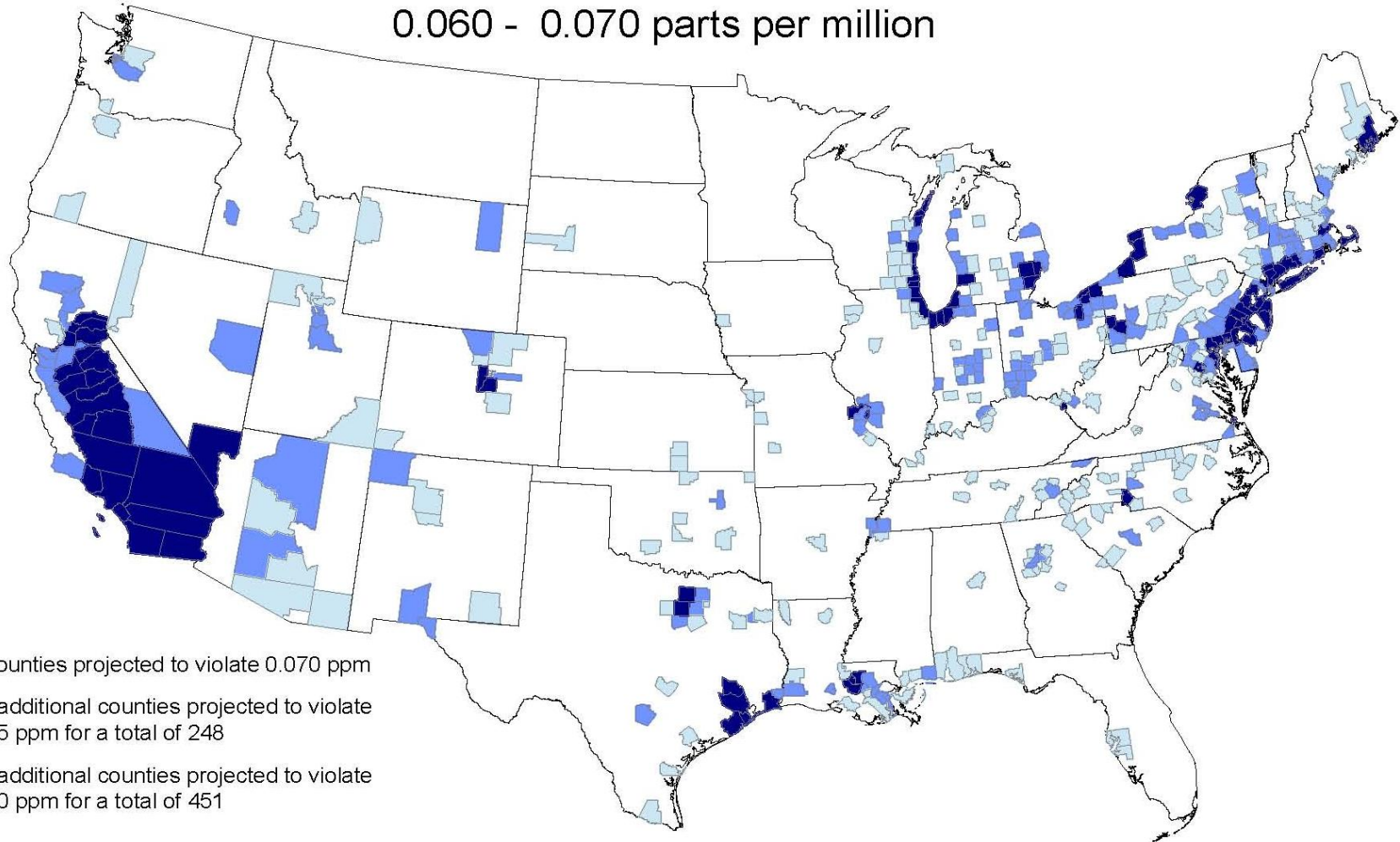


Notes:

1. No monitored counties outside the continental U.S. violate.
2. EPA is proposing to determine compliance with a revised primary ozone standard by rounding the 3-year average to three decimal places.

Counties With Monitors Projected to Violate Proposed Primary 8-hour Ground-Level Ozone Standards in 2020

0.060 - 0.070 parts per million



- 99 counties projected to violate 0.070 ppm
- 149 additional counties projected to violate 0.065 ppm for a total of 248
- 203 additional counties projected to violate 0.060 ppm for a total of 451

Notes:

1. The modeled emissions in 2020 reflect the expected emissions reductions from federal programs by 2020 including: the Clean Air Interstate Rule, the Clean Air Mercury Rule, the Clean Air Visibility Rule, the Clean Air Nonroad Diesel Rule, the Light-Duty Vehicle Tier 2 Rule, the Heavy Duty Diesel Rule, the proposed rules for Locomotive and Marine Vessels and for Small Spark-Ignition Engines, and an estimate of State-level mobile and stationary source controls that were projected to be needed to attain pre-existing PM 2.5 and ozone standards.
2. Controls applied are illustrative. States may choose to apply different control strategies for implementation.
3. EPA did not model future violations outside the continental U.S.
4. EPA is proposing to determine compliance with a revised primary ozone standard by rounding the 3-year average to three decimal places.

More Reductions Are Needed

- 99 counties will be unable to comply with the upper end of the proposed ozone NAAQS
- EPA's analysis for the proposed NAAQS identifies that significant additional reductions will be needed
 - Another 40% in the OTR
 - Another 60+% in the Midwest



Other Pollutants

- New standards
 - More stringent fine particle standard on the way
 - NO₂
 - SO₂
 - Lead
- Mercury
- Climate Change/CO₂ reductions
- All in a resource constrained world
- Lots of discussion around multi-pollutant planning



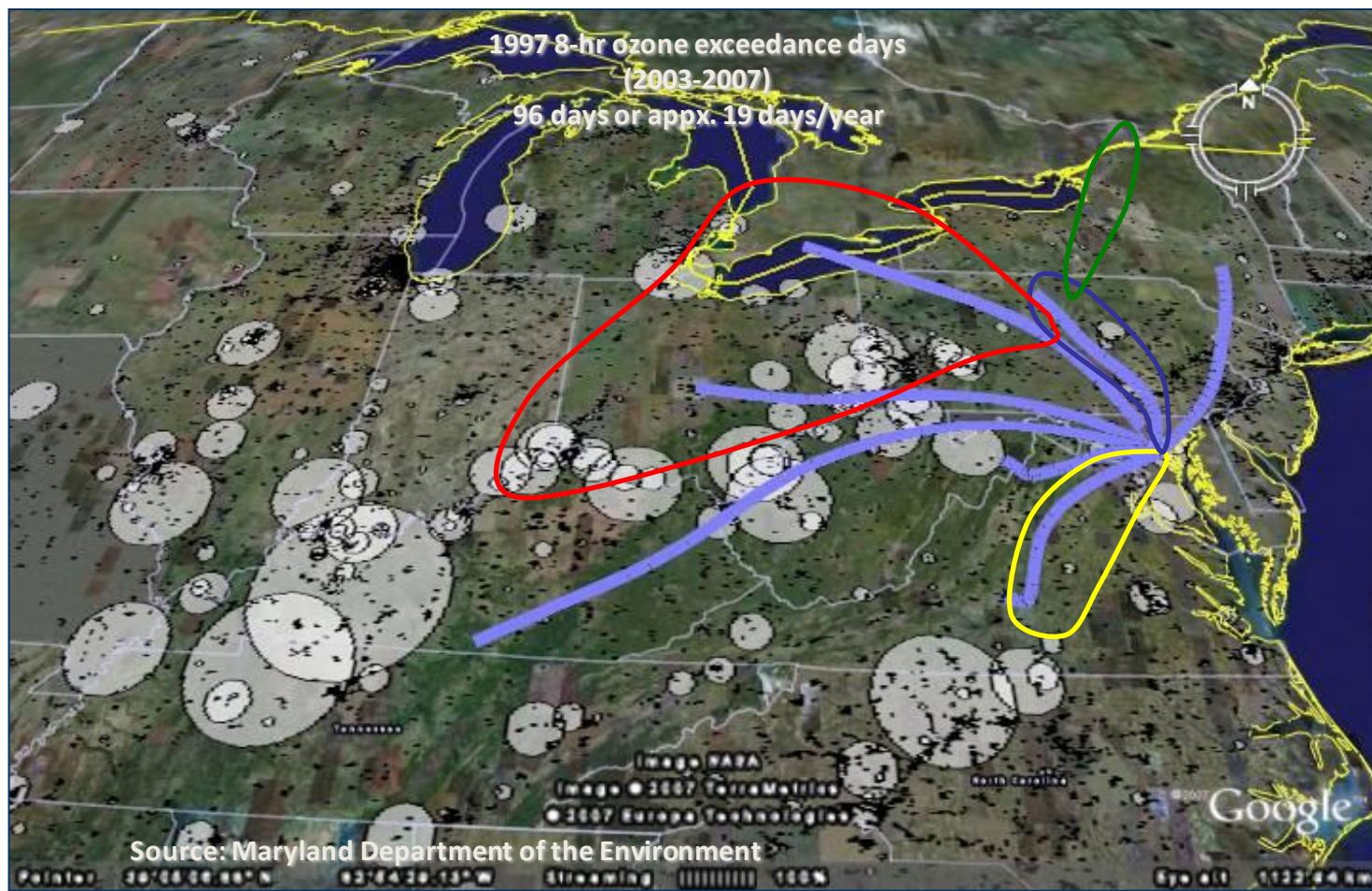
The Path Forward

- We understand the science of ozone better than ever
- We've implemented programs that have worked in the real world
- We need a two-part strategy
 - Local (inside the OTR) controls are still critical
 - Can help reduce about 1/3 of the ozone problem in most OTC cities
 - National/super-regional controls are now essential
 - Incoming ozone is already measured at levels above a 60-70 ppb standard
 - Regional contribution represents approximately 2/3 of the ozone problem in most OTC cities

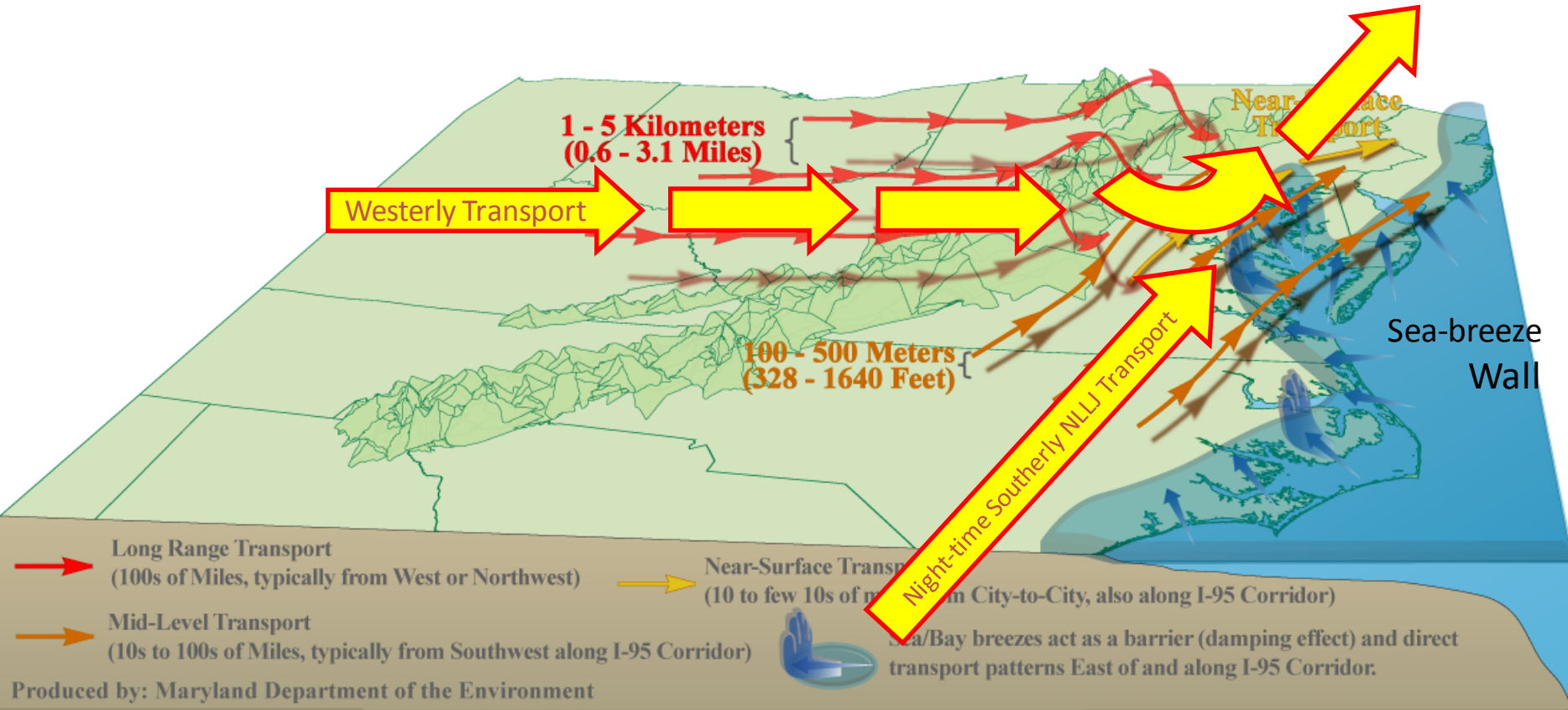


The Science - Three Types of Transport

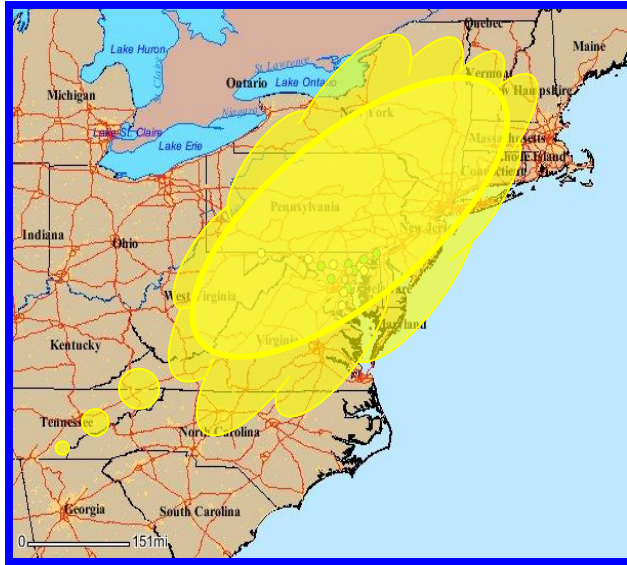
From the OTC “Conceptual Model”



The Transport Crossroads

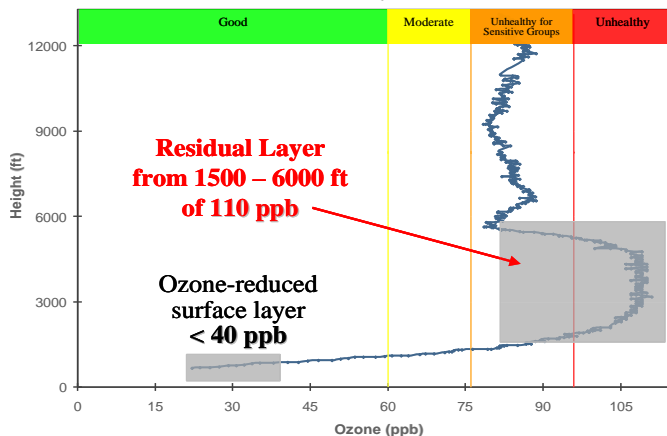


The Elevated Ozone Reservoir



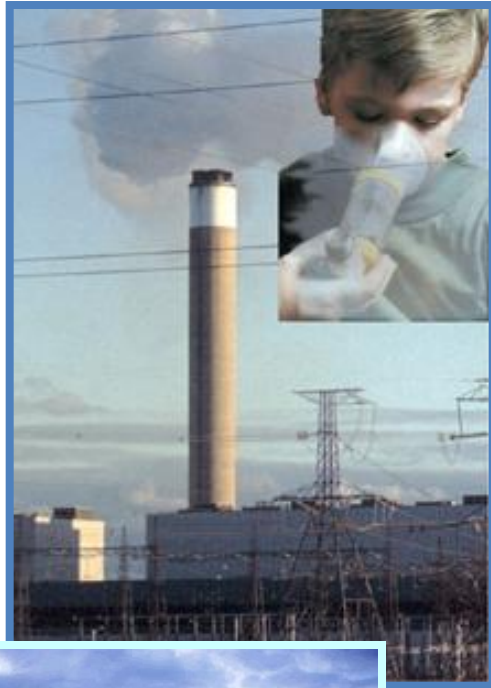
- Or .. The “Transport Cloud”
- In the morning hours, a large ozone reservoir sits above the Mid-Atlantic
 - Measured with balloons, airplanes and aloft monitors
 - Levels in the reservoir reach 60-100 ppb
 - Levels at the surface are very low
- Around 10-11 AM, when the earth heats up and the nocturnal inversion breaks down, the ozone in the reservoir mixes down to the ground
 - Air quality degrades significantly
 - Ground-level monitors simultaneously all go to the level measured aloft at night
 - Represents about 2/3 of the ozone problem in most OTC Cities

Incoming Ozone
August 2, 2005 (7:00 AM EDT)
Beltsville, MD



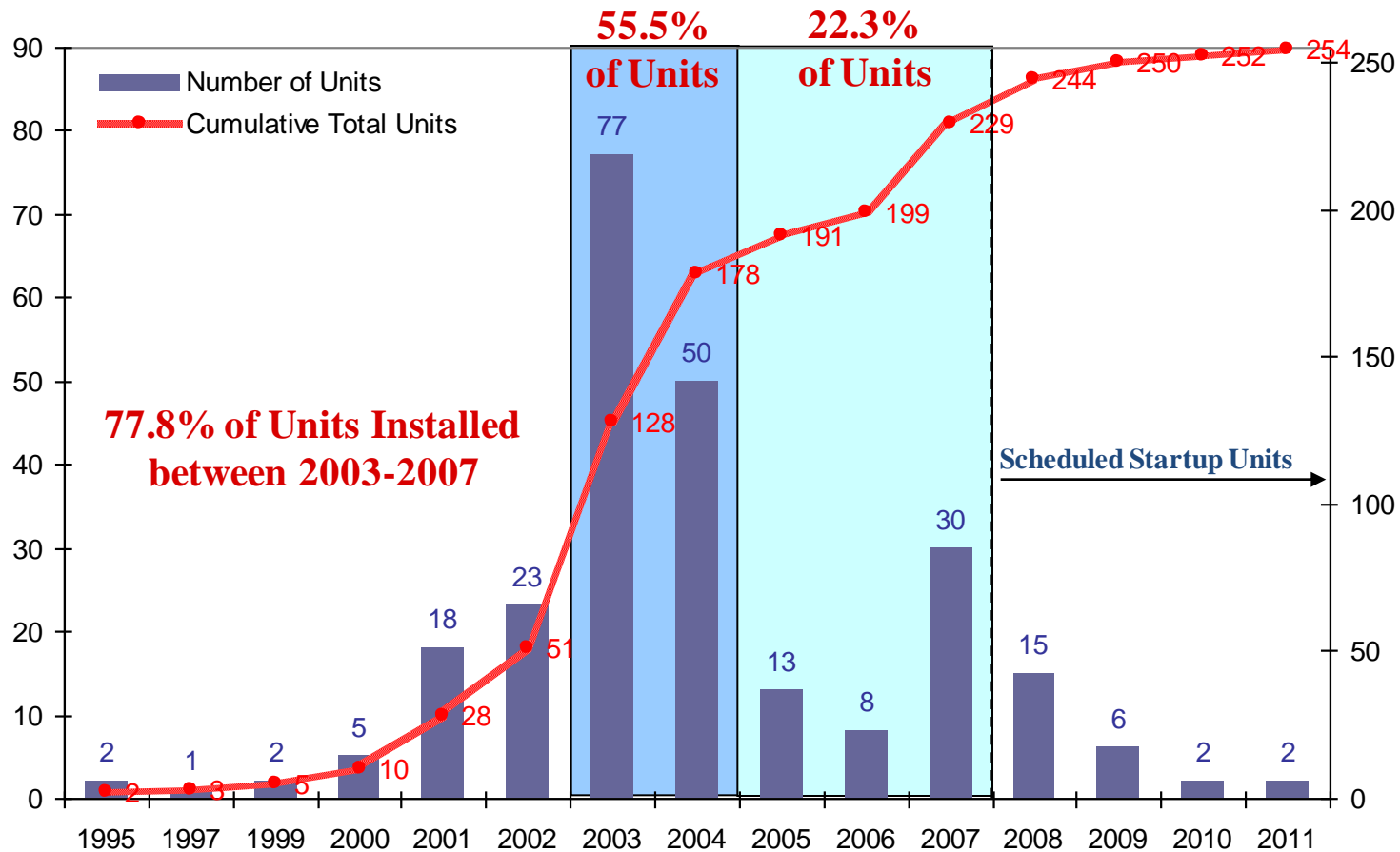
Source: Maryland Department of the Environment & Howard University

How Do We Reduce the Transport Cloud?



- Example: the NO_x SIP Call
 - OTAG collaboration in late 90's
 - EPA finalizes SIP Call in 1998
 - Very significant super-regional NO_x reductions across the East in the 2003/2004 timeframe
 - Dramatic drops in ozone levels
- Similar for PM & SO₂ controls

Controls From the NOx SIP Call

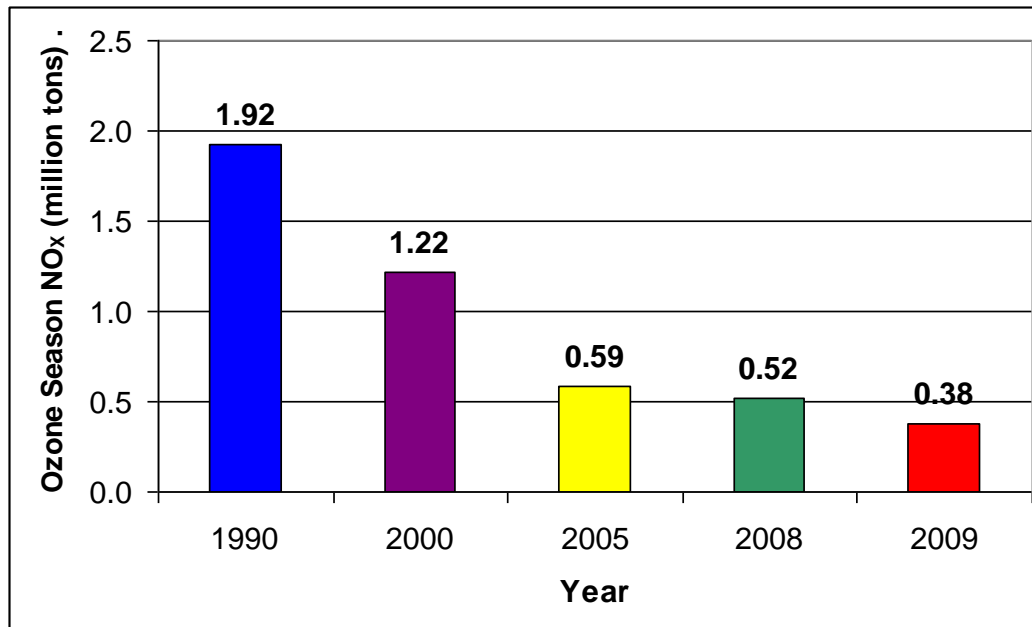


Huge investment in SCR controls in the East
in 2003 and 2004

Regional NOx Emission Reductions

- Dramatic super-regional NOx emission reductions in the 2003/2004 time frame
- NOx reductions from Tier II/LEV II standards also, very gradually, occurred in this same period

NOx Reductions at NOx Budget Program Sources

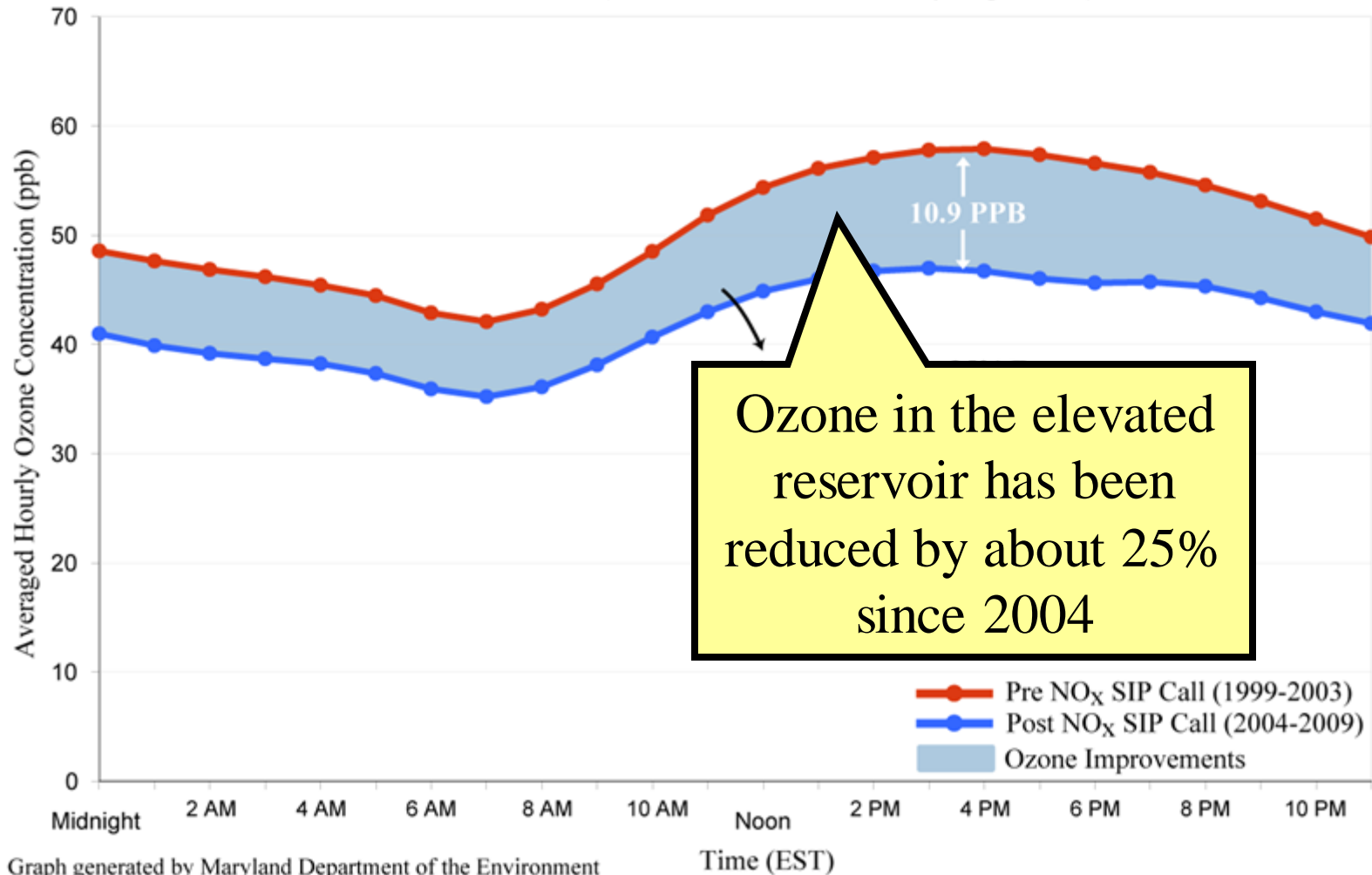


Thanks: EPA Clean Air Markets

Reducing Ozone in the Transport Cloud

Pre/Post Nox SIP Call Benefits

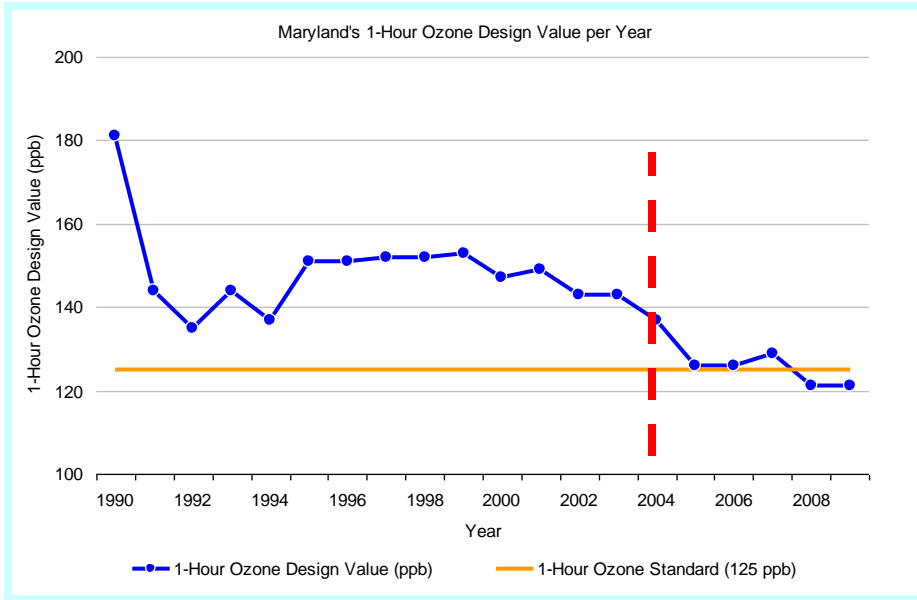
Methodist Hill, PA (2218 Feet above MSL, May-September)



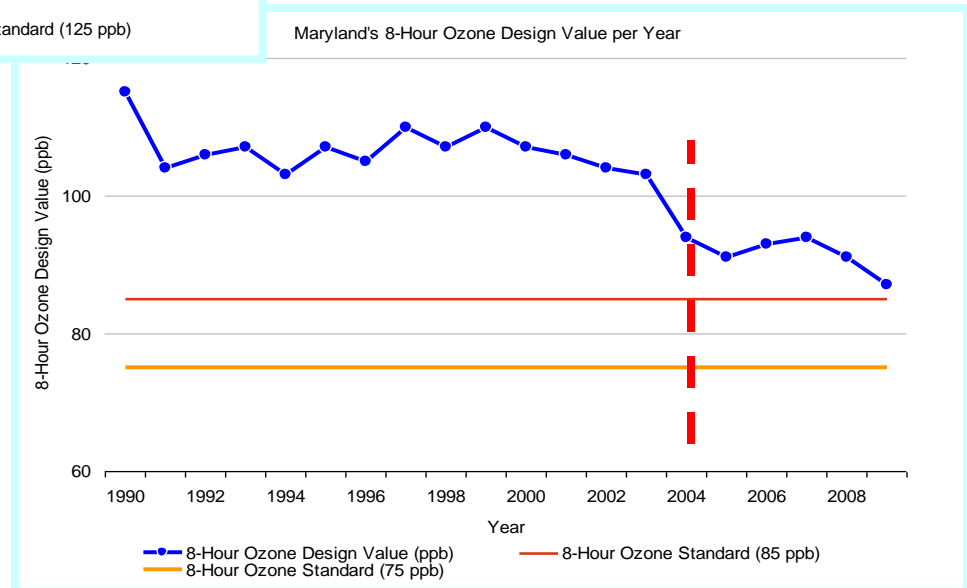
Graph generated by Maryland Department of the Environment

Time (EST)

Dramatic Reductions in Ground-Level Ozone



1-Hour and 8-Hour Ozone Levels Have Dropped Dramatically Across the East

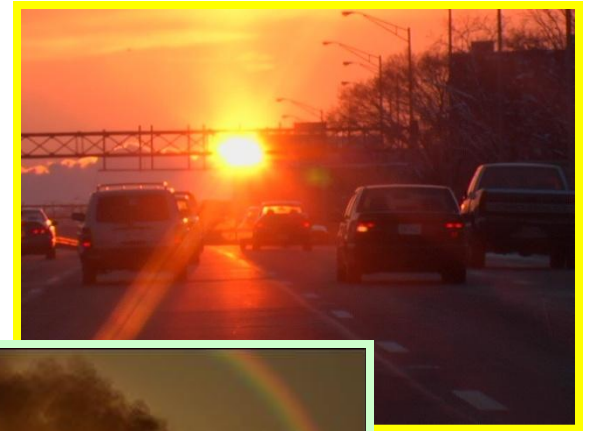


Reducing Super-Regional NOx Emissions Works !!!

We Need To Push For More Super-Regional NOx Reduction Programs

What to Push - The Priority Source Categories

- Local (inside the OTR) controls are still critical
- June 2010 OTC Resolution urged EPA to adopt national rules to reduce regional NO_x emissions from:
 - EGUs
 - Tougher On-Road Vehicle Standards
 - ICI Boilers
 - Cement Kilns
 - Marine Engines
 - Locomotives
- These categories represent
 - 75 % of the NO_x left to regulate
 - 85 % of the SO₂ left to regulate
 - 75 % of the 2005 Hg emissions



Very Preliminary Screening Modeling

- Three scenarios
 - Lower bound - 50% NO_x / 30% VOC
 - All states and all sectors in the East
 - Upper bound - 70% NO_x / 30% VOC
 - All states and all sectors in the East
 - “Scenario 3” - OTC Strategy Run
 - Tried to mimic federal rules and local controls being pursued by the OTC
- Many thanks to NYDEC & UMD
- Special thanks to Barbara Kwetz – We’ll miss you
- More later in Modeling session



Screening Modeling Results

Results for Potential Nonattainment Levels Inside the OTR

Monitors Above Potential Levels of the New Standard

	Base Case		N50/V30		N70/V30		"Scenario 3"	
.084 ppm	34	(18%)	0	(0%)	0	(0%)	0	(0%)
.070 ppm	167	(86%)	16	(8%)	1	(0%)	1	(0%)
.065 ppm	186	(96%)	55	(29%)	4	(2%)	12	(6%)
.060 ppm	191	(98%)	101	(53%)	15	(8%)	29	(15%)
Monitors in OTR	194		190		190		190	

What We Have Been Doing?

- New local (inside the OTR) controls
 - Actions at last 4 OTC meetings pushing Committees to develop new local control programs for selected source categories
 - More later
- National rules to reduce transport
 - Actions at last 5 OTC meetings urging EPA to move ahead with strong federal rules to address transport
 - September 2009 State Collaborative letter signed by 17 Midwest and OTC Commissioners
 - Aggressive power plant controls and national rules for other source sectors
 - More later



Today's Meeting

- Take action on new local (inside the OTR) control measures
- Push for help from EPA to reduce emissions from mobile sources
- Identify additional opportunities for additional local and national reductions
- Show results from preliminary modeling that outline a path forward

