



OTC States' Outlook on Effective Air Pollution Control

NACAA Spring Meeting

May 6, 2008

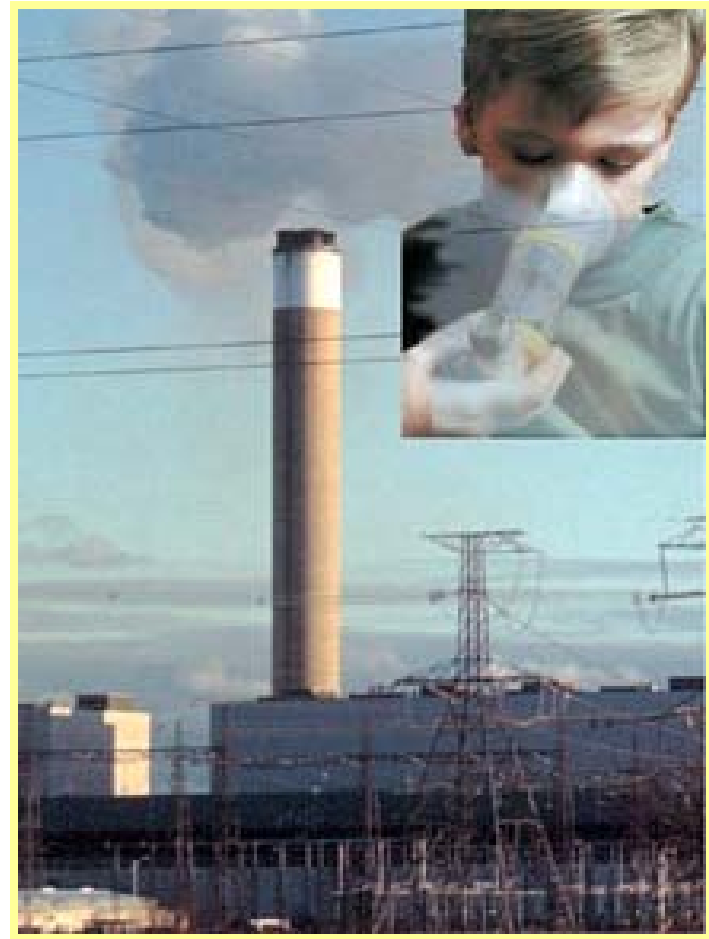
Anna Garcia

Overview

- What's Worked in the OTR
- OTC Controls for 2010 Attainment
- MANE-VU Emission Strategies for Haze and PM and Collaboration with Other States
- New Ozone NAAQS & Initiatives for National Controls
- Health Benefits from Beyond CAIR and MANE-VU Programs

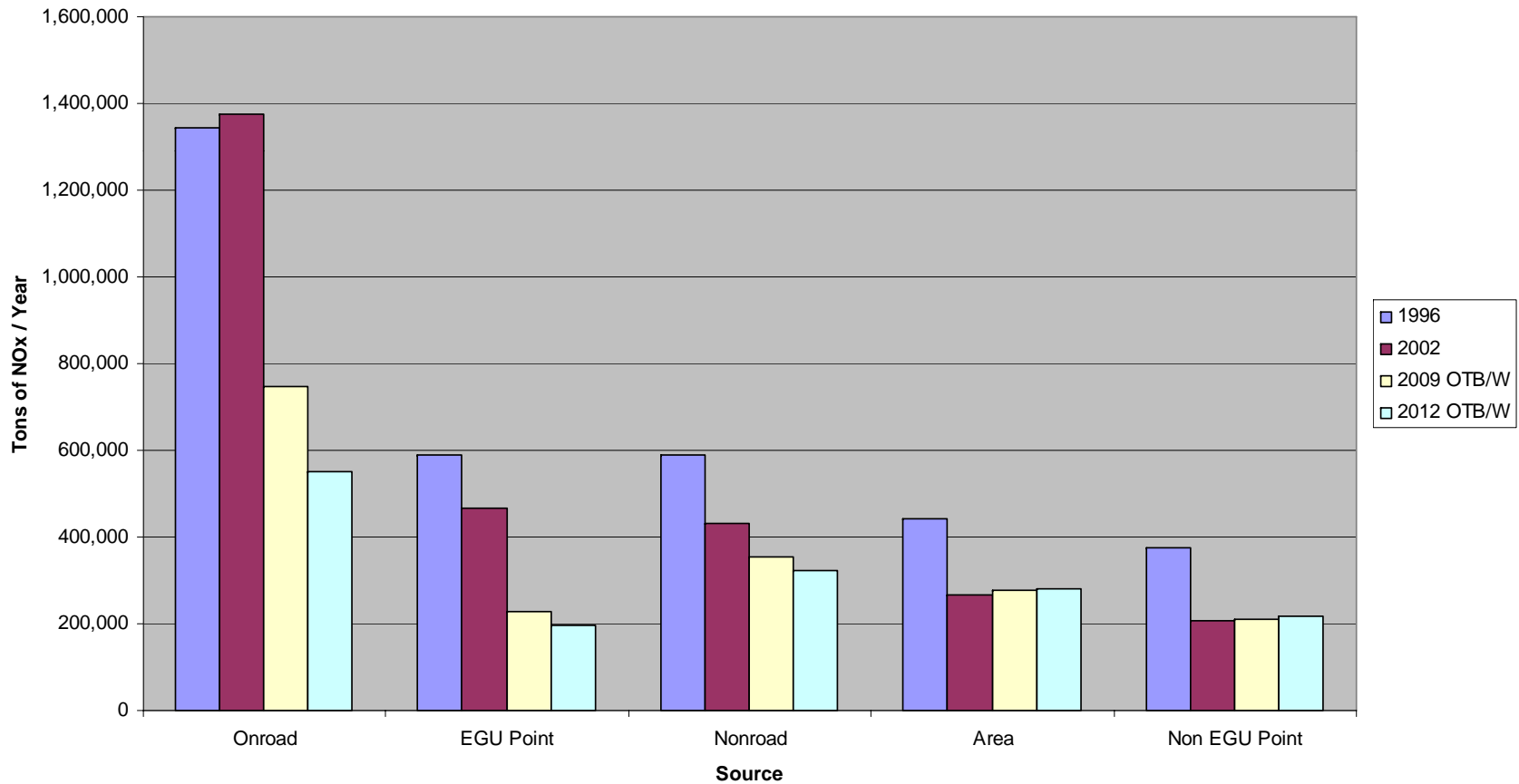
Cleaning Up the Air: Regional Control Programs Are Working

- Early years
 - Mobile sources/LEV
- 1990s
 - Power Plants/Electric Generating Units (EGUs)
 - NOx Budget Program
 - OTAG and the NOx SIP Call
 - State “Multi-P” Programs
- More recently ...
 - Area sources
 - Paints
 - Consumer products
 - Gas cans
 - More ...
- Critical role of national rules



Recent Emission Reductions Across the OTR

NOx Emissions by Sector (1996 - 2012)



Ozone Control Programs for 2010 Attainment

- Old and new control programs both contribute considerably towards 2010 attainment
- Older programs - “On The Books” or “On The Way”
 - State and federal mobile source controls, earlier NOx controls at EGUs, NOx and VOC RACT, earlier efforts on consumer products, coatings, gas cans, other area sources, etc., etc., etc.
- More recent programs
 - State Multi-P EGU control programs and CAIR
 - 2nd, sometimes 3rd ratcheting down of consumer products, coatings and gas can controls
 - Industrial, commercial and institutional (ICI) boilers, asphalt, cement and glass manufacturing
 - Paving and other amended VOC rules.
 - Non-traditional efforts like the High Electricity Demand Day (HEDD) Program and voluntary local efforts

Photochemical Modeling for 2007 O₃ SIPs

- Much thanks to NYDEC and Barbara Kwetz (MA DEP)
- Projected progress in reducing 2010 ozone is clear
- All states supplementing modeling with “Weight of Evidence” (WOE) demonstration

AIRS-ID	State	Monitor	2002	2009 OTB/OTW	2009 BOTB/OTW	2009 Advanced CAIRPLUS	2012 BOTB/OTW
340290006	NJ	Colliers Mills	106.0	92	92	91	86
90013007	CT	Stratford	98.3	90	90	90	86
361030009	NY	Holtsville	97.0	90	89	89	86
420170012	PA	Bristol	99.0	88	88	88	84
90093002	CT	Madison	98.3	89	88	88	83
340070003	NJ	Camden	98.3	88	88	87	83
340155001	NJ	Clarksboro	98.3	88	88	87	83
90010017	CT	Greenwich	95.7	87	87	87	83
340071001	NJ	Ancora St. Hos	100.7	87	87	87	82
421010024	PA	Northeast	96.7	87	87	86	82
340210005	NJ	Rider Univ.	97.0	86	86	85	81
510130020	VA	Arlington Co.	96.7	86	86	85	80
510590018	VA	Fairfax Co.	96.7	86	86	85	79
361030002	NY	Babylon	93.7	85	85	85	82
361192004	NY	White Plains	91.3	85	85	85	82
90011123	CT	Danbury	95.7	86	85	85	81
90019003	CT	Westport	94.0	85	85	85	81
90099005	CT	Hamden	93.3	85	85	85	81
340030005	NJ	Teaneck	91.7	85	85	84	81
240251001	MD	Edgewood	100.3	85	85	85	80

MANE-VU's "Ask" for Improved Visibility from States

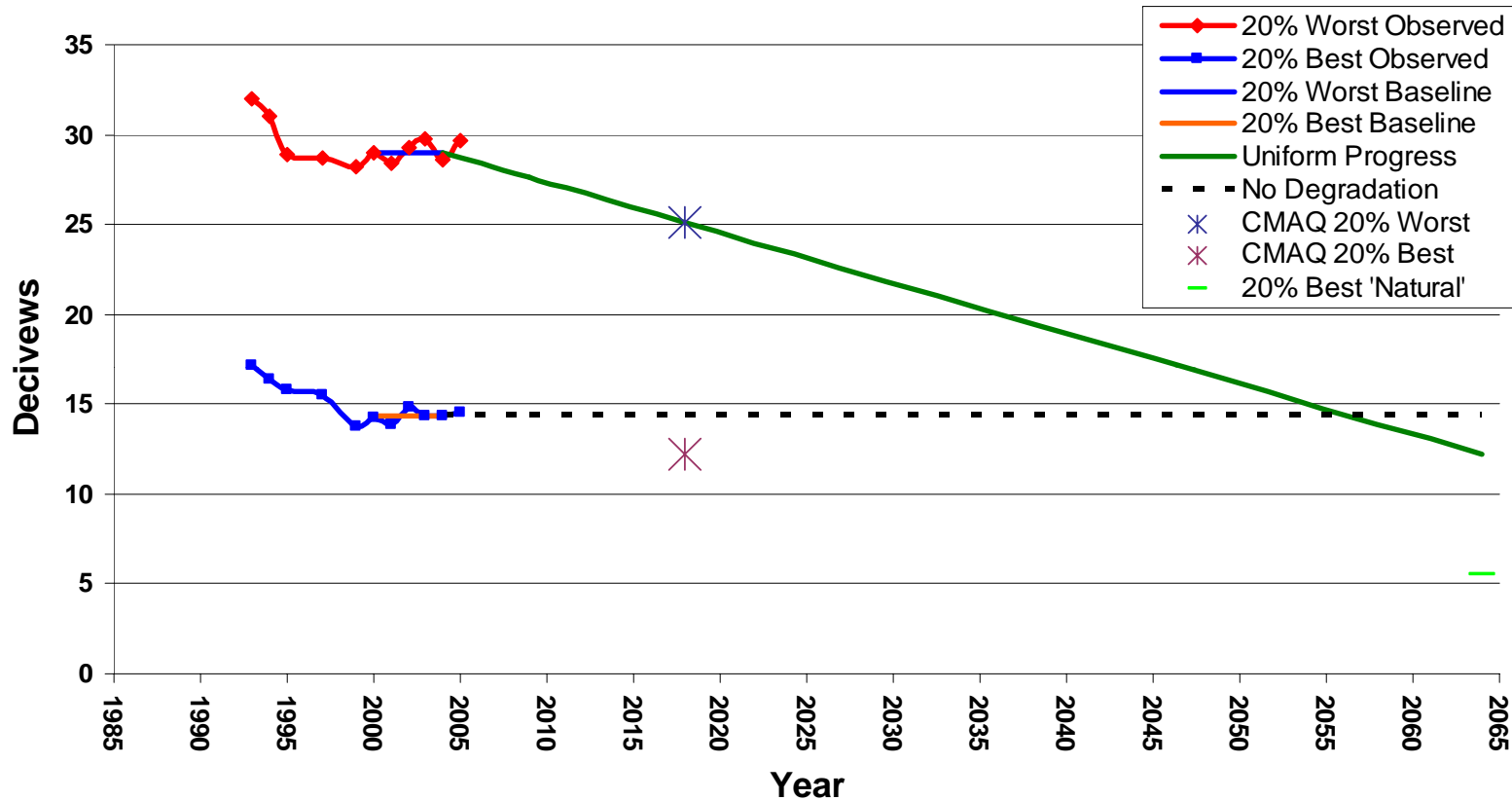
MANE-VU:

- BART
- Focused EGU Strategy within CAIR (167 "stacks")
- Low sulfur fuel oil strategy for non-EGU sources
- Continued evaluation of other measures, including Energy Efficiency, Clean Fuels and others

Other Regions:

- BART
- Focused EGU Strategy within CAIR
- 28% reduction in non-EGU SO₂ emissions
- Continued evaluation of other measures, including from all coal-burning facilities, and others

Brigantine Glide Path



If all states within and outside MANE-VU achieve the emission reductions outlined in the “ask” ...

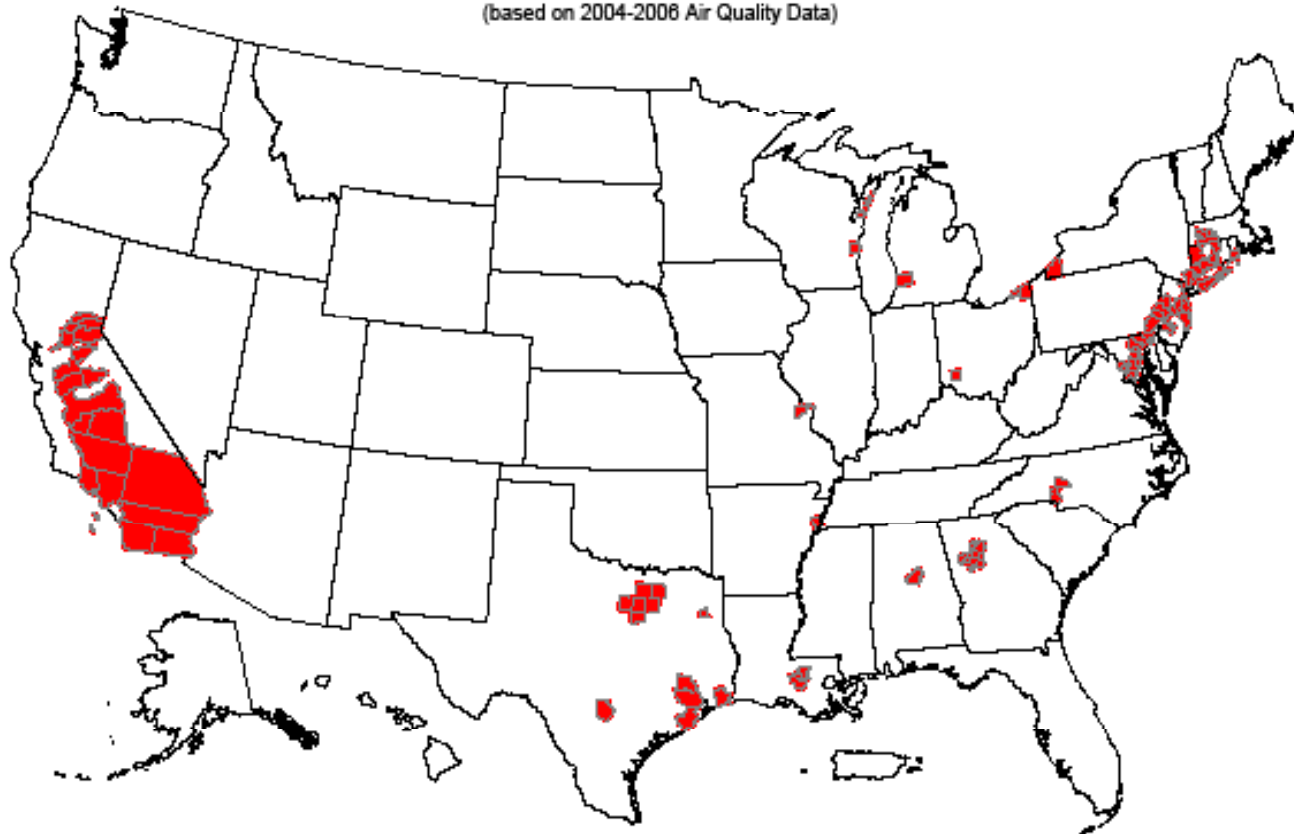
The uniform rate of progress for 2018 is achieved or exceeded at all MANE-VU Class I areas

New and Newer NAAQS & Other Requirements

- 1997 8-hr ozone NAAQS = 0.084 ppm
- 1997 Annual PM 2.5 NAAQS = 15 $\mu\text{g}/\text{m}^3$
- 2006 24-hr PM 2.5 NAAQS = 35 $\mu\text{g}/\text{m}^3$
- 2006 24-hr PM 10 NAAQS = 150 $\mu\text{g}/\text{m}^3$
- 2008 8-hr ozone NAAQS = 0.075 ppm
- Secondary standards for ozone and PM are the same as the primary standards

Counties with Monitors Violating the 1997 8-Hour Ozone Standard of 0.08 parts per million (ppm)

(based on 2004-2006 Air Quality Data)



Notes:

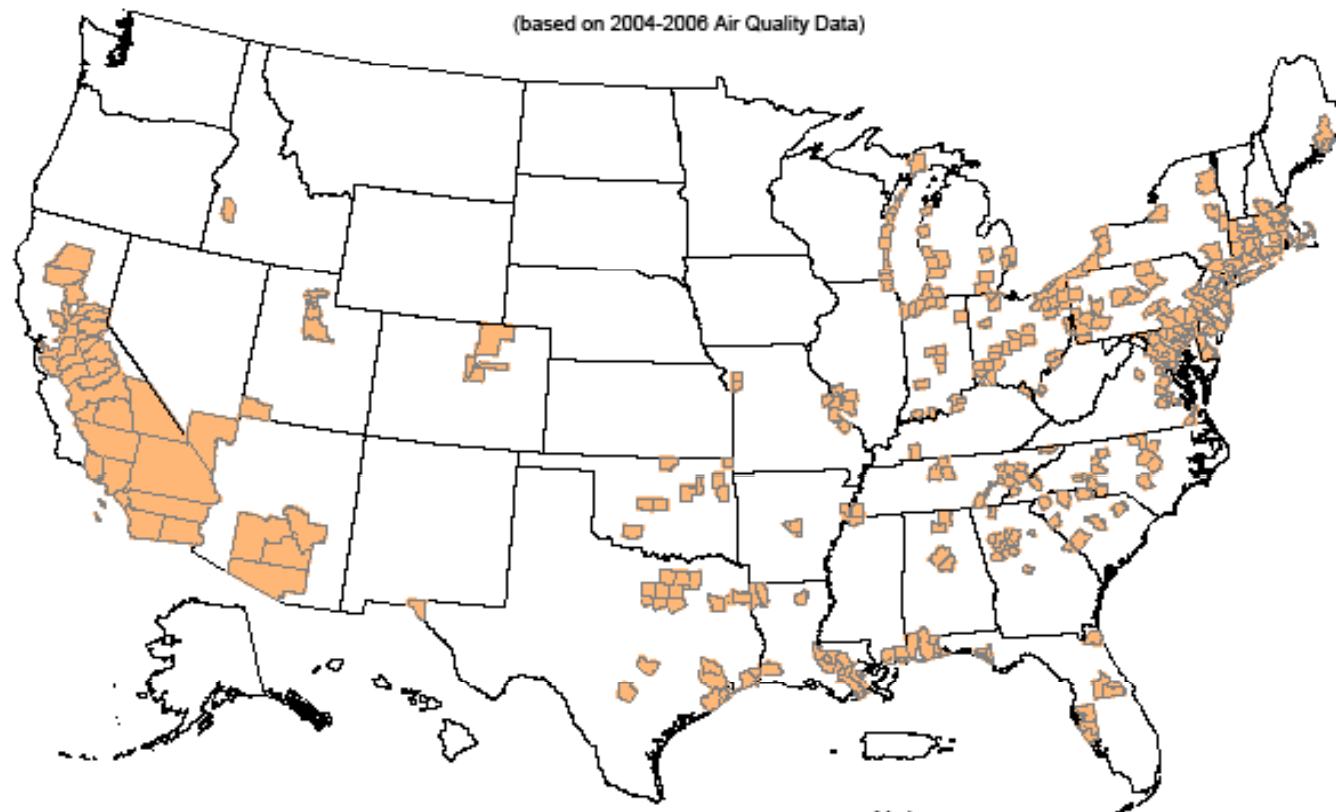
¹ 85 monitored counties violate.

² Monitored air quality data can be obtained from the AQS system at <http://www.epa.gov/ttn/airs/airsaqs/>

³ The 1997 national ambient air quality standard (NAAQS) for ozone of 0.08 ppm is effectively expressed as 0.084 ppm when data handling conventions are applied.

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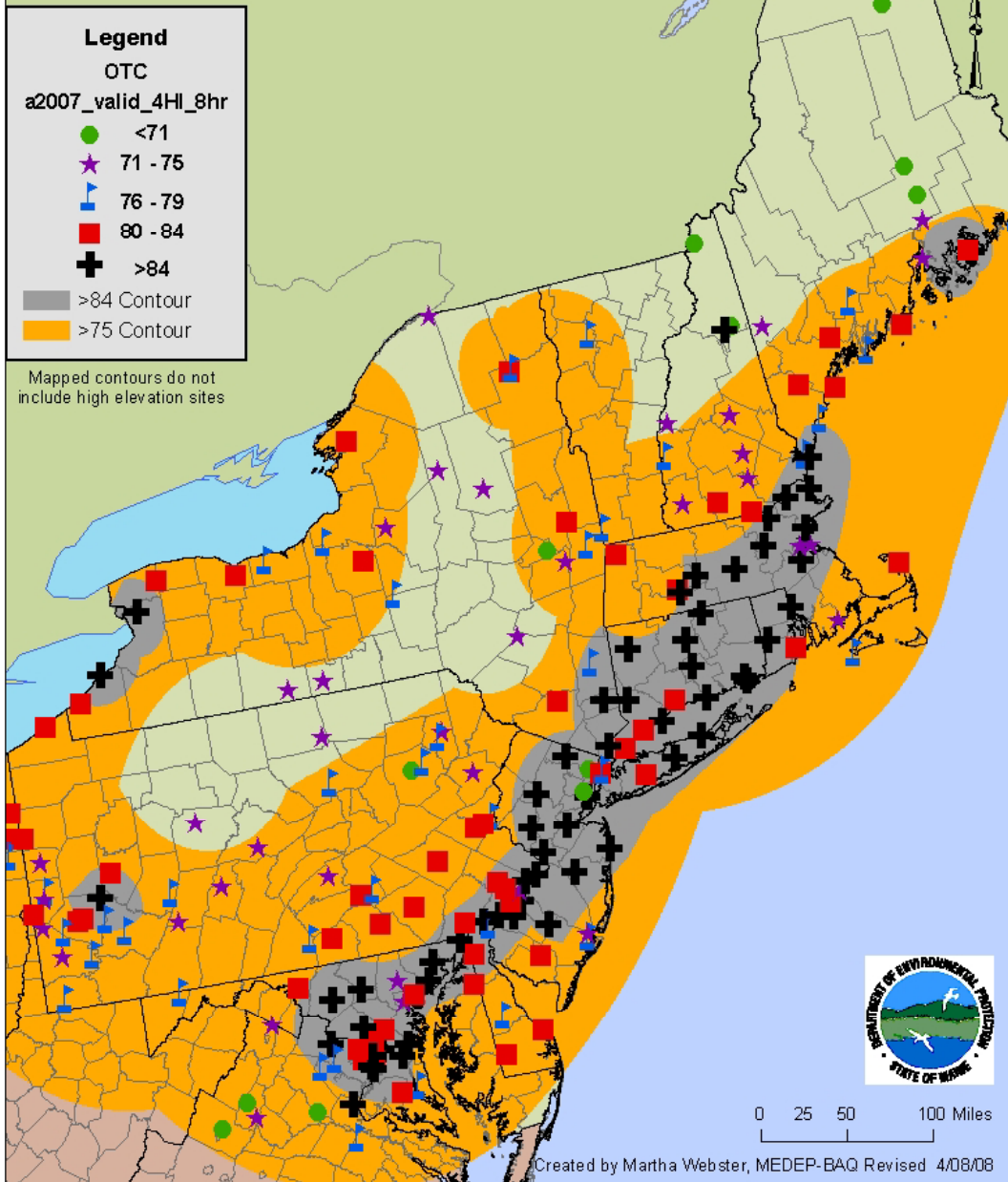


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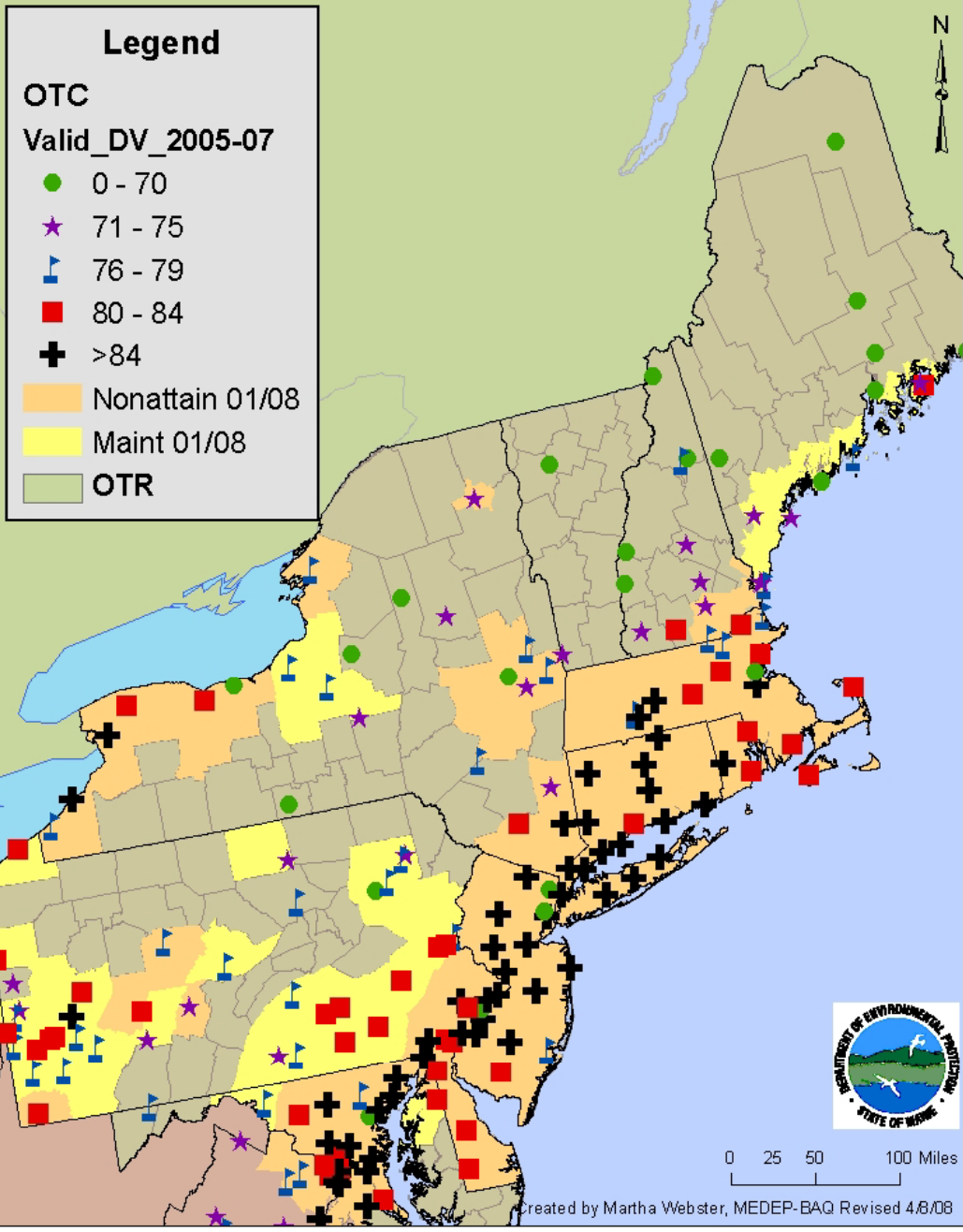
¹ 345 monitored counties violate the 2008 8-hour ozone standard of 0.075 parts per million (ppm).

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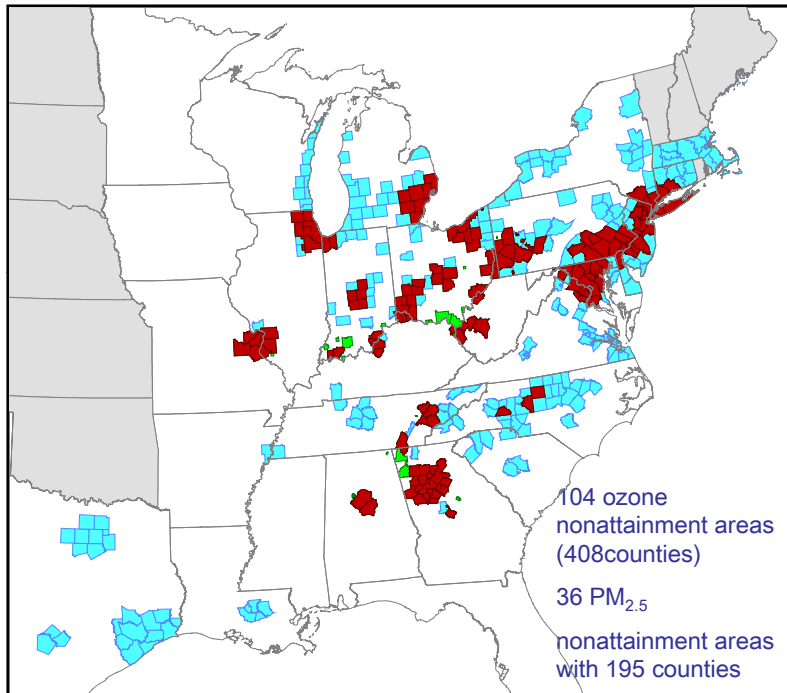
4th Highest 8-hour Average Ozone Concentrations in the OTC - 2007



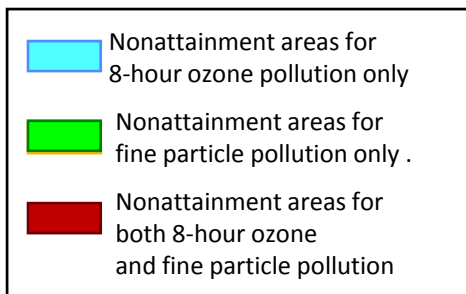
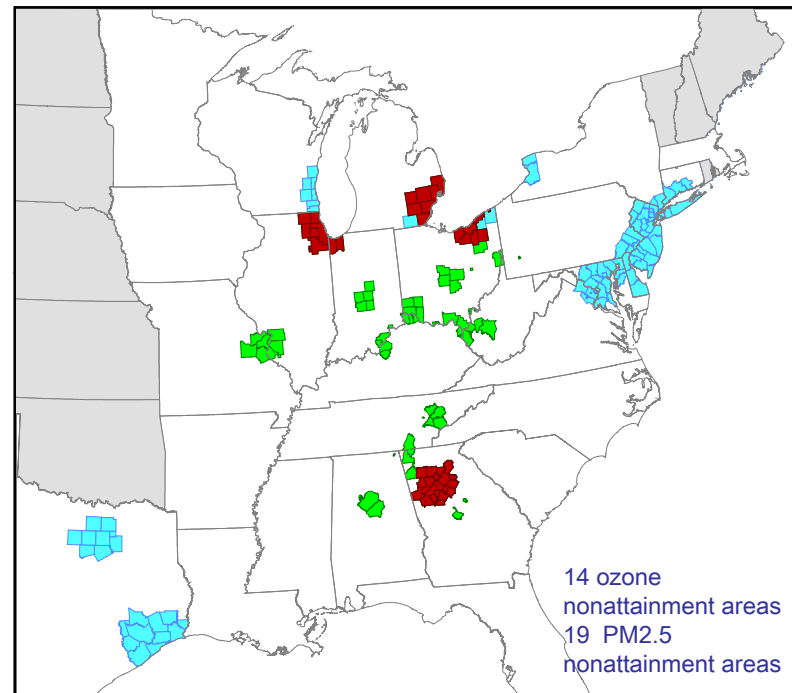
Ozone 8-hr 2005-07 Valid Design Value in the OTC



Ozone and Fine Particle Nonattainment Areas
(April 2005)

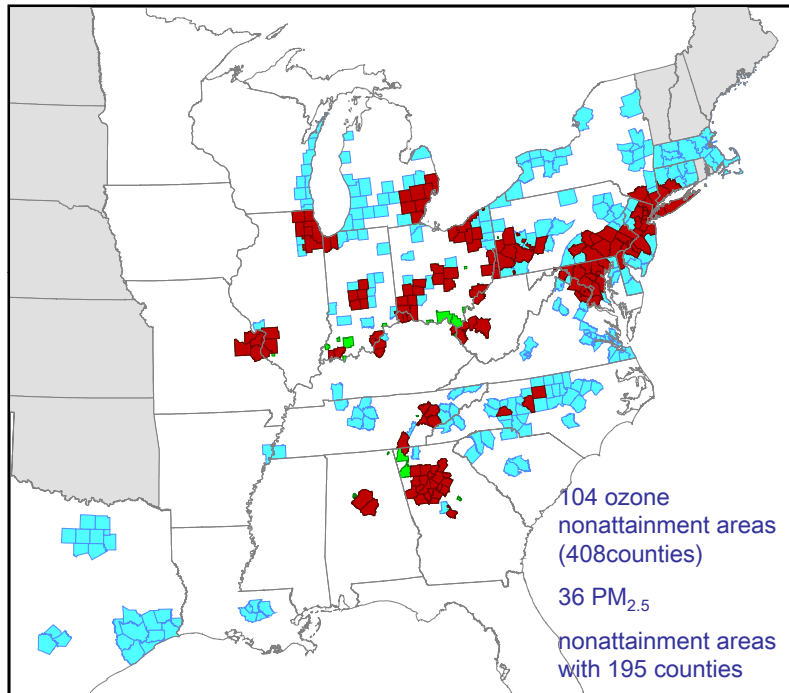


Projected Nonattainment Areas in 2010 after Reductions from CAIR and Existing Clean Air Act Programs

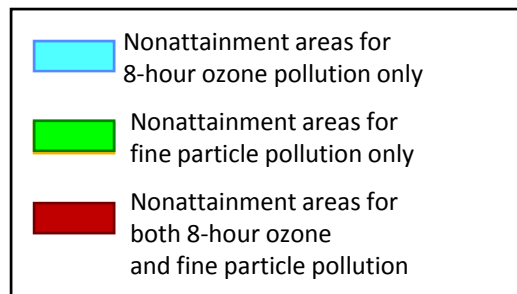
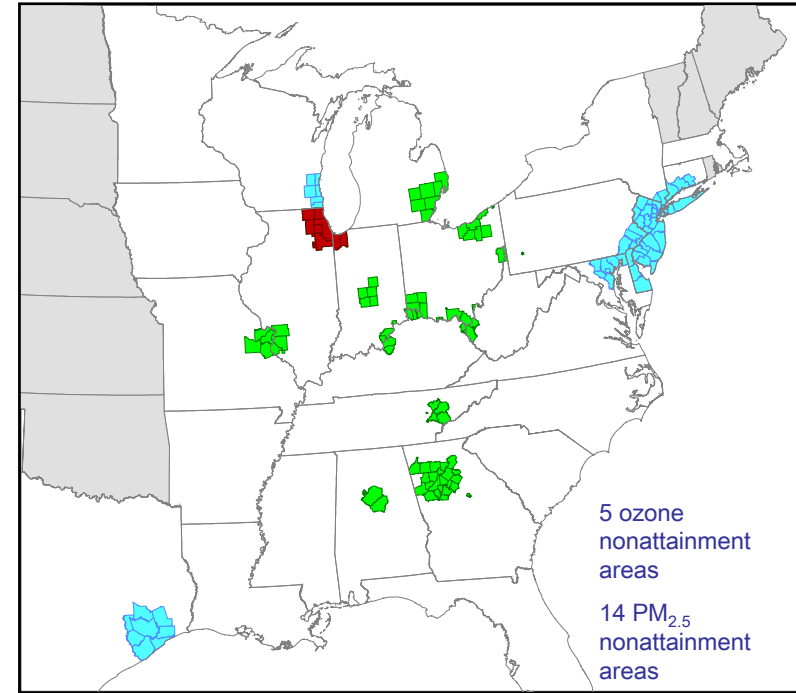


Projections concerning future levels of air pollution in specific geographic locations were estimated using the best scientific models available. They are estimations, however, and should be characterized as such in any description. Actual results may vary significantly if any of the factors that influence air quality differ from the assumed values used in the projections shown here.

Ozone and Fine Particle Nonattainment Areas (April 2005)

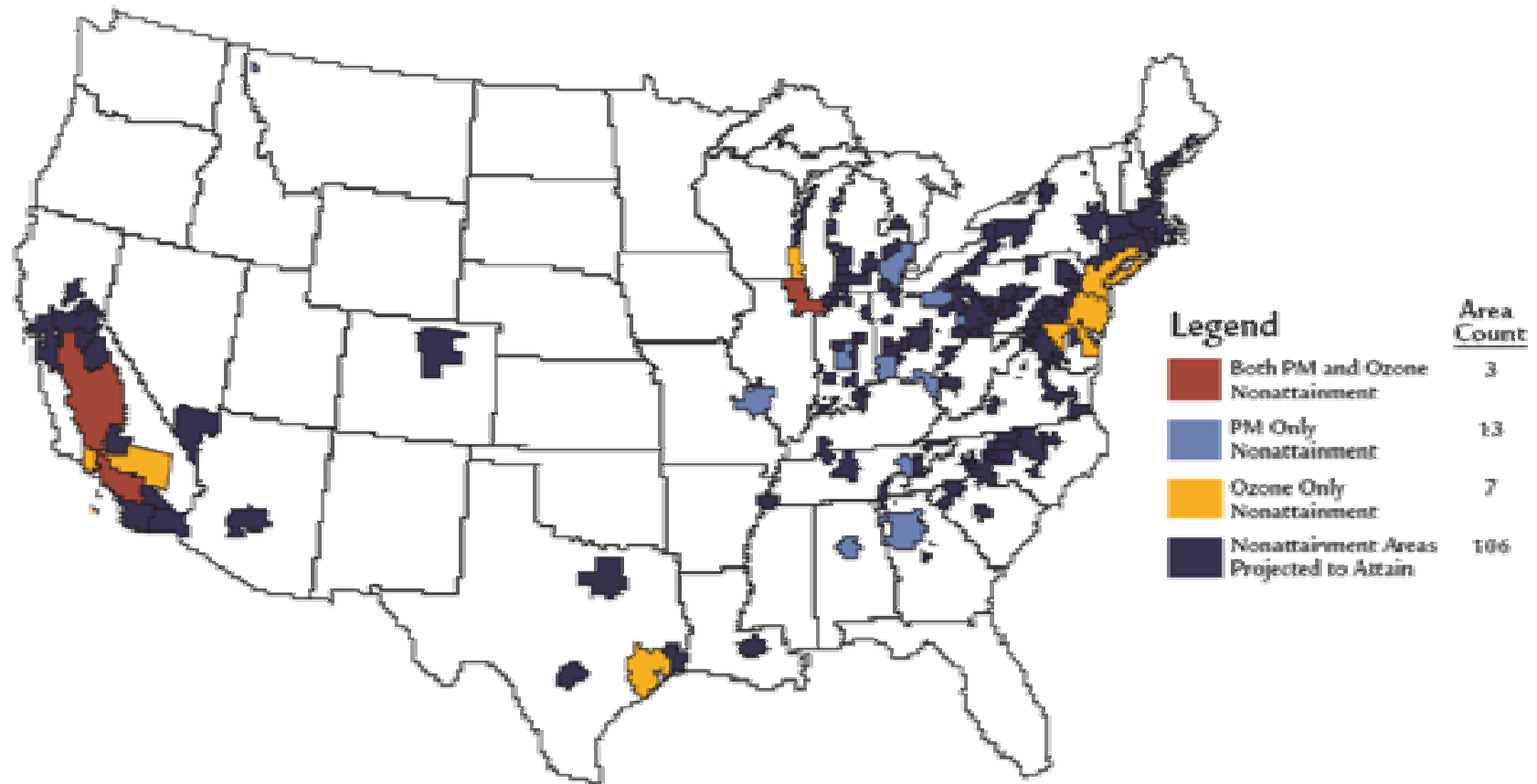


Projected Nonattainment Areas in 2015 after Reductions from CAIR and Existing Clean Air Act Programs



Projections concerning future levels of air pollution in specific geographic locations were estimated using the best scientific models available. They are estimations, however, and should be characterized as such in any description. Actual results may vary significantly if any of the factors that influence air quality differ from the assumed values used in the projections shown here.

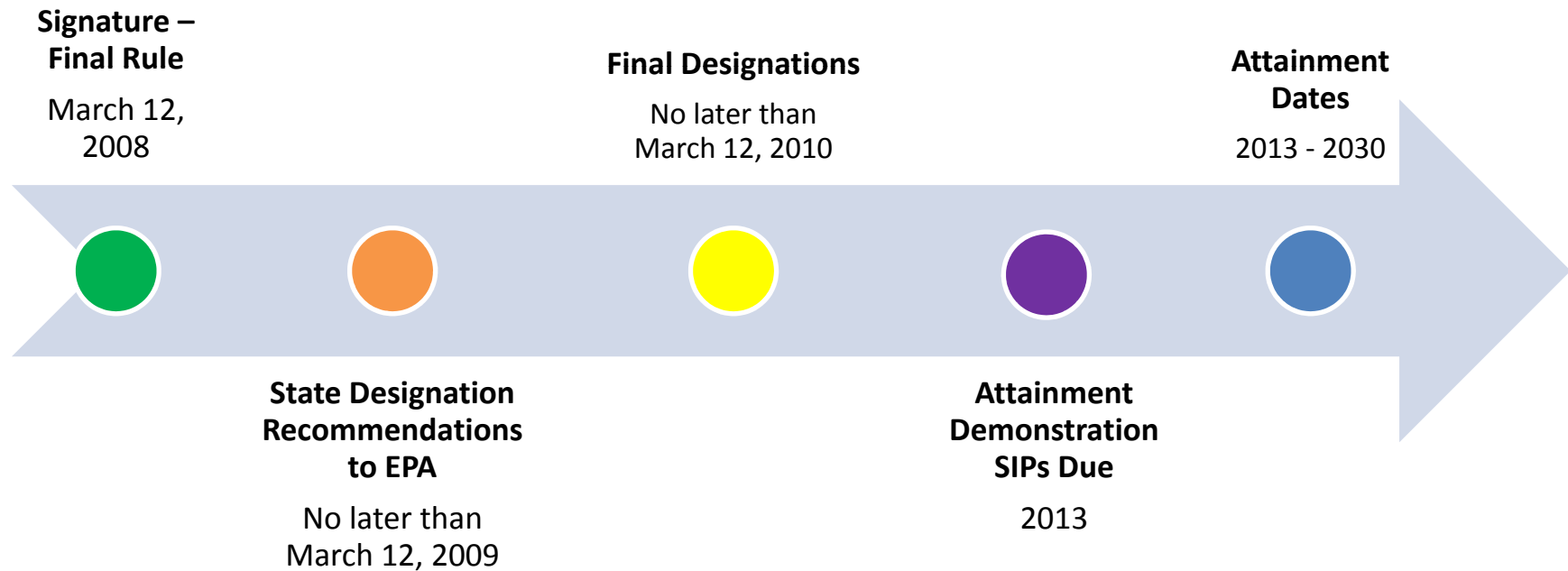
Projected Nonattainment Areas in 2020 for the Ozone and Annual Fine Particle NAAQS after Reductions from CAIR, CAVR and Clean Air Act Programs



Note: Figure 25 depicts 129 areas that, as of April 2006, were in nonattainment of the PM_{2.5} or ozone NAAQS (or both). As indicated in the legend, 106 of those areas are projected to attain the applicable NAAQS by 2020 as a result of existing programs, such as Title IV of the Clean Air Act, the NO_x SIP Call, and some existing state rules, and the addition of CAIR and CAVR. Note that the 23 areas that are forecast to remain in nonattainment may need to adopt additional local or regional controls to attain the dates set pursuant to the CAA. These additional local or regional measures are not forecast in Figure 25, and therefore the figure overstates the extent of expected nonattainment in 2020.

Source: EPA, 2006

EPA's Expected Implementation Timeline for New O₃ NAAQS



What We Are Working On

- Further EGU reductions
 - CAIR Plus or a “Next Generation” of national EGU controls
- ICI Boilers
 - Request for national controls on a majority of boilers (NO_x and SO₂)
- Additional VOC controls
 - CARB 2007 SCM for coatings
 - Roofing adhesives, auto refinishing
- Next EGU controls and ICI boilers are “Super-Regional” initiatives – OTC working with LADCO and VISTAS states on recommendations to EPA

CAIR Plus: NOx Caps & SCR Retrofits

OTC CAIR Plus:

- 2009- 2011 = 0.12 lbs/MMBtu
- 2012- 2014 = 0.08lbs/MMBtu
- 2015 & beyond = 0.07 lbs/MMBtu

X

Current Heat Input

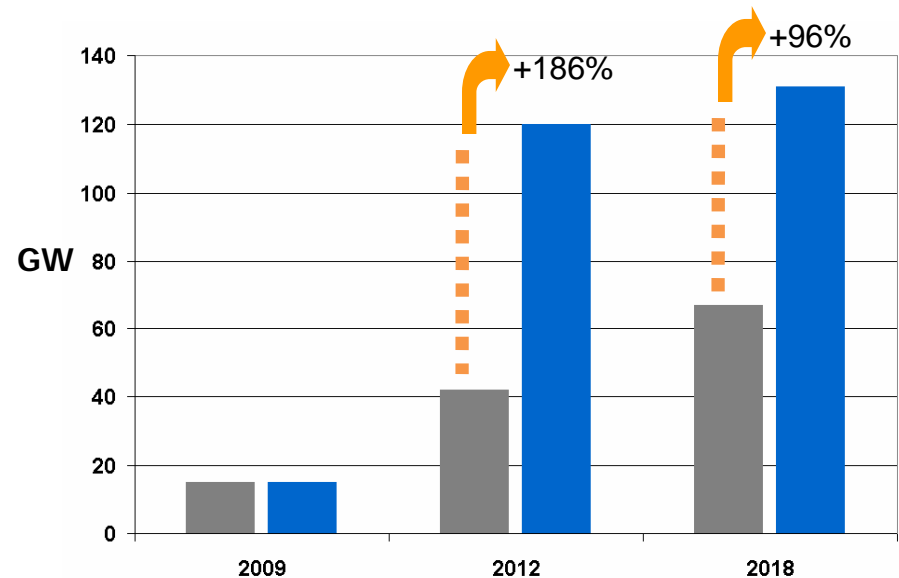
CAIR Base Case Scenario:

- 2010 = 0.15 lbs/MMBtu
- 2015 & beyond = 0.125 lbs/MMBtu

X

Current Heat Input

Additional coal capacity retrofits



SCR: CAIR Base Case vs. CAIR Plus

CAIR Plus: SO2 Retirement Ratios & Scrubber Retrofits

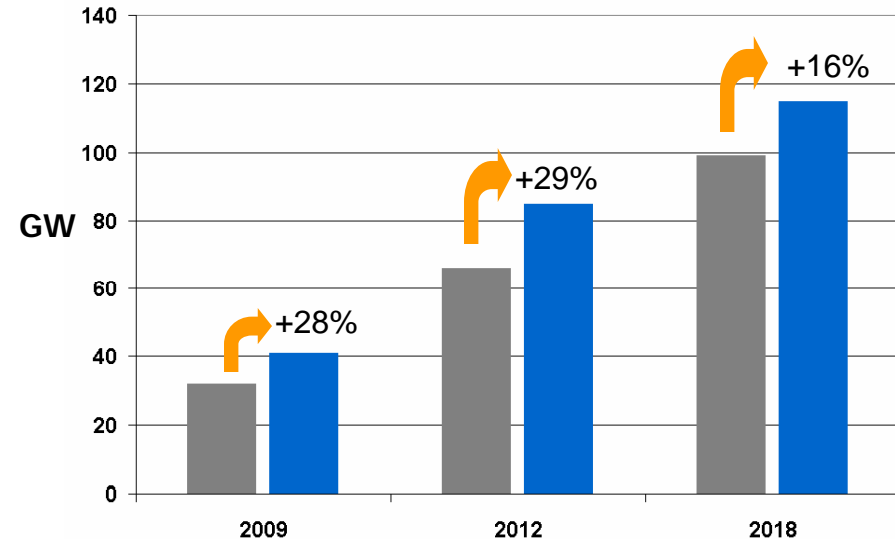
OTC CAIR Plus Scenario:

- 2009 = 1.0
- 2010 = 2.50 (60% reduction)
- 2012 = 2.94(66% reduction)
- 2015= 3.57 (72% reduction)
- 2018 = 4.16 (76% reduction)

CAIR Base Case Scenario:

- 2009 = 1.0
- 2010= 2.0 (50% reduction)
- 2012 = 2.0 (50% reduction)
- 2015 = 2.86 (65% reduction)
- 2018 = 2.86 (65% reduction)

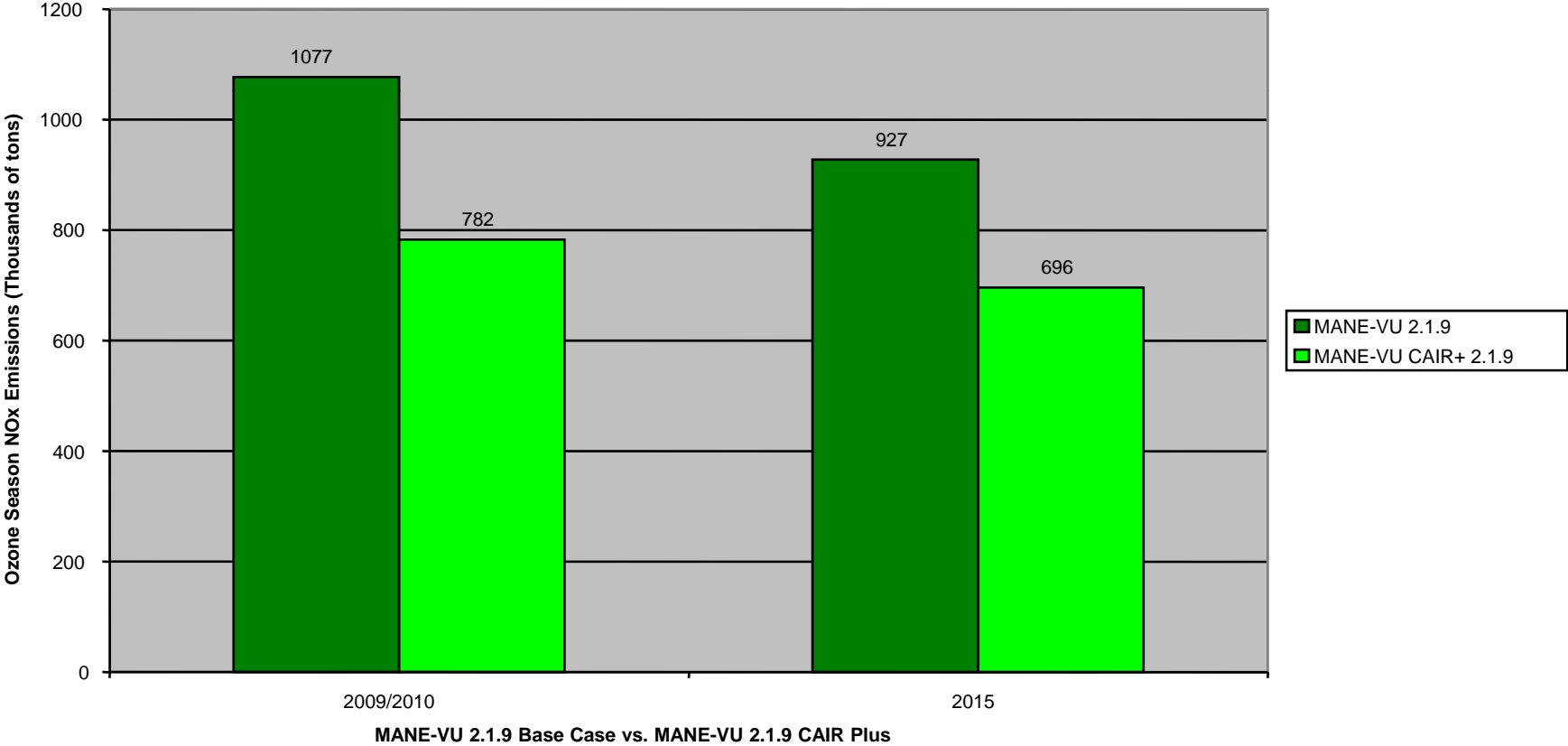
Additional coal capacity retrofits



Scrubbers: CAIR Base Case vs. [CAIR Plus](#)

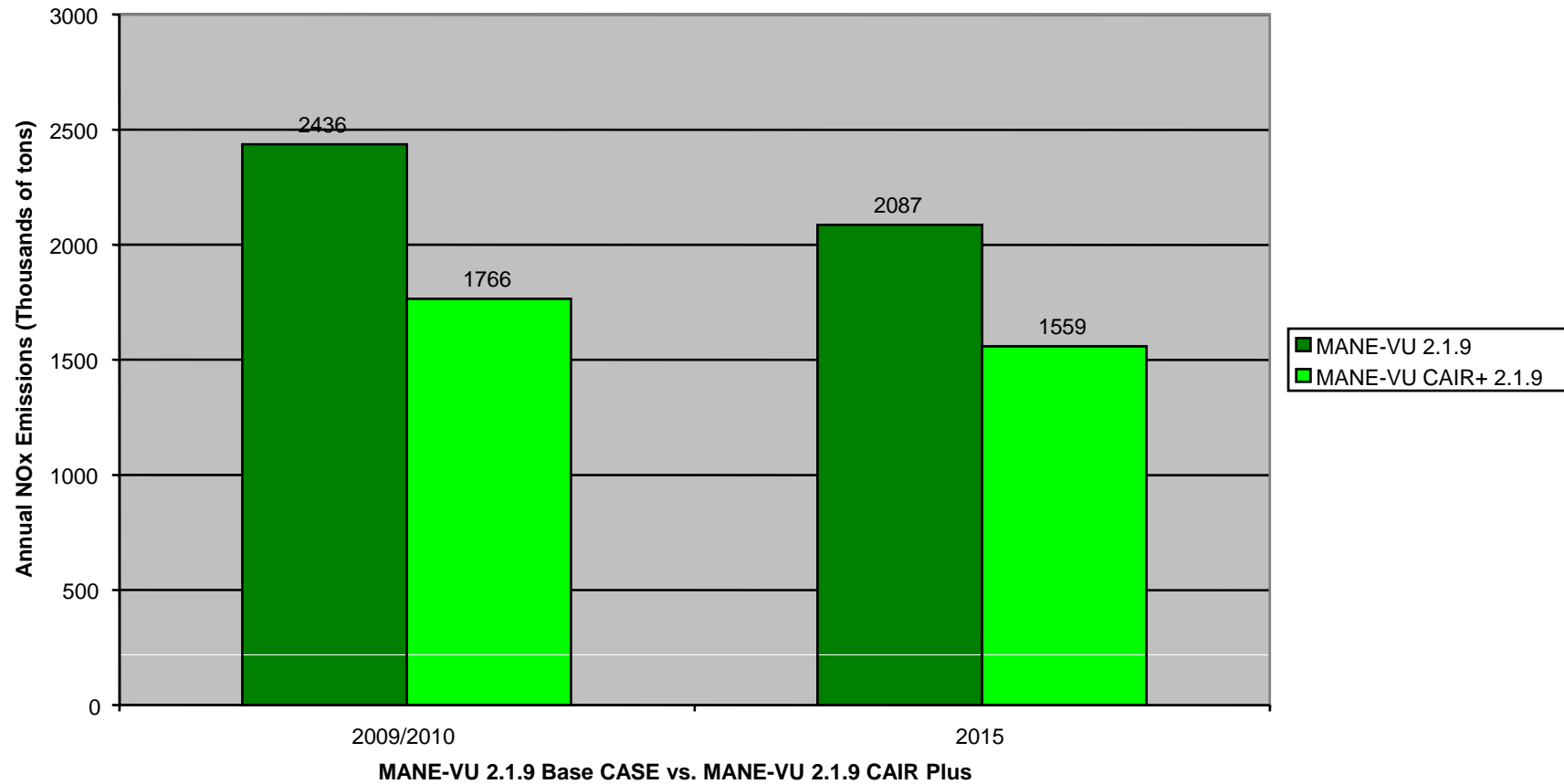
US Total IPM Ozone Season NOx Emissions

CAIR versus CAIR Plus Comparison



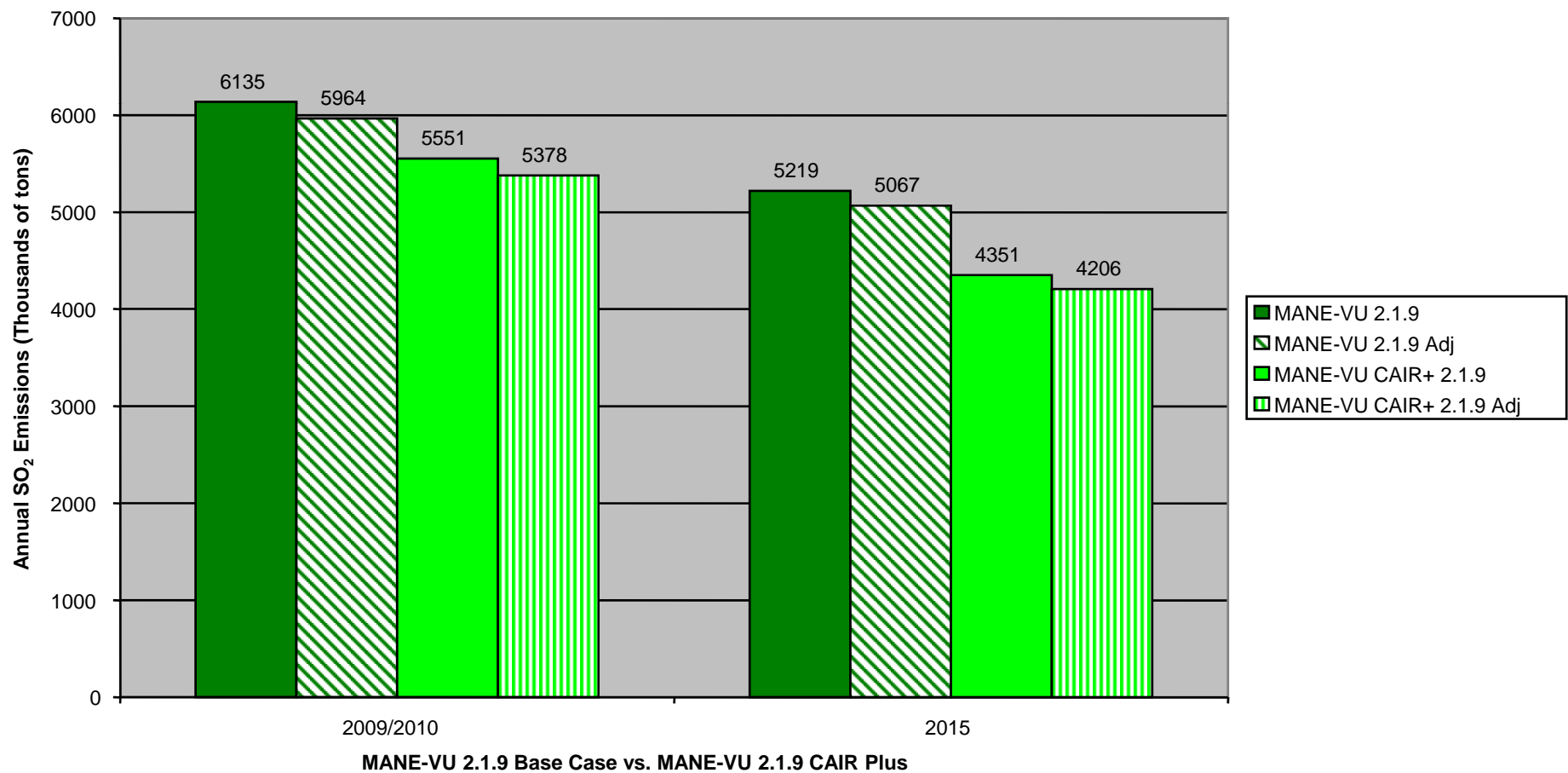
US Total IPM Annual NOx Emissions

CAIR versus CAIR Plus Comparison



US Total IPM Annual SO₂ Emissions

CAIR versus CAIR Plus Comparison



“Next Generation” of EGU Controls

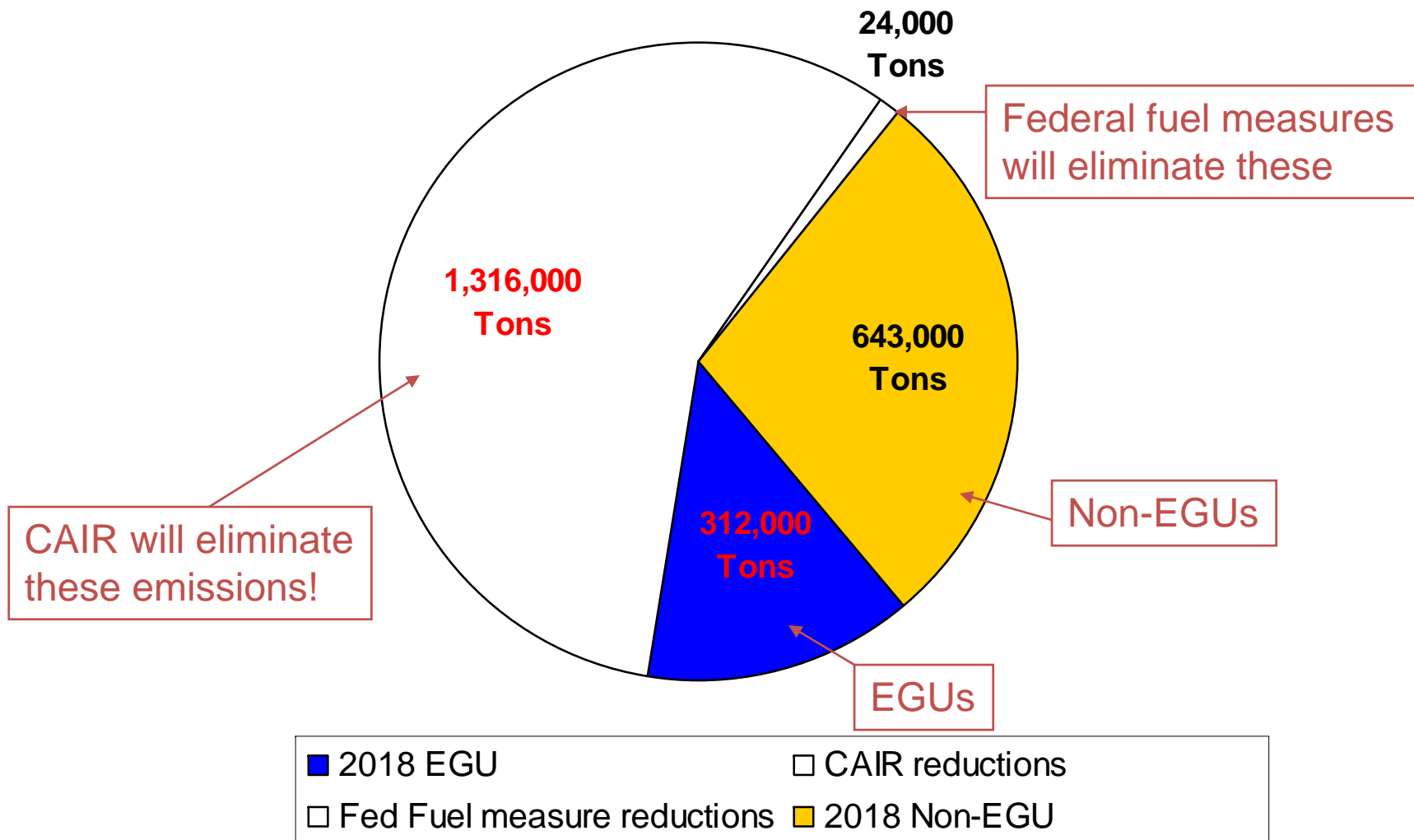
- OTC is re-examining its multi-p position
 - Working with other RPOs on an “ask” for national action on multi-pollutant control levels for a 3rd (national) phase of CAIR
 - Provide it to legislators as they continue to formulate multi-p proposals/amendments
 - Look at more stringent rates and appropriate compliance dates
 - Perform IPM modeling to ascertain cost impacts
 - Share analyses with MRPO and VISTAS states to develop a joint recommendation to EPA

ICI Boiler “Collaborative”

- OTC and LADCO states began working together to examine potential controls for ICI boilers in 2006
- OTC & LADCO ICI boiler emissions in 2002:
 - NO_x = nearly 300,000 tons per year
 - SO₂ = nearly 600,00 tons per year
- OTC & LADCO states agreed on need to jointly pursue boiler controls as part of national “ask”
 - Gather data on inventory, controls and costs
 - Develop joint proposal on achievable controls for coal, gas and oil-fired boilers of various sizes
 - Take recommendation to EPA

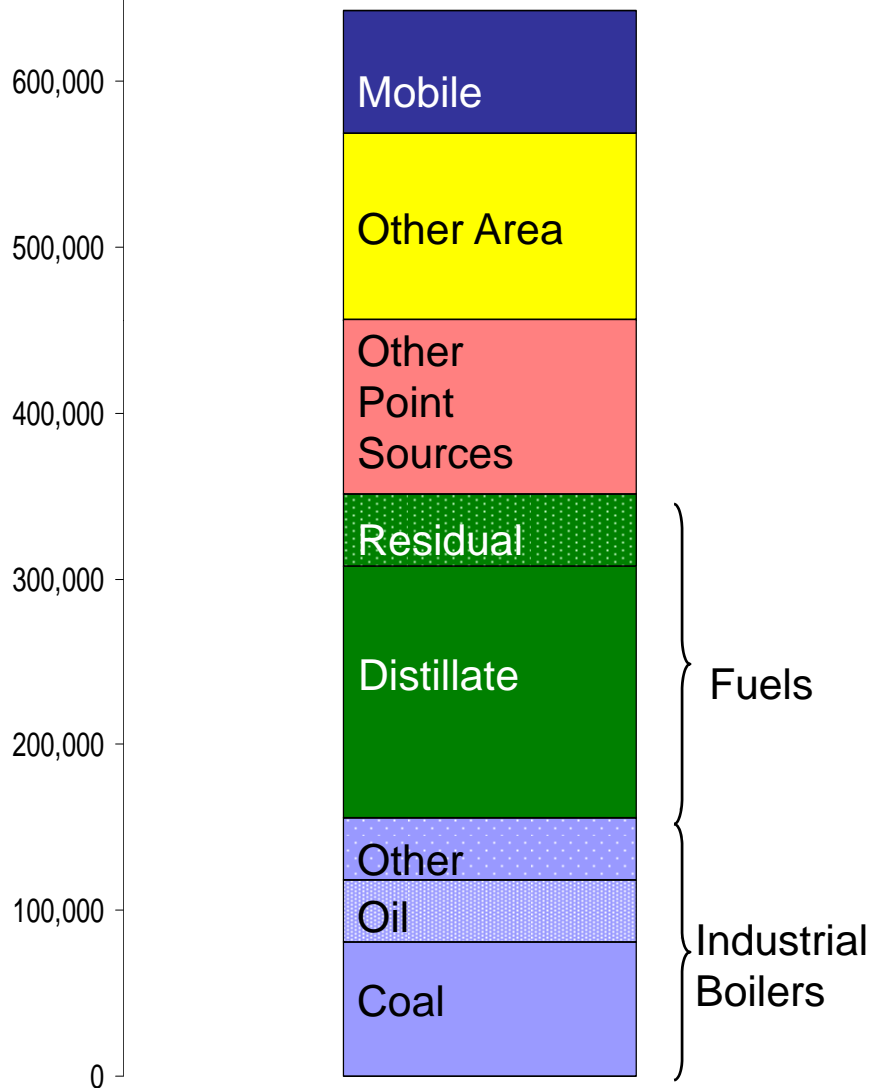
SO₂ Reductions in MANE-VU from CAIR and other Federal Measures by 2018

2.3 Million – 1.3 Million – 24,000 = **955,000 Tons!**



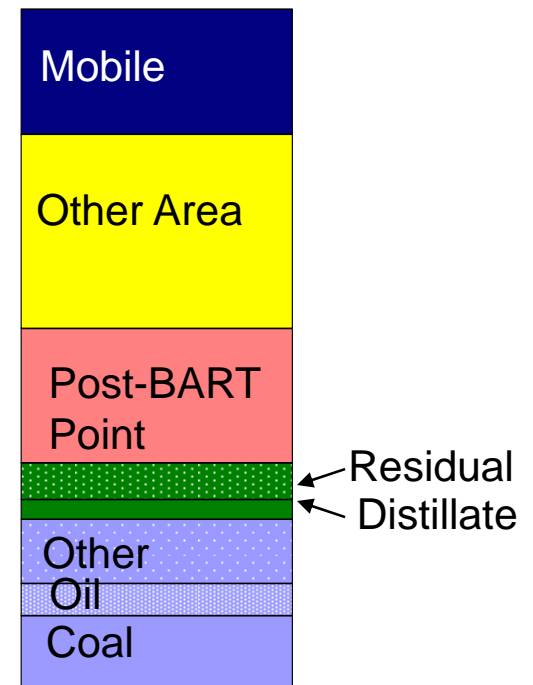
Potential for non-EGU SO₂ Reductions

2018 MANE-VU Projection with Federal Controls...



2018 Potential

Nearly 40% Reduction of Non-EGU SO₂ Emissions



Potential Boiler Controls*

To Reduce NOx Emissions

Smaller boilers:

- Combustion Tuning
- Low NOx Burners
- Flue Gas Recirculation

Larger boilers also include:

- Low NOx Catalysts
- OFA + SCR
- SNCR/Gas co-firing

To Reduce SO2 Emissions

Smaller boilers:

- Low sulfur fuels (oil/coal)
- Coal blending/washing

Larger boilers also include:

- COG desulfurization
- Flue Gas Desulfurization

*Controls under examination by OTC/LADCO – no recommendations yet

Health Benefits from Beyond CAIR Reductions

Health Benefits* in OTR from CAIR Plus by 2018:

- \$167 million to \$493 million due to ozone reductions
- \$1.5 billion due to PM_{2.5} reductions
- \$1.7 billion to \$2.0 billion combined

Health Benefits* in the OTR from 2008 Ozone NAAQS:

- \$192 million to \$918 million in the OTR by 2018

*Due to reduced incidences of: mortality, hospital visits for respiratory and cardiovascular symptoms, bronchitis, asthma, lost work days, etc.

Health Co-Benefits from MANE-VU “Asks”

Programs in MANE-VU:

- Fuel sulfur content: \$3.7 billion
- BART: \$1.8 billion
- “167 Stack” EGU measure: \$6.5 billion
- **\$12 billion** combined benefit

In Neighboring RPOs:

- Fuel sulfur content: \$297 million
- BART: \$276 million
- “167 Stack” EGU measure: \$4.3 billion
- **\$4.9 billion** combined benefit

Program Grand Total = **\$16.9 billion**



QUESTIONS?