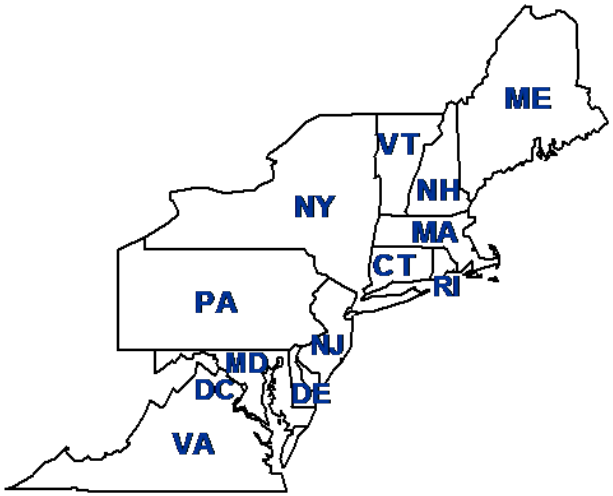
Modeling Committee Update

OTC Annual Caucus

June 15th, 2011

Washington, DC

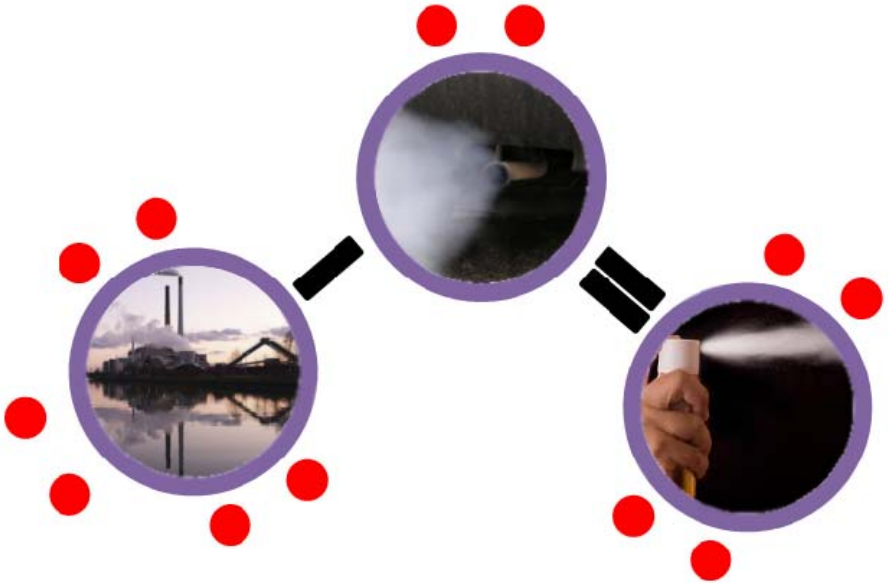


OZONE TRANSPORT COMMISSION

OZONE TRANSPORT COMMISSION

Overview

1. Ozone NAAQS
2. Ozone Season Update
3. Screening Modeling
4. EGU Projections/ERTAC



OZONE NATIONAL AMBIENT AIR QUALITY STANDARD (NAAQS)

Ozone NAAQS History

1-Hour Standard of 124ppb (1991)

- Standard met throughout OTR (NOx SIP Call)

8-Hour Standard of 84ppb (1997)

- Most recent fully implemented standard (CAIR/TR1)

8-Hour Standard of 75ppb (2008 Reconsidered)

- Most recent standard but not fully implemented

Final Standards - To be announced next month?

- Primary: 8-Hour - 60 to 70ppb
  Secondary: - W126 - 7 to 15 ppm-hours

Form of Ozone NAAQS Design Values

1-Hour	• **4th highest** value during **3 consecutive years** at the same monitor
8-Hour	• **3 year average** of the **4th highest 8-hour daily maximum** at the same monitor
W126	• a longer term calculation with weighting factors for daylight (growth) hours of the day

Ozone NAAQS

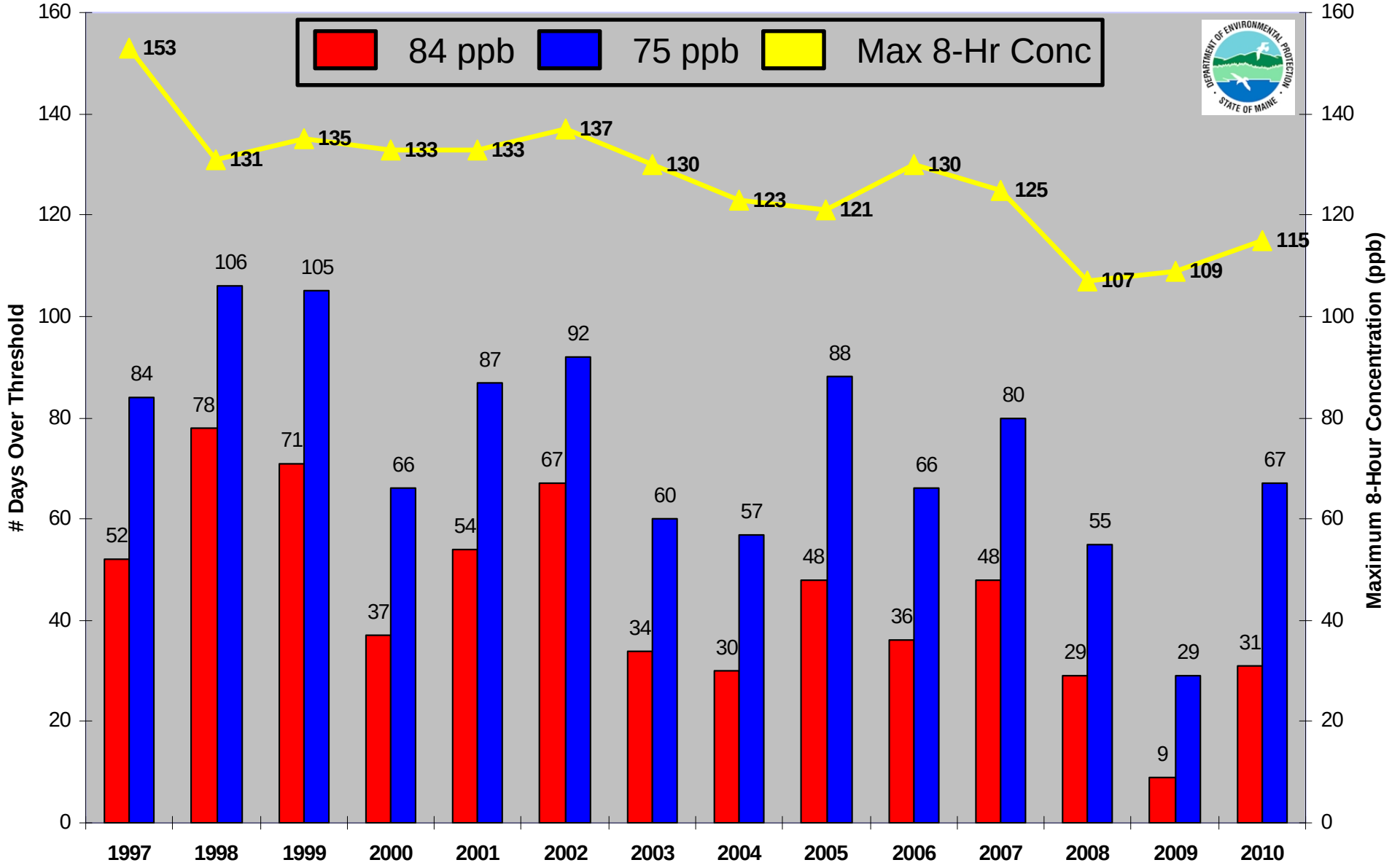
Design Value – current monitoring data summarized in a form directly comparable to the NAAQS

Modeling predicts relative changes that could occur due to changes in pollutant source emissions. These modeled relative changes are applied to Design Values for each monitor to produce estimates of future design values

Relative Reductions – the model's predicted fractional change (similar to percentage change) due to changing pollutant source emissions

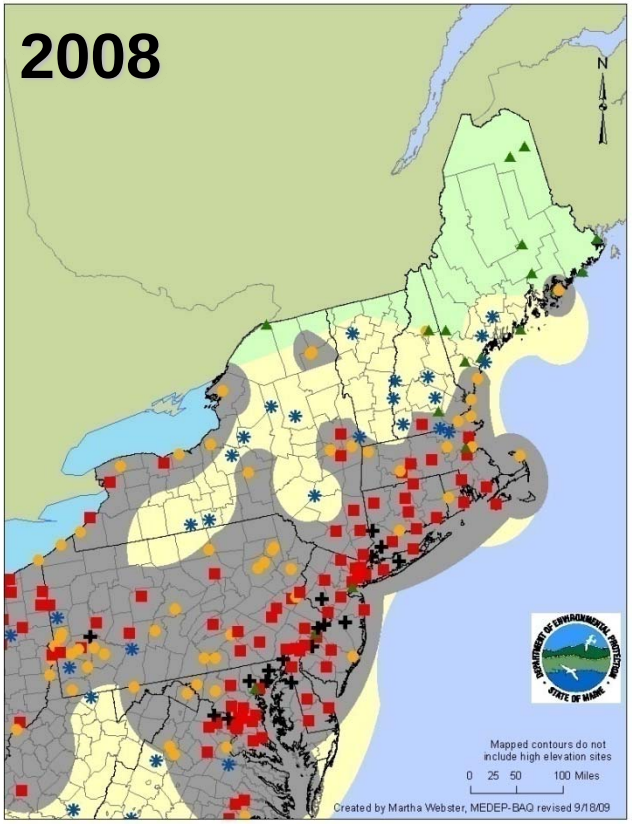
OZONE SEASON UPDATE

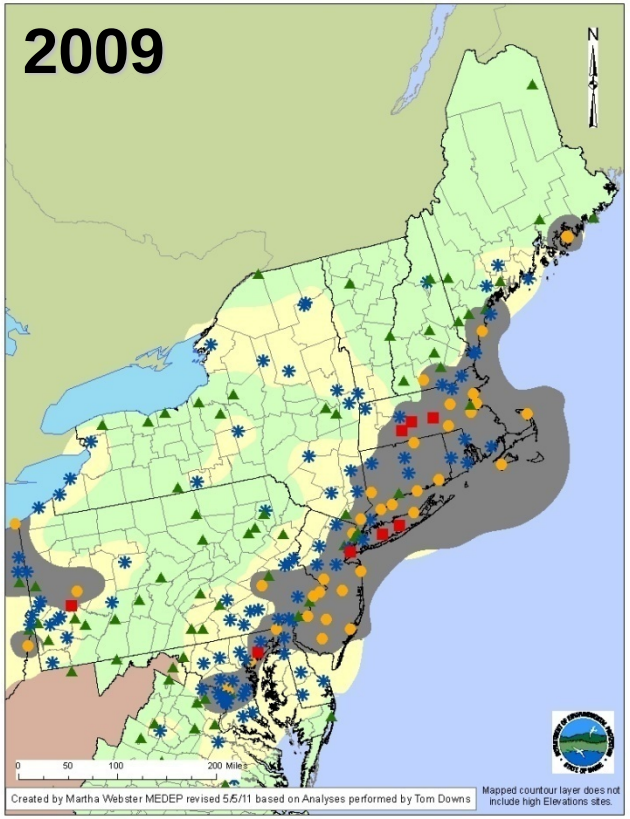
OTR Ozone Day Trends 1997-2010

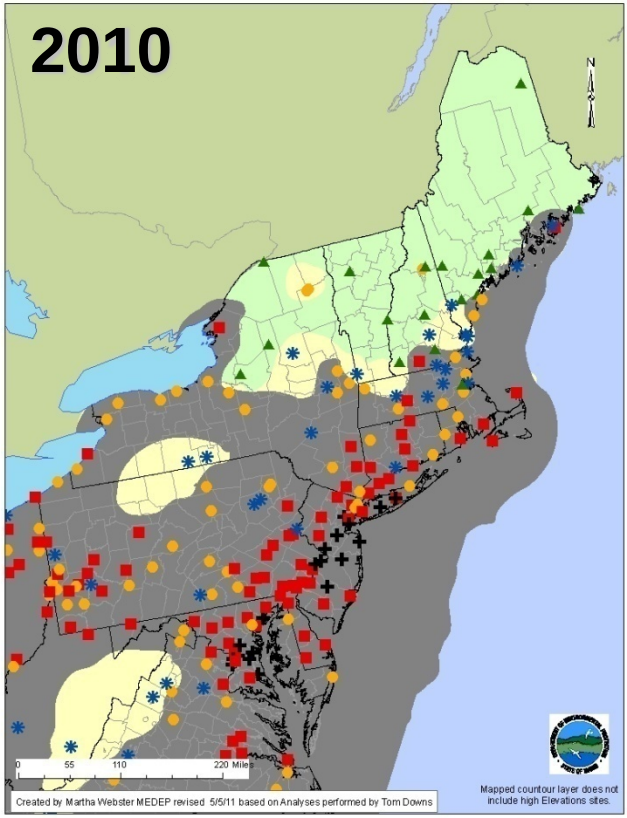


Annual 4th High Ozone Values

for the 3 Design Value Years – 2008, 2009 and 2010







Grey shaded area highlights general areas greater than 75 ppb ozone

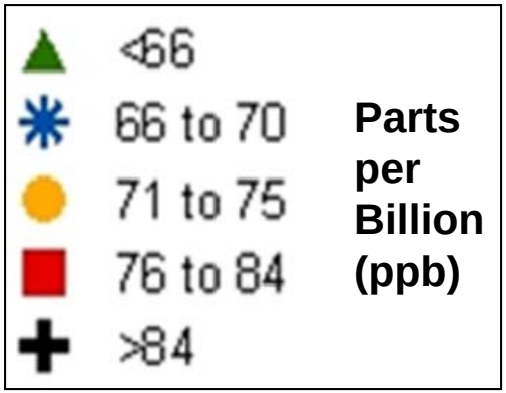
▲	<66	■	76 to 84
✱	66 to 70	✚	>84
●	71 to 75		

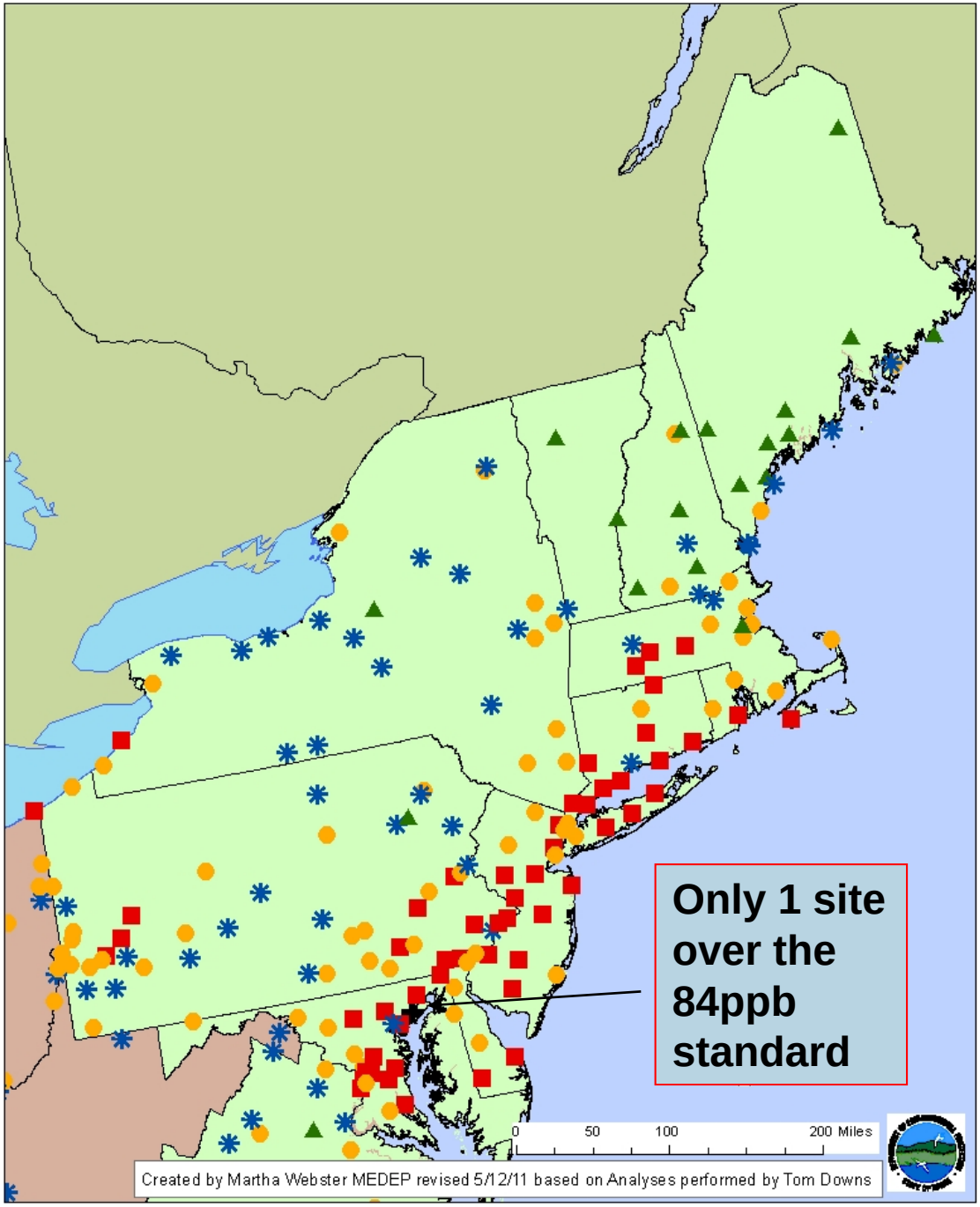
Parts per Billion (ppb)

Preliminary 2008-2010

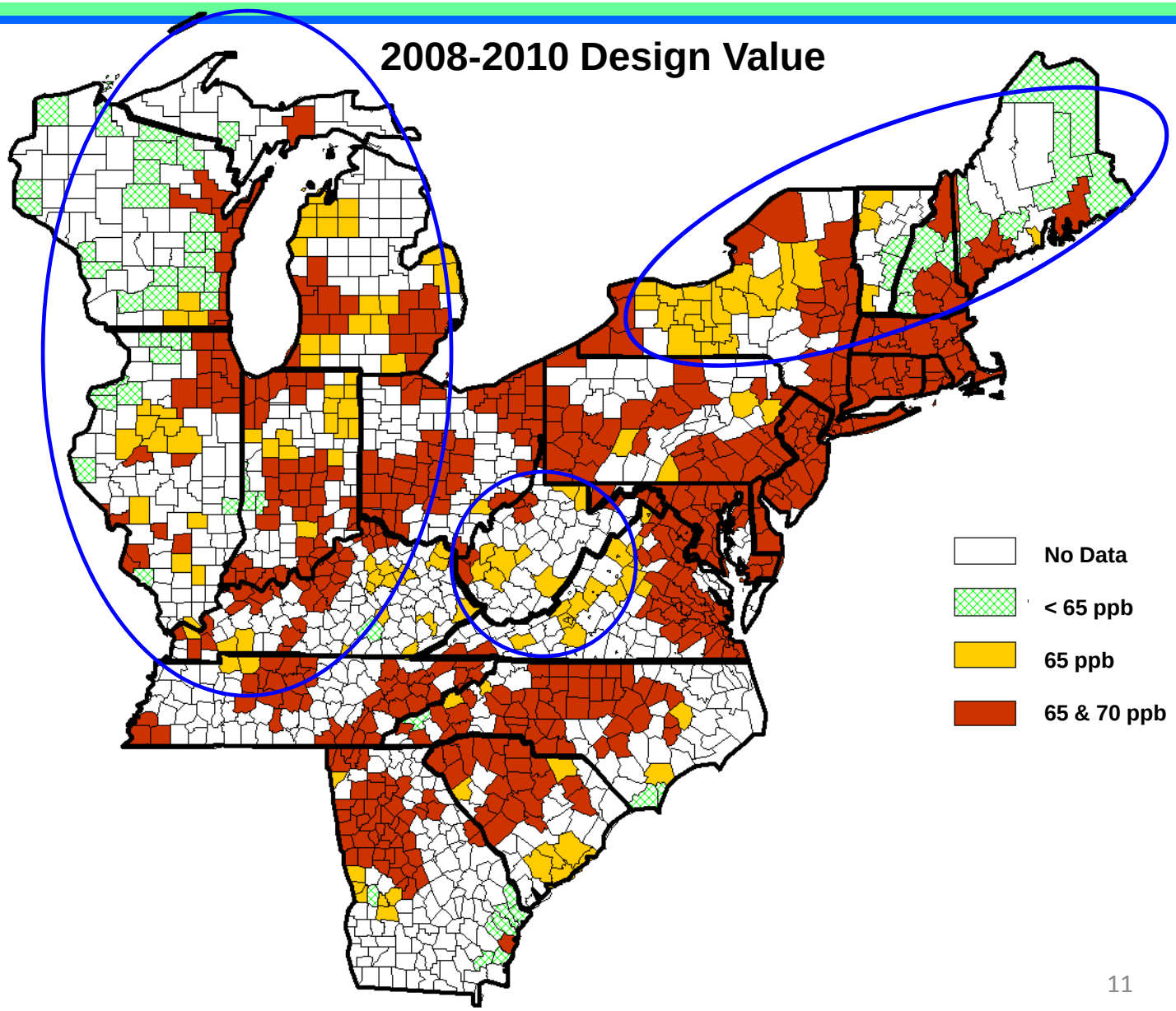
Design Values in the OTR

Note: Includes two years of cooler and wetter weather and a down economy.

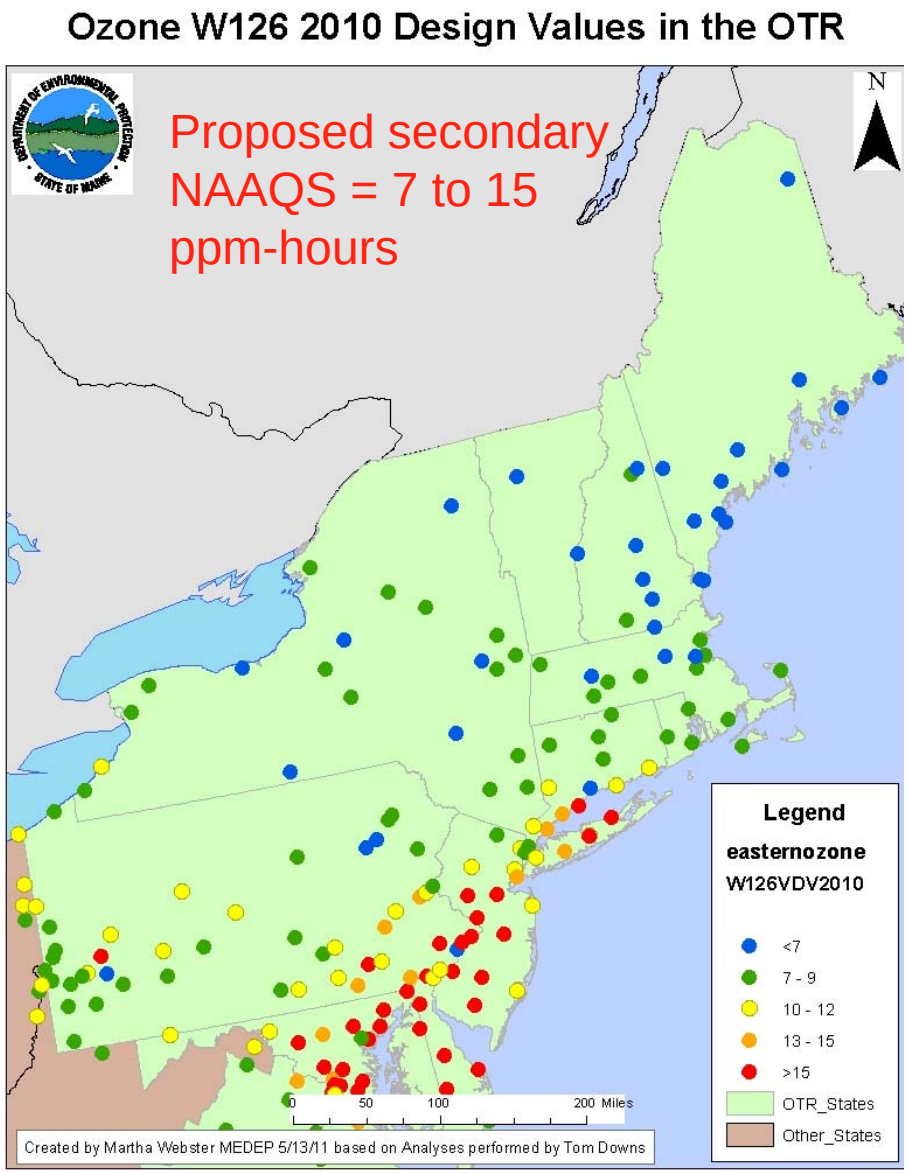


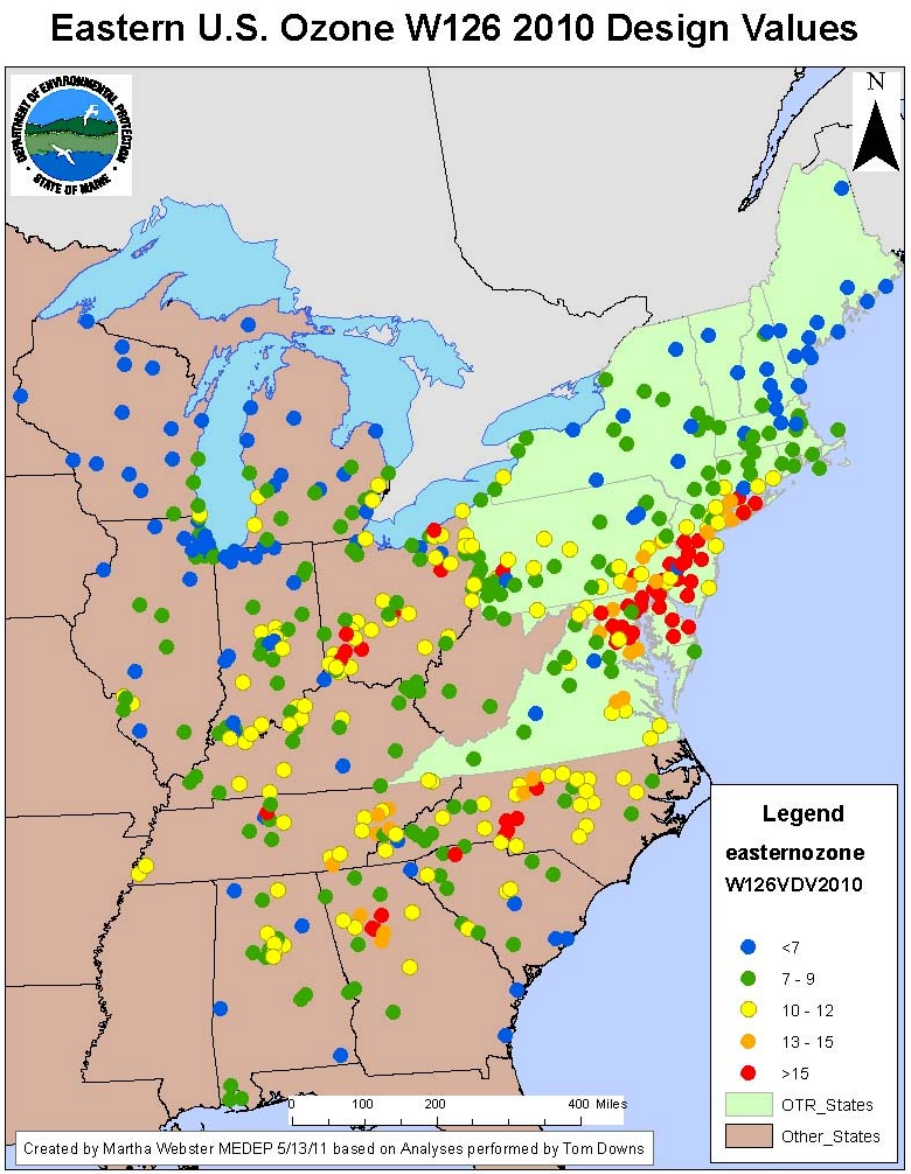


Potential 8-Hour Nonattainment by CSA



Preliminary Secondary Ozone Design Values (2008-2010)

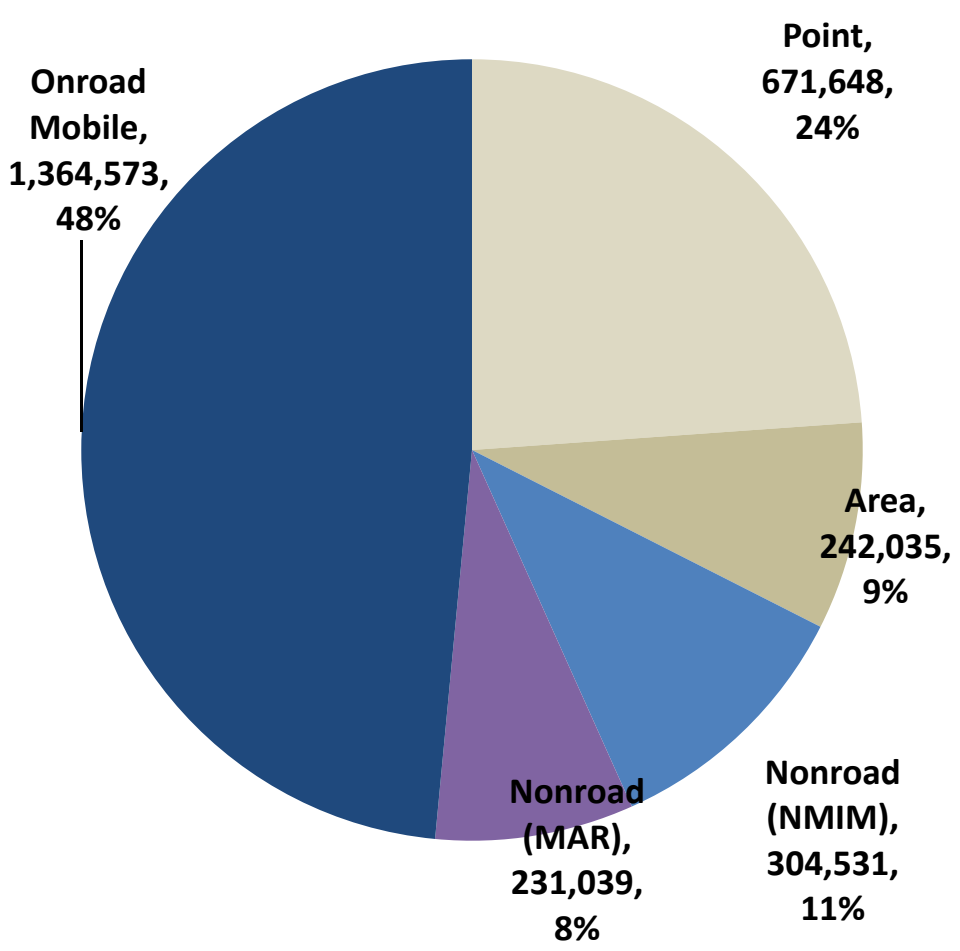




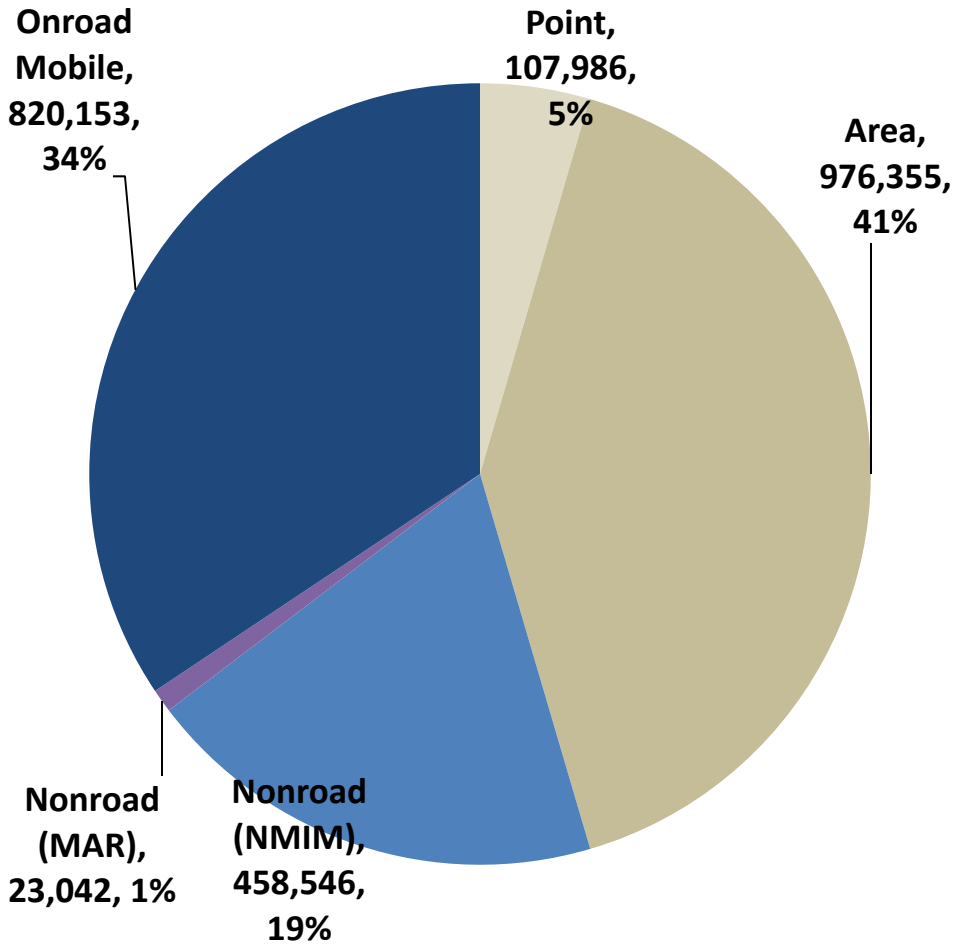
SCREENING MODELING

2007 Anthropogenic Emissions OTC + VA Region

NO_X 2,813,826 Tons/Year



VOC 2,494,068 Tons/Year



Screening Modeling – Assess Possibilities

Level 1 Screening – **DONE**

- Uses best available 2007 emission inventory and projects three future year control scenarios (includes "**Scenario 3**")

Level 2 Screening – **On-going**

- Uses higher quality 2007 emission inventory to test model performance
- Uses best available 2020 emission inventory to reassess "Scenario 3" – New case is called "**Scenario 4**". Possible bounding of "Scenario 4"

Level 3 Screening – **Proposed**

- Final 2007 emission Base Case
- High quality 2020 emission inventory with ERTAC EGU projections
- Additional bounding and sensitivity runs

SIP Modeling – **Final high-quality assessment**

"**Scenario 3**" vs. "**Scenario 4**"

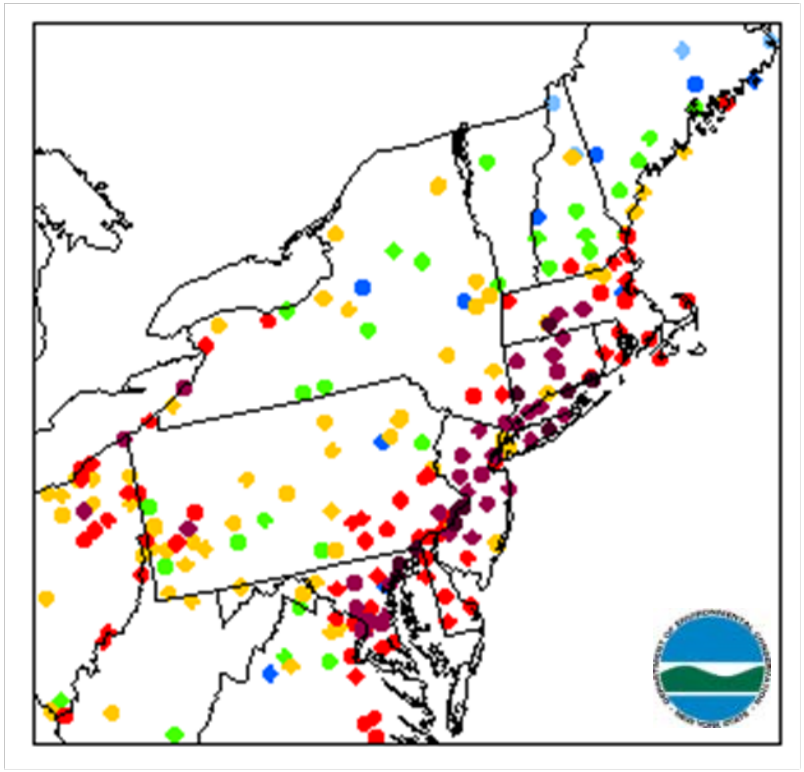
- Both approximate OTC's recommendations
- Theoretical reductions applied:

Scenario 3	**Scenario 4**
Scales from 2007 (or 2005)	Uses best available 2020 data except where noted
Domain-Wide NOx Reductions • Point: 65% (includes EGUs and ICI boilers/cement kilns) • Onroad: 75% (LEV3) • Nonroad: 35%	Domain-Wide NOx Reductions • Point: 65% (EGUs) from 2007 • Onroad: 70% (LEV3) from 2007
Domain-Wide VOC Reductions • 30% man-made sectors	Domain-Wide VOC Reductions • 30% EGU & On-road sectors from 2007
OTR Only: Extra 5% NOx	OTR Only: Extra 5% NOx

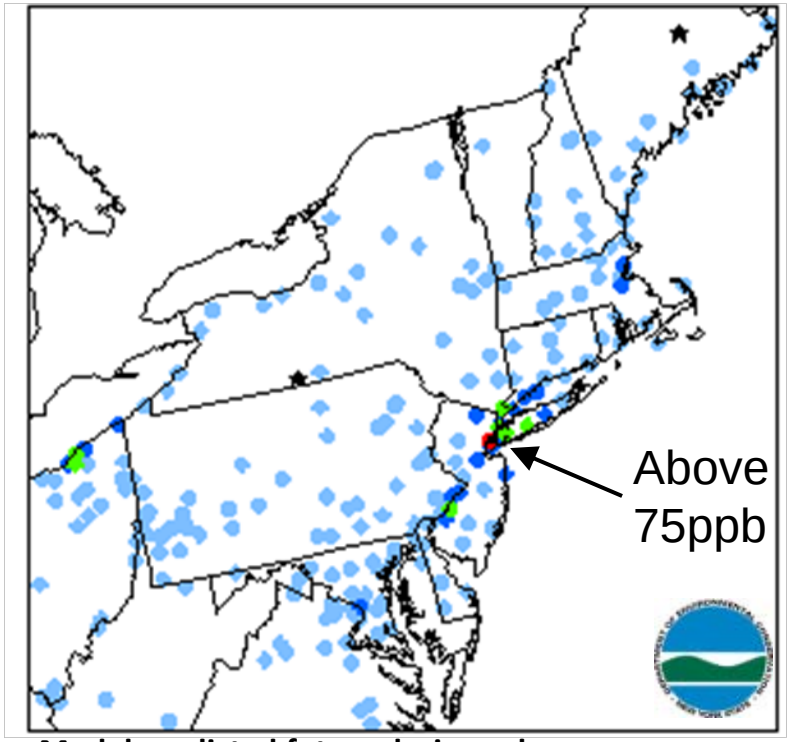
Level 1 Screening “Scenario 3”

Screening of OTC Recommended Measures Predicted Nearly Full Attainment of 75ppb NAAQS!
All locations would meet the 84ppb version of the NAAQS

Observed 2005 - 2009



OTC Recommendations “Scenario 3”



Model predicted future design values

Parts per Billion (ppb)

Current Modeling - Level 2 Screening

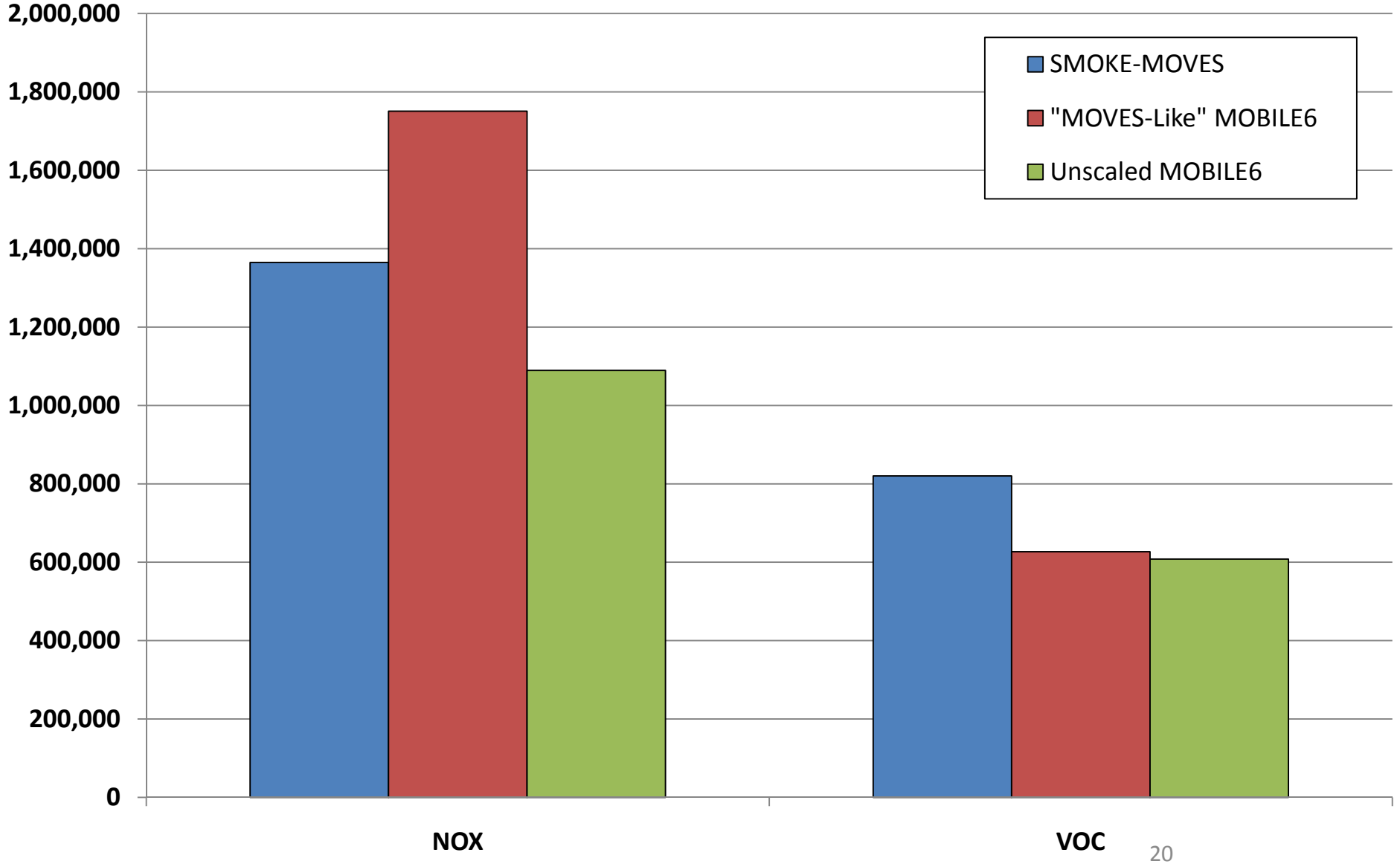
- 2007 Base - model performance testing
- Proxy 2020 Control “Scenario 4”
  - MARAMA 2020, except EGUs and on-road mobile
- Up to Two potential 10% NOx bounding runs

Estimated Inventory Development Timeline

Sector	2007 Inventory Timeline	2020 Inventory Timeline
EGU Point	Complete	**Fall 2011**
Non-EGU Point	Complete	Complete
Area	Complete	Complete
Non-Road (NMIM)	Complete	Complete
Non-Road (M/A/R)	Complete	Complete
On-Road (MOVES Lookup)	Complete	**Summer 2011***
SESARM	**Mid Summer 2011**	
LADCO	**Late Summer 2011**	

** - Note: Timelines for completion of MOVES runs is subject to change due to ongoing issues identified with the MOVES model.*

MOVES: 2007 Onroad in OTR+VA (t/y)



EGU Projections/ERTAC

ERTAC - Future EGU Emissions

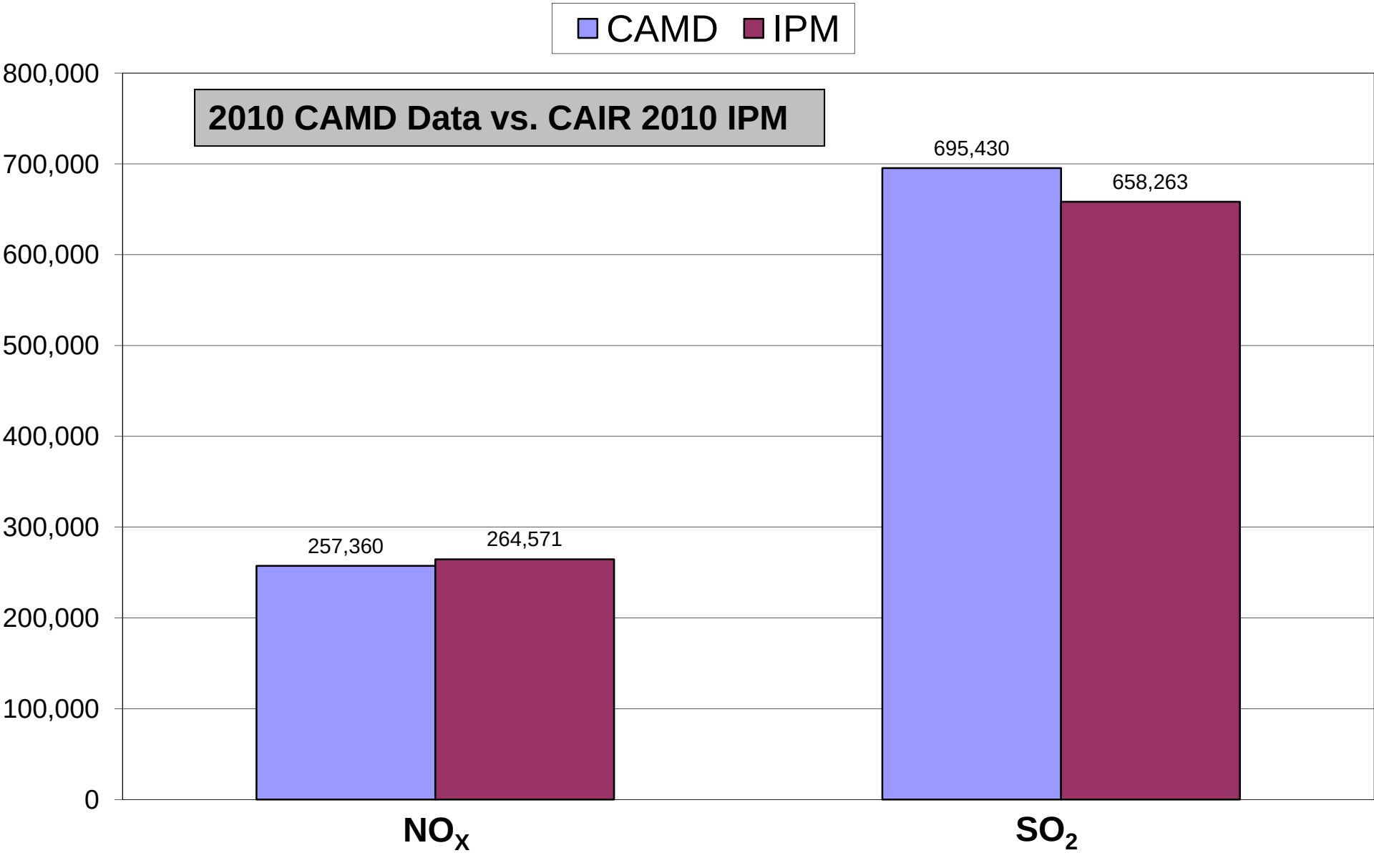
- Eastern Regional Technical Advisory Committee
- Collaboration:
  - States throughout country and multi-state organizations
  - Industry stakeholders
- Goal: Develop improved and transparent methodology to estimate EGU future year emissions

The ERTAC Model

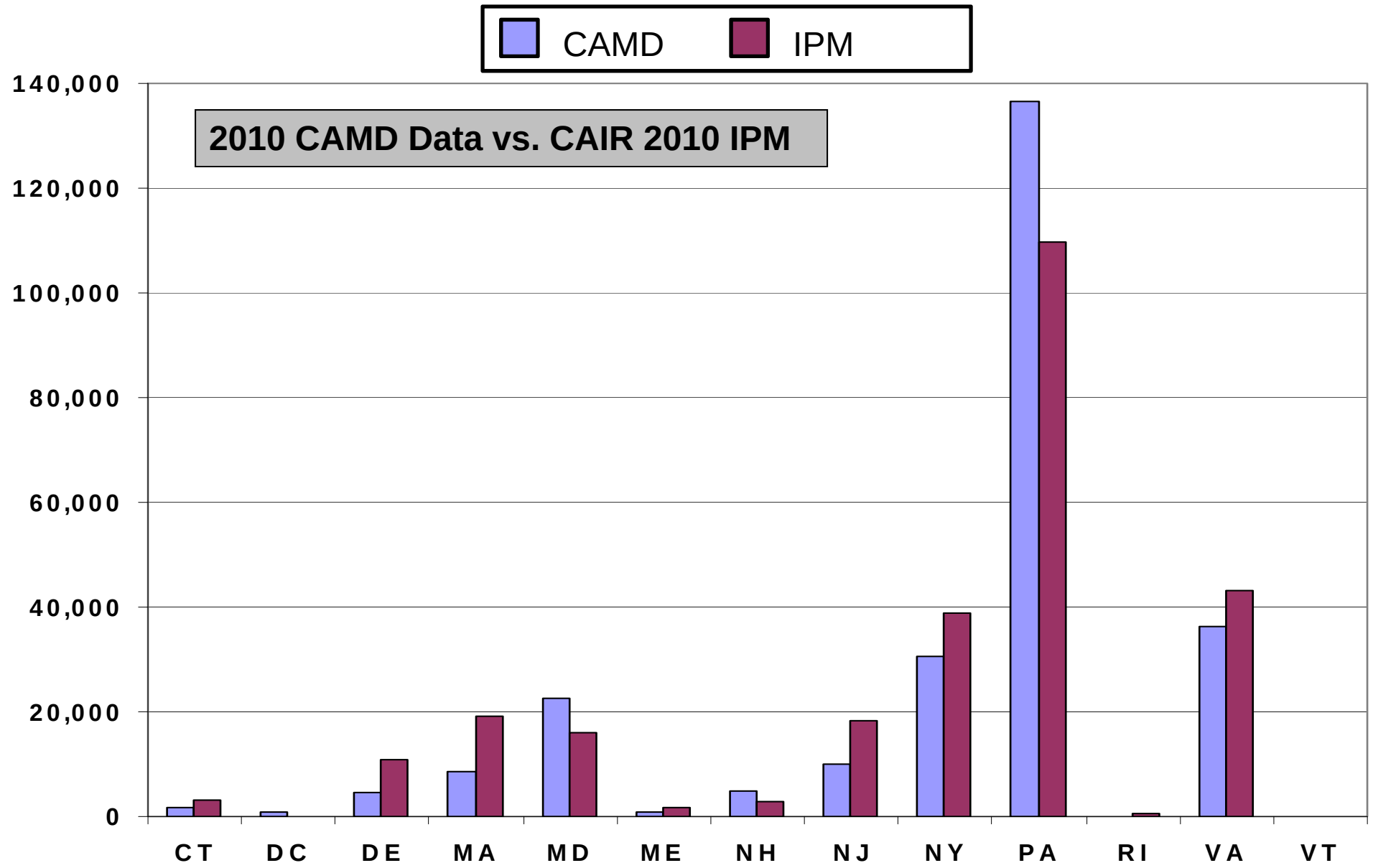
- The ERTAC model will:
  - ✓Estimate EGU emissions for future years
  - ✓Be open sourced, transparent, and reproducible
  - ✓Incorporate latest and best data from states, industry, and multi-state organizations
  - ✓Provide a viable alternative to the Integrated Planning Model (IPM)

IPM vs. CAMD OTR Regional Totals

(Tons/Year)

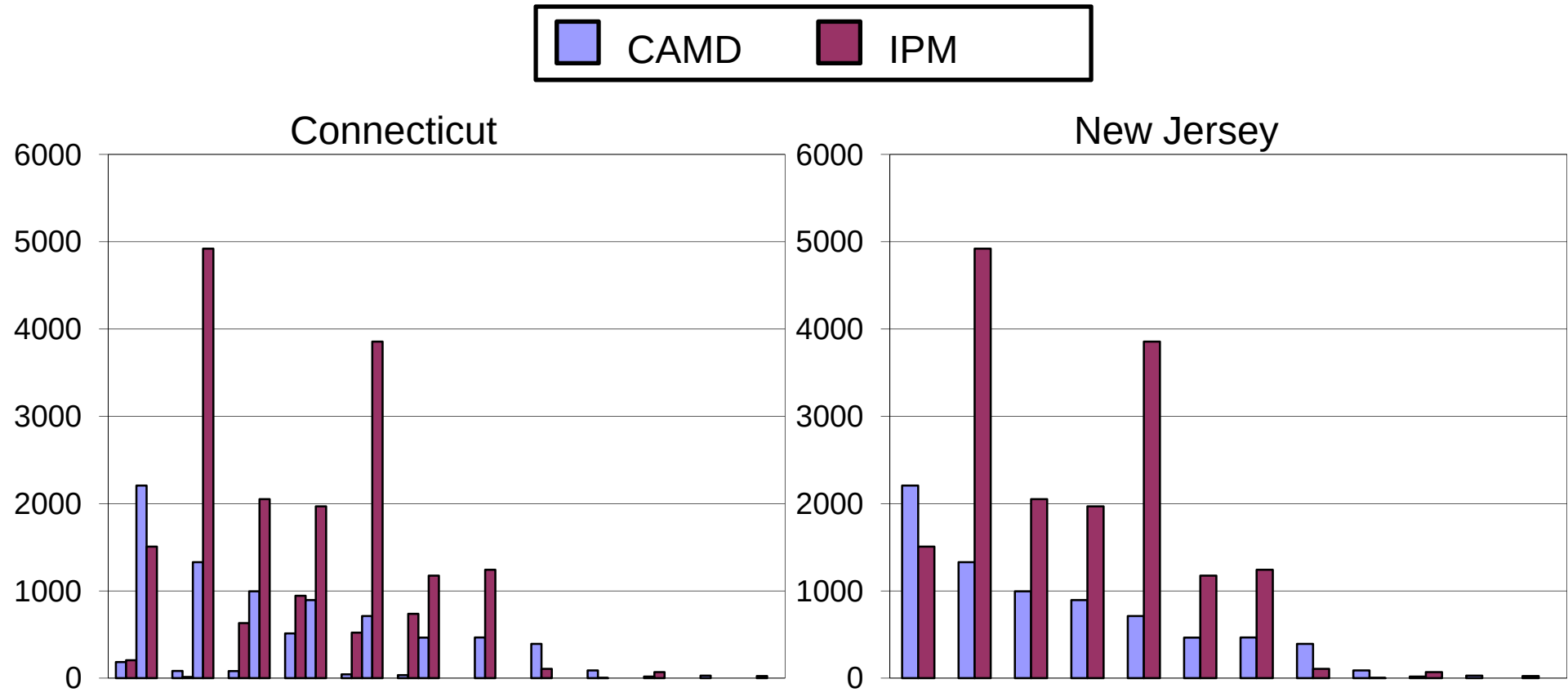


IPM vs. CAMD OTR State Totals (Tons/Year NO_X)



Units Operating >50% (Tons/Year NO_X)

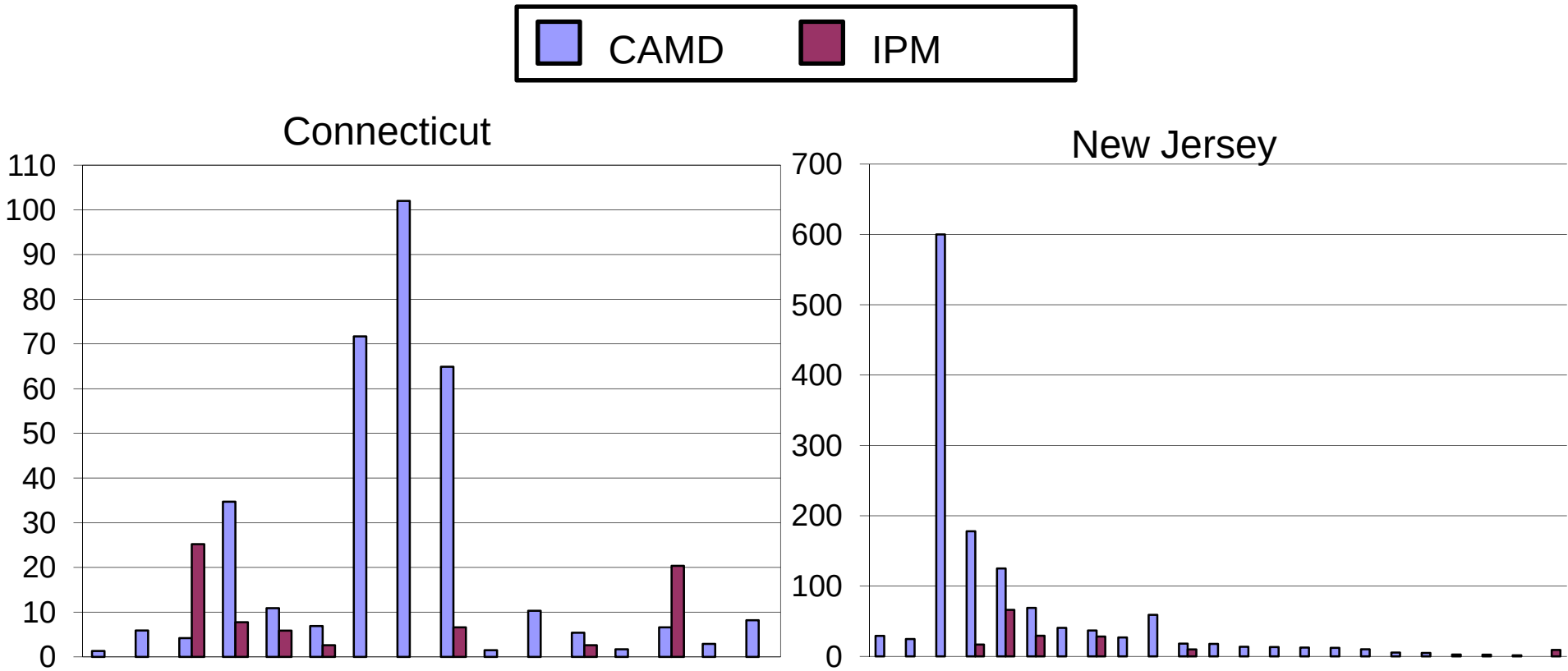
When looking at the details by EGU, IPM results were highly variable and off substantially both high and low



In general, units operating >50% of the time are **over** estimated by IPM

Units Operating <15% (Tons/Year NO_X)

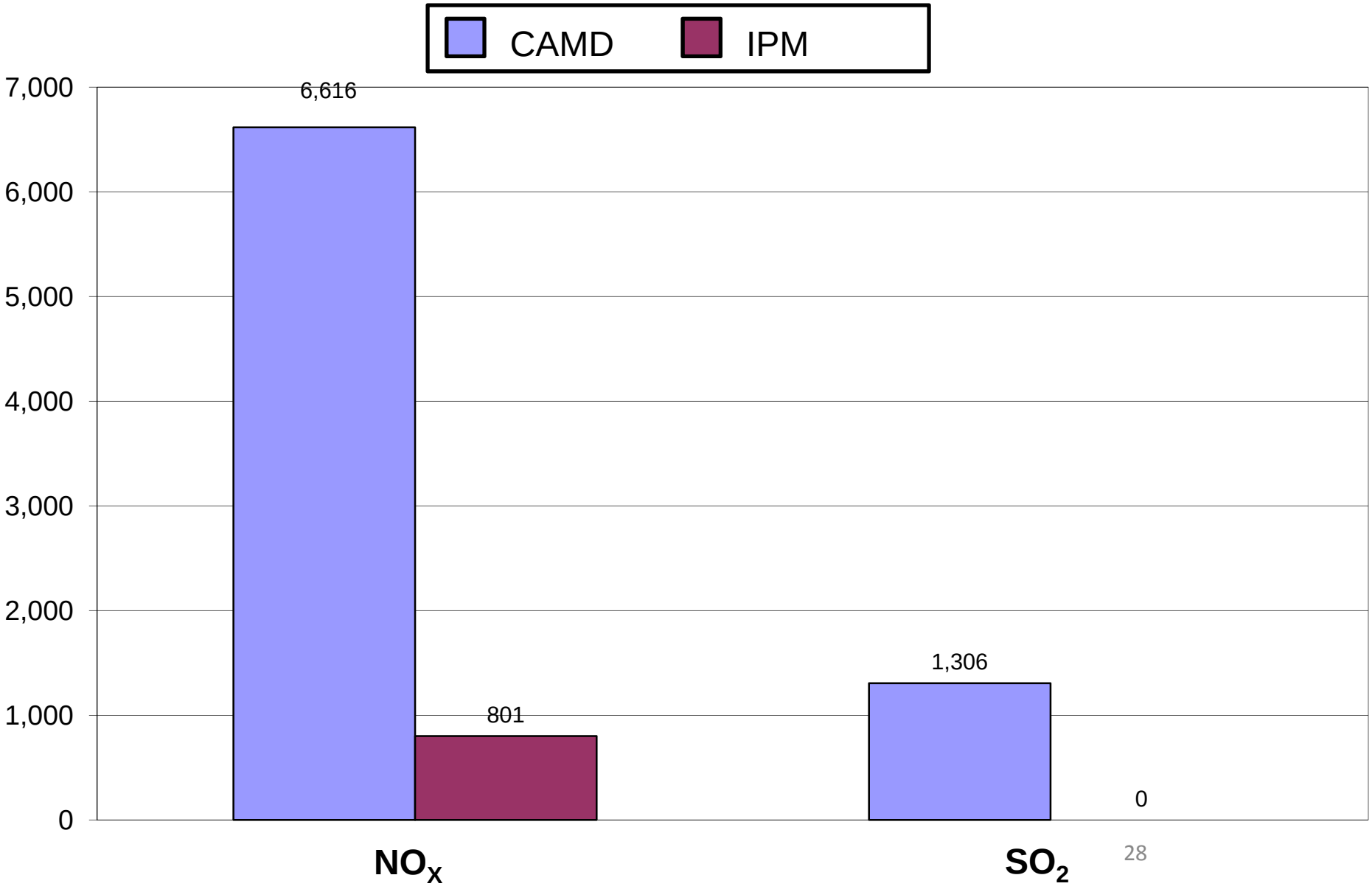
When looking at the details by EGU, IPM results were highly variable and off substantially both high and low



Remember, peaking units are often run on high ozone days

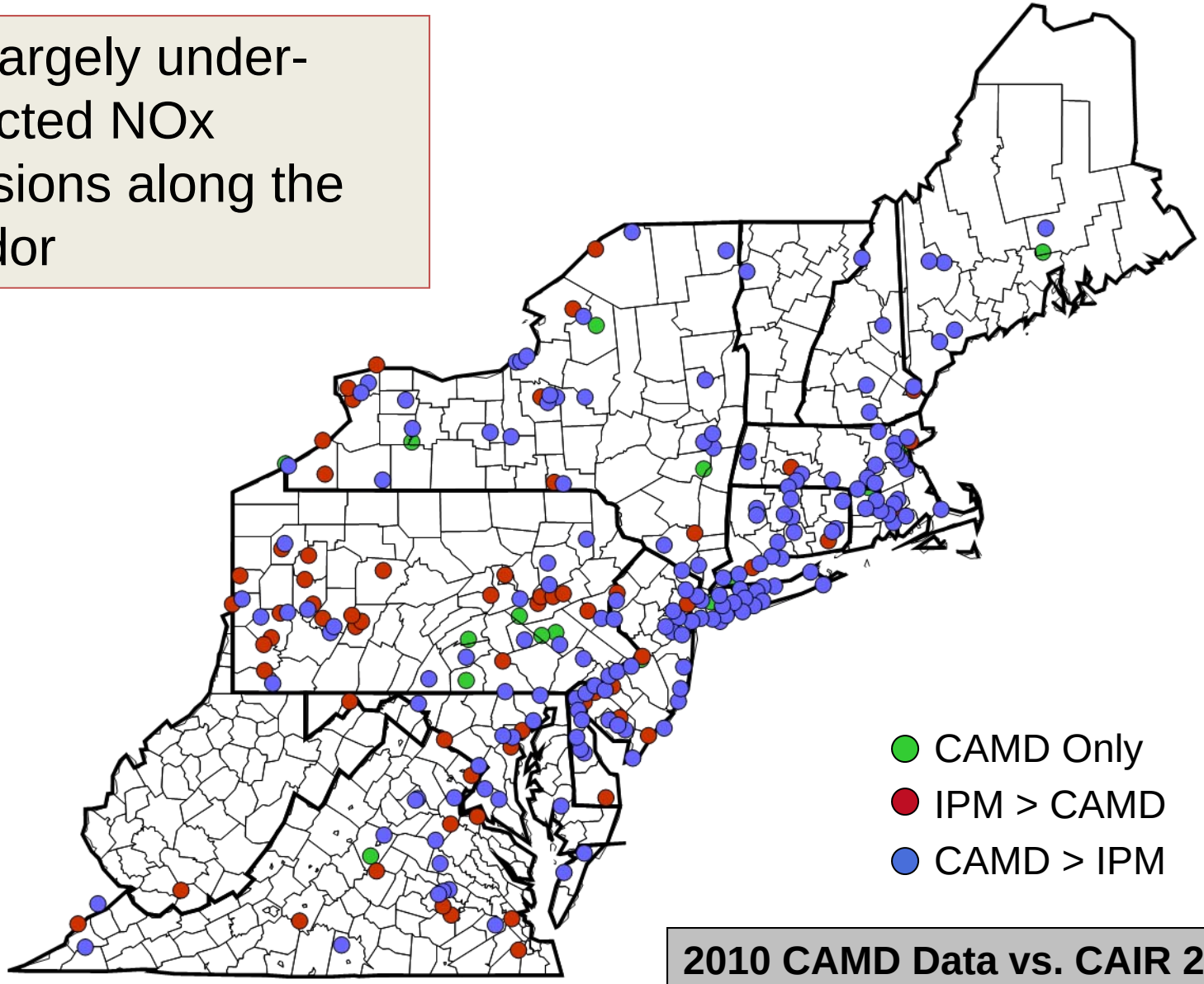
In general, units operating <15% of the time are **under** estimated by IPM

New York City Totals (Tons/Year)



Plant Level Over/Under Predictions by IPM

IPM largely under-predicted NOx emissions along the corridor



2010 CAMD Data vs. CAIR 2010 IPM

Summary

- The Modeling Committee expects to start Level 2 Screening Modeling in July 2011
- Projected year emission inventory work continues and the OTC Modeling Committee expects to use the best available inventories when performing modeling.
- ERTAC emission inventory work is expected to be a big step forward in developing EGU emission data projections
- OTC and State resources are becoming more limited, thus the committee is committed to its 2007 based modeling platform for near-term ozone SIP work.