



# Control Strategy Development Process and Status of Potential Control Measures

*Ozone Transport Commission  
Special Meeting*

*Ali Mirzakhali, Delaware*

*February 22, 2006*

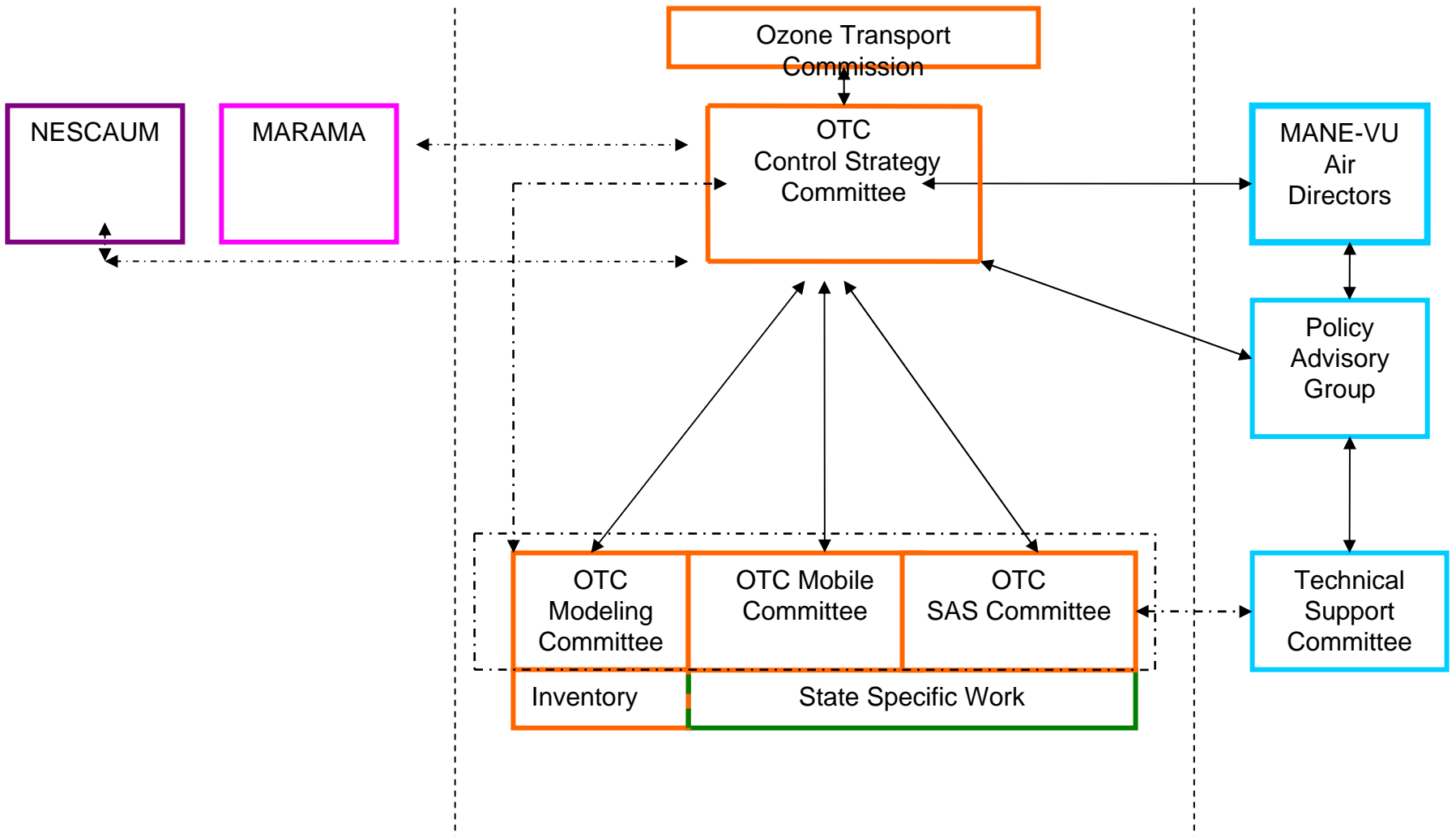
*Washington, DC*







# Organization and Coordination





# OTC Control Strategy Work

- Multi-Pollutant Program Development
  - EGU and ICI Boilers
  - Intra- and Inter-Regional Coordination
- Control Measure Analysis and Development
  - RACT Update - 10 Plus fruitful categories
  - RACT Benchmark – Most Stringent in Region
  - Identification of New Measures
- Corridor Approach to Diesel Emissions

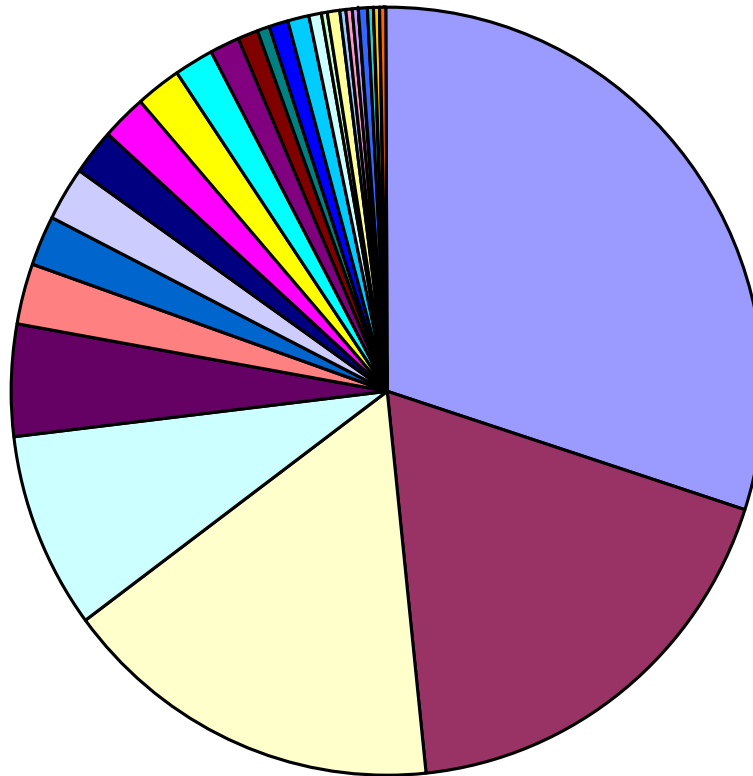


# Sources of Information

- Multiple State Initiatives
  - State Staff Leads
  - Workshops
  - Other State Activities/ Workgroup Consultation
  - Intra and Inter-Regional Coordination
- Stakeholder Input, Meetings w/ Key Organizations
- Control Strategy Committee Meetings – 2 held, 1 in April
- MARAMA RACT Update
- STAPPA Menu of Options
- NESCAUM and MARAMA Diesel Collaboratives
- Contractor Assistance
- Modeling Results

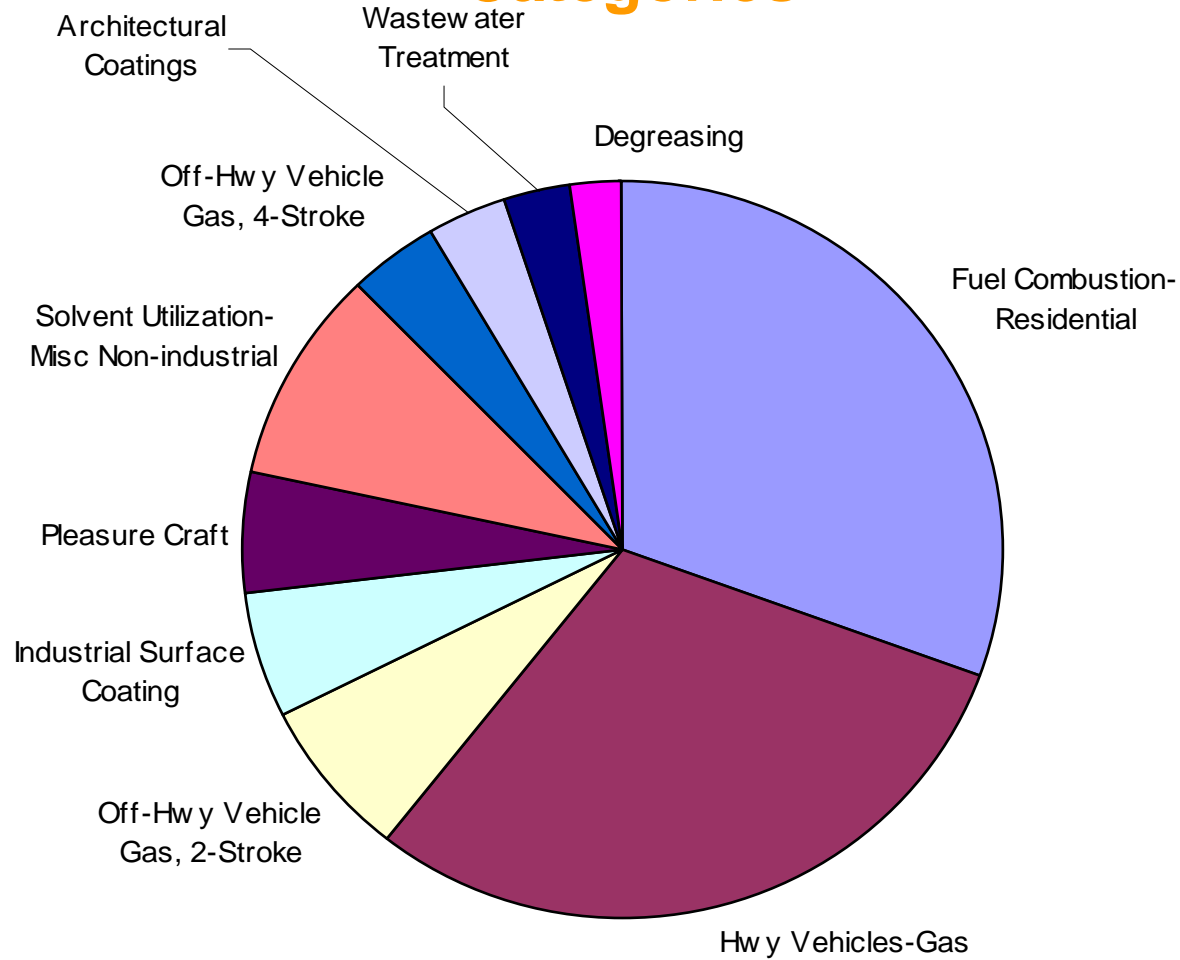


## Summary of Annual NOx Emissions (2002, MANE-VU)

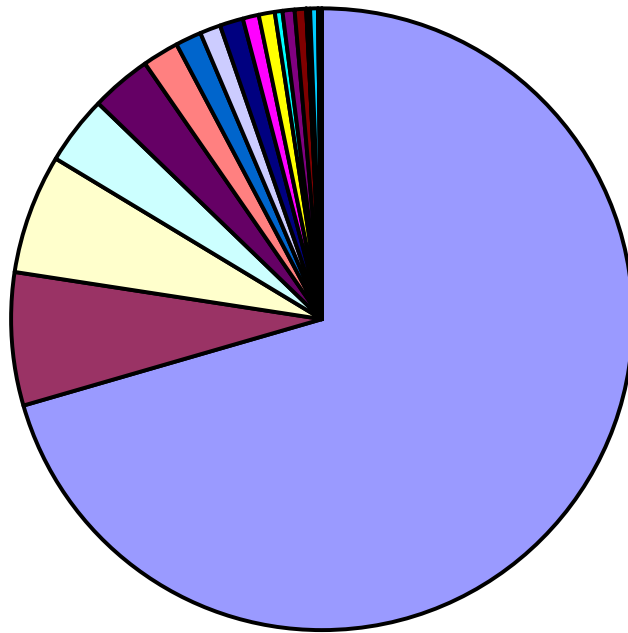


- Mobile Sources-Highway Vehicles-Gasoline
- Mobile Sources-Highway Vehicles-Diesel
- External Combustion Boilers-Electric Generation
- Mobile Sources-Off-highway Vehicle Diesel
- Stationary Source Fuel Combustion-Residential
- Stationary Source Fuel Combustion-Commercial/Institutional
- Industrial Processes-Mineral Products
- External Combustion Boilers-Industrial
- Mobile Sources-Railroad Equipment
- Mobile Sources-LPG
- Mobile Sources-Marine Vessels, Commercial
- Stationary Source Fuel Combustion-Industrial

# OTC VOC Sources by % of Top Categories



## Summary of Annual SO<sub>2</sub> Emissions (2002, MANE-VU)



- External Combustion Boilers-Electric Generation
- External Combustion Boilers-Industrial
- Stationary Source Fuel Combustion-Residential
- Stationary Source Fuel Combustion-Commercial/Institutional
- Stationary Source Fuel Combustion-Industrial
- Industrial Processes-Mineral Products
- Mobile Sources-Off-highway Vehicle Diesel
- Mobile Sources-Highway Vehicles-Gasoline
- Mobile Sources-Marine Vessels,





# Most Promising Areas to Model

## Based on 2002 Inventory and 2009 Projections

- Point Sources:
  - Industrial, Commercial and Institutional Boilers
  - Cement Kilns
  - Lime Kilns
  - Municipal Waste Combustion
  - Petroleum Refining
  - EGU Peaking Units
  - Small Diesel Generation



# Most Promising Areas to Model

## Based on 2002 Inventory and 2009 Projections

- Area Sources:

- Residential Coal
- Residential Wood
- Open Burning
- Cutback Asphalt
- Architectural, Traffic Markings, Industrial Maintenance Coatings
- Consumer Products
- POTWs
- Degreasing
- Printing and Graphic Arts
- Metal Production
- Stage 1 Vapor Recovery
- Adhesives
- Auto Refinishing



# Most Promising Areas to Model

## Based on 2002 Inventory and 2009 Projections

- **Mobile Sources:**
  - Onroad Gasoline Vehicles
  - Onroad Heavy Duty Diesel Vehicles
  - Onroad Heavy Duty Diesel Buses
  - Nonroad Gasoline Equipment
  - Marine and Locomotive
  - Airport Passenger and Aircraft Service Equipment
  - Off Highway LPG



# Reasonable Available Controls Work

<b>Area, Point or Mobile</b>	<b>Source Category</b>	<b>Proposed Action</b>
A	Architectural, Industrial and Maintenance (AIM) coatings	Model, & Rule Development
A	Asphalt Paving	Model
P	Asphalt Production Plants	Model
A	Auto Refinish Coatings	Model
P	Cement Kilns	Model
A	Consumer Products including Portable Fuel Containers	Model and Rule Development
M	Diesel Retrofits	Continue Eval.
A	Diesel Truck Chip Reflash	Model and Rule Development
P	EGUs	Model
P	EGU Peaking Units	Model
P	Glass/Fiberglass Furnaces	Model



# Reasonable Available Controls Work (continued)

<b>Area, Point or Mobile</b>	<b>Source Category</b>	<b>Proposed Action</b>
A	Industrial Adhesives	Continue Eval.
A	Industrial Surface Coatings	Continue Eval.
P	ICI Boilers	Model
P	Lime Kilns	Model
P/A	Metal Production	Continue Eval.
P	Municipal Waste Combustors	Model and EPA Rule
P	POTWs	Continue Eval.
A	Printing and Graphic Arts	Continue Eval.
P	Refineries	Model
A/M	Regional Fuel based on reformulated gasoline options.	Model
M	Stage I Gas Distribution	Continue Eval.

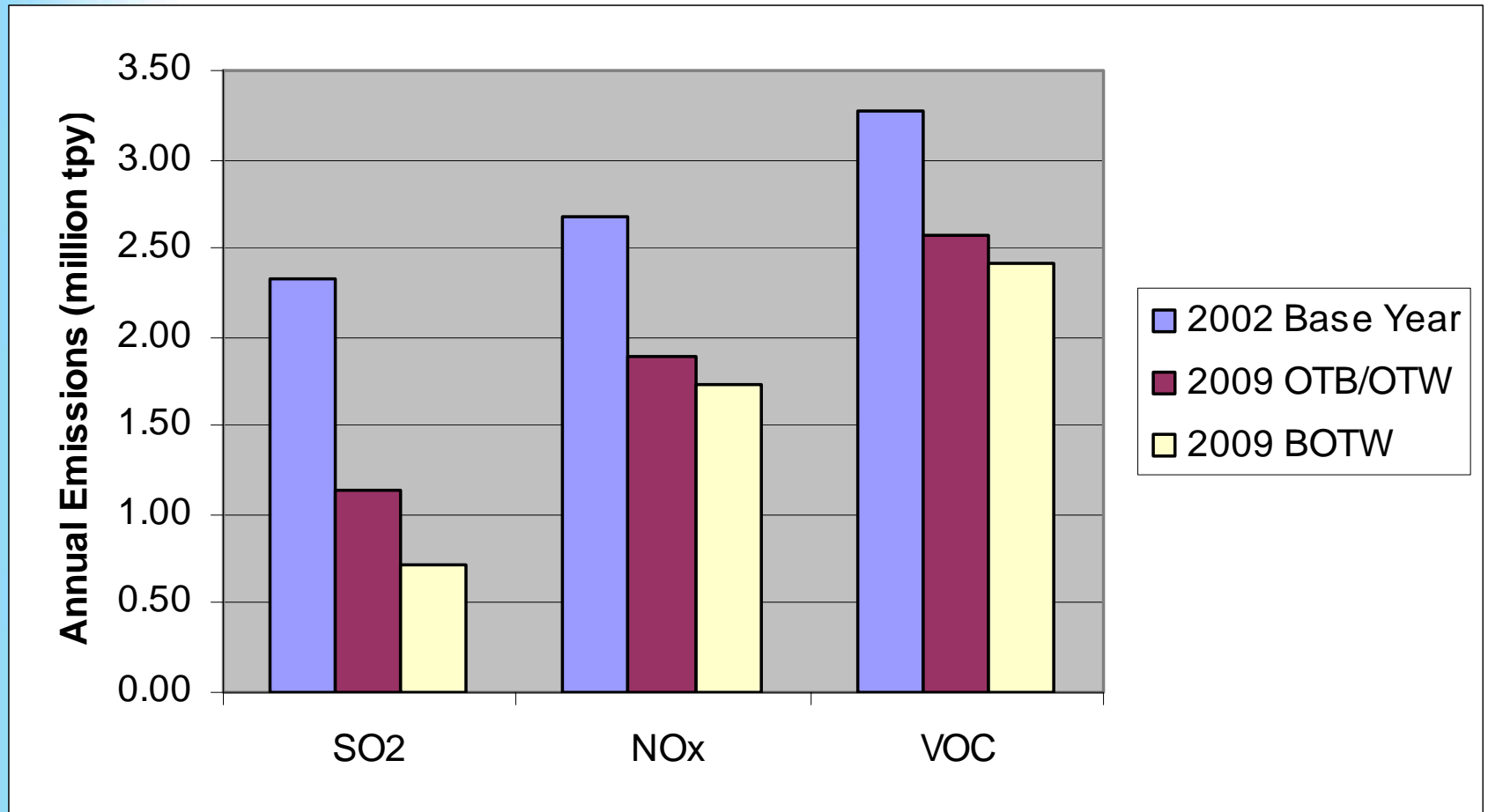


# Reasonable Available Controls Work (Continued)

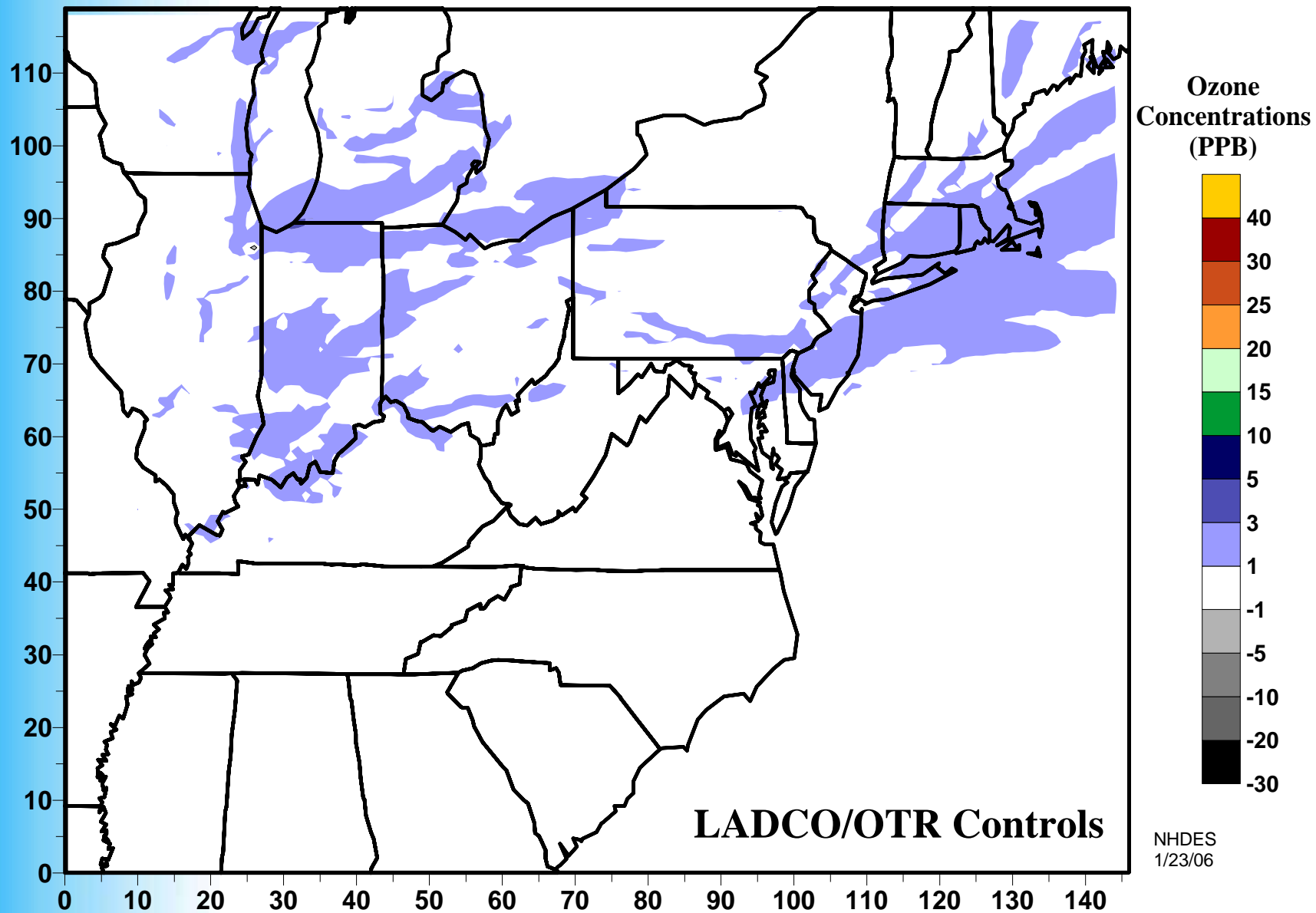
<b>Area, Point or Mobile</b>	<b>Source Category</b>	<b>Proposed Action</b>
M	Other Mobile Measures including i) Anti-idling ii) Differential Tolls iii) Executive Orders on Diesel retrofits	Continue Evaluation
A	Wood Combustion	Continue Eval.
P,A,M	Other source categories as may be appropriate	Continue Eval.



# Control Measure Reduction Estimates

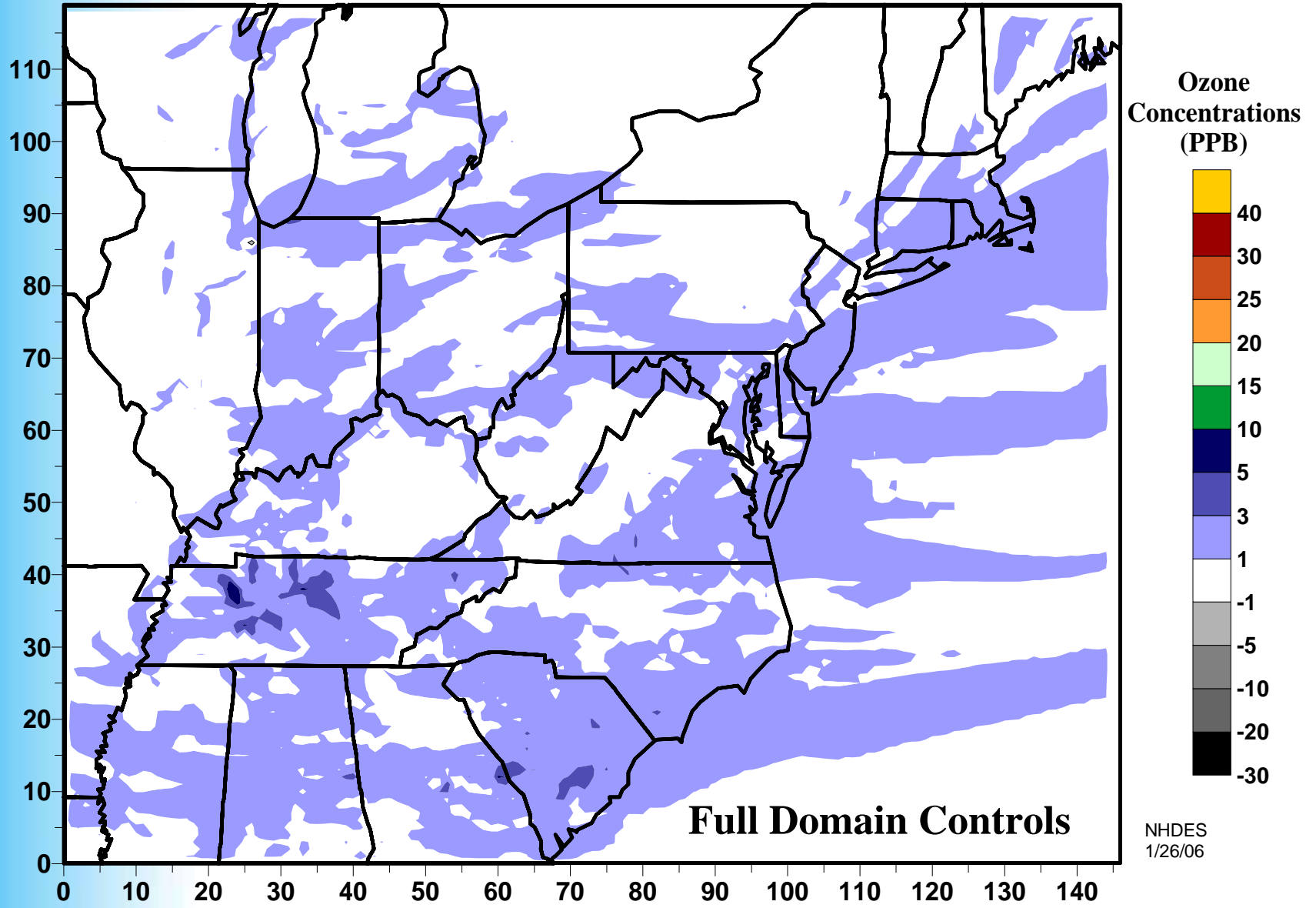


# 2009 - Benefits of Additional Local/Regional Controls Beyond CAIR and OTW/OTB



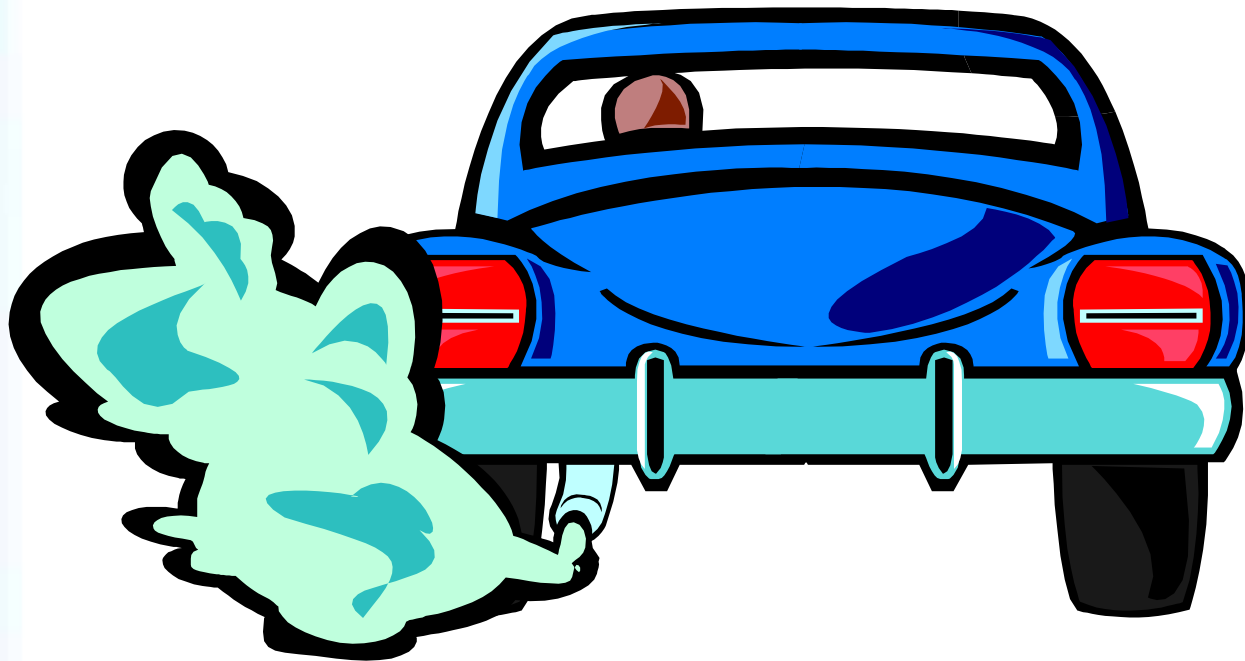


# 2009 - Benefits of the All Identified Additional Regional Controls - Without Additional EGU Controls





# Clean Corridors Control Measures Update



# Summary of Mobile Measures

- Mandatory Chip Reflash
- Reformulated Gas
- Diesel Retrofits in the OTR
- Voluntary Measures

# Chip Reflash

- **Recommendation:** Develop a model rule for mandatory chip reflash in all OTR states
- **Benefits:** 63 TPD NO<sub>x</sub> emission reductions
  - 41 TPD Northeast states
  - 22 TPD Mid-Atlantic states
- **Rationale:** Expected federal reductions are not being achieved
  - EPA program falling far short of its expected 90% compliance rate,
  - OTC states are not precluded from putting a mandatory program into place
  - Cost is low; < \$100/ton of NO<sub>x</sub> reductions, and engine manufacturers provide kits for free, assume cost of installation
  - May not result in credited tons since EPA already assumed high rule penetration rate, but would be real reductions

# Reformulated Gas

- **Recommendation:** Examine possibility for a regional RFG throughout the OTR
- **Benefits:** ~ 127 tons/summer day
  - Approximately 3.4 tpsd NO<sub>x</sub>
  - Approximately 123 tpsd VOC
- **Rationale:** One-third of gasoline sold in the OTR is not RFG
  - 2005 Energy Policy Act provides authority for RFG in the OTR, and eliminates the oxygenate requirement
  - Potential to reduce the number of fuels in the region
  - Need to examine whether/what states may have statutory/legislative constraints re RFG

# Diesel Retrofits in the OTR

- **Recommendation:** Pursue opportunities for conducting voluntary diesel retrofit projects in the OTR
- **Benefits:** Ranges from 30% to 99% NO<sub>x</sub> control efficiency, depending on the technology
- **Rationale:** Several voluntary projects are being implemented via grants and partnerships with federal agencies
  - The Energy Policy Act of 2005 may provide for additional projects if funds are appropriated
  - Northeast and Mid-Atlantic collaboratives with EPA Regions have formed and are examining possibilities along I-95 corridor
  - Voluntary approach is most feasible at this time; cost/ton range from \$3,000 to as much as \$150,000, so financial and other incentives are helpful in achieving higher implementation rates

# Other Potential Measures

- Anti-idling regulations
  - Areas in 8 OTR states have some level/kind of anti-idling regulations in place
  - Have relatively high emission reduction potential and short-term implementation
- Stage 1 gasoline distribution
- Replacement catalyst program for pre-1996 vehicles
  - Preliminary estimates indicate 50% reduction in NO<sub>x</sub> may be possible

# Possible Voluntary Measures

- Electrification of ground service equipment at airports and cargo handling equipment at shipbuilders and ports
- Reduced licensing fees and/or EZ Pass discounts for green vehicles, i.e., those that have done retrofits
- Lawnmower/garden equipment replacement incentives
- OTC is investigating these and other options



# Multi-P – EGU





# Multi-P Straw Proposal

	Pollutant	OTC National Cap (tons)	OTC 2004 Position (lb/MMBtu)	Mid-West RPO EGU White Paper Proposal (2009/2013)		Straw Proposal
				EGU1	EGU2	
NO <sub>x</sub>	Phase I (2008)	1,870,000	0.13	0.15	0.12	0.12 (2009)
	Phase II (2012)	1,280,000	0.09	0.10	0.07	0.08 (2012)
SO <sub>2</sub>	Phase I (2008)	3,000,000	0.21	0.36	0.24	0.24 (2009)
	Phase II (2012)	2,000,000	0.14	0.15	0.10	0.14 (2012)

Heat Input (2000) 29,221,854,977



# Activities

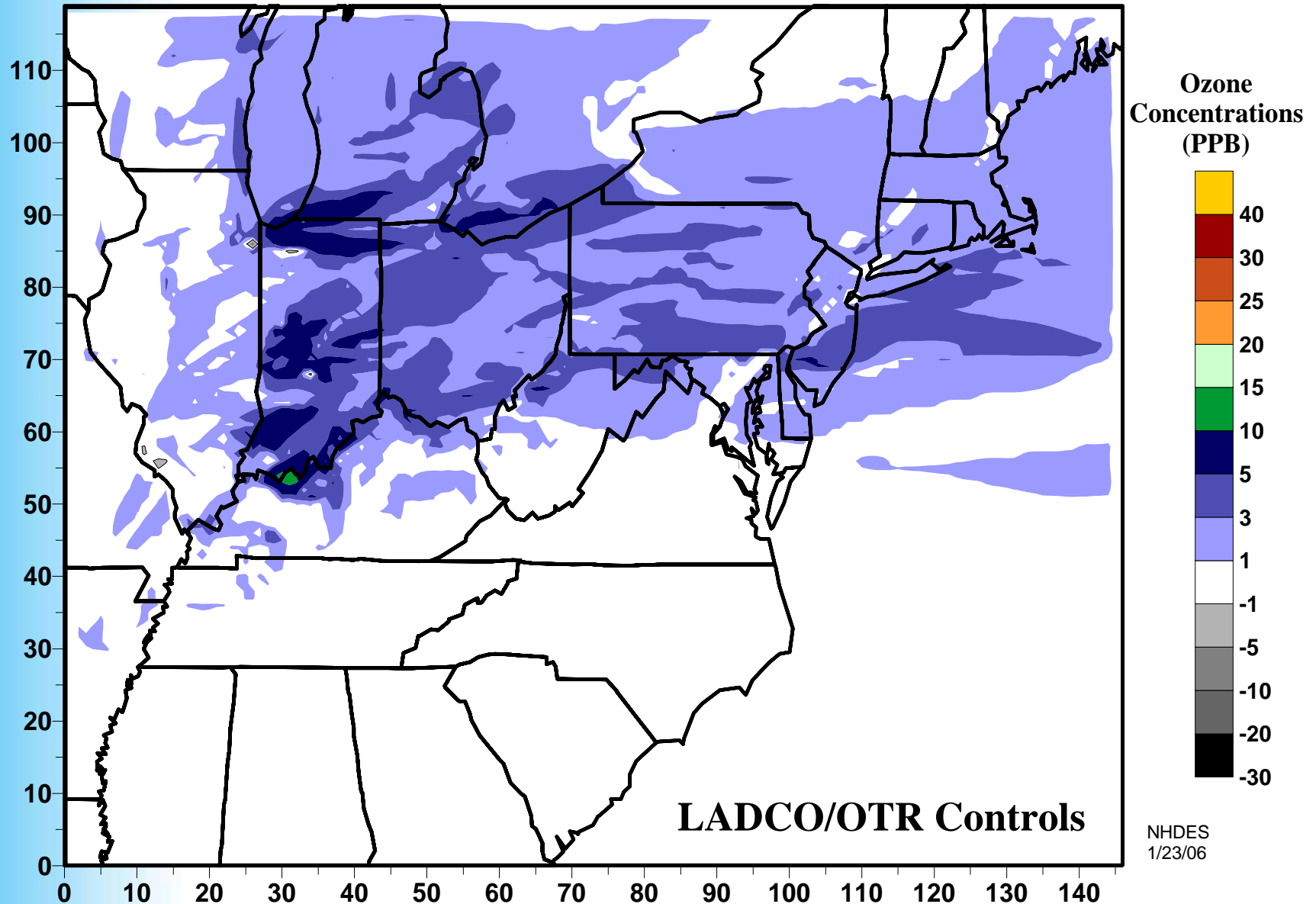
- Work with LADCO/MWRPO to Compare Results of OTC Straw with EGU1/EGU2
- IPM Runs to Re-evaluate effect
  - Current Assumptions
    - High Gas, Oil Prices; Higher Coal Prices
- Reliability
  - Meet with RTO/ISO/DPUC
  - Address Generation, Transmission, Distribution



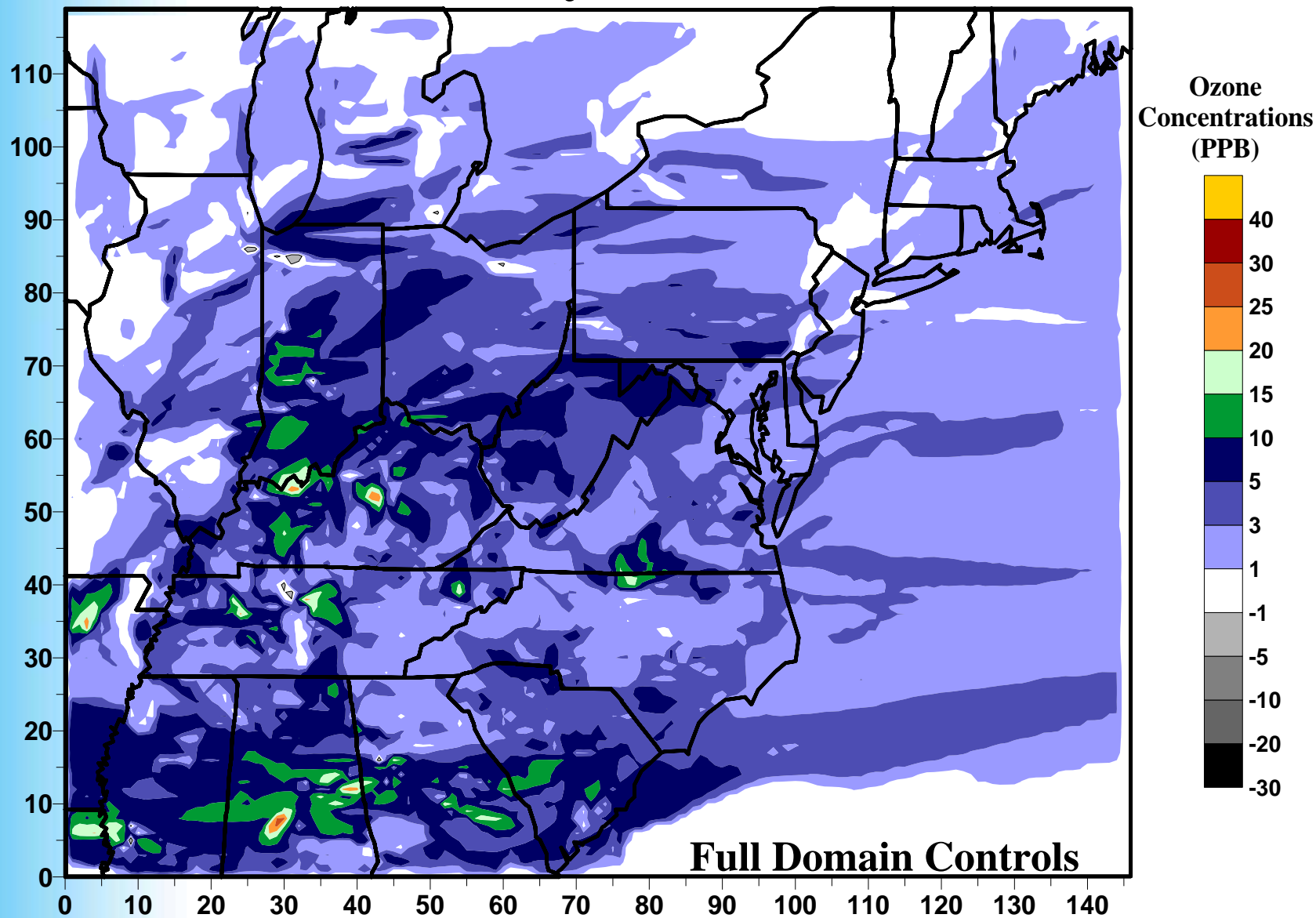
# RACT Related Work

- ICI Boilers
  - 100 MMBTU
    - Identify Appropriate RACT Measures
  - 250 MMBTU
    - Similar to EGU Recommendations?
    - Trading Program Options?
- Peaking Units

# 2009 - Benefits of Straw Proposal as a Regional Strategy vs. CAIR/OTW/OTB



# 2009 - Benefits of OTC Position (w/ICI Boilers) Beyond CAIR



# 2009 Benefits of EGU2 Plus Area & Mobile Beyond CAIR

