OTC Committees Meeting

April 10, 2014

Hall of States

Washington, D.C.

Ali Mirzakhalili, P.E.
Stationary and Area Source Committee Update

OZONE TRANSPORT COMMISSION

Outline

- Update on Committee efforts
- Update on completing Charge
- Moving Forward- Next steps for the SAS Committee

Charge to the Committee

LARGEST CONTRIBUTOR ANALYSIS

Using the most recent emission inventory data available to:

- **Identify the largest individuals and groupings of NOx emitters *within states where* that *state* contributes at least 1% of the 2008 ozone NAAQS of 75 ppb to OTC states;**
- **Identify emission sources with the highest short-term emissions of NOx and VOC;**
- **Evaluate real world achievable NOx emission rates across load ranges to adjust long and short term expectations for emission reductions.**
- **Develop individual state EGU NOx emission rates achievable, considering reasonable available controls.**

DISTRIBUTED AND EMERGENCY GENERATOR INVENTORY

Obtain information from system operators concerning the location, operation and emissions of all units that participate or plan to participate with the system operator to analyze the air quality impact of these engines and make recommendations for potential control strategies to the Commission.

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Largest Contributor (EGU) Analysis

EGU Workgroup has posted the draft Whitepaper of the EGU Emissions Inventory Analysis for the OTC Modeling Domain for stakeholder comments on the OTC website: http://www.otcair.org

The draft EGU Emissions Inventory Analysis Whitepaper includes:

- Analysis of 2011 and 2012 state level ozone season EGU NOx emissions (tons) and ozone season state average EGU NOx emission rate (lb/mmBtu) data.
- Analysis of Approach 1 NOx controls and EGU retirements
- Analysis of Short Term (Hourly) EGU NOx Emissions - 2012
- Analysis of daily EGU NOx emissions during the 2011 Ozone Season including emissions, fuel type, and temperature charts.
- “Coal SCR Scorecard” Analysis - 2011 & 2012
- Recommendation for modeling of Short Term NOx emission limits for EGUs

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Top 25 NOx Emitters for 2011 Ozone Season

State	Facility Name	Facility ID	Unit ID	Avg. NOx Rate (lb/MMBtu)	NOx (tons)
IN	Rockport	6166	MB2	0.2431	5,339
PA	Keystone	3136	2	0.3630	5,044
PA	Keystone	3136	1	0.3717	4,855
PA	Hatfield's Ferry Power Station	3179	1	0.4923	4,288
PA	Conemaugh	3118	2	0.3170	4,086
PA	Hatfield's Ferry Power Station	3179	2	0.4746	3,984
AR	White Bluff	6009	1	0.2755	3,956
PA	Conemaugh	3118	1	0.3411	3,890
PA	Brunner Island	3140	3	0.3760	3,834
AR	White Bluff	6009	2	0.2798	3,794
IN	Rockport	6166	MB1	0.2372	3,616
OH	W H Zimmer Generating Station	6019	1	0.2189	3,559
AR	Independence	6641	1	0.2591	3,302
PA	Montour	3149	1	0.3323	3,298
PA	Montour	3149	2	0.3159	3,132
PA	Hatfield's Ferry Power Station	3179	3	0.4320	2,848
MI	Monroe	1733	2	0.2851	2,811
GA	Harllee Branch	709	4	0.4076	2,806
WV	Fort Martin Power Station	3943	1	0.3514	2,660
NY	Lafarge Building Materials, Inc.	880044	41000		2,647
AR	Independence	6641	2	0.2270	2,463
KY	Paradise	1378	3	0.3865	2,431
NY	Somerset Operating Company (Kintigh)	6082	1	0.2965	2,347
OH	Avon Lake Power Plant	2836	12	0.4000	2,328
OH	Eastlake	2837	5	0.2621	2,323

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- **Red text indicates units retired or scheduled for retirement**
- **Units with a pink highlight in the Unit ID column possess SCR controls**

Top 25 NOx Emitters for 2012 Ozone Season

State	Facility Name	Facility ID	Unit ID	Avg. NOx Rate (lb/MMBtu)	NOx (tons)
MO	New Madrid Power Plant	2167	1	0.627	5,786
IN	Rockport	6166	MB1	0.221	5,001
PA	Keystone	3136	1	0.365	4,661
IN	Rockport	6166	MB2	0.224	4,215
MO	New Madrid Power Plant	2167	2	0.505	4,134
PA	Conemaugh	3118	1	0.320	3,909
PA	Montour	3149	2	0.414	3,794
PA	Conemaugh	3118	2	0.300	3,789
PA	Keystone	3136	2	0.343	3,774
PA	Hatfield's Ferry Power Station	3179	3	0.509	3,677
PA	Hatfield's Ferry Power Station	3179	1	0.486	3,601
PA	Hatfield's Ferry Power Station	3179	2	0.520	3,589
PA	Montour	3149	1	0.402	3,543
AR	White Bluff	6009	1	0.278	3,504
AR	White Bluff	6009	2	0.246	3,383
MO	Thomas Hill Energy Center	2168	MB2	0.684	3,236
AR	Independence	6641	2	0.205	2,816
WV	Fort Martin Power Station	3943	1	0.319	2,730
AL	E C Gaston	26	5	0.203	2,656
WV	Harrison Power Station	3944	3	0.308	2,628
PA	Brunner Island	3140	3	0.346	2,601
WV	Harrison Power Station	3944	1	0.313	2,569
MI	Monroe	1733	2	0.259	2,536
MI	Monroe	1733	1	0.247	2,517
OH	Killen Station	6031	2	0.351	2,426

- **Red text indicates units retired or scheduled for retirement**
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Potential EGU NOx Reductions from Retirements & Approach 1 Controls

Results of Approach 1 NOx Controls & EGU Retirements Inventory Analysis

Approach 1 applied different levels of NOx controls to EGUs in the CAMD database depending on unit type, unit size & primary fuel type

EGU retirements list

- Used multiple data sources – DOE-EIA Electric Power Monthly, newspapers, company press releases, integrated operating plans, state air agency data, etc.
- Intended to cover only coal-fired EGUs retirements but current draft includes some EGUs combusting other types of fuel

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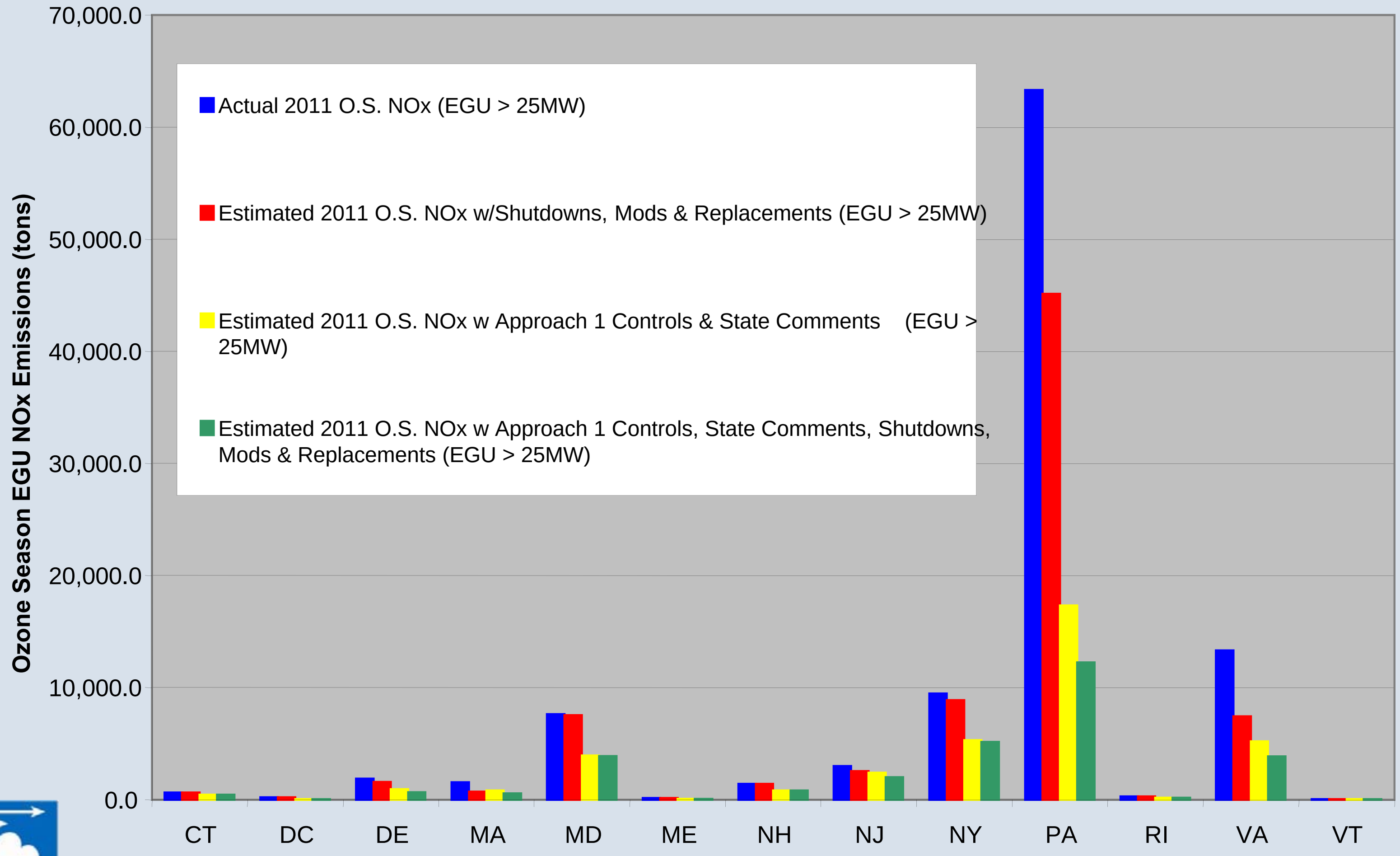
Estimated Impact of Coal-fired EGU Retirements & Approach 1 NOx Controls on Ozone Season EGU NOx Emissions

OTC States

DRAFT



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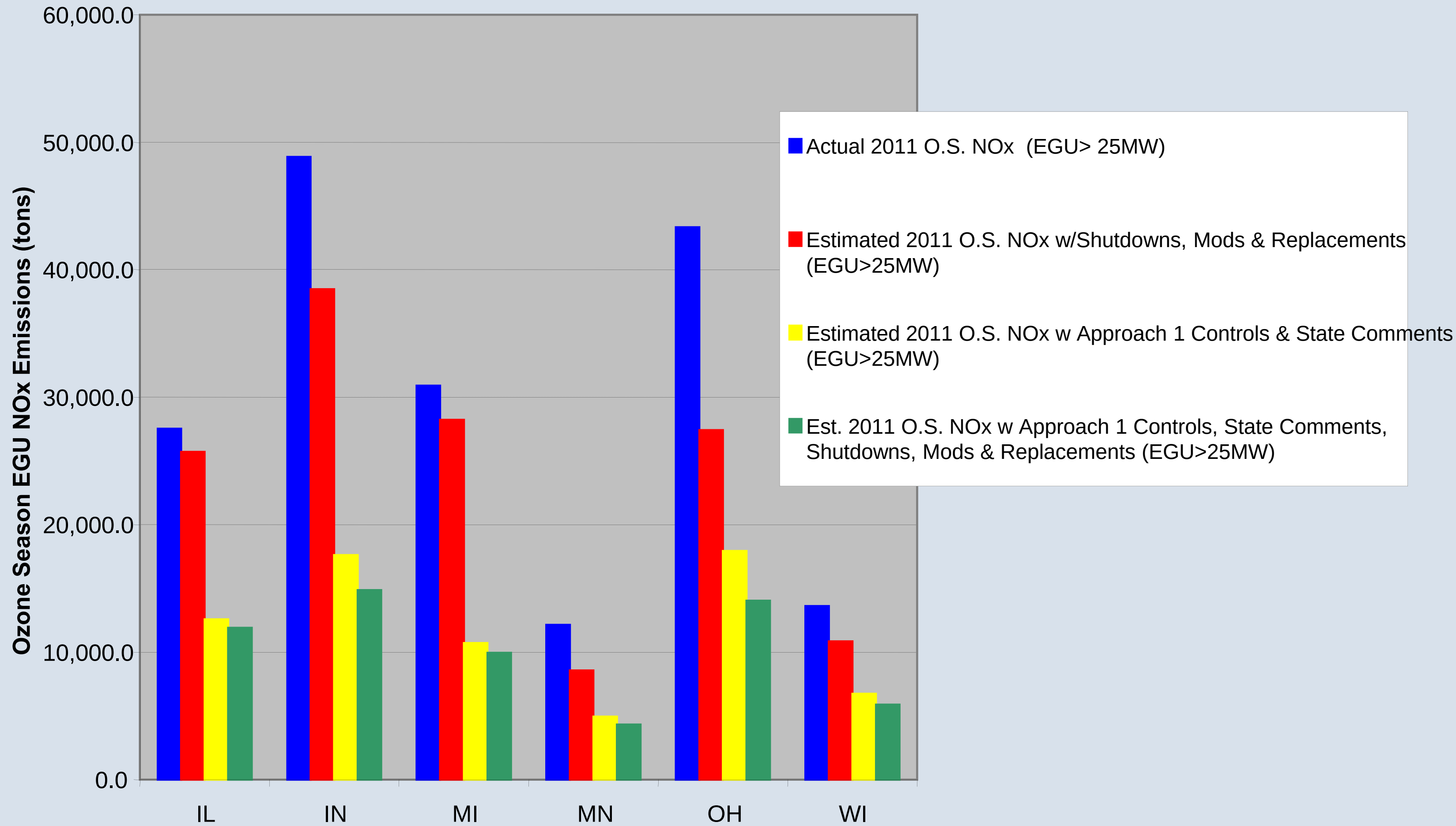
Estimated Impact of Coal-fired EGU Retirements & Approach 1 NOx Controls on Ozone Season EGU NOx Emissions

LADCO States

DRAFT



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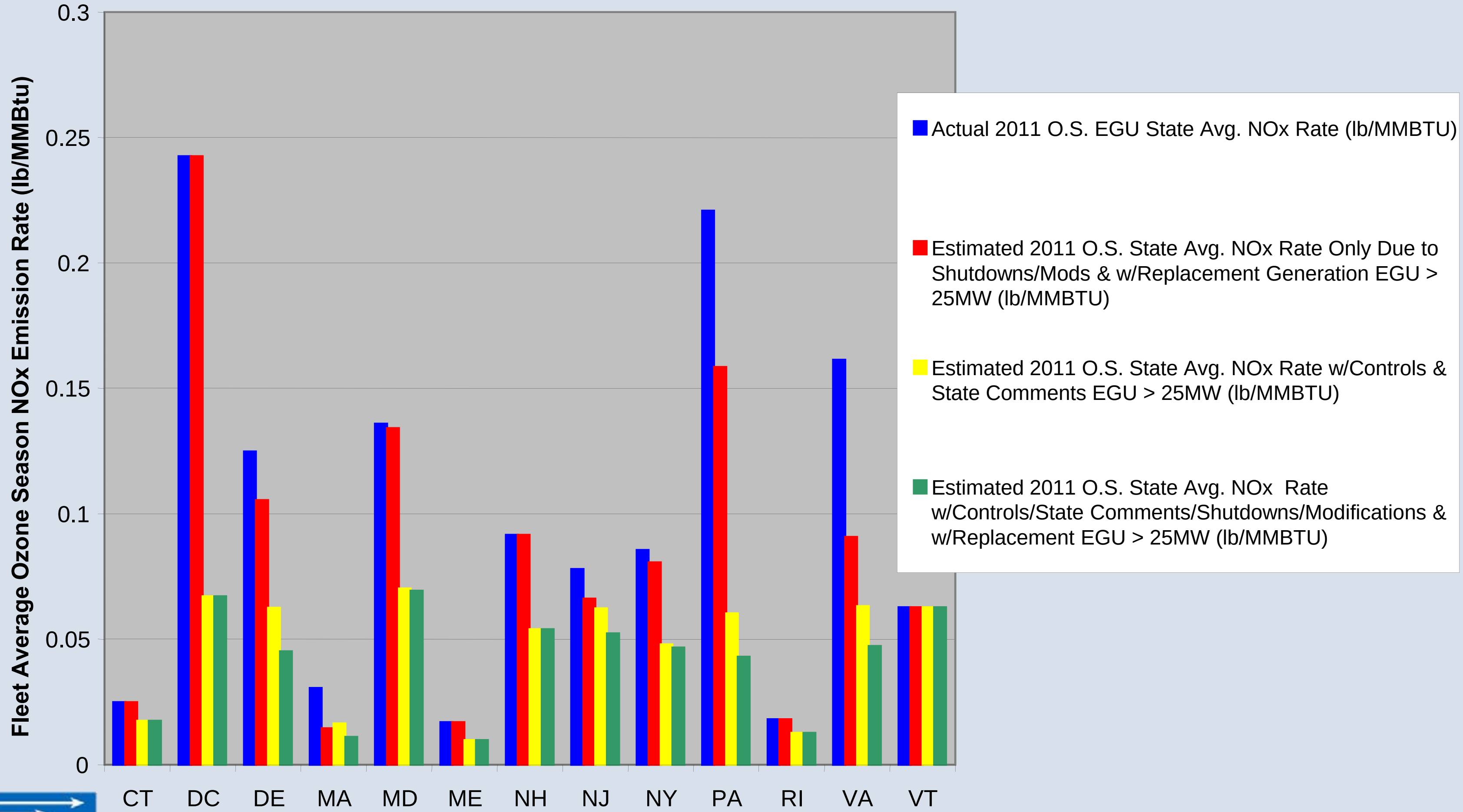
Estimated Impact of Coal-fired EGU Retirements & Approach 1 NOx Controls on Ozone Season Fleet Average NOx Emission Rates

OTC States

DRAFT



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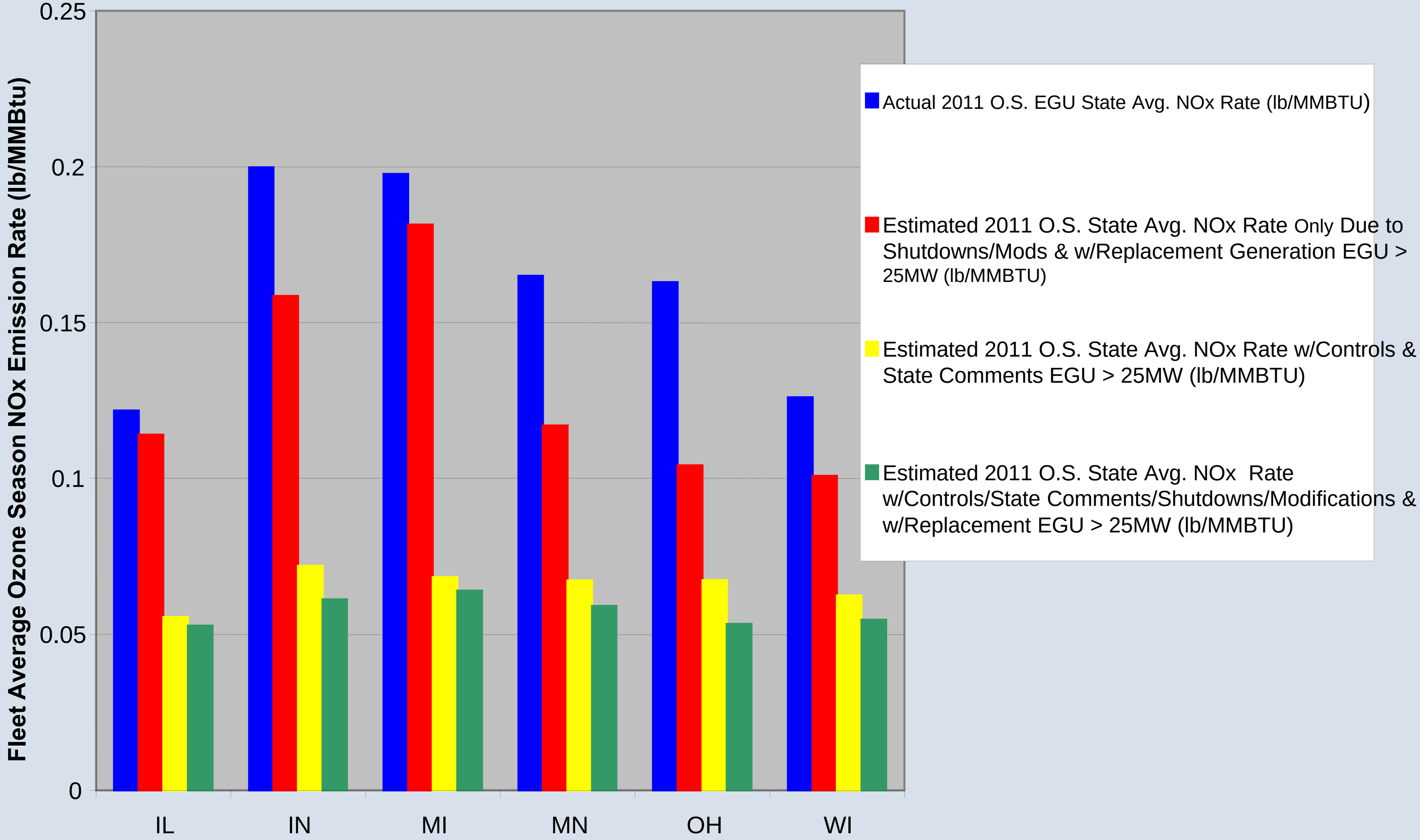
Estimate Impact of Coal-fired EGU Retirements & Approach 1 NOx Controls on Ozone Season Fleet Average EGU NOx Emission Rates

LADCO States

DRAFT



State Rules Summary
Short Term NOx Limits for EGU Boilers & Turbines

- These Short Term NOx Limits listed as "Current Thinking" not intended to reflect technological edge of NOx control capability, but rather to represent NOx control retrofit capability for much of the EGU Industry
  - Alternative compliance means may be necessary for some existing units that may not be able to achieve these NOx rate limits with RACT controls
- State rules included in analysis are from CT, DE, NH, NJ, NY & WI

  EGU boiler NOx limits in state rules – 24 hr avg. (rolling avg. or calendar day avg.)

- EGU turbine NOx limits in state rules varied from state to state (1hr avg., 24 hr avg, 30 day rolling avg.)

- For EGU boilers assumed 0.1 lb/MM Btu ≈ 1.0 lb/MWh

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State Rules Summary (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Boilers

Unit Type	Heat Input (MM Btu/hr)	Boiler Type	Current Thinking (lb/MMBtu) 24 hr. avg.	Range (lb/MMBtu) 24 hr. avg.	Range (lb/MWh)
Boiler – Solid Fuel	HI≥ 1000	Arch, Cell or CFB	0.125	0.125 - 0.150	1.25 - 1.50
		Cyclone Dry Bottom	0.150	0.125 - 0.150	1.25 - 1.50
		Cyclone Wet Bottom		0.125 - 1.40	1.25 - 14.00
		Stoker	0.150	0.08 - 0.30	0.8 - 3.00
		Tangential	0.125	0.12 - 0.38	1.2 - 3.80
		Wall	0.125	0.12 - 0.50	1.2 – 5.00

State Rules Summary (Cont'd) (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Boilers

Unit Type	Heat Input (MM Btu/hr)	Boiler Type	Current Thinking (lb/MMBtu) 24 hr. avg.	Range (lb/MMBtu) 24 hr. avg.	Range (lb/MWh)
Boiler – Solid Fuel	HI<1000	Arch or Cell CFB	0.150 0.125	0.125 - 0.150 0.125 - 0.150	1.25 - 1.5 1.25 - 1.5
		Cyclone Dry Bottom	0.150	0.125 - 0.150	1.25 - 1.5
		Cyclone Wet Bottom		0.20 - 0.92	2.0 - 9.2
		Stoker	0.150	0.125 - 0.30	1.25 - 3.0
		Tangential	0.150	0.120 - 0.38	1.2 - 3.8
		Wall	0.150	0.120 - 0.50	1.2 - 5.0

State Rules Summary (Cont'd) (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Boilers

Unit Type	Heat Input (MM Btu/hr)	Boiler Type	Current Thinking (lb/MMBtu) 24 hr. avg.	Range (lb/MMBtu) 24 hr. avg.	Range (lb/MWh)
Boiler - Gas	All	All	0.125	0.08 - 0.125	0.8 - 1.25
Boiler - Distillate Oil	All	All	0.125	0.125 - 0.15	1.25 - 1.5
Boiler – Residual Oil	All	All	0.150	0.125 - 0.20	1.25 - 2.0

State Rules Summary (Cont'd) (CT, DE, NH, NJ, NY, & WI)

Short Term NOx Limits for EGU Turbines

Unit Type	Heat Input (MM Btu/hr)	Turbine Type	Current Thinking ($ppmvd@15\%O_2$)	Range ($ppmvd@15\%O_2$)	Range (lb/MWh)
Combustion Turbine Gas Fuel	All	Simple Cycle	25	25 - 55	1.0 - 2.2
Combustion Turbine Gas Fuel	All	Combined Cycle	25	25 - 43.3	0.75 - 1.3
Combustion Turbine Oil Fuel	All	Simple Cycle	42	42 - 100	1.6 - 3.81
Combustion Turbine Oil Fuel	All	Combined Cycle	42	42 - 88	1.2 - 2.51

Next Steps for EGU Subgroup

- Finalize OTC EGU Emissions Inventory Analysis Whitepaper

- Workgroup review of results from preliminary ERTAC model runs on NOx reductions if Approach 1 controls were applied and Ozone benefits from NOx reductions due to EGU retirements

    - Prepare data for ERTAC model run on NOx reductions if Short Term NOx limits were applied

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EMF Project

What are EMF and CoST?

- **EMF** is a USEPA tool to manage and quality assure emission inventories
- **CoST** works with EMF inventories to model the effect and cost of control strategies for point, area, and mobile sources.

Why implement a regional EMF and CoST? – In-house capability:

- Annual inventory projection
- Analyze effectiveness and cost of strategies
- Project base year point & area emissions for SIP quality modeling
- Prepare SMOKE-ready input files for multiple years

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EMF IS A BOX FOR INVENTORIES

Easy access to inventories - database

Inventory management tools:

- **Inventory summary**
- **Plot sources on maps**
- **Quality assurance & documentation**
- **Analysis (HEDD, Compare etc)**
- **Projection to future years**
- **Cost and impact of control strategies (CoST Tool)**
- **Convert to modeling files**
- **Vary the time step of inventories (from annual to daily, seasonal)**

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Where are we right now?

- DONE – MARAMA & OTC provided funding.
- DONE - EMF set up on Amazon Cloud.
- Underway – MARAMA uploads 2007/2011/2018/2020 datasets
- Underway – Developing growth & control factors through 2035
- Underway - Seven training webinars for members
- Next step - EMF code modification to vary the time step of inventories (from annual to daily, episodic or seasonal)

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How are Sectors Stored in EMF

- EGU – ERTAC EGU summarized to daily
- Nonroad - Monthly
- Point, Area, MAR – Annual
- Onroad – Summarized to daily

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Distributed and Emergency Generator Inventory

- OTC pursuing strategy of using state authority to gather information on DR engines

- OTC looking into how to account for Demand Response emissions in modeling scerios

Other SAS Committee Updates

Consumer Products Rule

- OTC Sent EPA a request to adopt the OTC Consumer Products Model Rule as a National Rule
  - Available at http://www.otcair.org

AIM

- Beginning process to develop a package to present to EPA asking for the adoption of the OTC AIM Model Rule as a National Rule.

Vapor Recovery

- Continue to look at ways to improve Stage I
- Looking at Low Permeation Hoses, Dripless Nozzles, and Pressure Monitoring and Management

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Next Steps for the Committee

- Continue to evaluate EGU NOx real world emission data including daily EGU NOx emissions during ozone season episodes and HEDD days
- Use Largest Contributor analyses in ERTAC EGU modeling
- Look at ICI Boiler Emissions,
- Recommend using individual state authorities to collect data from demand response units
- Continue developing the AIM model rule to send to EPA.
- Continue to evaluate Vapor Recovery strategy options.

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Questions?

Questions for Stakeholders

1. Is there a minimum allowance price under CAIR that would serve as the right signal for running controls i.e. at what price would it make sense to run the installed controls?
2. How can daily or shorter term performance standards and seasonal emission trading work together?
3. What regulatory or non-regulatory signals are necessary to reduce the excessive start-up/shutdown cycling of the units that we are observing?
4. How could we design a trading program to assure necessary emission reductions on all days, including high electric demand days?
5. How can a system wide average for a company's units within a state be provided to optimally use units in close proximity and meet a RACT rate?

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