

OTC/MANE-VU Fall Meeting
November 14, 2013
Embassy Suites
Washington, D.C.

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



Outline

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



Charge to the Committee

LARGEST CONTRIBUTOR ANALYSIS

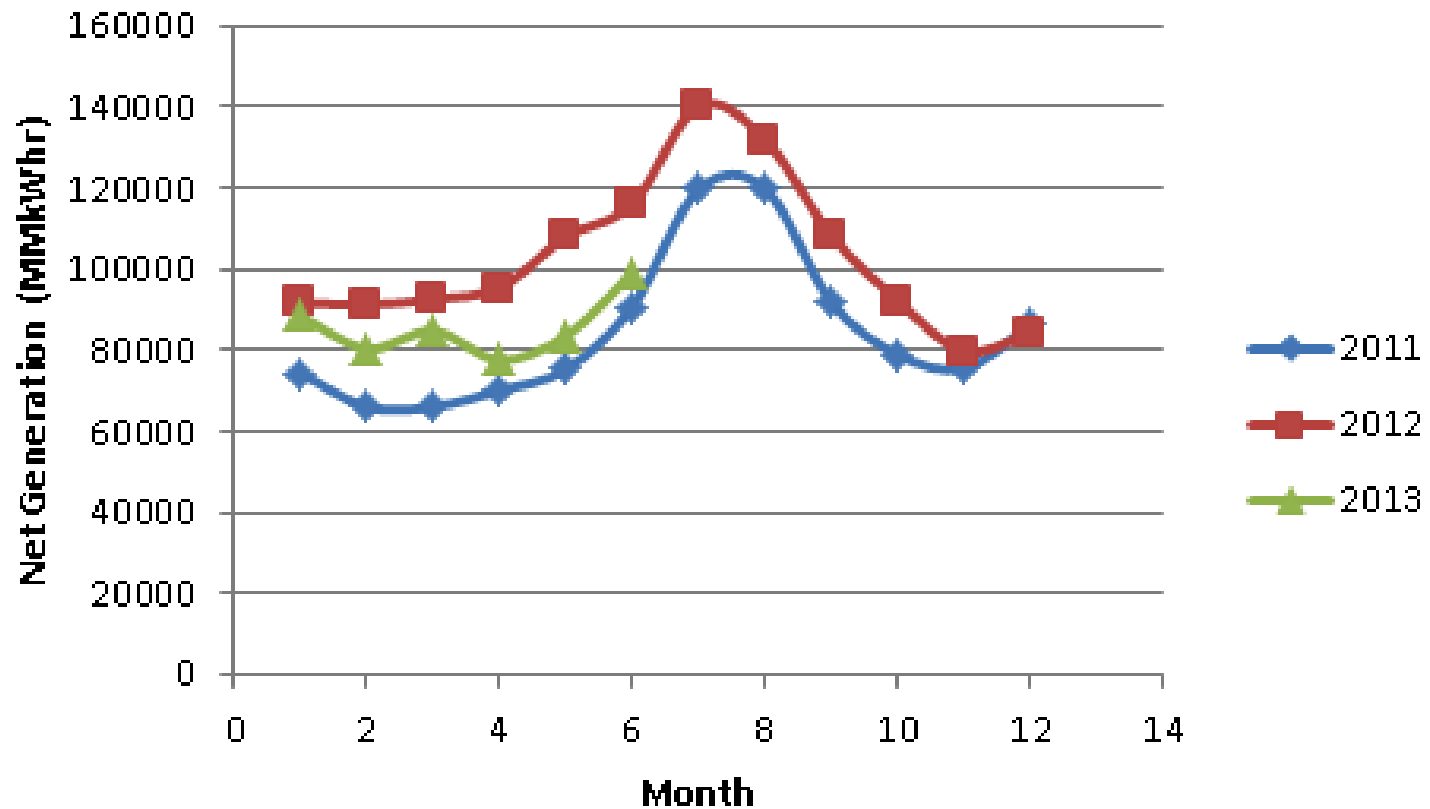
- Focused on EGUs
 - identify units with the highest emissions of NO_x;
 - evaluate real world achievable NO_x emission rates across load ranges to adjust long and short term expectations for emission reductions;
 - develop individual state EGU NO_x emission rates achievable, considering reasonable available controls.

Largest Contributor Analysis

- Coal continues to be a major source of electricity generation
- The Ranking Of Highest NOx Mass Emitting EGUs May Vary From Ozone Season To Ozone Season.
- The Ranking of Highest NOx Mass Emitting EGUs May Also Vary Day To Day And Hour To Hour
- Analysis of achievable state level ozone season EGU NOx emissions for OTC and LADCO

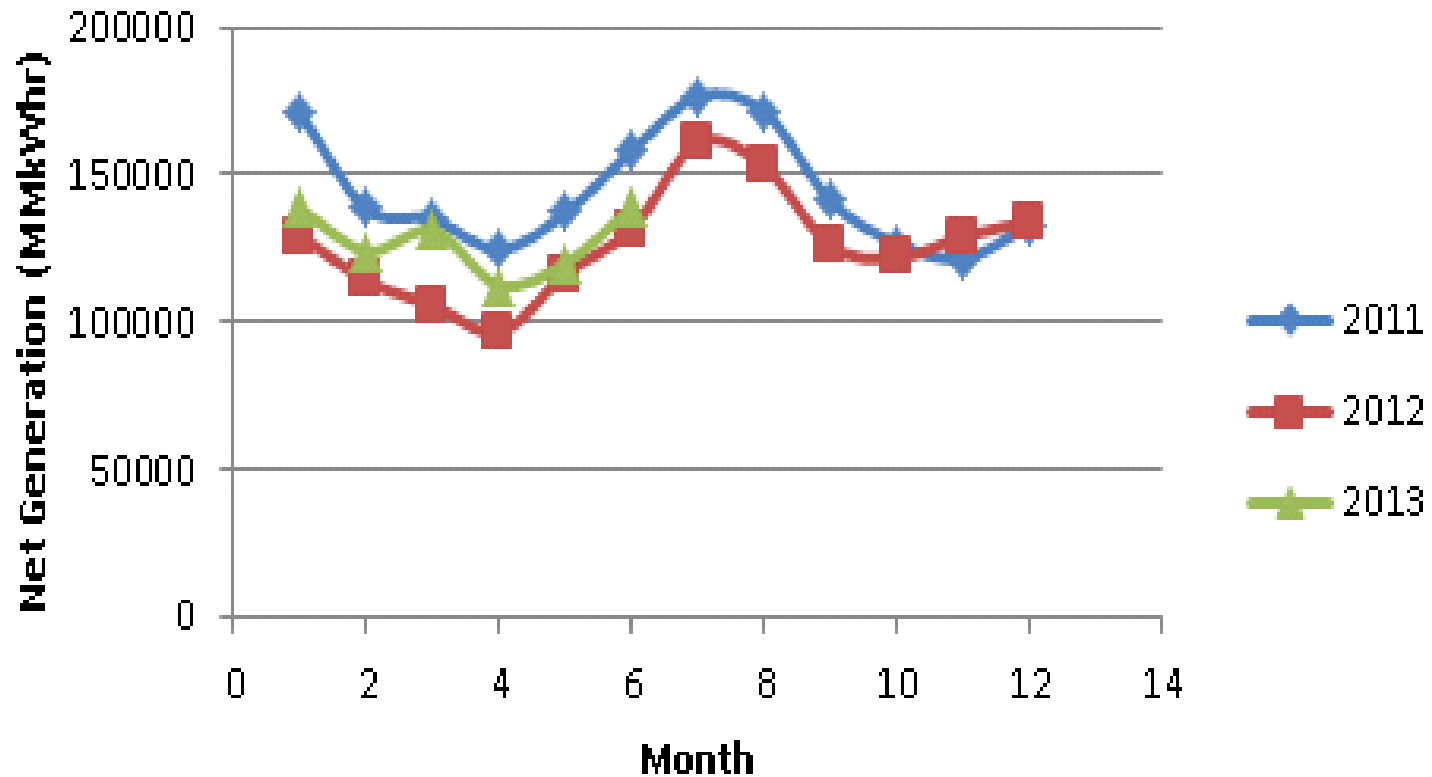
National Net Electric Generation Data from EIA

Nat Gas-Fired Net Electric Generation



National Net Electric Generation Data from EIA

Coal-Fired Net Electric Generation



Top NOx Emitters for 2011 Ozone Season

State	Facility Name/ Unit ID	SO2 (tons)	Avg. NOx Rate (lb/MMBtu)	NOx (tons)
IN	Rockport- Unit MB2	15, 215.217	0.2431	5,339
PA	Keystone- Unit 2	12, 003.958	0.3630	5,044
PA	Keystone- Unit 1	11, 465.644	0.3717	4,855
PA	Hatfield's Ferry Power Station- Unit 1	240.25	0.4923	4,288
PA	Conemaugh-Unit2	1, 741.005	0.3170	4,086
PA	Hatfield's Ferry Power Station- Unit 2	211.755	0.4746	3,984
AR	White Bluff- Unit 1	8, 193.767	0.2755	3,956
PA	Conemaugh- Unit 1	1, 581.72	0.3411	3,890
PA	Brunner Island- Unit 3	3, 941.335	0.3760	3,834
AR	White Bluff- Unit 2	7, 577.479	0.2798	3,794
IN	Rockport- Unit MB1	10, 408.895	0.2372	3,616
OH	W H Zimmer Generating Station- Unit 1	7, 574.883	0.2189	3,559
AR	Independence- Unit 1	6, 946.97	0.2591	3,302
PA	Montour- Unit 1	4, 217.97	0.3323	3,298
PA	Montour- Unit 2	4, 088.761	0.3159	3,132



- Red text indicates units retired or scheduled for retirement
- Units with a pink highlight possess SCR controls

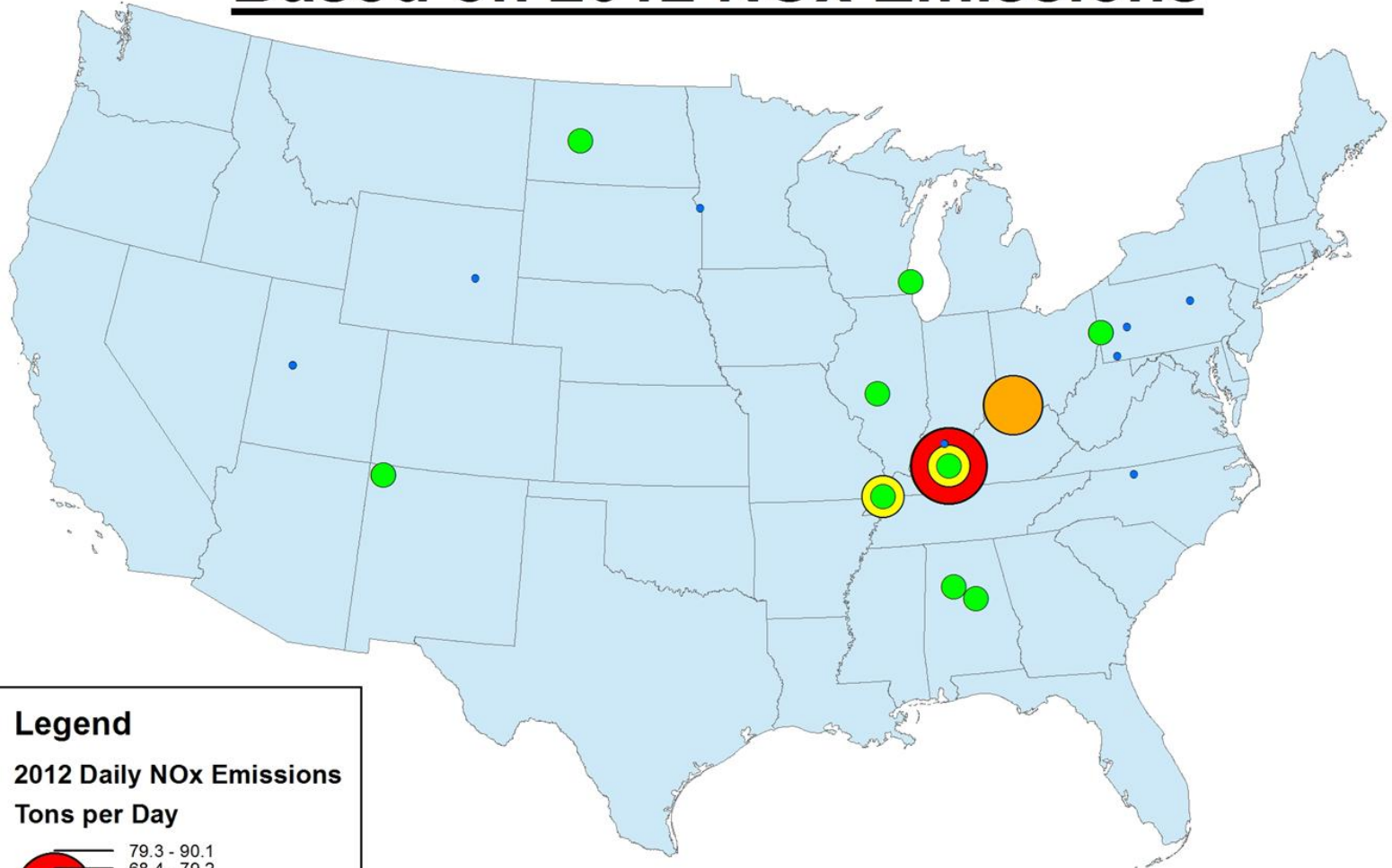
Top NOx Emitters for 2012 Ozone Season

State	Facility Name/Unit ID	SO2 (tons)	Avg. NOx Rate (lb/MMBtu)	NOx (tons)
MO	New Madrid Power Plant- Unit 1	3, 783.145	0.627	5,786
IN	Rockport- Unit MB1	13, 080.843	0.221	5,001
PA	Keystone- Unit 1	8, 325.276	0.365	4,661
IN	Rockport- Unit MB2	10, 779.121	0.224	4,215
MO	New Madrid Power Plant- Unit 2	2, 741.181	0.505	4,134
PA	Conemaugh- Unit 1	1, 476.726	0.320	3,909
PA	Montour-Unit 2	3, 832.866	0.414	3,794
PA	Conemaugh-Unit 2	1, 542.654	0.300	3,789
PA	Keystone- Unit 2	5, 821.209	0.343	3,774
PA	Hatfield's Ferry Power Station-Unit 3	646.229	0.509	3,677
PA	Hatfield's Ferry Power Station-Unit 1	511.008	0.486	3,601
PA	Hatfield's Ferry Power Station-Unit 2	537.327	0.520	3,589
PA	Montour-Unit 1	3, 524.199	0.402	3,543
AR	White Bluff-Unit 1	7, 759.429	0.278	3,504
AR	White Bluff-Unit 2	8, 209.766	0.246	3,383



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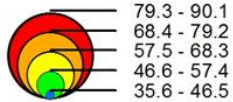
Top 25 Daily EGU NOx Emissions Based on 2012 NOx Emissions



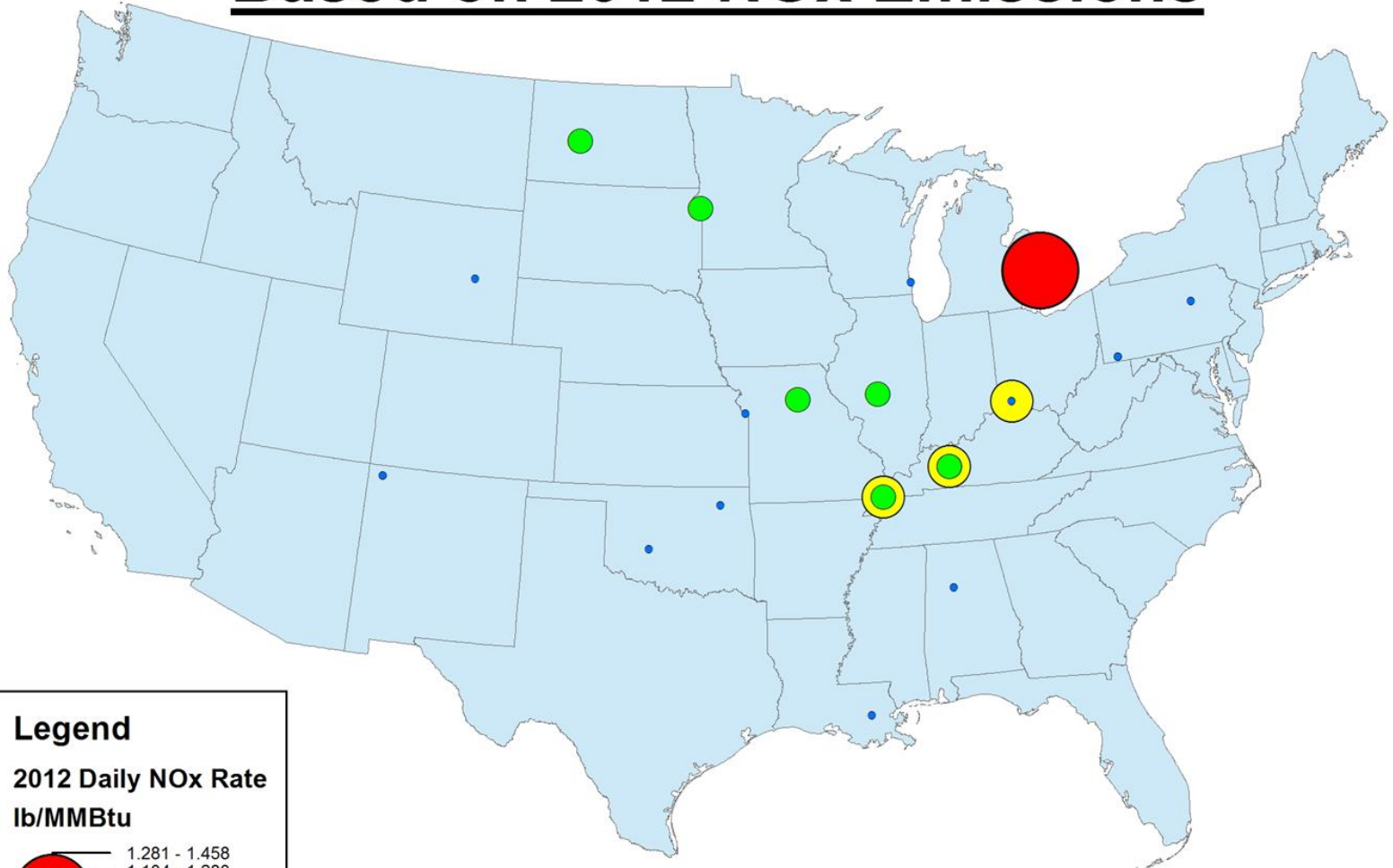
Legend

2012 Daily NOx Emissions

Tons per Day



Top 25 Daily EGU NOx Rates Based on 2012 NOx Emissions



Legend

2012 Daily NOx Rate
lb/MMBtu



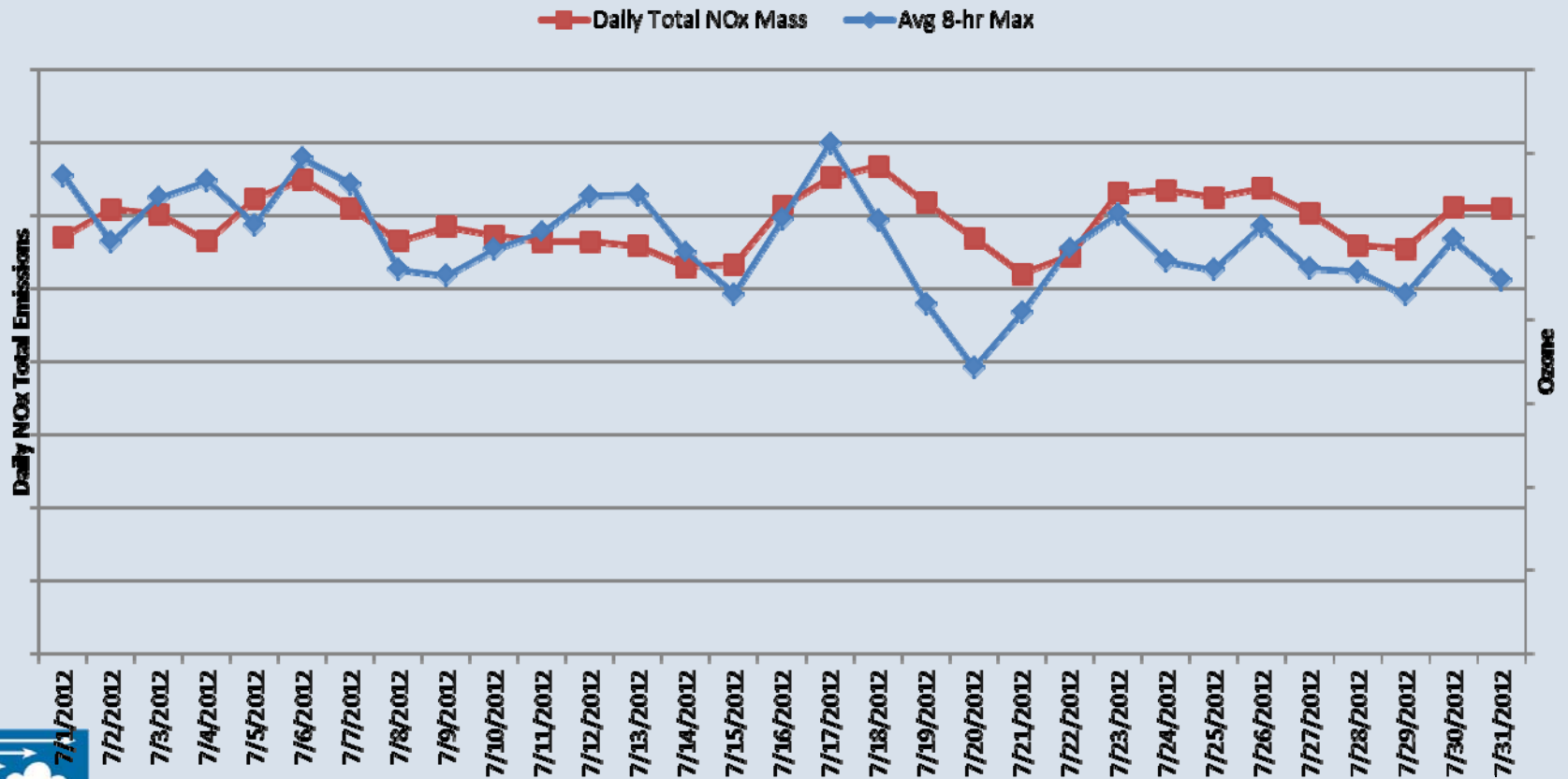
Importance of Short Term Rates

State	Facility/ Unit	2012 OS			7/18/12			7/18/12		
		NOx Mass Ranking	2012 Avg. NOx Rate (lb/MMBtu)	2012 NOx (tons)	Daily NOx Mass Ranking	Daily Avg. NOx Rate (lb/MMBtu)	7/18/1 2 NOx (tons)	Highest Hourly NOx Ranking	Highest Hour of 7/18/12 Avg. NOx Rate (lb/MMBtu)	Hour of 7/18/12 NOx (pounds)
ND	Coyote- B1	5	0.7166	4846.8	1	0.7175	41.3	4	0.7839	4099
NM	Four Corners Steam Elec Static	2	0.4707	5122.2	2	0.4849	40.9	6	0.5079	3904
IN	Rockport-MB2	8	0.224	4214.5	3	0.2462	39.6	11	0.252	3363
IN	Rockport- MB1	3	0.2207	5000.9	4	0.2462	39.0	12	0.252	3319
PA	Keystone- 1	6	0.3651	4660.6	5	0.3779	38.3	10	0.3969	3371
MO	New Madrid Power Plant- 1	9	0.5051	4134.1	6	0.6053	37.6	7	0.665	3608
SD	Big Stone- 1	7	0.6923	4397.2	7	0.7019	35.6	8	0.706	3496
AL	E C Gaston-5	34	0.2031	2655.7	8	0.3593	35.3	5	0.435	3936
KY	Paradise- 3	69	0.1663	2025.3	9	0.6916	35.2	1	1.3719	10067
MO	New Madrid Power Plant- 1	1	0.6267	5785.8	10	0.5434	34.3	9	0.6359	3493
PA	Montour- 1	19	0.4018	3542.5	11	0.4244	34.1	19	0.493	3105
PA	Keystone-2	14	0.3433	3774.4	12	0.3364	33.8	21	0.3519	2984
OH	Eastlake- 5	49	0.3777	2335.2	13	0.5226	33.7	23	0.5508	2965
PA	Hatfield's Ferry Power Station-	15	0.5085	3677.4	14	0.5415	32.3	22	0.5588	2972
PA	Hatfield's Ferry Power Station-	17	0.5197	3589.1	15	0.5675	32.3	20	0.597	3091



Total daily NOx emissions and daily ozone 8-hr max (average Regions 1 – 5) July 2012

July 2012 Average Ozone Daily 8-hr Max Reg. 1-5 and NOx Emiss.



2012 TOP 25 NOx EMITTERS IN OTC'S MODELING DOMAIN

ANNUAL EMISSIONS

1	New Madrid Power Plant 1 (MO) <u>SCR</u>
2	Rockport MB1 (IN) <u>SCR in 2017</u>
3	Rockport MB2 (IN) <u>SCR in 2019</u>
4	Keystone 1 (PA) <u>SCR</u>
5	New Madrid Power Plant 2 (MO) <u>SCR</u>
6	Conemaugh 2 (PA)
7	Hatfield's Ferry Power Station 3 (PA)*
8	Conemaugh 1 (PA)
9	Hatfield's Ferry Power Station 2 (PA)*
10	Keystone 2 (PA) <u>SCR</u>
11	Montour 2 (PA) <u>SCR</u>
12	Montour 1 (PA) <u>SCR</u>
13	White Bluff 2 (AR)
14	Hatfield's Ferry Power Station 1 (PA)*
15	White Bluff 1 (AR)
16	WH Zimmer Generating Station 1 (OH) <u>SCR</u>
17	Kincaid Station 1 (IL) <u>SCR</u>
18	Marshall 4 (NC)
19	Harrison Power Station 3 (WV) <u>SCR</u>
20	Killen Station 2 (OH) <u>SCR</u>
21	Brunner Island 3 (PA)
22	Thomas Hill Energy Centre MB2 (MO) <u>SCR</u>
23	Independence 2 (AR)
24	Fort Martin Power Station 1 (WV)
25	EC Gaston 5 (AL) <u>SCR</u>

MO, IN, PA, AR, OH, IL, NC, WV, AL

OZONE SEASON EMISSIONS

1	New Madrid Power Plant 1 (MO) <u>SCR</u>
2	Rockport MB1 (IN) <u>SCR in 2017</u>
3	Keystone 1 (PA) <u>SCR</u>
4	Rockport MB2 (IN) <u>SCR in 2019</u>
5	New Madrid Power Plant 2 (MO) <u>SCR</u>
6	Conemaugh 1 (PA)
7	Montour 2 (PA) <u>SCR</u>
8	Conemaugh 2 (PA)
9	Keystone 2 (PA) <u>SCR</u>
10	Hatfield's Ferry Power Station 3 (PA)*
11	Hatfield's Ferry Power Station 1 (PA)*
12	Hatfield's Ferry Power Station 2 (PA)*
13	Montour 1 (PA) <u>SCR</u>
14	White Bluff 1 (AR)
15	White Bluff 2 (AR)
16	Thomas Hill Energy Centre MB2 (MO) <u>SCR</u>
17	Independence 2 (AR)
18	Fort Martin Power Station 1 (WV)
19	EC Gaston 5 (AL) <u>SCR</u>
20	Harrison Power Station 3 (WV) <u>SCR</u>
21	Brunner Island 3 (PA)
22	Harrison Power Station 1 (WV) <u>SCR</u>
23	Monroe 2 (MI) <u>SCR in 2015</u>
24	Monroe 1 (MI) <u>SCR</u>
25	Killen Station 2 (OH) <u>SCR</u>

MO, IN, PA, AR, WV, AL, MI, OH

DAILY EMISSIONS (7/18/12)

1	Rockport MB2 (IN) <u>SCR in 2019</u>
2	Rockport MB1 (IN) <u>SCR in 2017</u>
3	Keystone 1 (PA) <u>SCR</u>
4	New Madrid Power Plant 2 (MO) <u>SCR</u>
5	EC Gaston 5 (AL) <u>SCR</u>
6	Paradise 3 (KY) <u>SCR</u>
7	New Madrid Power Plant 1 (MO) <u>SCR</u>
8	Montour 1 (PA) <u>SCR</u>
9	Keystone 2 (PA) <u>SCR</u>
10	Eastlake 5 (OH)
11	Hatfield's Ferry Power Station 3 (PA)*
12	Hatfield's Ferry Power Station 2 (PA)*
13	Conemaugh 2 (PA)
14	Conemaugh 1 (PA)
15	Montour 2 (PA) <u>SCR</u>
16	Brunner Island 3 (PA)
17	Hatfield's Ferry Power Station 1 (PA)*
18	Avon Lake 12 (OH)
19	WH Zimmer Generating Station 1 (OH) <u>SCR</u>
20	Cheswick 1 (PA) <u>SCR</u>
21	Marshall 4 (NC)
22	Independence 2 (AR)
23	Somerset Operating Company 1 (NY) <u>SCR</u>
24	Thomas Hill Energy Centre MB2 (MO) <u>SCR</u>
25	Conesville 5 (OH)

IN, PA, MO, AL, KY, OH, NC, AR, NY

*Units retiring in 2013

All units coal-fired for primary fuel

Top 10 units emitted 49% of Top 25 annual NOx emissions



*Units retiring in 2013

All units coal-fired for primary fuel

Top 10 units emitted 49% of Top 25 Ozone season NOx emissions

*Units retiring in 2013

All units coal-fired for primary fuel

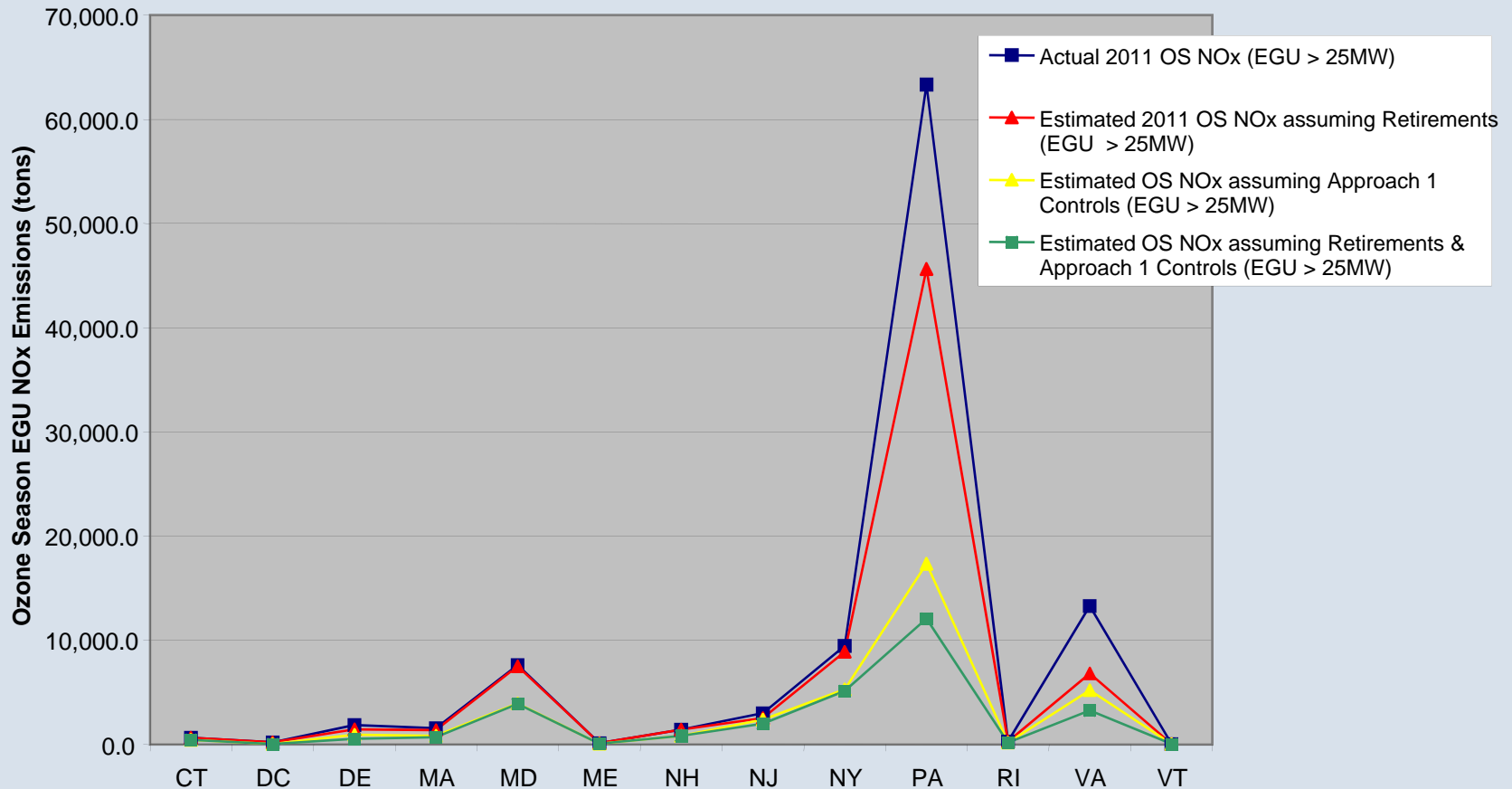
Top 10 units emitted 47% of Top 25 daily (on 7/18/12) NOx emissions

Potential EGU NO_x Reductions from Retirements & Approach 1 Controls

- Approach 1 applied different levels of NO_x 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

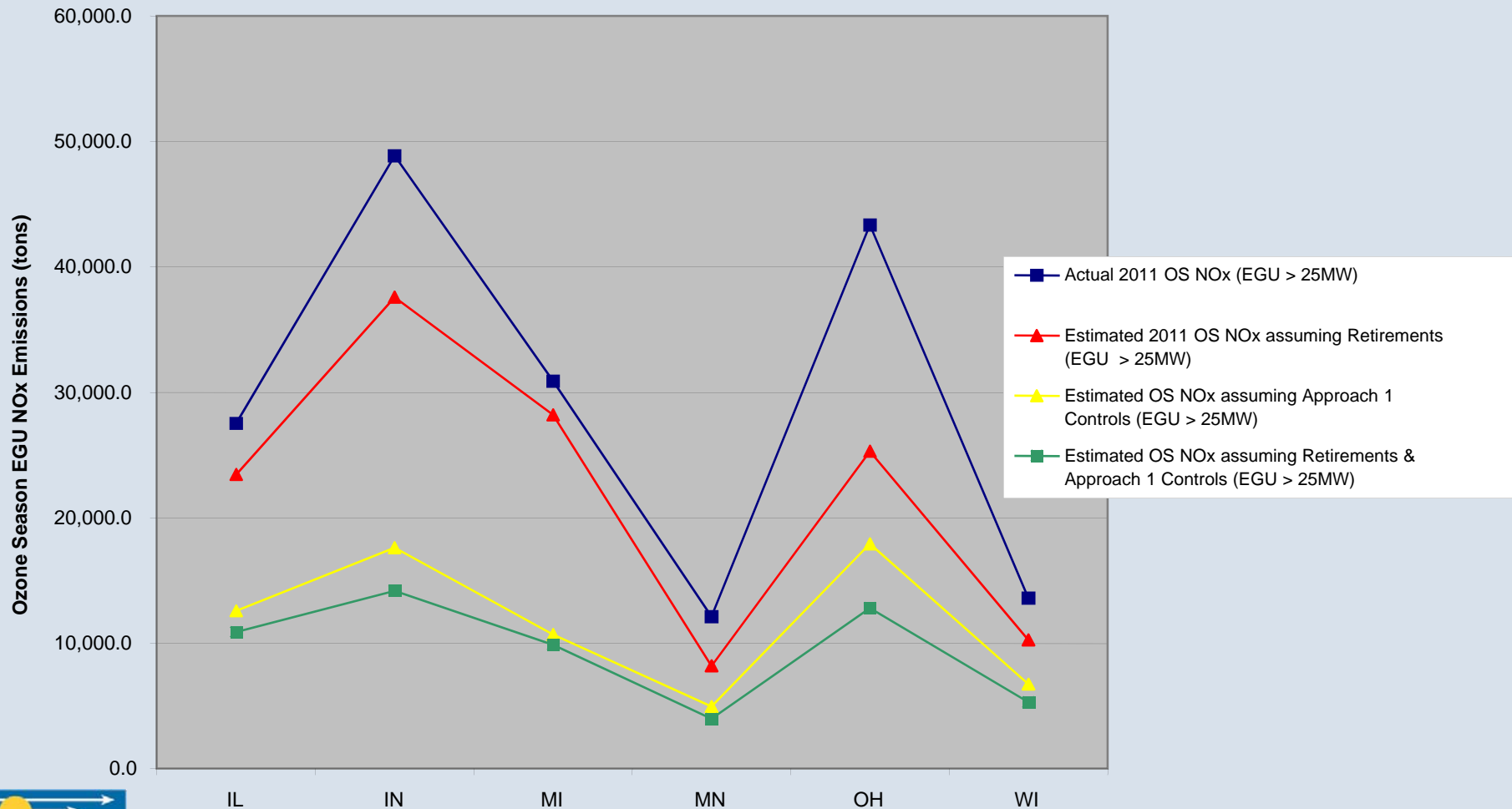
Estimated Impact of EGU Retirements and Approach 1 Controls on Ozone Season EGU NOx Emissions- OTC States

PRELIMINARY RESULTS



Estimated Impact of EGU Retirements and Approach 1 Controls on Ozone Season EGU NOx Emissions- LADCO States

PRELIMINARY RESULTS



Next Steps for EGU Subgroup

- Workgroup is preparing data in a form so the ERTAC model could be used to model different scenarios:
 - Ozone benefits from NO_x reductions due to EGU retirements
 - Ozone benefits from NO_x reductions if Approach 1 controls were applied
 - Ozone benefits from NO_x reductions if Short Term NO_x limits were applied
 - Contribution assessments for individual states before and after Approach 1 or Short Term NO_x limits were applied (CAM_x)
- White paper outlining the preliminary results from the analysis under development

Charge to the Committee

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.



Estimating daily NOX emissions due to Distributed Generation

2009 Federal Energy Regulatory Commission (FERC) study

State by state

Estimates 2019 peak load

Estimates percent of load met by Distributed Generation (DG)

FERC estimates 2% to 20% of peak met by DG in 2019

Assumptions in this estimate:

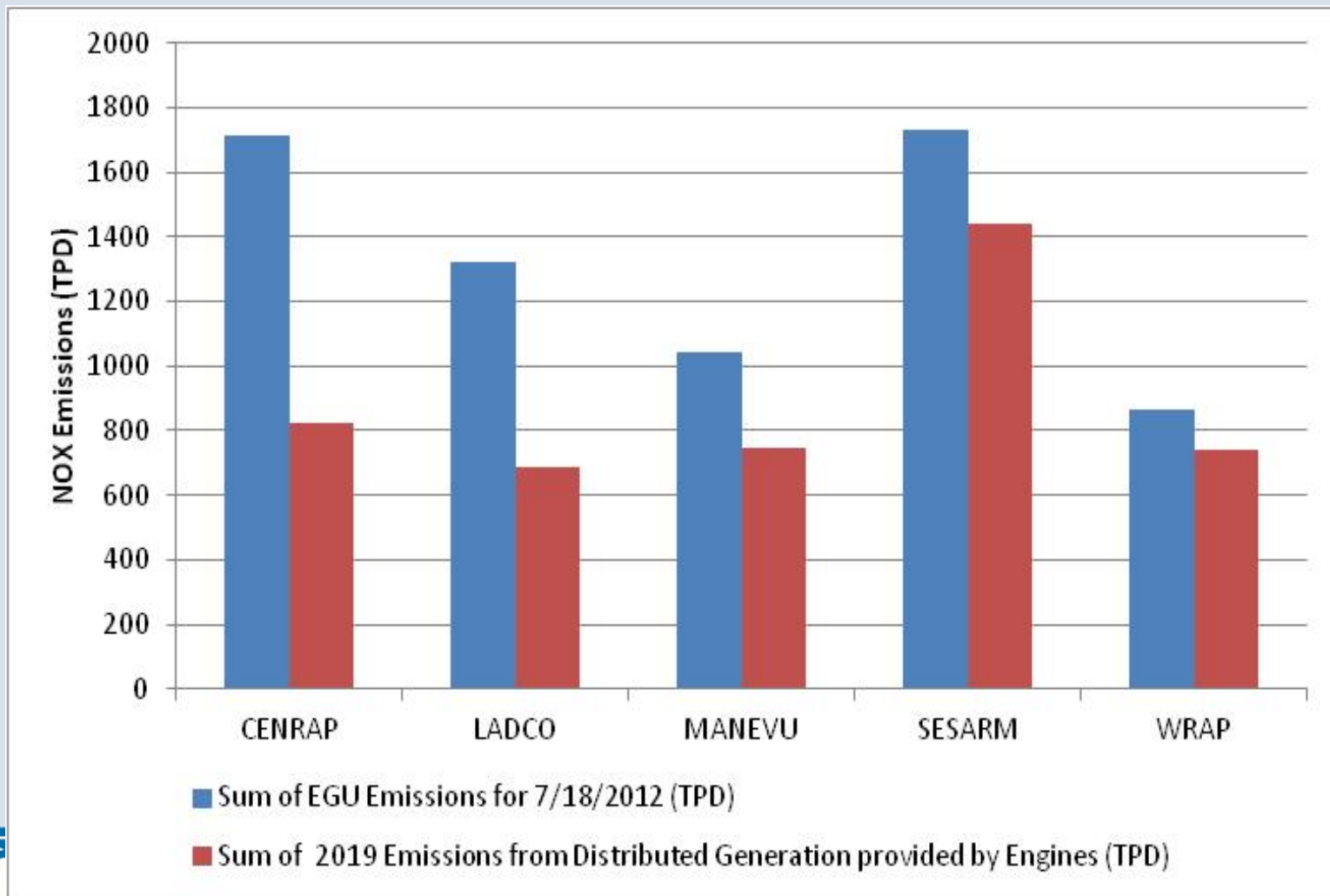
50% DG provided by Emergency Generators

Average engine emissions = Tier 1 (21.8 lb NOX/MW hr)

Operation 6 hours per day



Comparison of Daily NOX Emissions Distributed Generation vs EGU Regionally



Distributed and Emergency Generator Inventory

- RICE NESHAP – limited reconsideration
 - Timing for compliance with the ultra low sulfur diesel
 - Timing and required information for the reporting requirement
 - Conditions in for operation for up to 50 hours per calendar year in non-emergency situations as part of a financial arrangement with another entity.
 - Comments submitted on November 4, 2013 and available on the OTC website
- OTC pursuing strategy of using state authority to gather information on DR engines



Other SAS Committee Updates

Consumer Products Rule

- Draft Consumer Products resolution, asking EPA to adopt the OTC Consumer Products Package as a national rule with stakeholders support
- Estimate 183,000 tons per year VOC reduction nationally

AIM

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

Vapor Recovery

- State Update on Status of Stage II
- Continue to look at ways to improve Stage I

Building Capacity

Selected 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.
- EMF – Update code, load files & train state staff
- Develop growth and control factors

Questions?

