

Environmental Update

Peter Carney

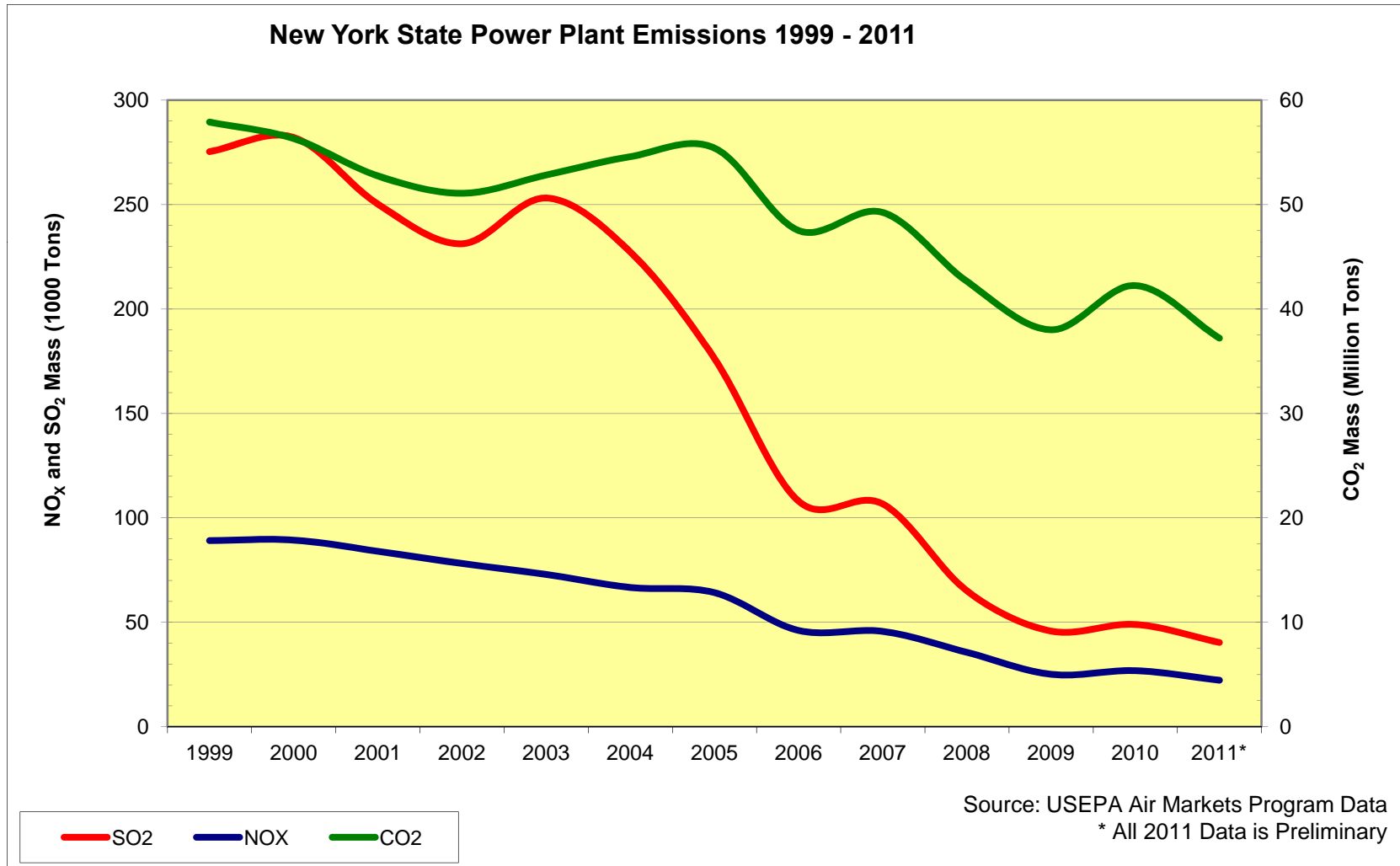
*Project Manager – Environmental Studies
New York Independent System Operator*

Electric System Planning Work Group

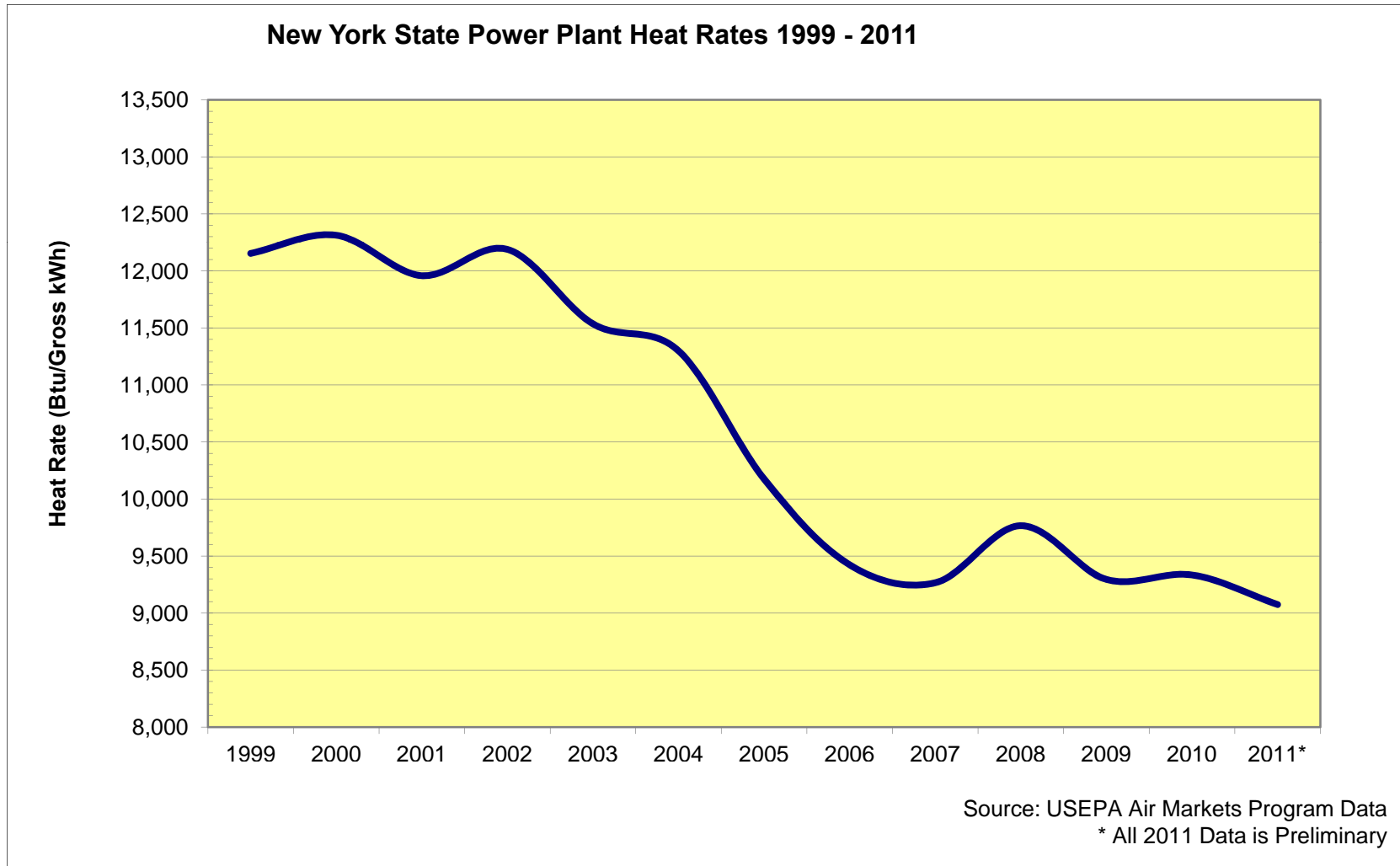
May 1, 2012

KCC

System Emission Trends



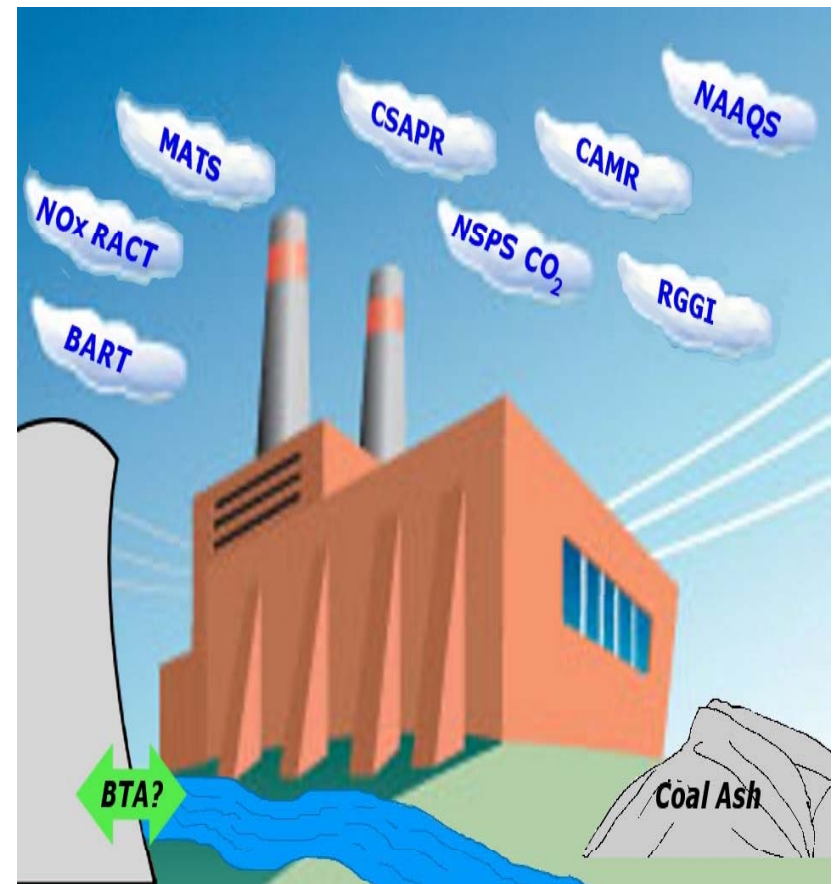
System Heat Rate Trend



Emerging Environmental Regulations

◆ Scheduled by 2015

- **BART** - *Best Available Retrofit Technology*
- **NOx RACT** — *Reasonably Available Control Technology for NOx*
- **MATS** — *Mercury and Air Toxics Standards*
- **CAMR**- *Clean Air Mercury Rule*
- **CSAPR**- *Cross State Air Pollution Rule*
- **BTA** - *Best Technology Available*
- **NSPS CO₂**- *New Source Performance Standard for CO₂*
- **NAAQS** - *National Ambient Air Quality Standards for NO₂ and SO₂*
- **RGGI** — *Lower Carbon Caps*
- **CCR**- *Classification for Coal Combustion Byproducts*



USEPA and NYSDEC BART

- ◆ **Best Available Retrofit Technology affects 8,200 MW of Capacity built between 1968 and 1977**
- ◆ **May result in reductions in emissions of SO₂, NO_x, and PM through fuel switching and emission control technology retrofits**
- ◆ **Compliance Date: July 1, 2014**
- ◆ **Compliance Plans submitted Q4 11**

NYSDEC NO_x RACT

- ◆ **NYSDEC Nitrogen Oxide Emission Limitations-Reasonably Available Control Technology**
 - *Establishes new Presumptive Limits for NO_x emission rates:*
 - Coal, oil, and gas fired boilers are lowered
 - Gas Turbines remain unchanged
 - *System Averaging*
 - Operations for system averaging will be more challenging
 - *Compliance Date: July 1, 2014*
 - *Compliance Plans Submitted 12/11*

USEPA and NYSDEC BTA

- ◆ **Clean Water Act sections 316 a & b**
- ◆ **Applies to plants that use public waters for cooling systems and is reviewed when SPDES permits are renewed**
 - *Study current levels of fish entrainment and impingement*
 - *Propose “Best Technology Available”*
 - *This may mean conversion to closed cycle cooling systems*
 - *The requirement for conversions may lead to unplanned retirements*

Cross State Air Pollution Rule

- ◆ **USEPA Proposed Clean Air Transport Rule (CATR) is now finalized as the Cross State Air Pollution Rule (CSAPR)**
 - *Limits SO₂ and NO_x emissions in 28 Eastern States*
 - DE and New England are exempt
 - *Provides for limited interstate trading of emission allowances*
 - Up to 18% / 21% of State Budget is allowable, however other considerations may prevail
 - *Limits start Jan. 2012 * Stayed by Court*

CSAPR Budget Allocations

New York State [1] Emission Allocations under the Cross State Air Pollution Rule				
	2012 SO2	2014 SO2	Annual NOX	Ozone Season NOX
A Allocation for Units Proposed to be In-Service	28,395	21,301	17,342	8,318
B Retired Unit [2] + Non-EGU Allocations [3] + Miscellaneous [4]	7,175	5,704	3,946	1,844
C New Unit Set-Aside [5]	726	551	434	207
D Total Allocation (A+B+C)	36,296	27,556	21,722	10,369
E Trading Variability for 2014 18% Annual, 21% Ozone Season	N/A	4,960	3,910	2,177
F 2014 Assurance Level (D+E)	N/A	32,516	25,632	12,546
Historic Emissions				
G 2011 Emissions from Units Proposed to be In-Service	34,512		18,980	9,379
H 2011 "New Unit" Emissions [5]	11		134	58

[1] Linden Cogeneration Facility is not included.

[2] Retired Units Include: Poletti, Project Orange, Greenidge, Westover, Ogdensburg Cogen, Astoria Generating ST2 and 4, Glenwood ST 4 and 5, Far Rockaway ST4, and Dunkirk 1-4

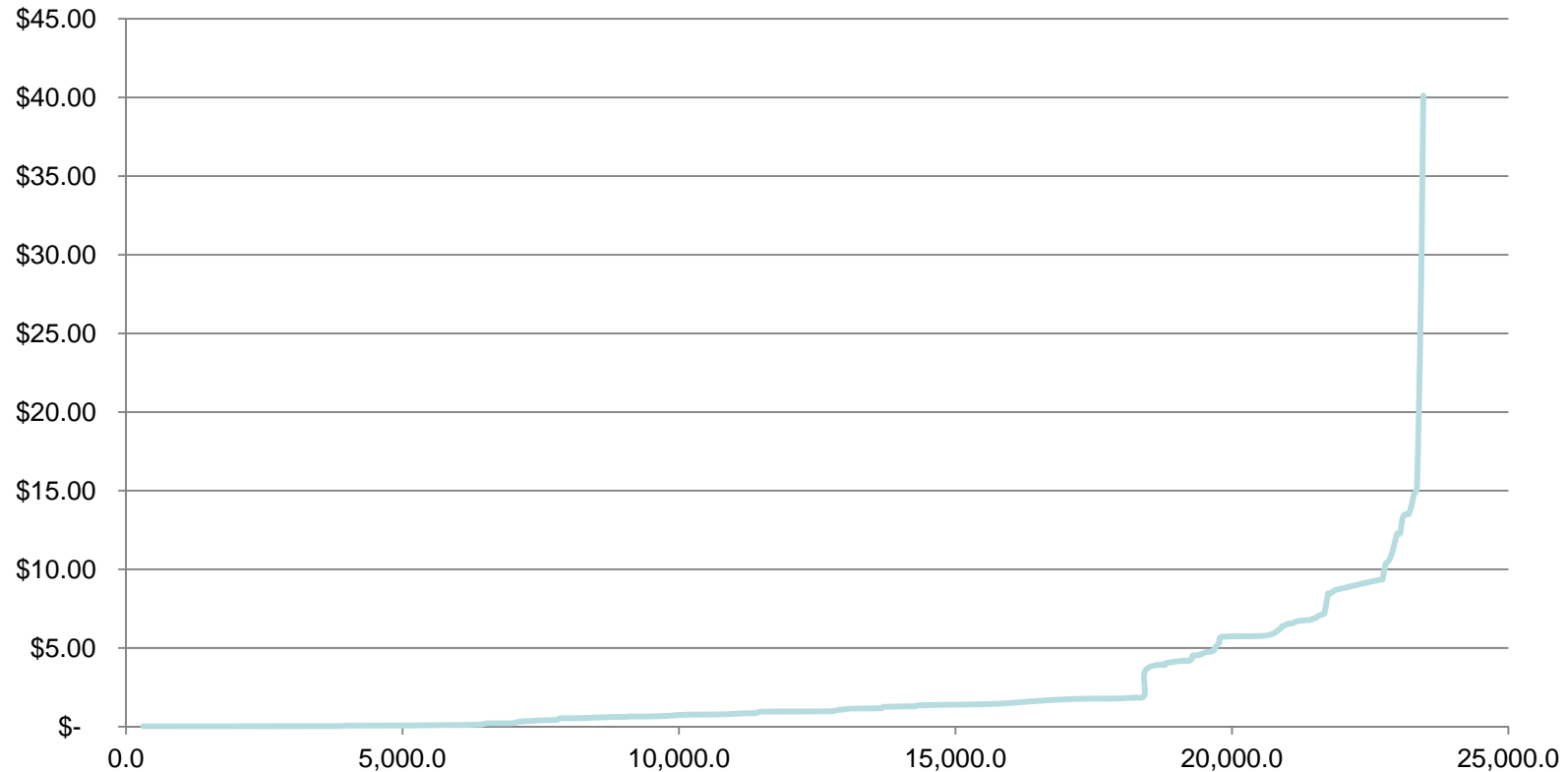
[3] Three (3) Consolidated Edison Steam System Boilers were given allocations.

[4] EPA calculation and rounding error.

[5] New Unit allocations will be given to: Empire Generating and SCS Astoria II. Any remaining new unit set aside will be reallocated among existing generators.

Allowance Price Bid Stack Adders for Affected Units

USEPA Allowance Price Estimated Emission Costs (\$/MWh) vs. Cumulative Summer Capacity



Mercury and Air Toxics Standards (MATS)

- ◆ **Establishes limits for the emission of Mercury, Acid Gases, and Non-Mercury Toxic Metals from Coal and Oil Fired Electric Generating Units**
- ◆ **Existing NYSDEC Clean Air Mercury Rule for Coal EGU is more restrictive than MATS in 2015**
- ◆ **Effective Q1 2015 + 1yr.(for most) + 1yr. for Reliability Critical Units**

MATS Applicability

- ◆ **Coal-fired EGU**

- *> 25 MW*
- *> 10% average annual heat input from coal during 3 consecutive years or*
- *> 15% annual heat input from coal during one year*

- ◆ **Oil-fired EGU**

- *Not coal fired*
- *> 25 MW*
- *> 10% average annual heat input from oil during 3 consecutive years or*
- *> 15% annual heat input during one year*

1100 Coal and 300 Oil EGUs MATS Affected

NYCA Affected Units:

Coal

16 units

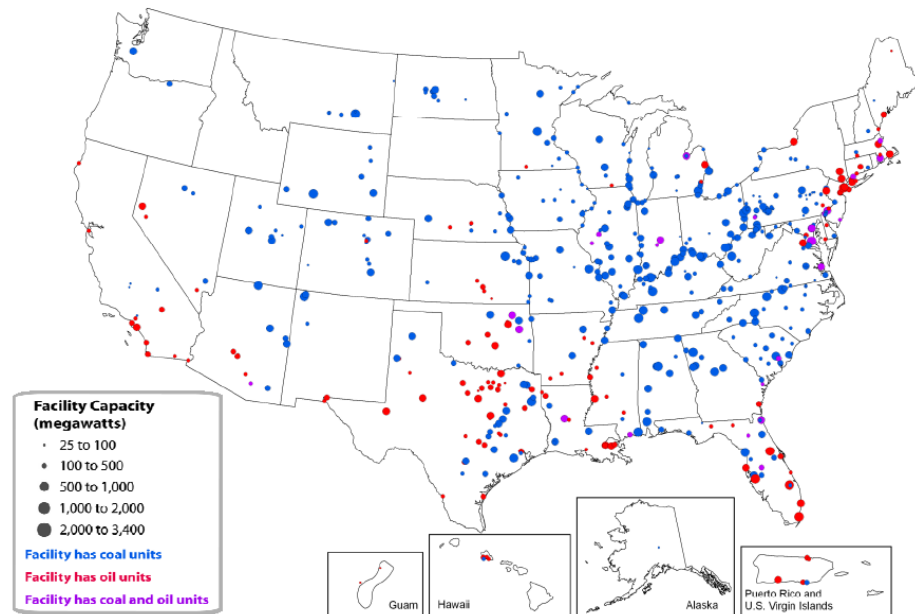
2650 MW

Oil/Gas

31 units

11650 MW

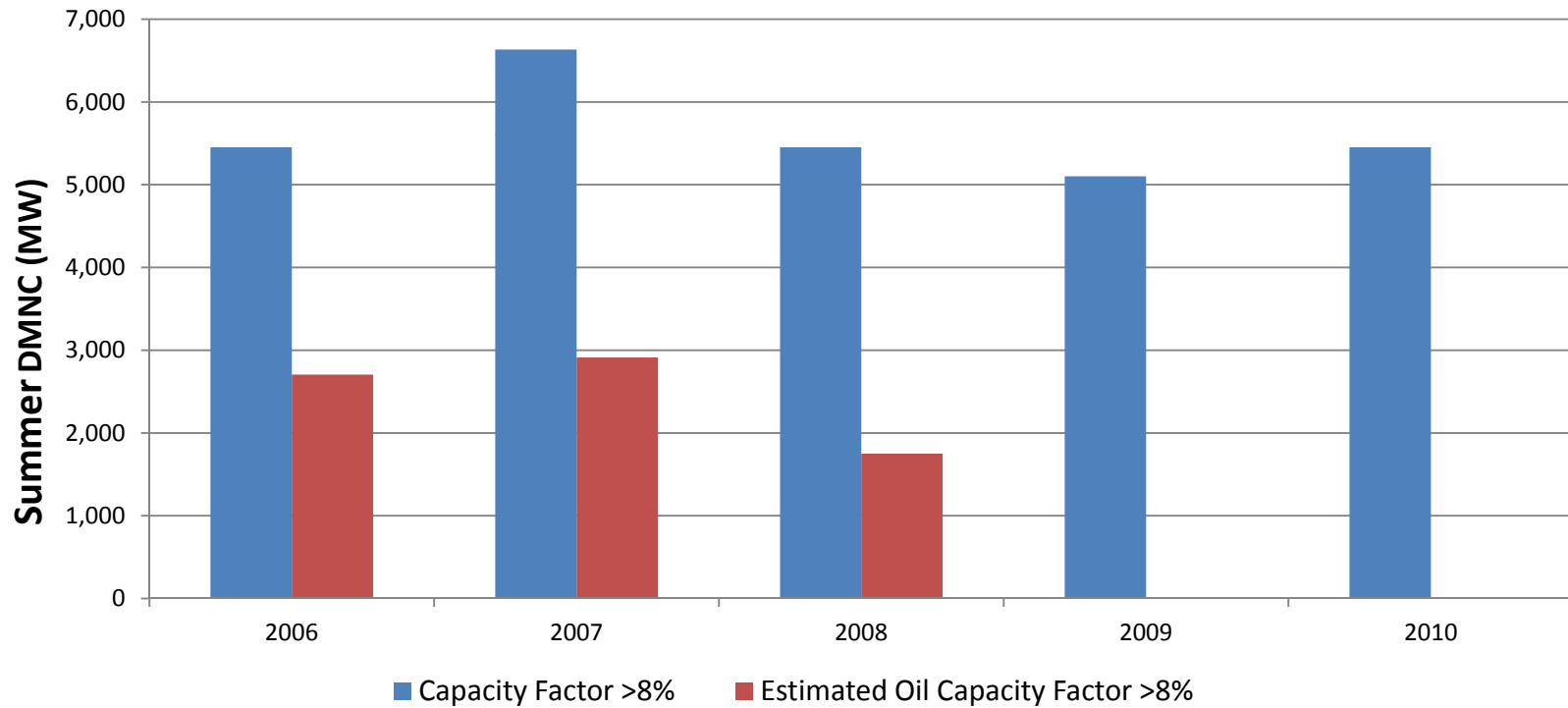
Location of Coal and Oil Power Plants



Source: National Electric Energy Data System (NEEDS 4.10 MATS) (EPA, December 2011) and EPA's Information Collection Request (ICR) for New and Existing Coal- And Oil-Fired Electric Utility Stream Generation Units (2010)

Limited Use Oil-fired EGU Subcategory

MATS NYCA Gas/Oil Capacity



Emission Limits

Existing Coal-fired EGU

	Filterable PM #/mmBTU	Non-Hg Metals #/mmBTU	HCl #/mmBTU	SO2 #/mmBTU	Hg #/TBTU
Limit	0.03		0.002		1.2
Alt. Limit		0.00005		0.2	

Existing Oil-fired EGU

	Filterable PM #/mmBTU	HAP Metals #/mmBTU	HCl #/mmBTU	Fuel Moisture	HF #/mmBTU	Fuel Moisture
Limit	0.03		0.002		0.0004	
AltLimit		0.0008		1%		1%

Compliance is based on 30 day rolling averages or quarterly stack tests.

Output limits are based on 10,000 BTU/kwh heat rate equivalence.

USEPA Cost Impacts

- ◆ **Cost are estimated beyond the costs for CSAPR**
- ◆ **USEPA projects a \$0.003/kwh increase in retail prices in NY**
 - *2.2% increase beyond costs of CSAPR*
 - *\$588 Mil/yr.*
- ◆ **Annualized retrofit costs**
 - *Oil-fired units*
 - **3117 MW**
 - **\$33 Mil/yr**

New Source Performance Standards for CO₂

Proposed New Source Performance Standards for Carbon Dioxide

		NYSDEC		EPA
		Input Based [lb CO ₂ / mmBtu]	Output Based [lb CO ₂ / MWh]	Output Based [lb CO ₂ / mmBtu]
Boilers	Oil/Gas	120	925	1,000
	Coal			1,800*
Combustion Turbines	Combined Cycle	120	925	1,000
	Simple Cycle	160	1,450	N/A
Internal Combustion Engines	Gas Only	120	925	N/A
	Oil/Gas	160	1,450	

* Decreases to 600 [lb CO₂ / mmBtu] after the first 10 Years

National Ambient Air Quality Standards

◆ **SO₂**

- ***New Standard requires hourly modeling***
 - Preliminary modeling results indicate multiple plants with exceedences which is in conflict with actual measurements
 - 2015 SIP revision possible

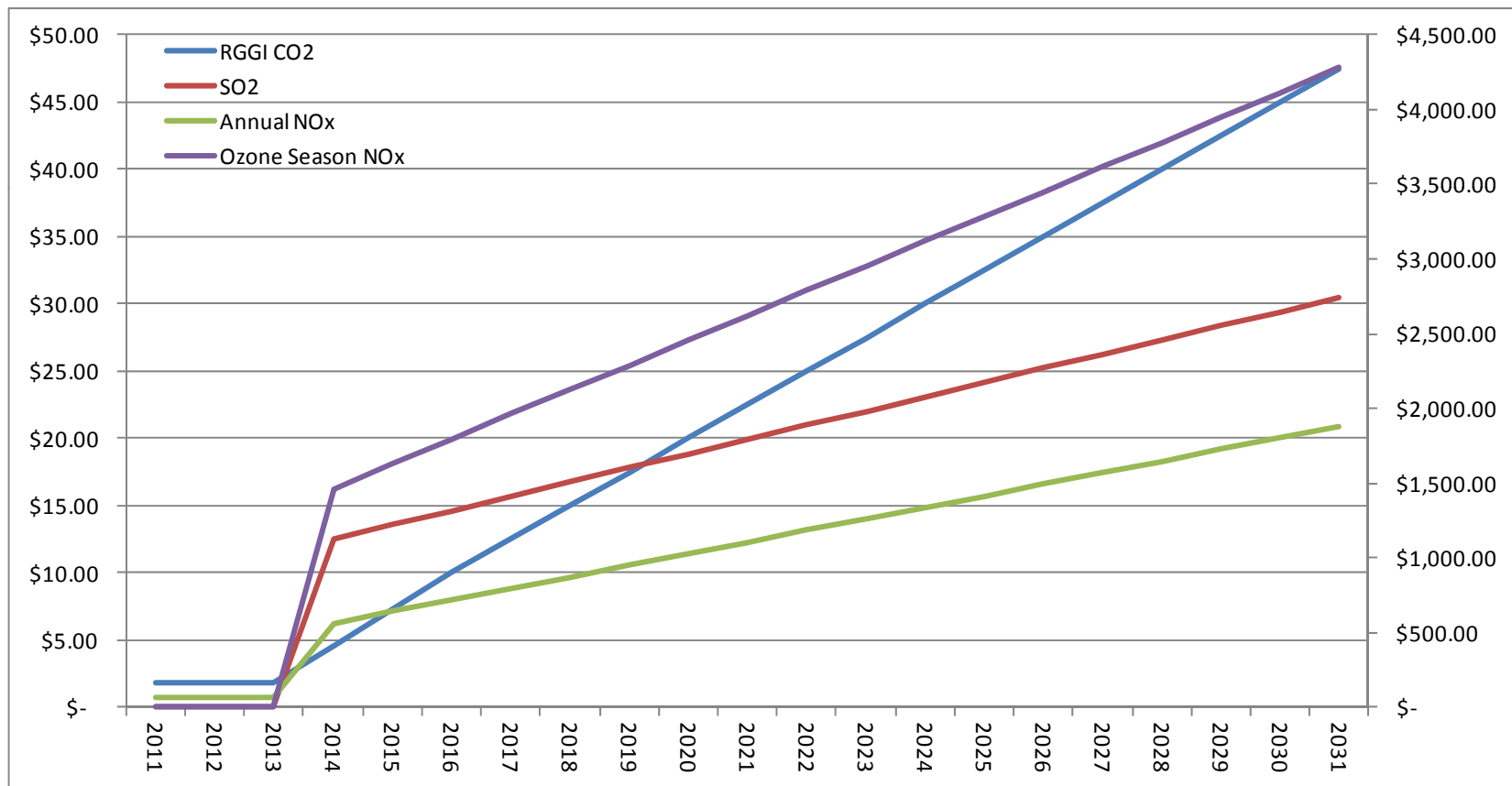
◆ **Ozone**

- ***2015 next scheduled review of the standard***

Regional Greenhouse Gas Initiative

- ◆ **First Control Period Complete with \approx 1 yr. surplus of unsold allowances**
 - *New Jersey Withdraws*
 - *NY,CT,DE,MA,RI,VT Eliminate 72% of unsold allowances*
- ◆ **2011-2012 Program Evaluation**
 - *Cap reduction proposals 106-120 Mil.TPY*
 - *Cost Containment Reserve \$5-\$15*
 - *Movement towards coordination with CA?*
- ◆ **Implement program changes in this control period (2013 or 2014?)**

Allowance Prices



Cooling Water Discharges

- ◆ **USEPA 316 b**

- *Focused on plants > 125 MGD*
- *July 12 2012 Final Rule*
- *Up to 8 yr. implementation period*

- ◆ **NYSDEC BTA**

- *Plants > 20 MGD*
- *Performance Goal = Wet Closed Cycle*
- *Focal point of Indian Point License Renewal*

The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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