CSAPR and EPA Regulations Impacting Louisiana Power Generation

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Rapidly Changing Regulations

Electric Industry Environmental Regulations Create Uncertainty for Coal

National Ambient Air Quality Standards (NAAQS)

- Sets acceptable levels for six criteria pollutants (carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, sulfur dioxide).
- A network of 4,000 State and Local Air Monitoring Stations is used to determine if geographic areas are meeting or exceeding the NAAQS.

Transport Rule (now CSAPR) [proposed]

- Issued to replace the Clean Air Interstate Rule ("CAIR") and its predecessor the Clean Air Transport Rule ("CATR"). Requires 31 states (and D.C.) to improve air quality by reducing power plant emissions (SO2 and NOX) that contribute to ozone and fine particulate pollution in other states (some annual, some on ozone season only).
- By 2014, the rule and other state and EPA actions would reduce power plant SO2 emissions by 80% over 2005 levels. Power plant NOx emissions would drop by 58%.

Utility Maximum Achievable Control Technology (MACT) [to be proposed]

- EPA must set emission limits for hazardous air pollutants. The rule is expected to replace the Clean Air Mercury Rule ("CAMR") and add standards for lead, arsenic, acid gases, dioxins and furans.

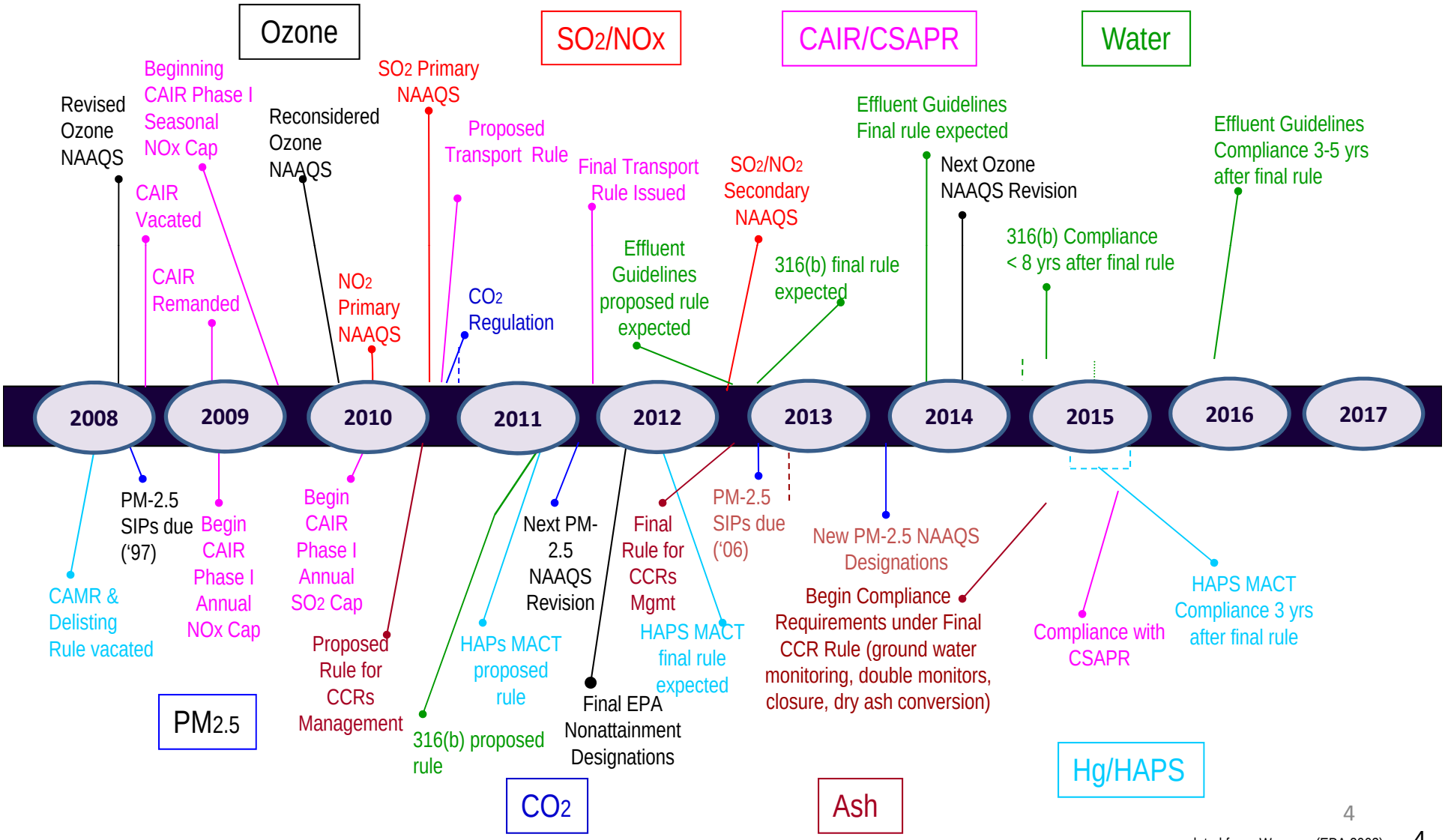
Coal Combustion Residuals (CCR) [proposed]

- Would establish, for the first time under the Resource Conservation and Recovery Act ("RCRA") requirements for the proper disposal of coal ash generated by coal combustion at electric power plants.

Power Plant Cooling Water Intake Structures Rule

- Section 316(b) of the Clean Water Act is intended to address environmental impacts from cooling water intake to and discharge from power plant cooling systems. Requires that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

Electric Industry Environmental Regulations Create Uncertainty for Coal

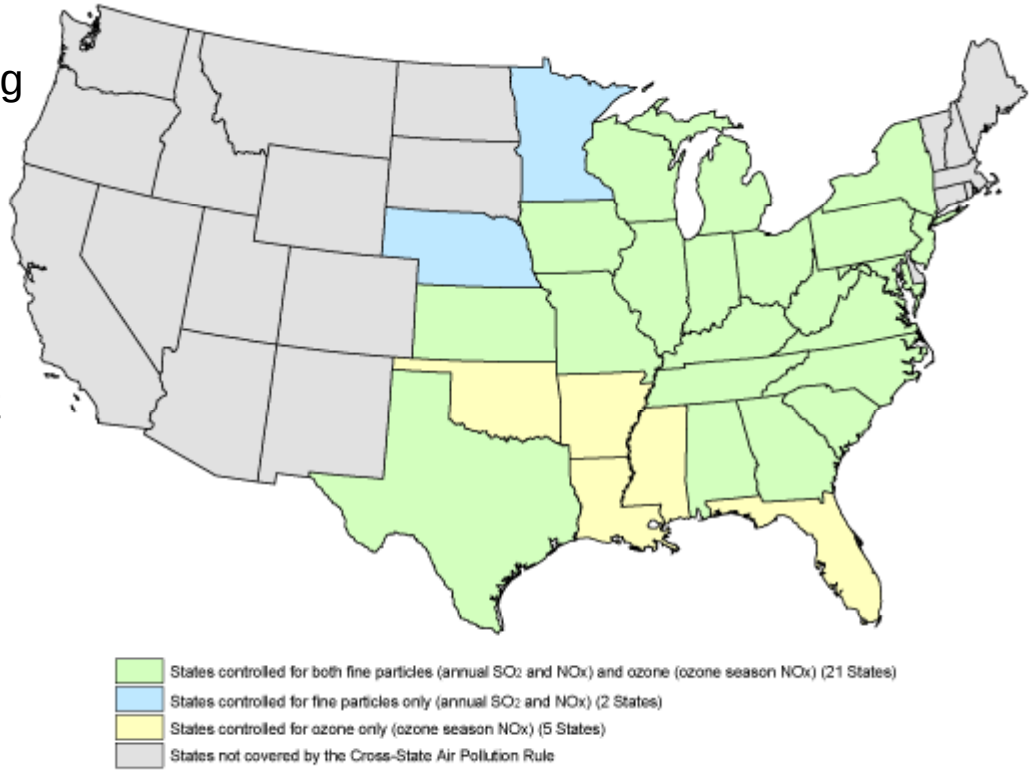


-- updated from Wegman (EPA 2003)

Cross State Air Pollution Rule (CSAPR)

CSAPR at a Glance

- The Cross-State Air Pollution Rule ("CSAPR") was finalized July 6, 2011.
- Requires 27 states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states.
- This rule replaces EPA's 2005 Clean Air Interstate Rule (CAIR). Purpose is to continue the reduction in acid rain emissions started under CAAA and reduce NOx emissions that can lead to ozone-related air quality problems. Both are/were designed to increase air quality and reduce hazards to human health.
- Emission reductions will take effect starting January 1, 2012 for SO2 and annual NOx reductions, and May 1, 2012 for ozone season NOX reductions.
- By 2014, combined with other final state and EPA actions, the CSAPR will reduce power plant SO2 emissions by 73 percent and NOx emissions by 54 percent from 2005 levels in the CSAPR region.
- EPA estimates this rule will cost $800 million annually, in addition to the $1.6 billion per year in capital investments already under way as a result of CAIR



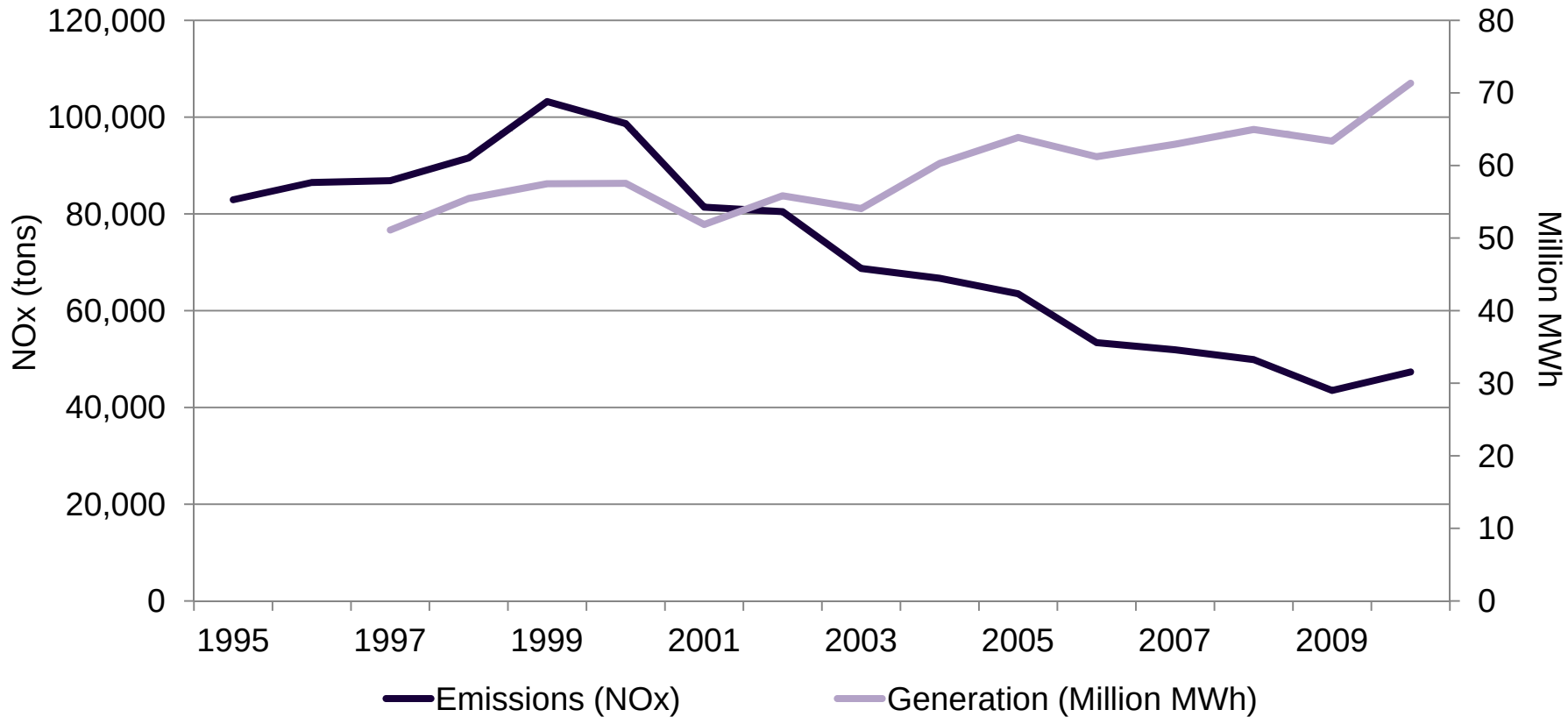
CSAPR Proposed Reductions

	Emissions in 2010 (tons NOx)	Emission Budget 2012-2013 (tons NOx)	Emissions Over or (Under) Budget (tons NOx)	Percent Change (%)
Alabama	27,849	31,746	3,897	14%
Arkansas	17,921	15,037	(2,884)	-16%
Florida	33,334	27,825	(5,509)	-17%
Georgia	26,790	27,944	1,154	4%
Illinois	21,371	21,208	(163)	-1%
Indiana	49,159	46,876	(2,283)	-5%
Kentucky	39,065	36,167	(2,898)	-7%
Louisiana	**23,172**	**13,432**	**(9,740)**	**-42%**
Maryland	9,428	7,179	(2,249)	-24%
Mississippi	16,089	10,160	(5,929)	-37%
New Jersey	5,192	3,382	(1,810)	-35%
New York	12,887	8,331	(4,556)	-35%
North Carolina	24,661	22,168	(2,493)	-10%
Ohio	47,582	40,063	(7,519)	-16%
Pennsylvania	58,211	52,201	(6,010)	-10%
South Carolina	13,769	13,909	140	1%
Tennessee	14,667	14,908	241	2%
Texas	68,446	63,043	(5,403)	-8%
Virginia	18,311	14,452	(3,859)	-21%
West Virginia	24,206	25,283	1,077	4%
Total	**552,110**	**495,314**	**(56,796)**	**-10%**

Source: U.S. EPA.

Historic Generation & Emissions

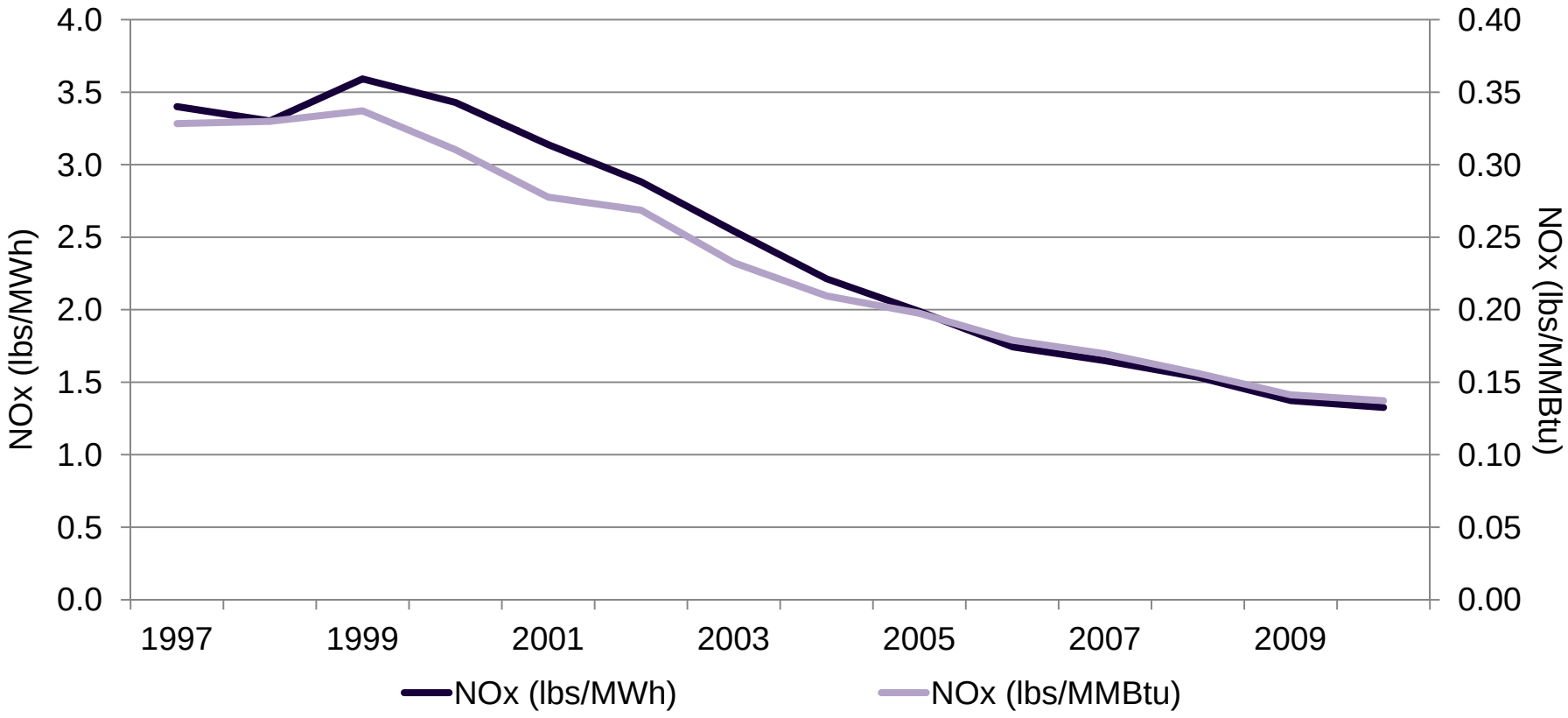
Louisiana generation trends are up, yet overall NOx emissions from fossil units are down.



Source: U.S. EPA.

Emissions per Output (MWh) and Heat Input (MMBtu) Basis

Increased generation and decreased emissions translate into higher efficiencies on an output and heat input basis.



Source: U.S. EPA.

Louisiana Allocations and Deficits

	3-Year Average NOx	CSAPR			
		Allocation	Percent Difference	Deficit with CSAPR 2012	Deficit with CSAPR 2014
CLECO	2,760.9	1,534.2	-44.4%	(1,226.7)	(1,226.7)
ELL	6,516.0	2,609.0	-60.0%	(3,907.0)	(3,907.0)
EGSL	2,925.3	1,583.0	-45.9%	(1,342.3)	(1,342.3)
ENO	896.5	592.0	-34.0%	(304.5)	(304.5)
SWEPCO	1,150.0	630.0	-45.2%	(520.0)	(520.0)
Muni	1,637.5	806.8	-50.7%	(830.7)	(830.7)
Big Cajun 2	5,001.7	2,842.0	-43.2%	(2,159.7)	(2,159.7)
IPP	281.6	415.0	47.4%	133.4	133.4
Cogen	1,864.5	2,018.0	8.2%	153.5	153.5
Total	**23,034.0**	**13,030.0**	**-43.4%**	**(10,004.0)**	**(10,004.0)**

Louisiana Specific Problems

- EPA's emission reductions and allowance modeling is flawed and makes a number of unrealistic assumptions about how specific regional power markets work.

- EPA's model leads to an unattainable standard for Louisiana since physical compliance cannot likely be reached. It takes approximately three years to design, engineer, permit, and install an SCR or scrubber. We have to comply in May, 2012 (8 months)

- Louisiana will be about 10,000 tons short in allowances relative to historic generation levels. Over 9,000 MWs of capacity received zero allowances.

- EPA modeling, and resulting allocations, does not recognize the reliability must-run nature of many units.

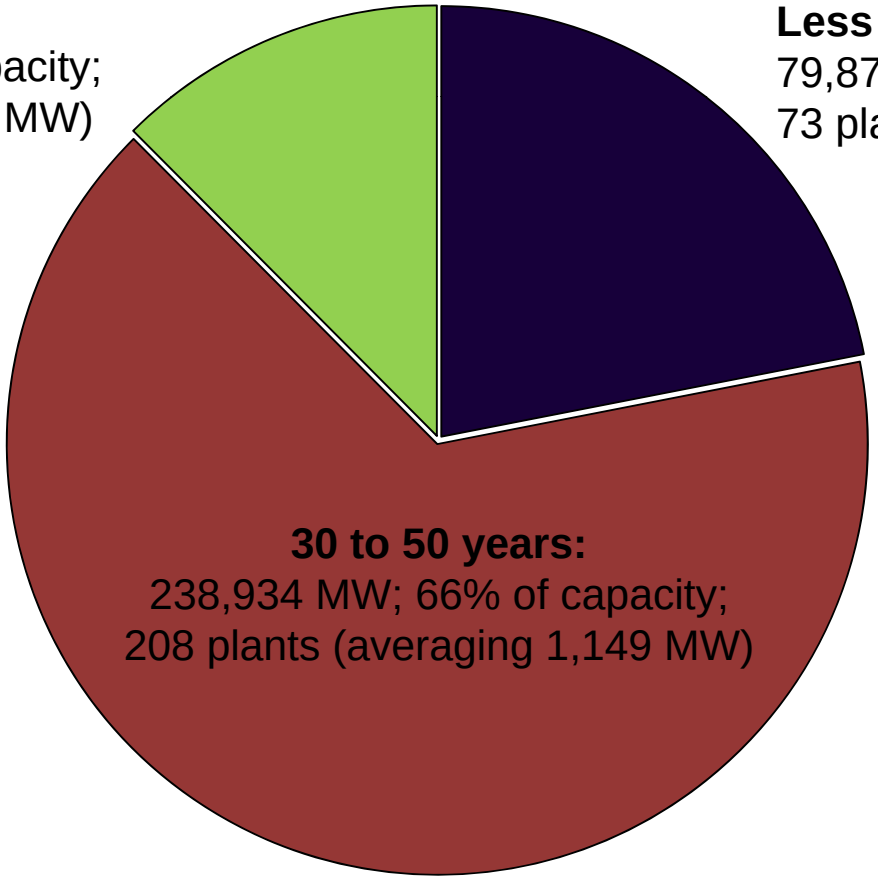
- Host of critical modeling errors that include failure to recognize intra-state transmission constraints, operational units, unit operating efficiencies, and likely dispatch.

Generation Availability Impacts

Coal-Fired Capacity Share by Age Category

There is a considerable amount of legacy coal capacity (45 GWs) that is relatively old, and in some instances, has few to little controls to meet anticipated standards.

Greater than 50 years:
45,382 MW; 12% of capacity;
72 units (averaging 630 MW)



Less than 30 years:
79,876 MW; 22% of capacity;
73 plants (averaging 1,094 MW)

Source: Energy Information Administration, U.S. Department of Energy

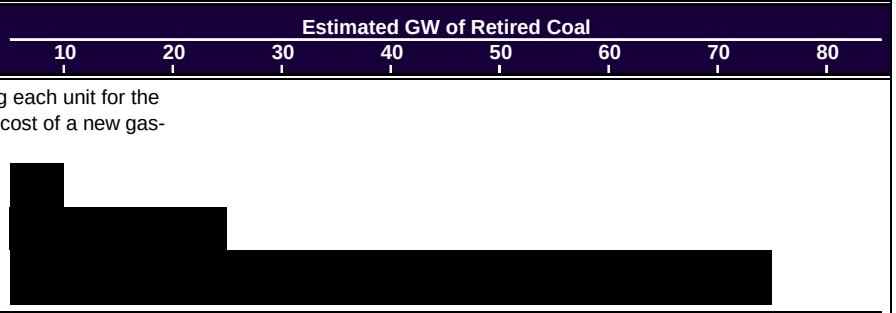
Increased Natural Gas Use from CSAPR-Induced Coal Plant Retirements

The retirement of 45 gigawatts of capacity would likely still have an impact on overall natural gas usage.

Note: Assumes 160 Bcf of NGV natural gas use. Also assumes retirement of 45 GW of coal-fired capacity, replaced with new natural gas generation with an 85 percent capacity factor and a 7,600 Btu/kWh heat rate.

Summary of Retirement Studies Related to EPA Rules

Study	Retired Capacity	Regulation Requirements
NERC (October 2010)	47 to 76 GW by 2018 (total fossil fuel capacity, including oil and gas)	Levelized costs (@2008 CF) after retrofitting each unit for the environmental regulations compared to the cost of a new gas-fired unit. Scenario 1 - Transport Rule Scenario 2 - Transport Rule, MACT Scenario 3 - Transport Rule, MACT, 316(b) Cooling Water, Coal Ash
ICF/IEE (May 2010)	25 to 60 GW by 2015	Cost of retrofitting coal plant compared to cost of new gas CC Scenario 1 - Transport Rule, MACT Scenario 2 - Transport Rule, MACT, CWA 316(b)
Brattle Group (December 2010)	50 to 65 GW by 2020	Regulated Units - 15-year present value of costs > replacement power from a CC or CT. Merchant unit - 15-year present value of cost > revenues from energy and capacity markets. Transport Rule, MACT, 316(b) Cooling Water, Coal Ash
Credit Suisse (September 2010)	60 GW	Size and existing controls Transport Rule, MACT
Charles River Associates (December 2010)	39 GW by 2015	In-house model (NEEMS) optimizing costs of existing capacity and costs of potential new capacity. Transport Rule, MACT
MJ Bradley (August 2010)	30 to 40 GW	Switch to lower sulfur coal, install emission controls, or retire Transport Rule, MACT
Bernstein Research (October 2010)	51 GW	FGS + emissions on all coal fired units by 2015 Transport Rule, MACT



Source: Synapse Energy Economics, Inc., "Public Policy Impacts on Transmission Planning, Prepared for Earthjustice", December 10, 2010; and "Miller, P. A Primer on Pending Environmental Regulations and their Potential Impacts on Electric System Reliability. Working Draft, JD Northeast States for Coordinated Air Use Management. January 24, 2011.

Louisiana Reliability Impacts

- EPA clearly did not seek, nor attempt to understand the reliability implications of its proposed regulation.
- Concerns imported generation may not be available (used to meet its own native requirements), that the generation will be expensive, or will be constrained by transmission.
- Most regional NERC reliability councils have expressed serious concerns about the proposed rule and its reliability implications.
- If credits and/or generation are not available, utilities will have to either (a) shut down units or (b) pay a penalty of $37,500 per ton per day. State emits, on average, about 150 tons per day – could be a $450 million penalty for 80 days.

NOTE: Louisiana will likely run out of emission credits around the 4th of July weekend if EPA's proposed regulations go into place.

The ozone season ends the last week of September.

Potential Rate Impacts

NERA CATR-MACT Impact Study

Significant capital costs will be associated with these regulations. Wide variation in capital and operating cost estimates.

Equipment/Cost	EPA (Est Cost $ 2010)	EIA (Est Cost $ 2010)
Wet Scrubber		
Capital ($/kW)	$ 538.00	$ 485.00
Fixed O&M ($/kW-yr)	$ 8.35	$ 24.99
Variable O&M ($/MWh)	$ 2.11	$ 0.44
Capacity Penalty	-0.0184	-0.05
Heat Rate Penalty	0.0187	0.0526
Dry Scrubber		
Capital ($/kW)	$ 460.00	
Fixed O&M ($/kW-yr)	$ 6.76	
Variable O&M ($/MWh)		
Capacity Penalty	-1.45%	
Heat Rate Penalty	1.47%	
SCR		
Capital ($/kW)	$ 201.00	$ 165.00
Fixed O&M ($/kW-yr)	$ 0.73	$ 1.66
Variable O&M ($/MWh)	$ 1.38	$ 0.34
Capacity Penalty	-0.58%	0.00%
Heat Rate Penalty	0.59%	0.00%

Equipment/Cost	EPA (Est Cost $ 2010)	EIA (Est Cost $ 2010)
ACI		
Capital ($/kW)	$ 8.00	$ 6.00
Fixed O&M ($/kW-yr)	$ 0.03	$ 1.17
Variable O&M ($/MWh)	$ 0.60	$ -
Capacity Penalty	-0.60%	0.00%
Heat Rate Penalty	0.60%	0.00%
Fabric Filter		
Capital ($/kW)	$ 170.00	$ 78.00
Fixed O&M ($/kW-yr)	$ 0.73	$ 5.97
Variable O&M ($/MWh)	$ 0.16	$ -
Capacity Penalty	-0.60%	0.00%
Heat Rate Penalty	0.60%	0.00%
DSI		
Capital ($/kW)	$ 43.00	
Fixed O&M ($/kW-yr)	$ 0.61	
Variable O&M ($/MWh)	$ 7.70	
Capacity Penalty	-0.79%	
Heat Rate Penalty	0.79%	

Source: NERA, Proposed CATR + MACT Report, Draft, May 2011

Potential Rate Impacts

NERA CATR-MACT Impact Study

While the national average impact is around 12 percent under older CATR these are diverse impacts across the U.S.

Some states are likely to see increases close to 24 percent, many well over 15 percent.

State/Region	Percent Change - Electricity Rates 2016	2020	2025
New England	7.5%	7.7%	5.4%
New York City	5.5%	5.0%	7.6%
NY Long Island	6.5%	4.8%	6.6%
NY Update	8.0%	6.4%	8.1%
Mid-Atlantic	17.1%	9.9%	7.8%
VA & Carolinas	12.7%	9.9%	8.2%
Southeast	14.5%	9.4%	9.8%
Florida	8.8%	8.9%	8.5%
Lower MI	20.5%	17.7%	13.4%
OH, IN & WV	12.9%	12.1%	11.9%
KY & TN	23.5%	17.8%	13.3%
WI and Upper MI	21.7%	17.3%	12.6%
Upper Midwest	17.6%	14.1%	10.2%
South IL & East MO	23.1%	18.8%	16.3%
KS & West MO	12.8%	12.0%	14.6%
AR, LA & West MS	9.0%	8.0%	7.5%
Oklahoma	15.8%	12.8%	10.9%
Texas	12.1%	9.4%	9.5%
CO & East WY	6.1%	7.3%	8.8%
Northwest	2.0%	4.0%	7.9%
AZ & NM	6.1%	5.2%	3.6%
California	1.8%	1.9%	0.8%
US Average	11.5%	9.5%	8.5%

Source: NERA, Proposed CATR + MACT Report, Draft, May 2011

Louisiana Specific Rate Impact Concerns

- Rate impacts that have been estimated to date for CATR are likely underestimated, potentially by as much as four percent or more.
- Studies to date do not account for the operating inefficiencies that may results from installed controls and “re-optimization/re-prioritization” of dispatch that could result in more inefficient fuel use.
- Studies to date do not take into account the “rush premium” likely to be assessed on mitigation equipment nor engineering and permitting costs.
- Studies likely do not take appropriate “allowance scarcity” into context.
- Studies do not consider the increased state regulatory burden associated with managing the approval and costs of compliance.

Regulatory and Ratemaking Impacts

Recent NARUC Resolution – Select Findings

- **NARUC recently passed a resolution expressing concerns about the EPA rulemakings and noted, among other points:**
  - **Such regulations under consideration by EPA could pose significant challenges for the electric power sector and the state regulatory commissions with respect to economic burden, the feasibility of implementation by the contemplated deadlines and maintenance of system reliability.**
  - **NARUC recognizes that flexibility with the implementation of EPA regulations can lessen generation cost increases because of improved planning, selection of correct design for the resolution of multiple requirements, greater use of energy efficiency and demand side resources and orderly decision-making.**
  - **Some generators that will be impacted by the new EPA rulemakings are located in constrained areas or supply-constrained areas and will need time to allow for transmission or new generation studies to resolve reliability issues.**

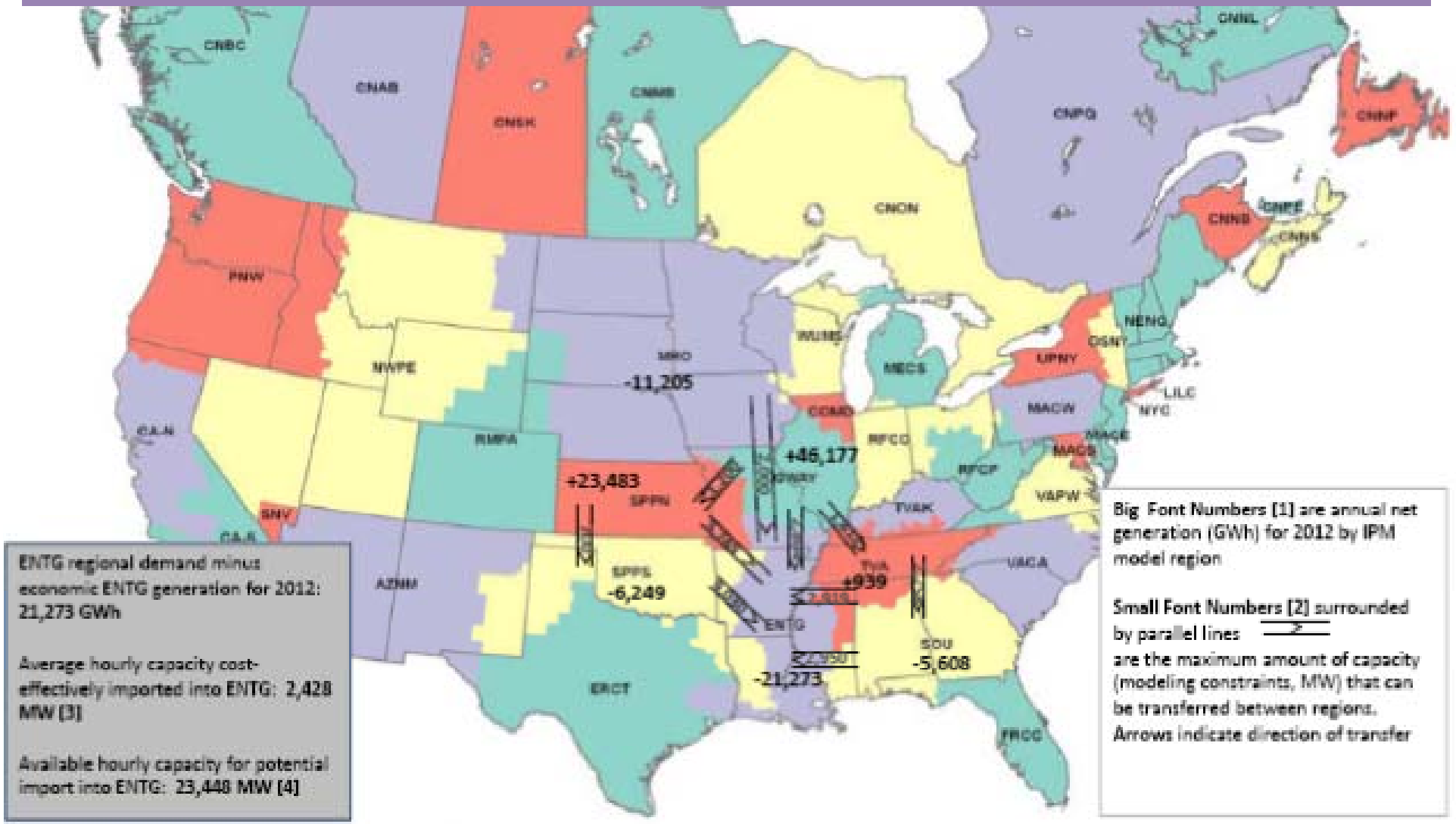
Regulatory and Ratemaking Issues

Regulatory challenges created by the new EPA rules include:

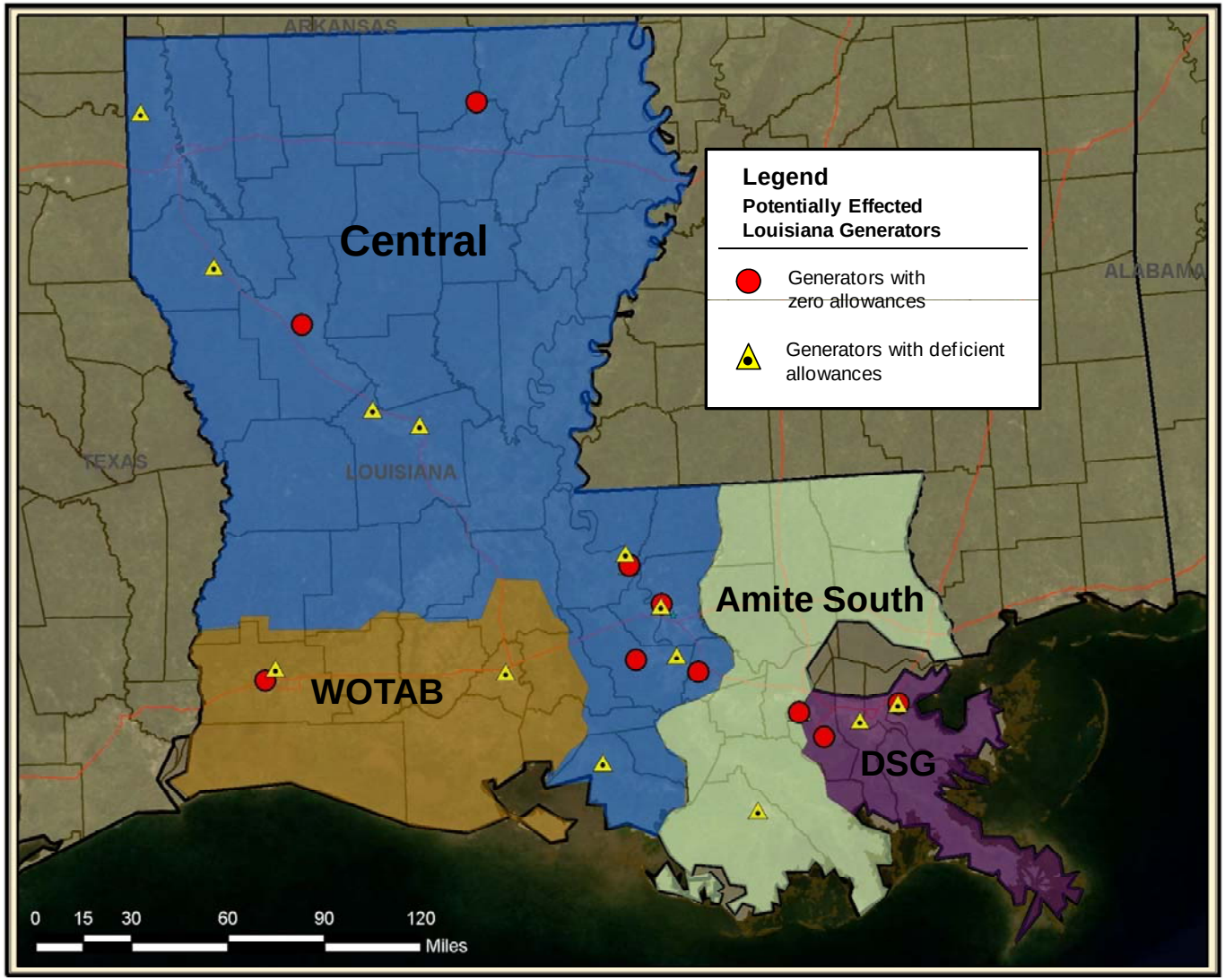
- **Timing: the ability to meet these requirements will be difficult if even possible. Equipment procurement, engineering, permitting and installation can be multi-year processes.**
- **Flexibility: there are limited alternatives, such as allowance trading or temporary attainment waivers for reliability, that utilities can utilize.**
- **Cost: limitations on timing and flexibility will increase costs dramatically in an area that has already experienced increased costs.**
- **Regulatory Planning Complications: will have implications for resource additions that are not limited to solid-fuel generation alone.**
- **Regulatory Review Complications: EPA regulations will make environmental cost recovery review more difficult in the near-term and longer run.**
- **Risk-shifting: EPA regulations will place utility regulators, utilities, and ratepayers in opposing positions on many cost recovery, rate of return, and risk allocation issues.**

Analytic Deficiencies Supporting Rule Changes

Failure to Recognize Intra-Regional Transmission Constraints



Louisiana Transmission Constraints

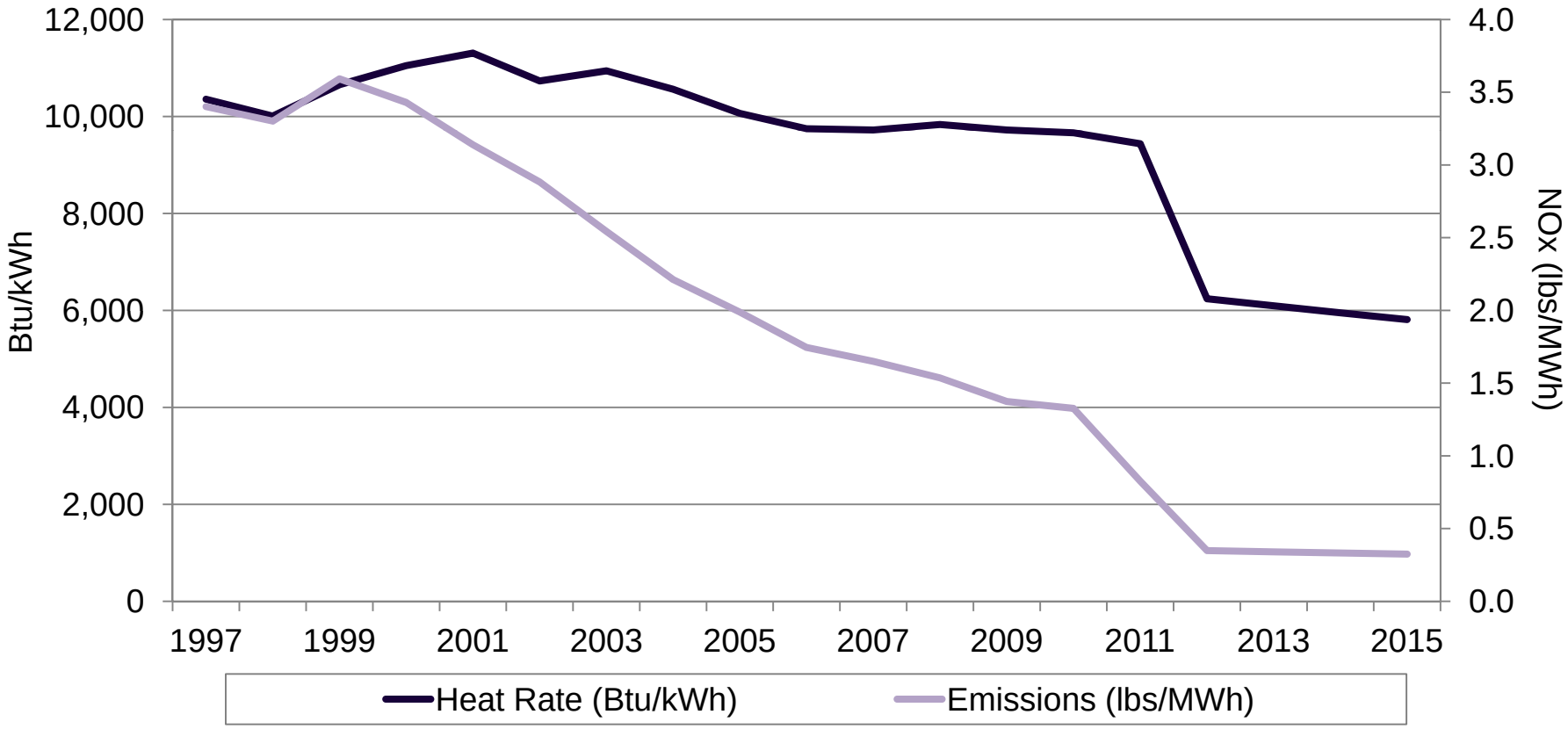


Incorrect Plant Operating Assumptions

	Advanced Combined Cycle	Advanced Combustion Turbine
Size (MW)	560	170
Availability (%)	87%	92%
Capacity Factor (%)	71%	32%
Heat Rate (Btu/kWh)	6,810	10,720
NOx Emission Rate (lbs/MMBtu)	0.01	0.01
Overnight Capital Cost (2007$/kW)	$ 976	$ 698
Fixed O&M (2007$/kW/yr)	$ 14.4	$ 12.3
Variable O&M (2007$/MWh)	$ 2.57	$ 3.59

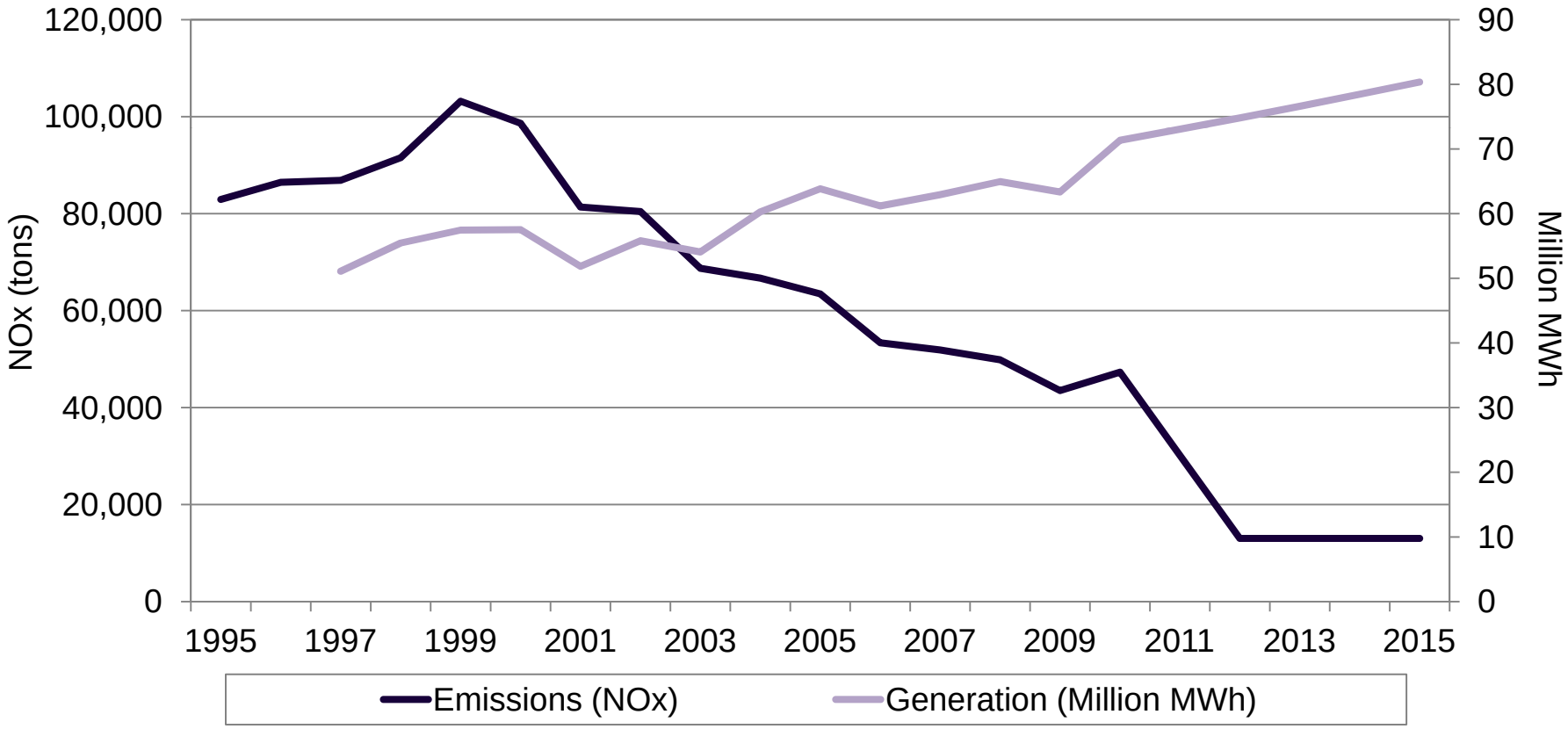
Implied Heat Input and Emissions Assumptions

EPA modeling assumptions result in outcomes suggesting significant reductions of heat input use while lowering emissions



Generation and Emissions Assumptions

EPA modeling assumptions also suggest that Louisiana can dramatically increase output and lower emissions, at the same time.



Conclusions

- If left in their current form, EPA's proposed regulations will likely have a considerably negative impact on U.S. utility ratepayers.
- These regulations will likely translate into rate increases that will likely occur at a very inopportune time in the country's economic recovery and a time when there are a large number of other policy goals being subsidized and recovered through rates (efficiency programs, renewables, smart meters, etc).
- EPA regulations will create an unnecessarily adverse and unproductive environment between utilities, regulators, and ratepayers.
- There are opportunities in this process since a degree of consensus is arising:
  - Most parties have not opposed the principles of improved air quality standards and regulations.
  - Timing of the standards are the biggest issue and one where utilities, regulators ,and ratepayers are all on the same page.
  - Flexibility is also an area of consensus – particularly as it relates to reliability.

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Questions, Comments and Discussion

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