

Agenda Item 2.0
PSPC Meeting 284
March 17, 2011

2009 ISO New England Electric Generator Air Emissions Report

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PSPC Meeting
March 17, 2011

Background

- ISO-NE posted and presented the 1st Draft 2009 ISO New England Generator Air Emissions Report on February 11, 2011 for the Environmental Advisory Group (EAG)
- ISO-NE has posted the 2nd Draft 2009 ISO New England Generator Air Emissions Report which incorporates EAG comments
- ISO-NE requests your comments on the report by March 25, 2011

Summary

2009 Calculated ISO New England Annual System Emissions

	Annual System Emissions	
	Emission Rate (lb/MWh)	Total Emissions (kTons)
NO_x	0.46	27.55
SO₂	1.29	76.85
CO₂	828	49,380

2009 Calculated ISO New England Marginal Emission Rates (lb/MWh)

Ozone / Non-Ozone Season Emissions (NO _x)					
Air Emission	Ozone Season		Non-Ozone Season		Annual Average (All Hours)
	On-Peak	Off-Peak	On-Peak	Off-Peak	
NO _x	0.17	0.13	0.19	0.16	0.17
Annual Emissions (SO ₂ and CO ₂)					
Air Emission		Annual			Annual Average (All Hours)
		On-Peak	Off-Peak		
SO ₂		0.24	0.19		0.22
CO ₂		918	943		930

Differences between 2008 and 2009 System and Marginal Emission Rates (lb/MWh)

	System Emissions		
	2008 Annual Rate (lb/MWh)	2009 Annual Rate (lb/MWh)	Percent Change 2008 to 2009(%)
NO_x	0.52	0.46	-11.5
SO₂	1.51	1.29	-14.6
CO₂	890	828	-7.0

	Marginal Emissions		
	2008 Annual Rate (lb/MWh)	2009 Annual Rate (lb/MWh)	Percent Change 2008 to 2009(%)
NO_x	0.21	0.17	-19.0
SO₂	0.33	0.22	-33.3
CO₂	964	930	-3.5

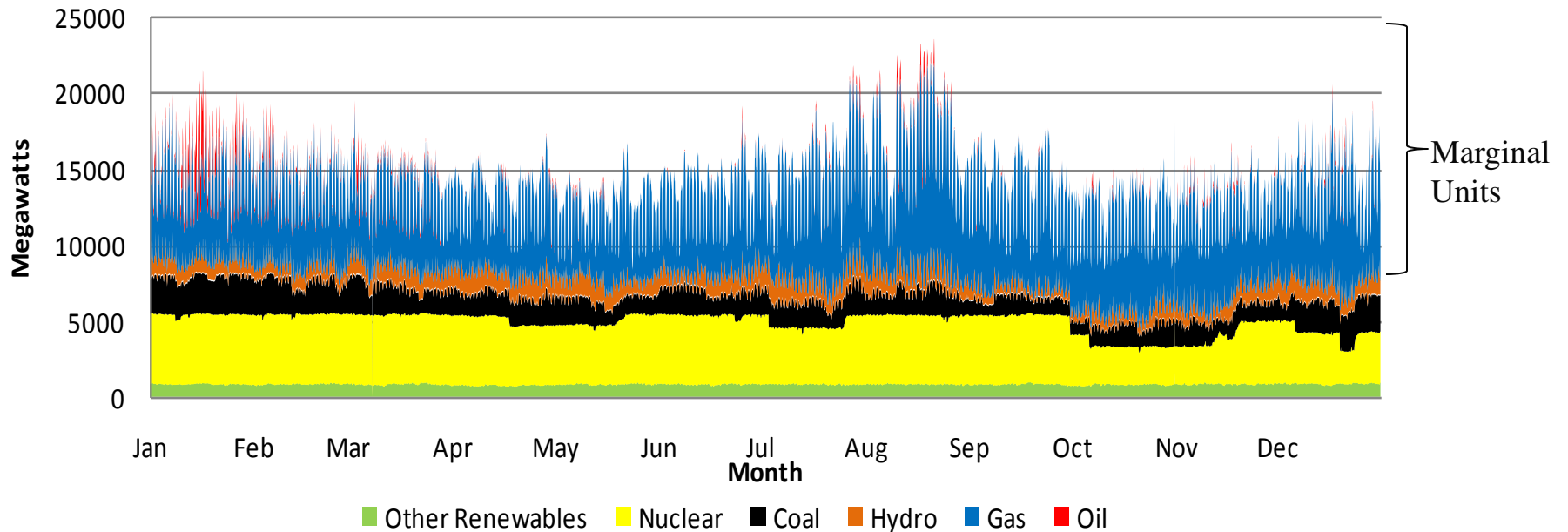
Overview of 2009 Emissions Analysis

- Total emissions by state (kTons) and annual system emission rates for NO_x , SO_2 , and CO_2 are calculated for all ISO New England generators
- Marginal emission rates are calculated based on emissions from only the marginal units, i.e. natural gas and oil-fired generators
 - These units are assumed to be the ones that respond to hourly increases/decreases electrical demand

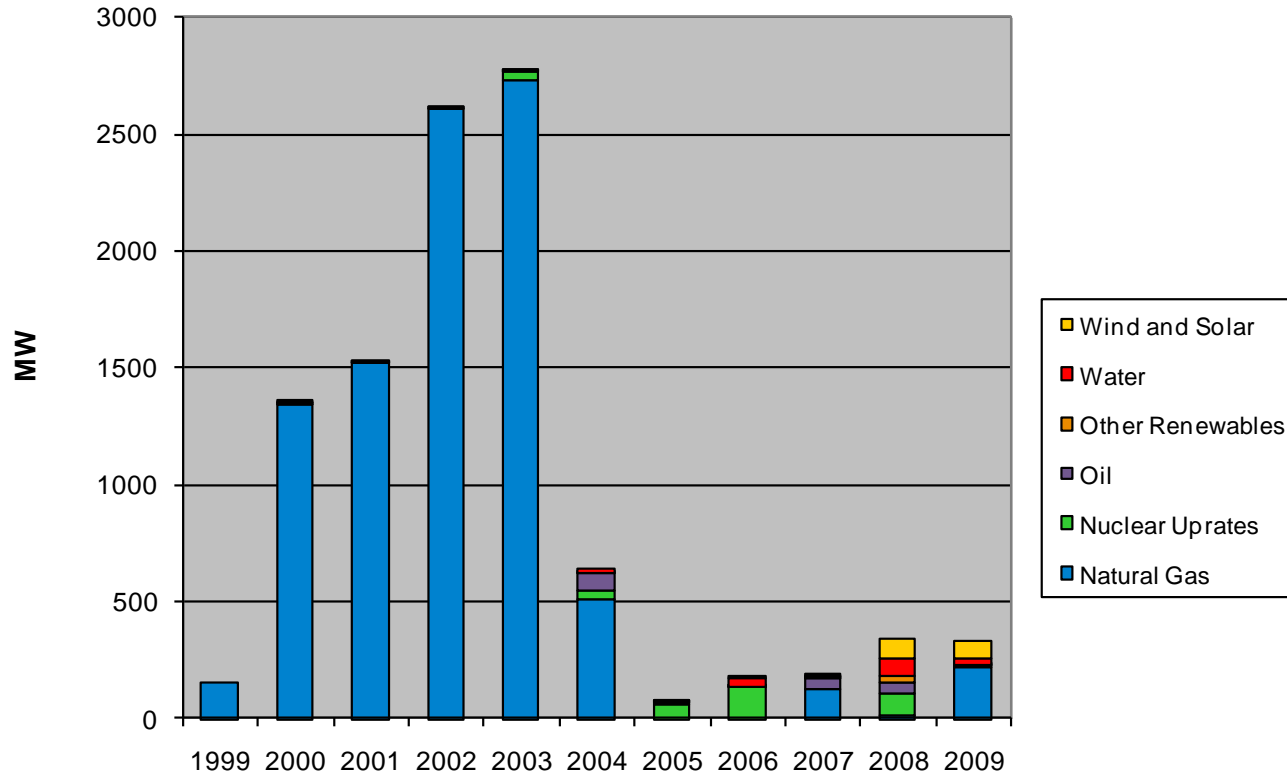
Methodology for Calculating Air Emissions

- Obtain annual air emissions for all ISO New England generating units for the year 2009
 - Used U.S. EPA emissions data for those units that are included in the U.S. EPA Clean Air Markets Database (includes 89% of total power plant emissions for SO₂, 54% for NO_x, and 78% for CO₂)
 - For units without U.S. EPA emissions
 - Used NEPOOL Generator Information System (GIS) monthly data
 - GIS data was not used when only proxy data was available
 - Obtained remaining data from U.S. EPA's eGRID database (2005 annual emission rates) or historically assumed emission rates (e.g. AP-42 rates)

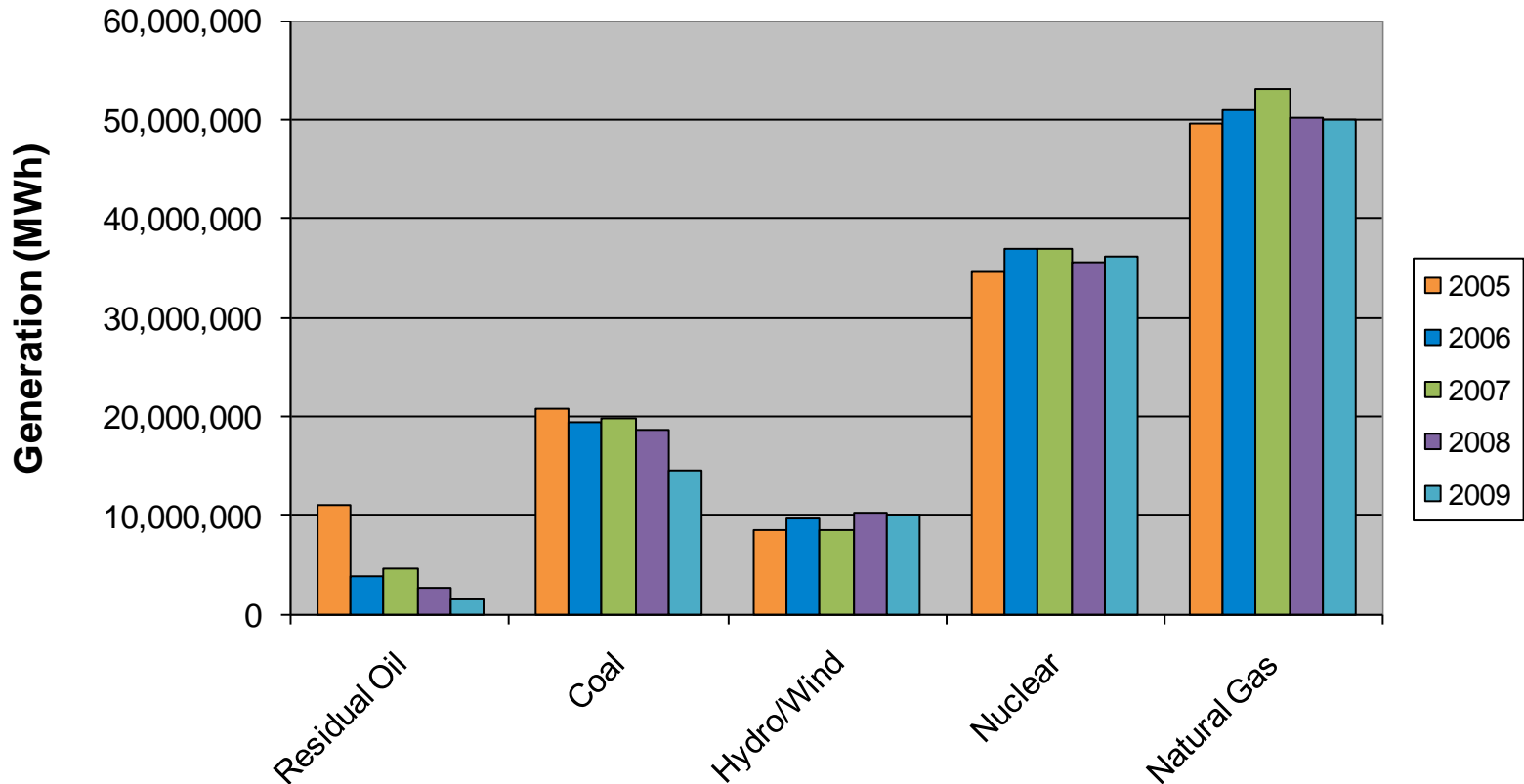
ISO New England 2009 Hourly Generation



1999–2009 ISO New England Generator Unit Additions



Generation for Select Fuel Types*, 2005 - 2009 (MWh)



*Based on the resource's primary fuel type in the 2010 CELT Report

2009 ISO New England System Emissions

2009 Calculated ISO New England Electric Generation System Annual Aggregate Emissions (kTons)

State	NO _x	SO ₂	CO ₂
Connecticut	5.65	4.61	9,780
Maine	2.77	1.61	5,832
Massachusetts	13.26	36.48	21,920
New Hampshire	4.79	33.69	7,693
Rhode Island	0.64	0.35	3,568
Vermont	0.44	0.12	588
New England	27.55	76.85	49,380

*May not equal total due to rounding.

2001 – 2009* Calculated ISO New England Electric Generation System Annual Aggregate Emissions (kTons)

Year	NO _x	SO ₂	CO ₂
2001	59.73	200.01	52,991
2002	56.40	161.10	54,497
2003	54.23	159.41	56,278
2004	50.64	149.75	56,723
2005	58.01	150.00	60,580
2006	42.86	101.78	51,649
2007	35.00	108.80	59,169
2008	32.57	94.18	55,427
2009	27.55	76.85	49,380
Percent Reduction, 2001 - 2009	54%	62%	7%

*2001-2007 emissions data is from prior ISO-NE Marginal Emissions Rate Analysis reports

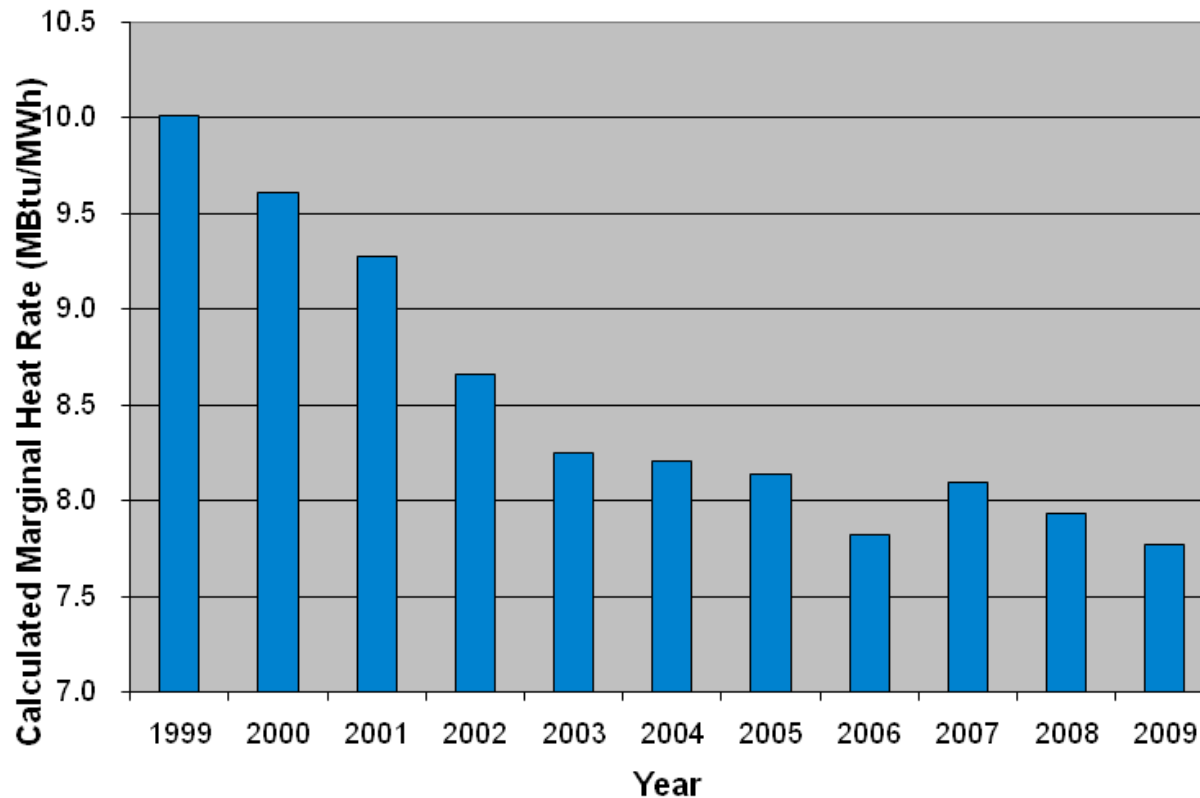
1999 – 2009* Calculated ISO New England Electric Generation System Annual Average Emission Rates (lb/MWh)

Year	Total Generation (GWh)	NO _x	SO ₂	CO ₂
1999	104,409	1.36	4.52	1,009
2000	110,199	1.12	3.88	913
2001	114,626	1.05	3.51	930
2002	120,539	0.94	2.69	909
2003	127,195	0.93	2.75	970
2004	129,459	0.78	2.31	876
2005	131,874	0.88	2.27	919
2006	128,046	0.67	1.59	808
2007	130,723	0.54	1.66	905
2008	124,749	0.52	1.51	890
2009	119,282	0.46	1.29	828
Percent Reduction, 1999 - 2009		66%	71%	18%

*1999-2007 emissions data is from prior ISO-NE Marginal Emissions Rate Analysis reports

2009 ISO New England Marginal Heat and Emission Rates

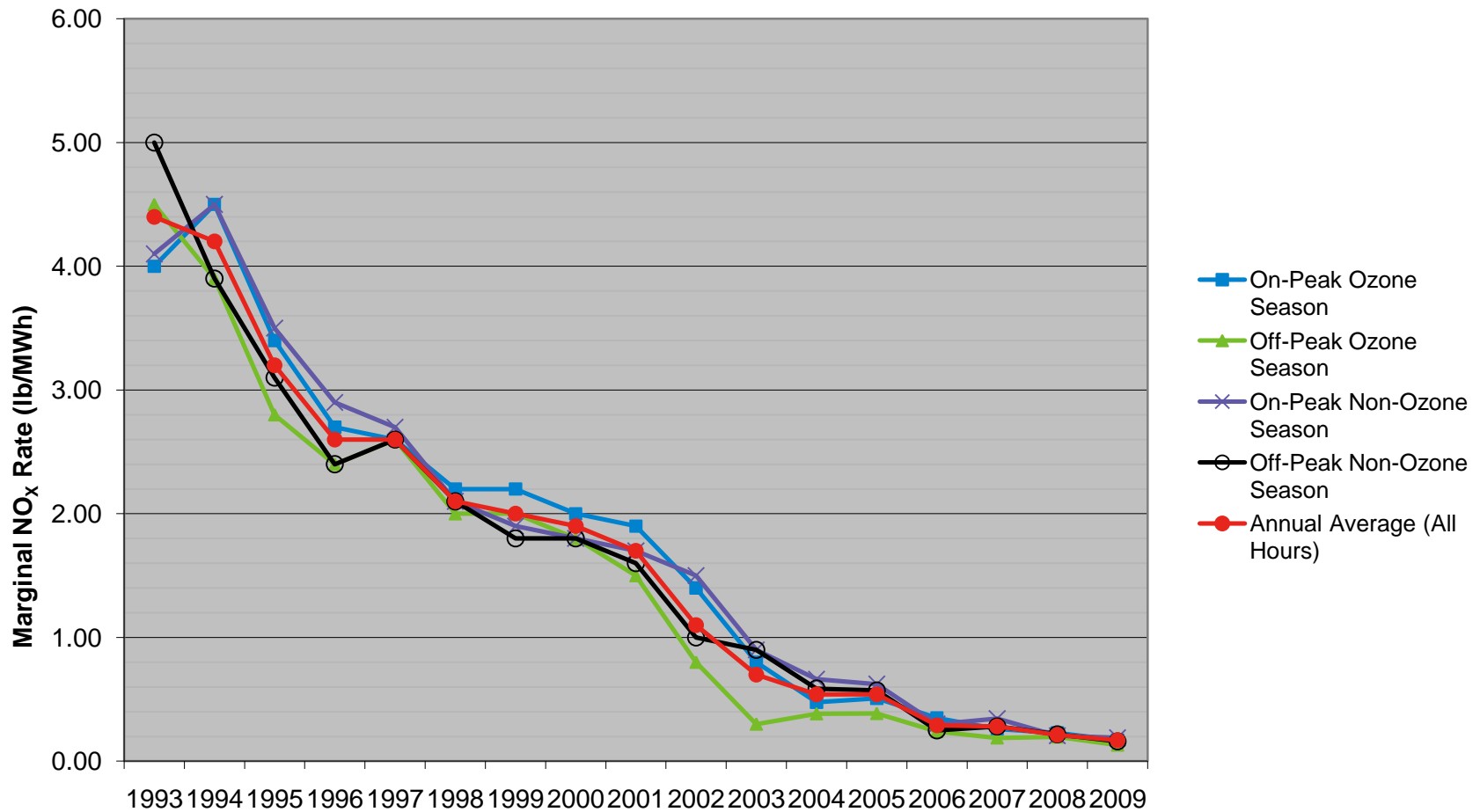
1999-2009 Calculated Marginal Heat Rates (MBtu/MWh)



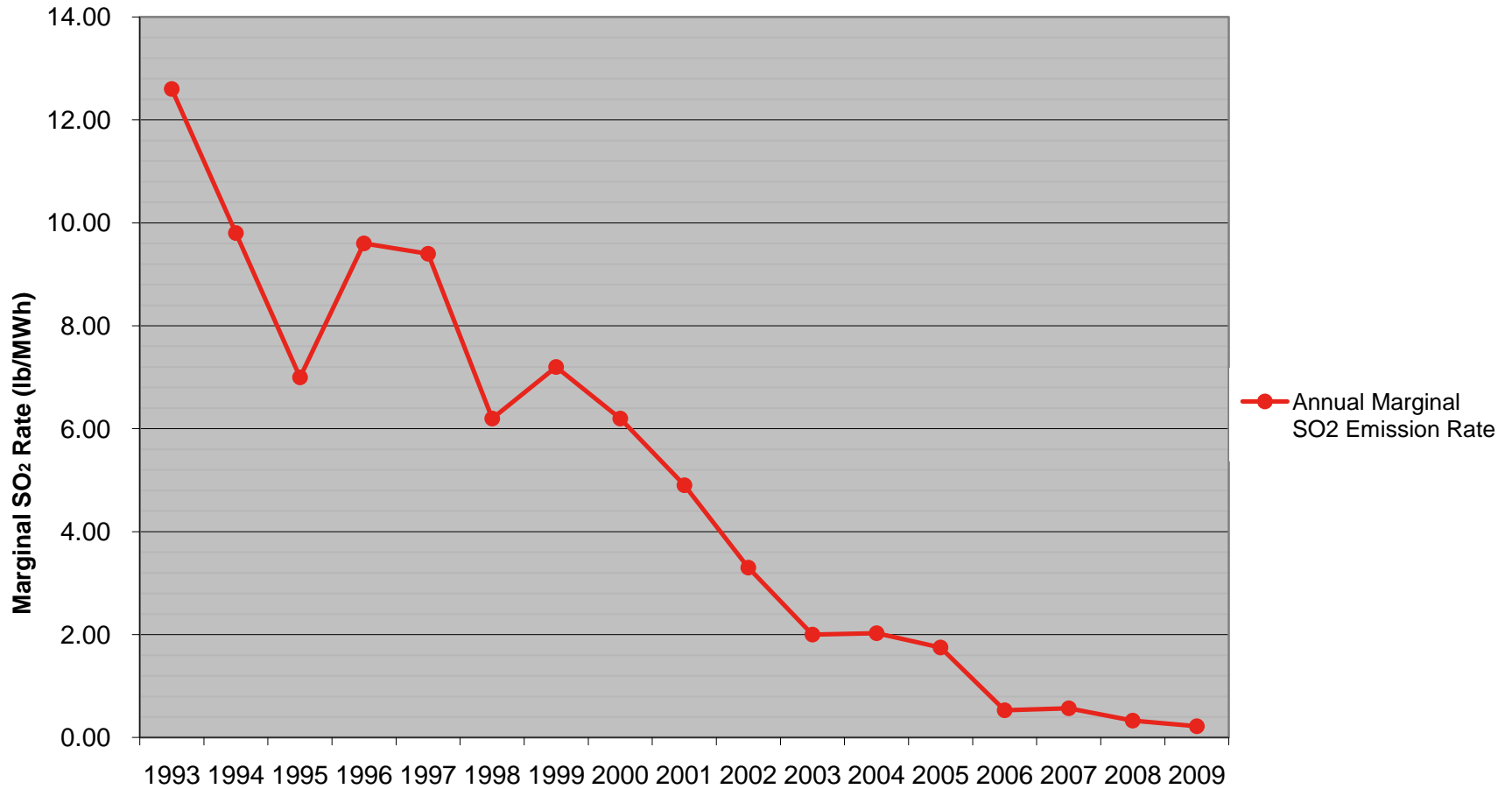
Year	Calculated Marginal Heat Rate (MBtu/MWh)
1999	10.013
2000	9.610
2001	9.279
2002	8.660
2003	8.249
2004	8.210
2005	8.140
2006	7.824
2007	8.095
2008	7.932
2009	7.774

Calculated 2009 Marginal Heat Rate is 7.774 MBtu/MWh

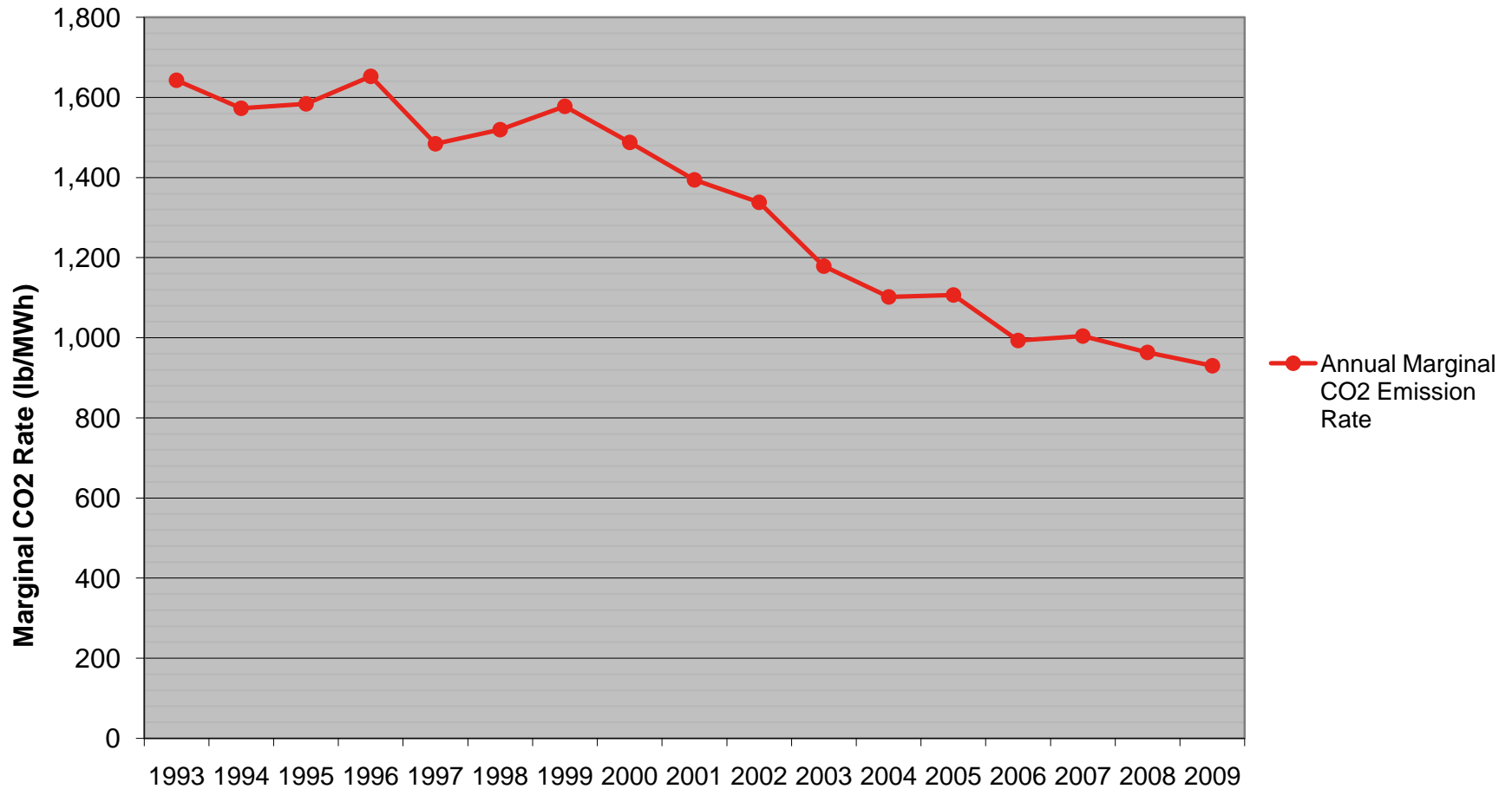
Historical New England NO_x Marginal Emission Rates (lb/MWh)



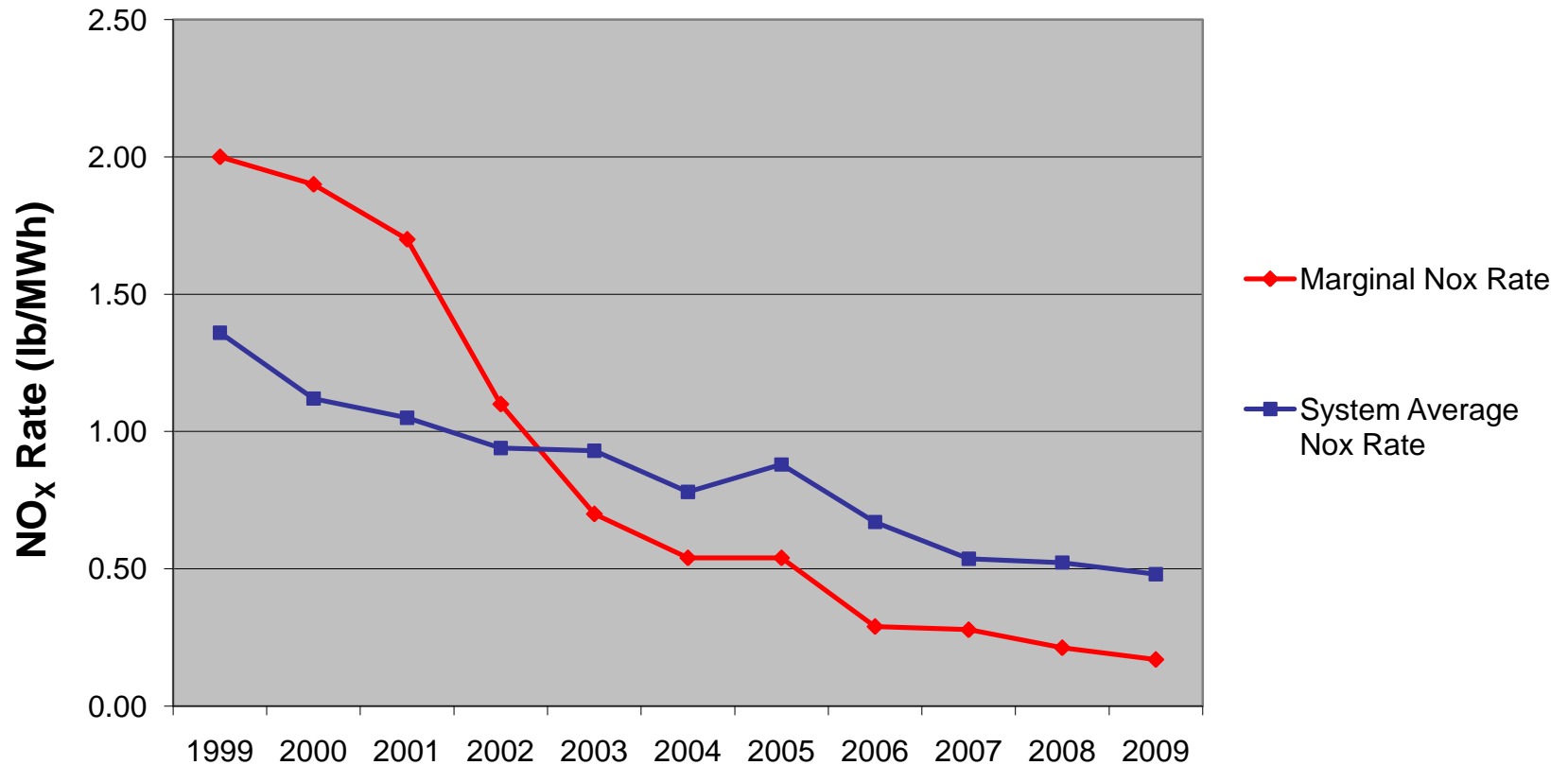
Historical New England SO₂ Marginal Emission Rates (lb/MWh)



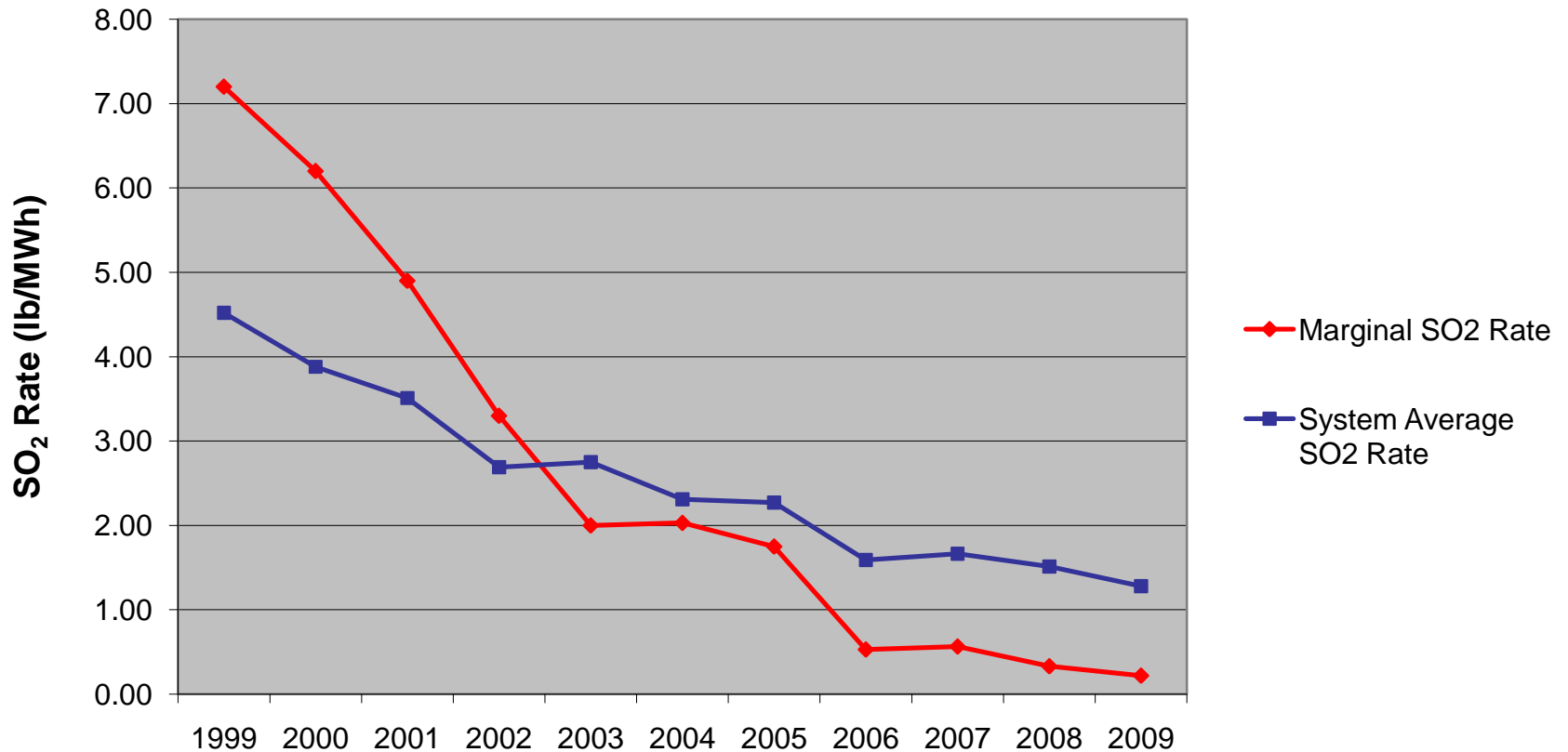
Historical New England CO₂ Marginal Emission Rates (lb/MWh)



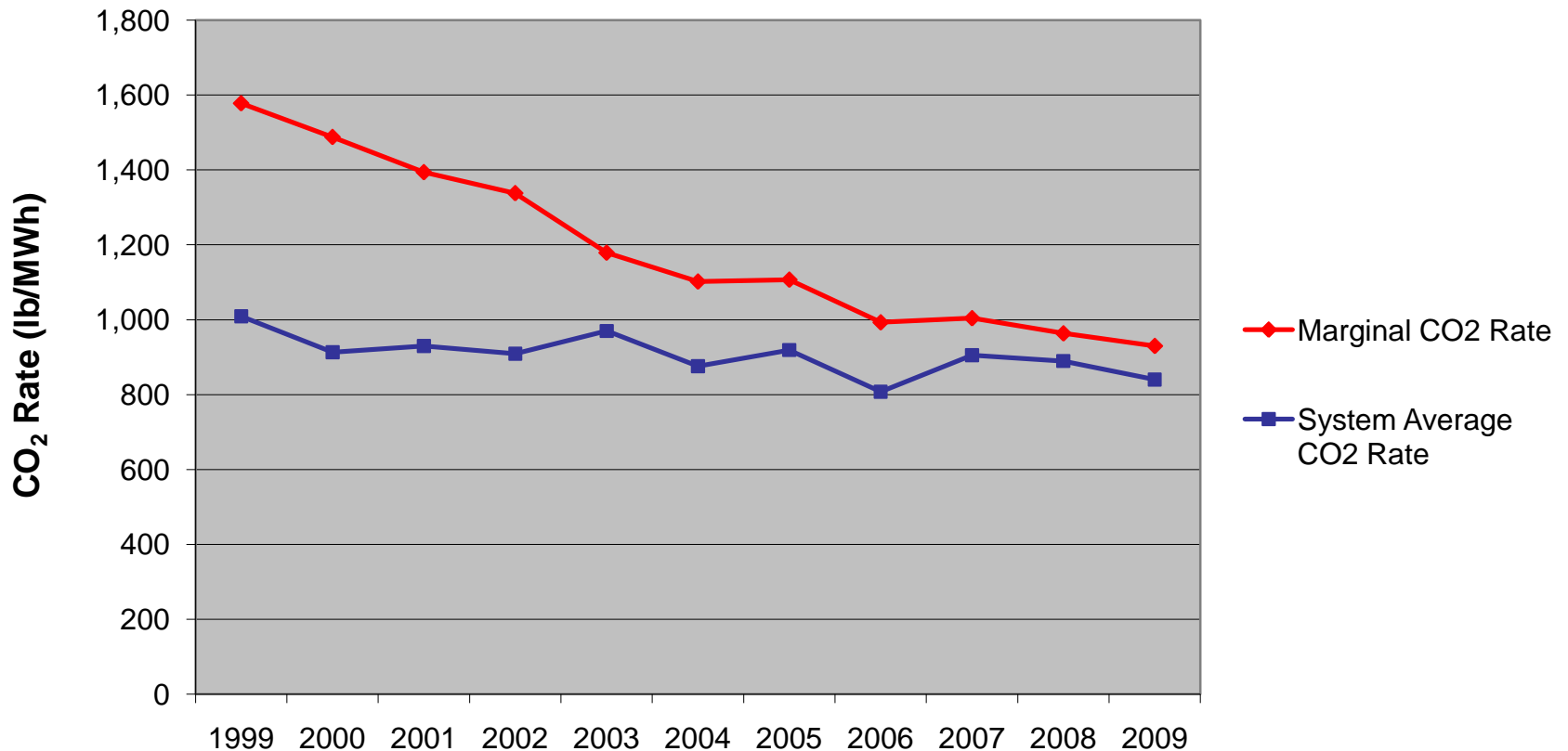
1999 – 2009 New England Annual Average System and Marginal NO_x Emission Rates (lb/MWh)



1999 – 2009 New England Annual Average System and Marginal SO₂ Emission Rates (lb/MWh)



1999 – 2009 New England Annual Average System and Marginal CO₂ Emission Rates (lb/MWh)



QUESTIONS?