



NAAQS – How Low Can We Go?
Recent CAA Initiatives

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NAAQS – How Low Can We Go?

The Costs and Benefits of Achieving Attainment

NAAQS – Historic Overview 5 'Criteria' Pollutants

	Ozone (ppm)	SO ₂ (ppb)	Particulate (24-Hour in ug/m ³)	CO (ppm)	NO ₂ (ppb)
1971	1 Hour - 0.08	24 Hour - 0.14	TSP - 260	1 Hour - 36 8 Hour - 9	Annual - 53
1979	1 Hour - 0.12				
1987			PM ₁₀ - 150		
1997	8-Hour - 0.08		PM _{2.5} - 65 PM ₁₀ - 150		
2006			PM _{2.5} - 35 PM ₁₀ - 150		
2008	8 Hour - 0.075				
2010	8 Hour - 0.070 0.065 0.060 (Proposed)	1 Hour - 75			1 Hour - 100

Source: EPA @ <http://www.epa.gov/air/criteria.html>
Excludes lead

NAAQS – Ozone

1-Hour and 1997 8-Hour Standard

2008 8-Hour Standard

2010 Proposal

NAAQS – Ozone

1-Hour Standard and 1997 8-Hour Standard

1978 - Designated as non-attainment (March 3)

1991 - Classified as Serious (Nov. 6)

Attainment Date of Nov. 15, 1999

1997 - New 8-Hour Standard (July 18)

0.08 ppm

1999 – Failed to achieve attainment

EPA Extension Policy – extended attainment date

Vacated by Fifth Circuit

NAAQS – Ozone

1-Hour Standard and 1997 8-Hour Standard

2003 - 'Bump-up' to Severe (1-Hour) (April 23)

New attainment date of Nov. 15, 2005

Effective June 23, 2003

RFG and Section 185 Penalty Fee

2004 - Designated/classified as Marginal (1997 8-Hour) (April 30)

Created 'anti-backsliding' requirements

2004 - RFG to be implemented June 23, 2004

Stayed by Fifth Circuit days before deadline

NAAQS – Ozone

1-Hour Standard and 1997 8-Hour Standard

- 2010 - Determined to be in attainment for 1-Hour (Feb. 10)
 - Section 185 Penalty Fees addressed separately
- Determined to be in attainment for 1997 8-Hour (Sep. 9)
- 2011 - Section 185 Penalty Fees (July 7)
 - Termination Determination
 - Based on attainment with 1-Hour
- Re-designated to attainment on approval of maintenance plan (Nov. 30)
- 2012 - RFG (April 23)
 - Not a 'covered area' because re-designated under 1997 8-Hour
 - Fifth Circuit case finally dismissed

NAAQS – Ozone

2008 8-Hour Standard and EPA Proposal

- 2008 - New 8-Hour Standard (0.075 ppm) (March 27)
 - Based on review begun in 2000
 - Criteria Document (2006) and Staff Paper (2007)
 - CASAC Panel had recommended 0.06 to 0.07 ppm
 - EPA proposed range of 0.070 and 0.075 ppm
 - State of Mississippi v. EPA* – challenge to rule
- 2009 - LDEQ recommendations for area designations (March 12)
 - Based on 2006 – 2008 data
 - EBR, WBR, Livingston, Ascension, Iberville
 - Caddo, Jefferson, Lafayette, Lafourche, Pointe Coupee, St. John
- 2009 – EPA announces it will reconsider the 2008 8-Hour Standard (September 16)
 - EPA puts designations under 1997 8 Hour on hold

NAAQS – Ozone

2008 8-Hour Standard and EPA Proposal

2010 - EPA proposes to review 2008 8-Hour Standard (January 19)

Based on much of the same data

Why? Because out of range recommended by CASAC
Concerns that public not sufficiently protected

2011 - EPA chose 0.070 ppm as appropriate standard (July 7)

2011 - President Obama postponed any revision until 2013 (Sept. 2)

State of Mississippi v. EPA moves forward

EPA proceeds with designations under 2008 8-Hour Standard

2012 – Designation and classifications under the 2008 8-Hour – Marginal (May 21)

Based on 2008 – 2010 data

NAAQS – Ozone

2008 8-Hour Standard



NAAQS – Ozone – Regulatory Impact 2008 8-Hour Standard

Benefits	\$ 17.0B*
Costs	\$ 8.8B
Net	\$ 8.2B

*Benefits include ozone and PM_{2.5} co-benefits (PM_{2.5} accounts for 42% - 99% of benefits)

	42%	99%
Benefits	\$9.86B	\$0.17B
Costs	\$8.80B	\$8.8B
Net	\$1.06B	\$-8.63B

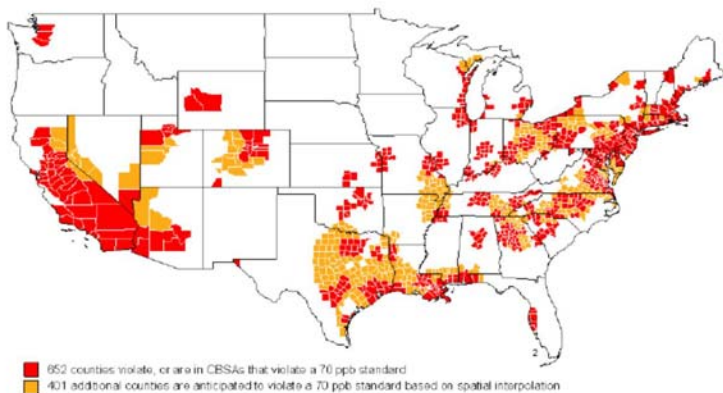
Source: Final NAAQS RIA, Section ES.2/Table ES.1 All at 7% discount rate (highest benefit v. highest cost).

NAAQS – Ozone – Regulatory Impact 2008 8-Hour Standard

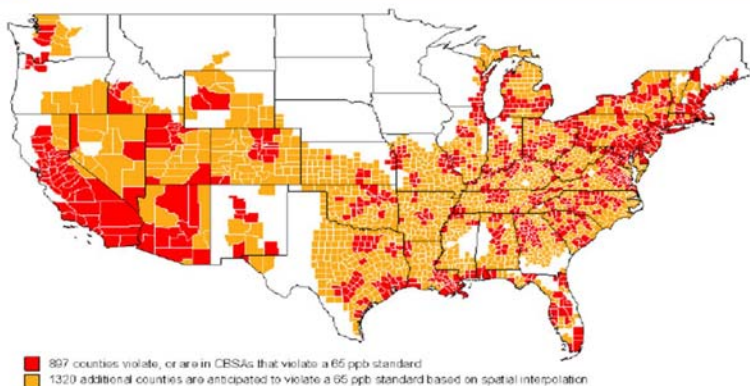
Mortality	260 – 2,300
Acute Myocardial Infarction	890
Upper Respiratory Symptoms	4,900
Lower Respiratory Symptoms	6,700
Chronic Bronchitis	380
Acute Bronchitis	1,000
Asthma Exacerbation	6,100

Source: Final NAAQS RIA, Section ES.2/Table ES.5

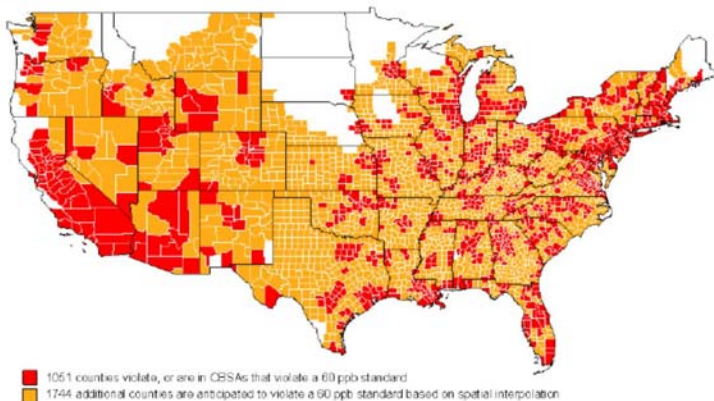
NAAQS – Ozone – EPA Proposal
Regulatory Impact - 0.070 ppm



NAAQS – Ozone – EPA Proposal
Regulatory Impact - 0.065 ppm



NAAQS – Ozone – EPA Proposal Regulatory Impact - 0.060ppm



NAAQS – Ozone – Regulatory Impact EPA Proposal

	0.070	0.065	0.060
Benefits	\$31B	\$53B	\$87B
Costs	\$25B	\$44B	\$90B
Net	\$7B	\$9B	\$-3B

Benefits include ozone and PM_{2.5} co-benefits. Source: Updated RIA, Table S1.1 All at 7% discount rate (highest benefit v. highest cost).

RIA assumes standards achieved "using a mixture of known air pollution control technologies and unknown, future technologies."

Source: Fact Sheet - Supplement to the RIA for Ozone, January 7, 2010

2010 Study of costs of 0.060ppm

Annual attainment costs between 2020 and 2030 are \$1.013T (5.4% of GDP)

Present value of those costs are 7.1T

Employment losses at 7.3M (4.3% of total work force) by 2020

Marginal cost of attaining standard rises rapidly as standard becomes more stringent

Source: Norman, J., 2010, for Manufacturers Alliance/MAPI

2007 Study of costs at 0.070ppm

Present value of costs is \$1.1T

Source: Vaughn, G., 2007, for Manufacturers Alliance/MAPI

NAAQS – Ozone – Regulatory Impact EPA Proposal

	<u>0.070</u>	<u>0.065</u>	<u>0.060</u>
Mortality	1,500-4,300	2,500-7,200	4,000 – 12,000
Acute Myocardial Infarction	2,200	3,500	5,300
Upper Respiratory Symptoms	19,000	31,000	48,000
Lower Respiratory Symptoms	25,000	41,000	63,000
Chronic Bronchitis	880	1,400	2,200
Acute Bronchitis	2,100	3,400	5,300
Asthma Exacerbation	23,000	38,000	58,000

Source: Updated RIA, Table S1.2

NAAQS – SO₂

2010 – New SO₂ 1 Hour Standard at 75 ppb (June 2)

75 Fed. Reg. 35520 (June 22, 2010)

Rule uses 'hybrid' of monitoring and modeling for compliance

Monitoring - Need 163 sites nationwide

Will need to establish 43 such sites, nationwide

Needs to be operational by January 1, 2013

Modeling - Due to localized impact of SO₂

EPA to issue guidance on proper modeling

NAAQS – SO₂

LDEQ designated West Baton Rouge and St. Bernard (May 26, 2011)

Based on 2008-2010 monitoring data

Designations due by EPA in June 2012

Has not officially published designations to-date

For non-attainment areas –

SIPs due in February, 2014 with attainment by August, 2017

All other areas –

Submit 'maintenance' or 'infrastructure' SIPs by June, 2013

LDEQ Stakeholder's Group

Modeling is ongoing

Hoping to show attainment

Recent CAA Initiatives

Utility MATS

Cross-State Air Pollution Rule (CASPR)

Boiler MACT

Recent CAA Initiatives Overview of CFR/Federal Register

	Federal Register Pages	Proposed Rules	Final Rules	CFR, Total Pages
1980	73,258	5,347	7,745	102,295
1990	49,795	3,041	4,334	126,893
2000	74,258	2,636	4,313	138,049
2010	81,405	2,439	3,573	165,494

Recent CAA Initiatives Overview of CFR/Federal Register

	Federal Register Pages	Proposed Rules	Final Rules	CFR, Total Pages
2008	79,435	2,475	3,830	157,974
2009	68,598	2,044	3,503	163,333
2010	81,405	2,439	3,573	165,494
2011	81,247	2,898	3,807	169,301

Recent CAA Initiatives – Utility MATS Summary

Final rule published February 16, 2012, effective April 16, 2012
77 Fed. Reg. 9304 (Feb. 16, 2012)

Affects coal and oil fired electric utility steam generating units (EGUs)

Industry emits 29 TPY of mercury

Single largest source in US

EPA: Rule will reduce emissions by 90% (20 TPY)

Conduct performance testing to demonstrate compliance

Compliance date

Existing – three years from effective date (April 16, 2015)

New – at start-up

Lawsuits filed

Utility Air Regulatory Group v. EPA, D.C. Cir., No. 12-1166

24 states attorney general filed suit

Partial stay of certain provisions until November 2, 2012 issued on August 2, 2012

Recent CAA Initiatives – Utility MATS Costs and Benefits

Rule will reduce mercury emissions by 90%

Installing technology to reduce mercury will also reduce PM_{2.5} and SO₂

PM_{2.5}/SO₂ benefits are 'co-benefits'

Not the primary objective of the rule

Costs \$9.6B in 2015

Capital investment, compliance, monitoring, and reporting

Monetized health benefits estimated between \$33B – \$81B (@ 7%)

Great majority of benefits from reductions in PM_{2.5}-related mortality

Mortality	Pope (2002)	4,200	\$30B
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	Laden (2006)	11,000	\$78B
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Non-Fatal Heart Attacks		4,700	\$0.4B
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Chronic Bronchitis		2,800	\$1.4B
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Acute Bronchitis		6,300	\$<0.01B
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Asthma Exacerbation		130,000	\$<0.01B
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Recent CAA Initiatives – Utility MATS Costs and Benefits

Mercury

Natural: 1,400 TPY – 15,000 TPY (U.N)

Man-Made: Europe – 250 TPY; Asia -1,070 TPY; North America - 210 TPY (U.N.)

All entering global cycle such that half deposited in US is from out of US (EPA)

Benefits of mercury reduction (from Utility MATS Regulatory Impact Analysis) - \$4-6M

Calculated by looking at effects from eating 8g/day of recreational freshwater fish

Translated that consumption to IQ loss

Reduced mercury emissions due to MATS in 2016 is an estimated 0.00209 fewer IQ points lost per prenatally exposed child from self-caught freshwater fish consumption, as opposed to the 2005 base case

Economic value of avoided IQ loss is \$4-6M (@3%) or \$0.47-1M (@7%)

Recent CAA Initiatives – Utility MATS Costs and Benefits

Other Cost Estimates

Retrofit up to 753 units (North American Electric Reliability Corp.)

Cost up to \$261B - \$358B for resource costs (US Energy Information Admin.-2005)

Loss of 4.7GW of coal-fired generation

2% of coal fired capacity and 0.05% of all capacity (EPA)

15 GW lost (North American Electric Reliability Corp.)

1.44M jobs by 2020 (Nat'l Assoc. of Manufacturers) (from Utility MACT/CSAPR)

\$18B per year to comply (Nat'l Assoc. of Manufacturers) (from Utility MACT/CSAPR)

Recent CAA Initiatives – Cross-State Air Pollution Rule (CSAPR) Summary

Final rule published August 8, 2011, effective October 7, 2011
76 Fed. Reg. 48208 (August 8, 2011)
Vacated by DC Circuit on August 21, 2012
CAIR still in effect

Identifies emissions in 27 states that significantly affect the ability of downwind states to attain and maintain compliance with 1997/2006 PM NAAQS and 1997 ozone NAAQS

Identifies and addresses significant contributions to downwind nonattainment
Used state-specific method to identify emission reductions that must be made
Came up with individual state budgets for emissions reductions from covered units
Budget is what remains after significant contribution is eliminated

Done via Federal Implementation Plans that regulate electric generating units (EGUs) in 27 states
FIPs require reductions in SO₂ and NO_x
Expect reductions in PM_{2.5} and ozone

Recent CAA Initiatives – CSAPR Costs and Benefits

Emission reductions	2012 Base Case	Reductions by 2014
SO ₂	7MT	3.9MT
Annual NO _x	1.4MT	0.2MT
Ozone-season NO _x	0.7MT	0.1MT
Costs	\$1.85B in 2012 and \$0.83B in 2014 (@7%)	
	Costs are the annual incremental electric generation production costs	
	EPA believes that these cost will be passed on to consumer	
Monetized health benefits estimated between \$110B – \$250B (@7%)		
Great majority of benefits from reductions in PM _{2.5} -related mortality*		
Mortality**		
	Pope (2002)	13,000
	Laden (2006)	34,000
Non-Fatal Heart Attacks		15,000
Chronic Bronchitis		8,700
Acute Bronchitis		19,000
Asthma Exacerbation		400,000
		\$94B
		\$240B
		\$1.3B
		\$4.2B
		\$0.008B
		\$0.02B

*Premature deaths from 2014 onward due to reductions in ambient PM_{2.5}, which are most significantly impacted by SO₂ reduction

**Between 27 and 120 fewer ozone-related mortalities (from other studies)

Recent CAA Initiatives – CSAPR Costs and Benefits

Costs - \$120B by 2015 for scrubbers and SCR Units (ALEC)
\$70 - \$100B to comply (Utility MATS/CSAPR) (Credit Suisse)

Electric Generation - 4.8 GW removed by 2014 (EPA)
7 – 55 GW (North American Reliability Corp./Brattle Group)

Report by American Coalition for Clean Coal Electricity (NERA)*

Retirements of Coal Units – 39GW by 2015 (12% of capacity)
Costs to comply - \$21B/year between 2012-2020; \$127B (present value)
Electricity prices – Up 6.5%
Employment – 183K/year; 1.65M between 2012-2020
GDP – loss of \$29B/year between 2012-2020; \$190B cumulative

*Utility MATS/CSAPR/CCR/cooling water intake rule

Recent CAA Initiatives – Boiler MACT Summary

Published final rule on March 21, 2011, effective May 21, 2011
76 Fed. Reg. 15554 (March 21, 2011) (Area Sources)
76 Fed. Reg. 15608 (March 21, 2011) (Major Sources)

Area sources - Emission standards for control of HAPs (mercury, PM [for non-mercury metals], CO [for organic air toxics]) from industrial, commercial, and institutional boilers

Major sources - Emission standards for control of HAPs (mercury, dioxin, PM [for non-mercury metals], HCL [for acid gases], CO [for non-dioxin organic air toxics]) from industrial, commercial, and institutional boilers and process heaters

EPA announced on same day that it was convening a proceeding to reconsider aspects of the rules (March 21), then delayed effective date until judicial review finalized or reconsideration completed (May 18), then proposed the reconsideration (Dec. 23)

The delay was vacated by the district court (Jan. 19, 2012)

No Action Assurance letters issued by EPA for certain aspects of the rules
Effective until December 31, 2012

Recent CAA Initiatives – Boiler MACT Area Source – Costs and Benefits

Emission reductions	Mercury	97 pounds per year
	PM	2,580 TPY
	Non-Mercury Metals	320 TPY
	POM	9 TPY

Costs \$535M per year in 2014
Includes installing controls, tune-ups, energy assessments, and implementing testing and monitoring requirements

Monetized health benefits estimated between \$190M to 470M (@ 7%)
Does not include any HAP reduction benefits; mainly based on monetized benefits of PM_{2.5} reductions in mortality

Mortality	Pope (2002)	24	\$190M
	Laden (2006)	61	\$470M
Non-Fatal Heart Attacks		40	
Chronic Bronchitis		17	
Acute Bronchitis		38	
Asthma Exacerbation		420	

Source: March 21, 2011 Federal Register, pp. 15579-15582; RIA, Feb., 2011, Tables 7-3, 7-5, 7-7

Recent CAA Initiatives – Boiler MACT Major Source – Costs and Benefits

Emission reductions	Mercury	1.4 TPY
	PM	47,500 TPY
	Non-Mercury Metals	2,700 TPY
	SO ₂	442,000 TPY
	HCL	30,000 TPY
	VOCs	7,000 TPY

Costs \$5.1B in capital expenditures and \$1.8B in annual costs

Monetized health benefits estimated between \$20B to \$49B (@ 7%)
Does not include any HAP reduction benefits; mainly based on monetized benefits of PM_{2.5} reductions in mortality

Mortality	Pope (2002)	2,500	\$20B
	Laden (2006)	6,500	\$49B
Non-Fatal Heart Attacks		4,000	
Chronic Bronchitis		1,600	
Acute Bronchitis		3,700	
Asthma Exacerbation		41,000	

Source: March 21, 2011 Federal Register, pp. 15649-15653; Fact Sheet; RIA, Feb., 2011, Tables 7-2, 7-4, 7-6

Recent CAA Initiatives – Boiler MACT Costs and Benefits

Council of Industrial Boiler Owners (August, 2010)

- Analysis of proposed rule
- Every billion spent on MACT upgrades and compliance costs puts 16,000 jobs at risk and reduces US GDP by \$1.2B
- Cost of upgrades at \$20.7B, across 24 industry subsectors
- Jobs at risk: 70K, directly tied to affected industries/facilities
338K total, including indirect and induced impacts
- Up to \$15.2B in employee compensation potentially forfeited

Questions?

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