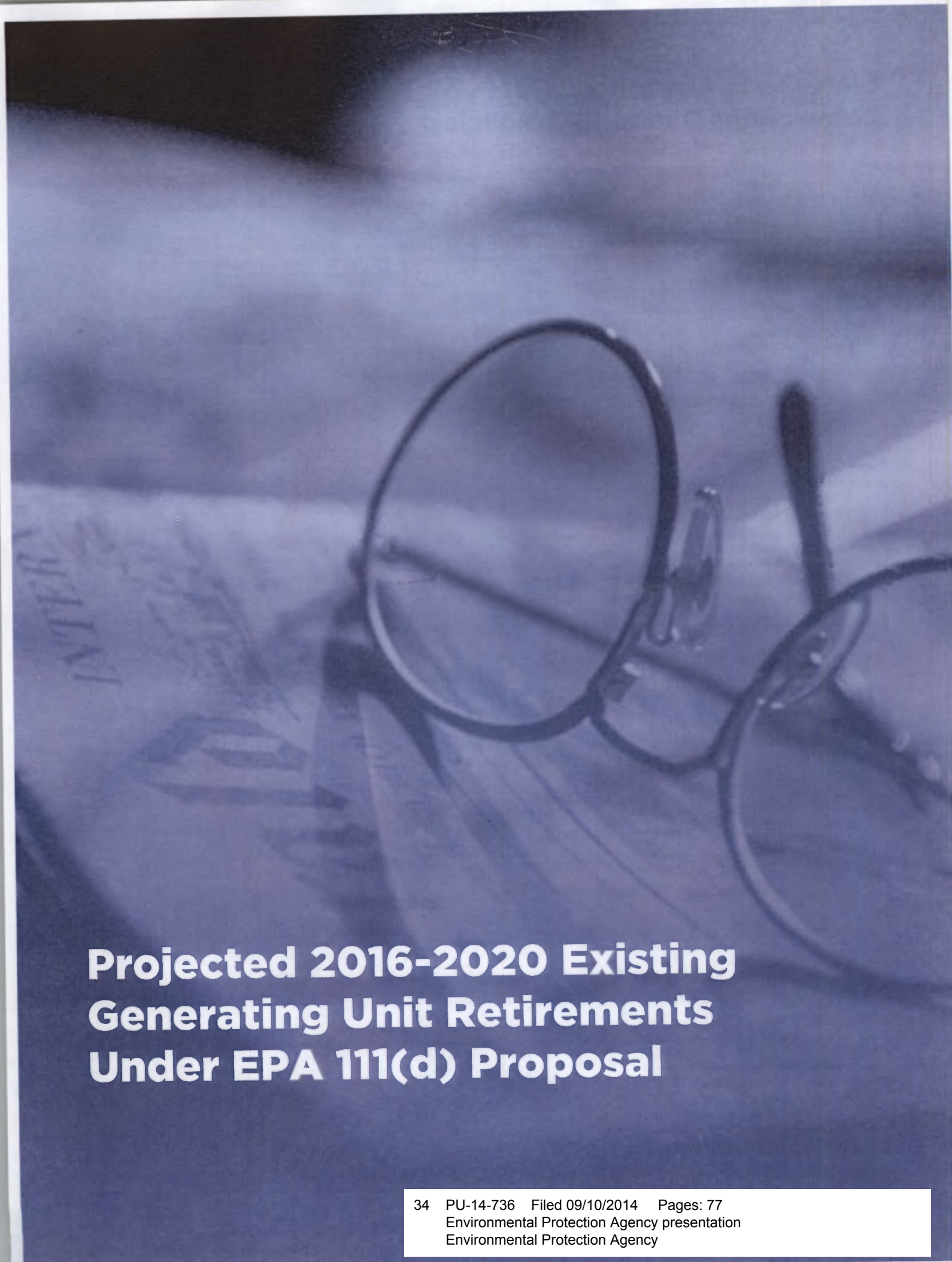
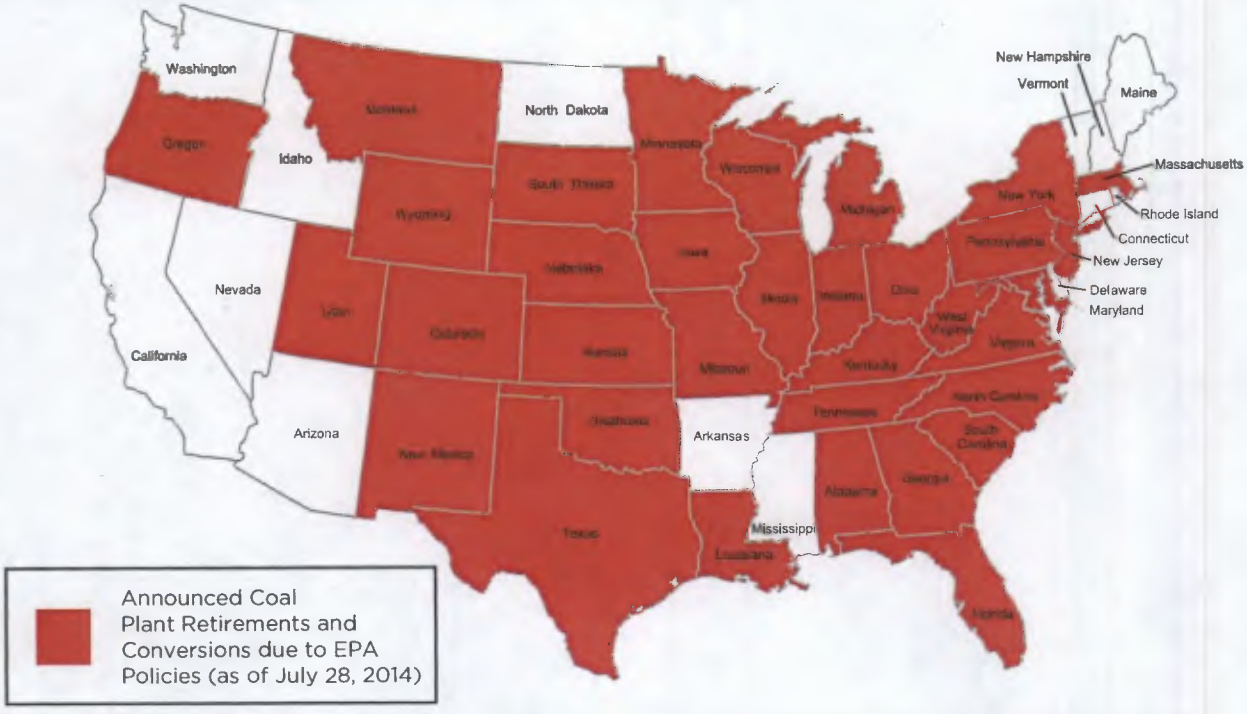


Projected 2016-2020 Existing Generating Unit Retirements Under EPA 111(d) Proposal

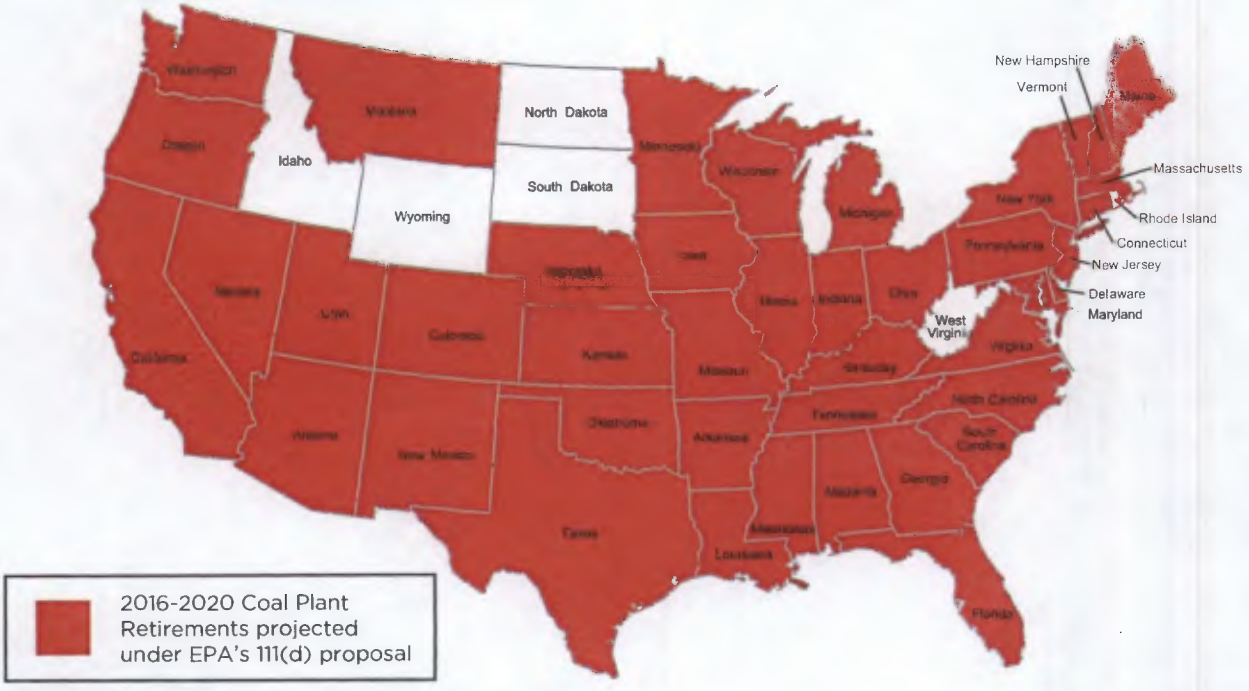
States with Announced Coal Unit Retirements and Conversions Due to EPA Policies*



*361 units nationally representing 55,702 MW of Capacity. 318 units are retiring, 43 are converting to natural gas or biomass.

Source Data: ACCCE, Coal Unit Shutdowns as of July 28th, 2014; www.americaspower.org

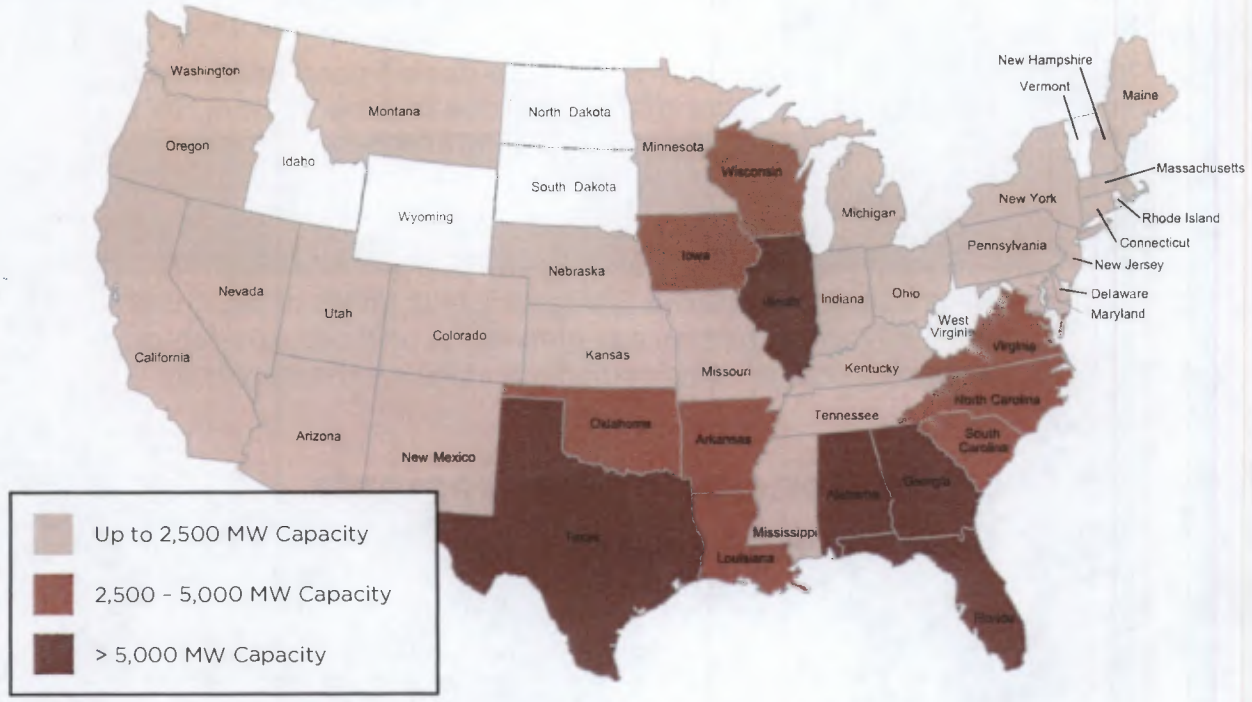
States with EPA-Projected Coal Unit Retirements Under 111(d) Proposal* (2016-2020)



*Excludes committed retirements prior to 2016

Source Data: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-0220

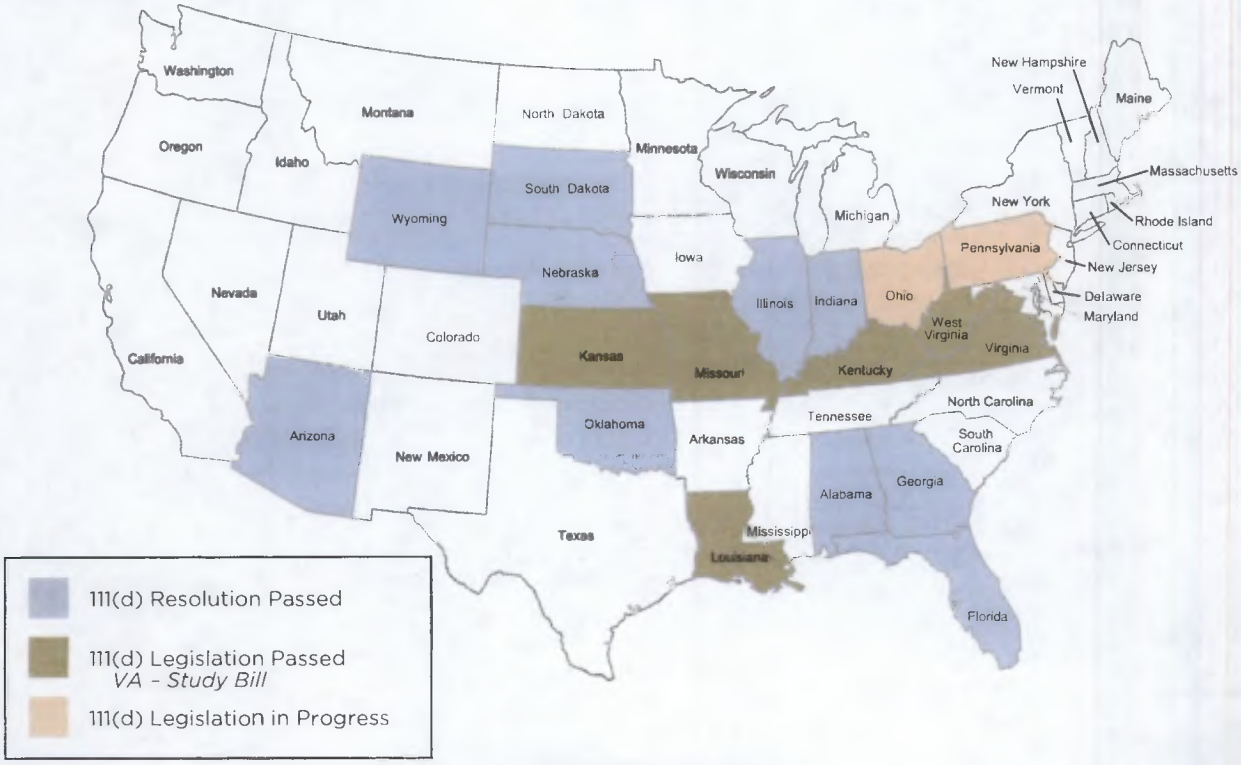
EPA-Projected Coal Capacity Retirements Under 111(d) Proposal* (2016-2020)



*Excludes committed retirements prior to 2016

Source Data: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-0220

111(d) State Legislation and Resolutions Adopted During 2014 Session



OVERVIEW

According to EPA predictions, approximately 50 gigawatts of retirements of baseload coal generation could occur between 2016 and 2020 due to its proposed regulations to reduce CO_2 from existing coal-fueled power plants commonly called EPA's "Clean Power Plan."

This is in addition to the approximately 70 gigawatts of coal-fueled generation that EPA acknowledges has already retired or will retire this decade due to other factors. This combined total of lost generation is enough to power 60 million homes. Almost every state would experience retirements shown on the maps and spreadsheet from EPA's database.

Greater or fewer Clean Power Plan retirements, and differences in associated jobs, electricity costs and output from manufacturing and agriculture-based economies might occur depending upon a state's ability to achieve EPA's very high levels of plant unit and consumer end use energy efficiency, natural gas generating unit capacity factor, and new renewable and nuclear generating unit deployments on EPA's extremely ambitious schedule.

Summary of EPA 111d Generation Retirements

- According EPA's IPM modeling of the proposed 111(d) rule using a regional compliance approach, 132 GW of generating capacity will retire between 2016 and 2020.
- 68 GW of the 132 GW is projected to retire directly in response to the proposed 111(d) rule (i.e. is incremental), including 46 GW of low cost, base load, coal generation and 11 GW of oil/gas steam generation.
- Of the 68 GW projected to come off-line directly in response to the rule, 44 GW is projected to retire in 2016 or less than 18 months from now.
    - Includes 28 GW of coal units and 11 GW of oil/gas steam units which are likely in the process of engineering and constructing (i.e. spending money on) emission control equipment to become MATS compliant.
    - Retirement of this 44 GW has likely not been considered within reliability planning efforts.
- Between 2010 and 2015 EPA has also concluded that 48 GW of capacity has retired or has firm plans to retire, including 30 GW of coal.
- In total, EPA projects 180 GW of electric generation capacity will retire between 2010 and 2020 in response to the 111(d) rule and other factors.
    - This represents greater than 15% of the total U.S. installed capacity.

Notes:

1. EPA's IPM analysis assumes "building blocks" are available for compliance commensurate with their assumptions in developing state targets. Real world achievability of building blocks could result in dramatically different retirement scenarios in the various states.
2. Accompanying unit specific spreadsheet shows a total of 121 GW of retirements during 2016-20 (less than the 132 GW total shown above). This is because it does NOT account for 11 GW of capacity that EPA projects will be retired but cannot be explicitly attributed to a specific generating unit due to the unique IPM modeling process.

Source Data: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-0220

Projected 2016-2020 EGU Retirements Under 111(d) Proposal*

EPA's IPM Assessment of Option 1 with Regional Compliance
2020 Run Year

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Alabama	**5,976**						**5,976**
Barry	886						886
Charles R Lowman	80						80
Colbert	1,184						1,184
E C Gaston	1,020						1,020
Gadsden	130						130
Gorgas	1,241						1,241
Greene County	497						497
Widows Creek	938						938
Arizona	**766**						**766**
Apache Station	350						350
Cholla	260						260
H Wilson Sundt Generating Station	156						156
Arkansas	**4,007**					**743**	**4,750**
Harvey Couch						123	123
Independence	1,678						1,678
Lake Catherine						620	620
Plum Point Energy Station	670						670
White Bluff	1,659						1,659
California	**120**	**2,602**	**1,236**			**6,122**	**10,080**
AES Alamitos LLC						667	667
Agnews Power Plant		30					30
Alameda			44				44
Almond Power Plant			50				50
Berry Cogen			35				35
Berry Cogen Tanne Hills 18			14				14
Cardinal Cogen		41					41
Carson Ice-Gen Project		58	51				109
Civic Center		24					24
Coalinga 25D Cogen			11				11
Coalinga Cogeneration			36				36
Coalinga Cogeneration Facility			6				6
Combustion Turbine Project No 2			49				49

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Coolwater		462					462
Cymric 31X Cogen			5				5
Cymric 36W Cogen			11				11
Cymric 6Z Cogen			5				5
DAI Oildale		30					30
Dome Project			6				6
Dynegy Morro Bay LLC						999	999
Dynegy Moss Landing Power Plant						1,509	1,509
Dynegy Oakland Power Plant			165				165
El Centro		110				116	226
Foster Wheeler Martinez		104					104
Fresno Cogen Partners		73					73
Frito-Lay Cogen Plant			6				6
Gateway Generating Station		563					563
Gianera			52				52
Gilroy Power Plant		105					105
Grayson		57					57
Greenleaf 2 Power Plant			50				50
Harbor		225					225
Harbor Cogen		81					81
Haynes						974	974
JRW Associates LP						2	2
Kern River Eastridge Cogen			42				42
Kern River Fee A Cogen			6				6
Kern River Fee B Cogen			3				3
Kern River Fee C Cogen			6				6
King City Power Plant		111					111
Kingsburg Cogen		34					34
Lodi			23				23
McClellan			77				77
McClure			112				112
McKittrick Cogen			9				9
North Midway Cogen			9				9
Oildale Energy LLC			39				39
Olive						99	99
Olive View Medical Center		5					5
OLS Energy Chino		29					29

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Panoche Peaker			40				40
Pittsburg Power						1,311	1,311
Redding Power		106					106
Rio Bravo Jasmin	33						33
Rio Bravo Poso	33						33
Roseville			42				42
Salinas River Cogeneration			33				33
San Jose Cogeneration			6				6
Santa Clara Cogen			8				8
Sargent Canyon Cogeneration			30				30
SCA Cogen 2		134					134
Scattergood						445	445
Sconza Candy Company			5				5
SPA Cogen 3		164					164
Stockton Cogen	54						54
Taft 26C Cogen			11				11
United Cogen		29					29
Walnut			47				47
Wheelabrator Lassen			43				43
Wheelabrator Norwalk Energy		27					27
Woodland			48				48
Colorado	**645**						**645**
Arapahoe	109						109
Cherokee	352						352
Valmont	184						184
Connecticut	**394**					**1,669**	**2,063**
Bridgeport Station	394						394
Middletown						400	400
Montville Station						491	491
New Haven Harbor						448	448
NRG Norwalk Harbor						330	330
Delaware	**260**						**260**
Edge Moor	260						260
Florida	**7,260**	**135**				**2,192**	**9,587**
Anclote						1,011	1,011
Arvah B Hopkins						76	76
Big Bend	1,552						1,552
C D McIntosh Jr	342					85	427
Cedar Bay Generating Company LP	249						249
Central Power & Lime	135						135
Crist	906						906

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Crystal River	869						869
Deerhaven Generating Station	232					83	315
Indian River						577	577
Indiantown Cogeneration LP	330						330
John R Kelly						23	23
Lansing Smith	357						357
Larsen Memorial		105					105
Sanford						138	138
Scholz	92						92
Seminole	1,310						1,310
Stanton Energy Center	886						886
Suwannee River						131	131
Tom G Smith		30				22	52
Vero Beach Municipal Power Plant						46	46
Georgia	5,178						5,178
Hammond	840						840
Harllee Branch	1,016						1,016
Kraft	201						201
Mitchell	155						155
Scherer	1,680						1,680
Yates	1,286						1,286
Idaho						3	3
Clearwater Paper IPP Lewiston						3	3
Illinois	6,058						6,058
Baldwin Energy Complex	608						608
Dallman	348						348
E D Edwards	380						380
Hennepin Power Station	282						282
Joppa Steam	1,002						1,002
Newton	1,197						1,197
Powerton	1,536						1,536
Will County	251						251
Wood River	454						454
Indiana	1,889						1,889
Eagle Valley	257						257
Frank E Ratts	241						241
Harding Street	212						212
Jasper 2	14						14
R Gallagher	280						280
R M Schahfer	472						472

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Wabash River	313						313
Whitewater Valley	100						100
Iowa	**3,065**						**3,065**
Ames Electric Services Power Plant	104						104
Earl F Wisdom	38						38
Fair Station	41						41
George Neal North	957						957
Lansing	237						237
Milton L Kapp	211						211
Muscatine Plant #1	216						216
Prairie Creek	164						164
Riverside	133						133
Streeter Station	35						35
Sutherland	78						78
Walter Scott Jr Energy Center	851						851
Kansas	**535**		**12**			**147**	**694**
Fort Dodge						147	147
Lawrence Energy Center	50						50
Nearman Creek	229						229
Quindaro	183						183
Riverton			12				12
Tecumseh Energy Center	73						73
Kentucky	**1,389**						**1,389**
Big Sandy	260						260
Cooper	334						334
Dale	195						195
E W Brown	267						267
Robert A Reid	65						65
Shawnee	268						268
Louisiana	**3,051**					**3,192**	**6,243**
Big Cajun 1						220	220
Big Cajun 2	1,756						1,756
Brame Energy Center	486					422	908
CII Carbon LLC	46						46
D G Hunter						130	130
Louis Doc Bonin						302	302
Louisiana 2						138	138
Michoud						813	813
Monroe						126	126
Morgan City						54	54
Plaquemine						38	38
R S Nelson	763					603	1,366

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Teche						346	346
Maine	**58**	**93**				**233**	**384**
Caribou Generation Station						14	14
Rumford Cogeneration	58						58
Verso Paper		93					93
William F Wyman						219	219
Maryland	**825**						**825**
C P Crane	385						385
Herbert A Wagner	440						440
Massachusetts	**1,136**	**521**	**10**			**1,102**	**2,769**
Brayton Point	1,136		10			435	1,581
Canal						566	566
Cleary Flood		108					108
Lowell Cogen Plant		29					29
NAEA Energy Massachusetts LLC						101	101
Potter Station 2		79					79
Stony Brook		306					306
Michigan	**2,411**	**21**				**284**	**2,716**
B C Cobb	312						312
Claude Vandyke		21					21
Eckert Station	301						301
Endicott Station	50						50
Erickson Station	151						151
Harbor Beach	95						95
J B Sims	73						73
J C Weadock	306						306
J R Whiting	322						322
James De Young	27						27
Mistersky						50	50
Presque Isle	431						431
River Rouge						234	234
Shiras	41						41
TES Filer City Station	60						60
Trenton Channel	188						188
White Pine Electric Power	54						54
Minnesota	**828**						**828**
Austin Northeast	29						29
Clay Boswell	428						428
Hoot Lake	138						138
Silver Lake	57						57
Taconite Harbor Energy Center	152						152

State / Plant	Retired Capacity (MW)						
	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Willmar	24						24
Mississippi	2,086	69				2,193	4,348
Baxter Wilson						1,176	1,176
Delta						177	177
Gerald Andrus						712	712
Henderson						29	29
Jack Watson	706						706
L L Wilkins		35				8	43
Natchez						73	73
R D Morrow	360						360
Victor J Daniel Jr	1,020						1,020
Wright						19	19
Yazoo		33					33
Missouri	599						599
Blue Valley	51						51
James River Power Station	194						194
Lake Road	92						92
Montrose	169						169
Sibley	93						93
Montana	139		226				365
Basin Creek Plant			54				54
Colstrip Energy LP	35						35
Dave Gates Generating Station			132				132
Highwood Generating Station			40				40
Lewis & Clark	52						52
Yellowstone Energy LP	52						52
Nebraska	85						85
Lon Wright	85						85
Nevada	508	104				244	856
North Valmy	253						253
Reid Gardner	255						255
Tracy		104				244	348
New Hampshire	540						540
Merrimack	444						444
Schiller	96						96
New Jersey	1,401				614		2,015
B L England	155						155
Oyster Creek					614		614
PSEG Hudson Generating Station	614						614
PSEG Mercer Generating Station	632						632

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
New Mexico	815					186	1,001
Cunningham						186	186
San Juan	815						815
New York	2,147	177		45		1,779	4,148
AES Cayuga	313						313
AES Greenidge LLC	108						108
AES Somerset LLC	686						686
AES Westover	84						84
Bowline Point						567	567
C R Huntley Generating Station	436						436
Carr Street Generating Station		96					96
Dunkirk Generating Plant	520						520
Massena Energy Holdings LLC		81					81
Roseton Generating Station						1,212	1,212
S A Carlson				45			45
North Carolina	4,532						4,532
Asheville	185						185
G G Allen	1,127						1,127
Marshall	760						760
Roanoke Valley Energy Facility II	44						44
Roxboro	2,416						2,416
Ohio	2,379						2,379
Avon Lake	736						736
Conesville	1,530						1,530
Hamilton	83						83
Orrville	30						30
Oklahoma	3,425						3,425
Hugo	440						440
Muskogee	1,022						1,022
Northeastern	920						920
Sooner	1,043						1,043
Oregon	585	726					1,311
Beaver		463					463
Boardman	585						585
Coyote Springs		246					246
Oregon State University Energy Center		17					17
Pennsylvania	1,417						1,417
AES Beaver Valley Partners Beaver Valley	129						129

State / Plant	Retired Capacity (MW)						
	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Ebensburg Power	51						51
G F Weaton Power Station	112						112
New Castle Plant	320						320
P H Glatfelter	52						52
PPL Brunner Island	371						371
Sunbury Generation LP	382						382
South Carolina	**3,633**						**3,633**
Cogen South	90						90
Cross	570						570
McMeekin	250						250
Urquhart	94						94
W S Lee	200						200
Wateree	684						684
Williams	615						615
Winyah	1,130						1,130
Tennessee	**2,145**						**2,145**
Allen Steam Plant	741						741
Gallatin	976						976
Johnsonville	428						428
Texas	**9,131**		**4**			**3,265**	**12,400**
AES Deepwater	138						138
Coleto Creek	592						592
Fayette Power Project	1,195						1,195
J Robert Massengale						20	20
J T Deely	870						870
Jones						486	486
Lake Creek			4				4
Lewis Creek						460	460
Monticello	1,130						1,130
Moore County						46	46
Nichols						457	457
Pirkey	723						723
Plant X						422	422
Sabine						954	954
San Miguel	391						391
Thomas C Ferguson						420	420
W A Parish	2,509						2,509
Welsh	1,584						1,584
Utah	**225**						**225**
KUCC	174						174
Sunnyside Cogen Associates	51						51

State	Retired Capacity (MW)						
Plant	Coal Steam	Combined Cycle	Combustion Turbine	IGCC	Nuclear	O/G Steam	Grand Total
Vermont					620		620
Vermont Yankee					620		620
Virginia	2,862		48				2,910
Bremo Bluff	227						227
Chesapeake	373		48				421
Chesterfield	1,237						1,237
Clinch River	460						460
Mecklenburg Power Station	138						138
Spruance Genco LLC	104						104
Yorktown	323						323
Washington	1,340	1,540	596				3,476
Chehalis Generating Facility		509					509
Crystal Mountain			3				3
Encogen		158					158
Frederickson			134				134
Fredonia			280				280
Northeast			45				45
River Road Gen Plant		220					220
Sumas Power Plant		126					126
Tenaska Ferndale Cogeneration Station		271					271
Transalta Centralia Generation	1,340	256					1,596
Whitehorn			134				134
Wisconsin	2,713					9	2,722
Alma	120						120
Blount Street	101						101
Columbia	1,118						1,118
Edgewater	378						378
John P Madgett	372						372
Manitowoc	116						116
Menasha	27						27
Port Edwards Mill						5	5
Pulliam	213						213
UW Madison Charter Street Plant						4	4
Valley	268						268
Grand Total**	88,556	5,986	2,131	45	1,234	23,363	121,316

*Excludes committed retirements prior to 2016

**Totals may not match regulatory impact analysis due to how EPA assigns retrofit/retired capacity to individual units

Source Data: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2013-0602-0220

Addressing Air Emissions in the Power Sector

Presentation at

Institute of Public Utilities 56th Annual Regulatory Studies Program

August 11, 2014

Erich Eschmann
U.S. Environmental Protection Agency
Office of Air and Radiation

EPA United States Environmental Protection Agency

Overview

- Air policy and emissions in context
- EGUs under the Climate Action Plan
  - New sources under CAA section 111(b)
  - Existing sources under CAA section 111(d)
- Mercury and Air Toxics Standards (MATS)
- CSAPR and Transported Air Pollution
- NAAQS
- Regional Haze
- PSD and NNSR
- Energy efficiency and renewable energy

EPA United States Environmental Protection Agency

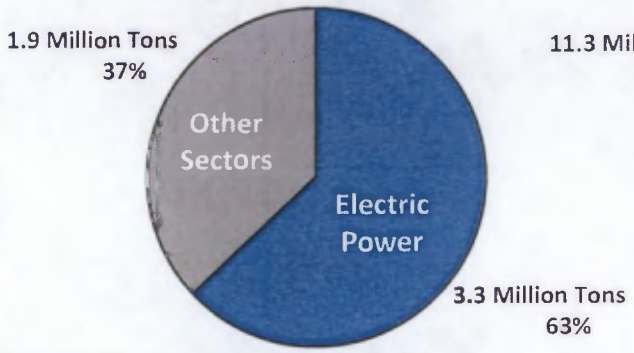
Addressing Environmental Impacts and Public Health Impacts of Power Plant Pollution

- **Air quality problems**
  - Ozone (O_3)
    - Precursors: volatile organics (VOCs) and nitrogen oxides (NO_X)
  - Particles (PM_{10} and $PM_{2.5}$)
  - Nitrogen dioxide (NO_2)
  - Sulfur dioxide (SO_2)
  - Lead (Pb), carbon monoxide (CO)
- **Air toxics**
  - Mercury (Hg) and other hazardous air pollutants
- **Greenhouse gases**
  - Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), SF_6
- **Cooling water intake**
- **Wastewater discharges**
- **Coal ash management**

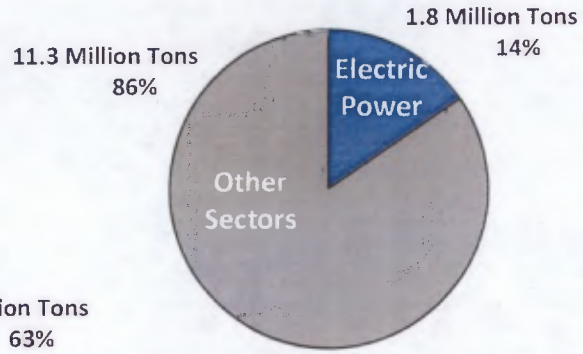
EPA United States Environmental Protection Agency

Power Sector Provides Major Share of Air Emissions

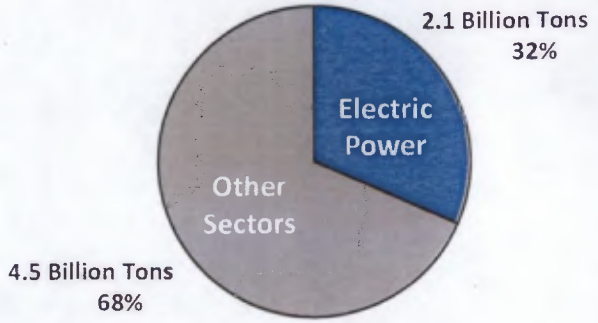
Sulfur Dioxide (SO_2), 2013
5.2 Million Tons



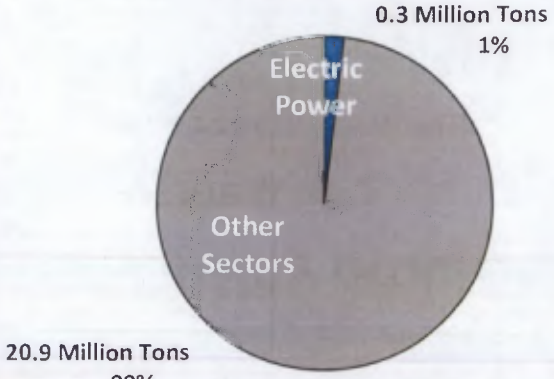
Nitrogen Oxides (NO_x), 2013
13.1 Million Tons



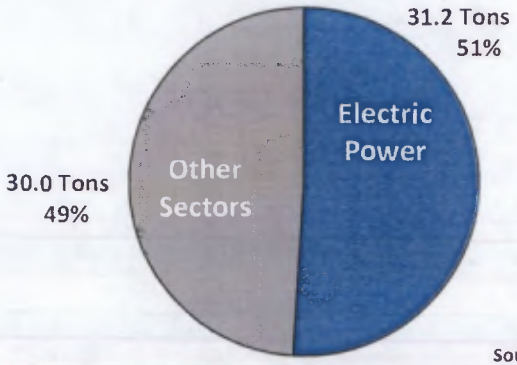
Carbon Dioxide (CO_2), 2012
6.5 Billion Tonnes



Particulate Matter (PM_{10}), 2013
20.9 Million Tons



Mercury (Hg), 2008
61.1 Tons



Other emissions include:

- Trace metals (nickel, arsenic, selenium and others)
- HCl, HF, other acid gases
- Dioxin/furans
- Trace organics
- Others (e.g., cyanide, radionuclides)

Emissions have substantial public health, environment, and other welfare implications

Sources:

NEI Trends Data (2013) (SO_2, NO_x, PM_{10})
Version 3 of EPA's National Emissions Inventory 2008 (2013) (Hg)
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012 (2014) (CO_2)
"Other" sectors include transportation, other mobile sources, and industrial sources

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Power Sector Air Pollution Contributes to Major Health and Environmental Effects

Public Health and Welfare

- Respiratory restrictions, aggravation of ailments (e.g., asthma attacks) and disease
- Heart ailments and attacks
- Premature deaths
- Neurological damage
- Loss of worker productivity and school days
- Emergency room visits and hospital admissions

Environment

- Acid rain damage
- Eutrophication
- Visibility loss
- Changes to ecosystem functions
- Damage to commercial forests, crops, and urban ornamentals
- Climate change and environmental adjustments

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Ways to Lower Power Sector Air Emissions

Clean Air Act (CAA)

- National Ambient Air Quality Standards (NAAQS) implementation*
  - Setting ambient standards
  - State Implementation Plans (SIPs)
- New Source Review/Prevention of Significant Deterioration (NSR/PSD)
- Authority to address interstate transport
  - NO_X SIP Call
  - Clean Air Interstate Rule (CAIR)
  - Cross-State Air Pollution Rule (CSAPR)
- Acid Rain Program (ARP)
- Mercury and Air Toxics Standards (MATS)
- Regional Haze (Visibility)
- New Source Performance Standards (NSPS)
  - GHG NSPS for new sources in the power sector
  - GHG emission guidelines for existing sources

Partnership Programs

- EPA has several major partnership programs to increase investment in clean energy (energy efficiency, renewable energy & CHP)
  - ENERGY STAR (product labeling and residential, commercial and industrial sectors)
  - State Energy Efficiency Action Network (co-sponsored with DOE)
  - Green Power Partnership
  - Combined Heat and Power Partnership
  - State and Local Climate and Energy Program

State Programs

- States implement CAA through SIPs and other regulatory actions
- Several states have passed their own laws requiring emission reductions from power plants
  - AL, AZ, CA, CO, CT, DE, GA, IL, KS, LA, ME, MD, MA, MI, MN, MO, MT, NH, NJ, NY, NC, OR, TX, UT, WA, WI
- All states and DC have renewable portfolio standards and/or other programs to promote renewable energy and/or energy efficiency
  - 25 states w/ EERS and 29 w/ RPS

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EGUS UNDER THE CLIMATE ACTION PLAN

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Electricity is the Largest Source of GHG Emissions in the U.S.

U.S. GREENHOUSE GAS POLLUTION INCLUDES:

CARBON DIOXIDE (CO2) 82%

Enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g., manufacture of cement).

FLUORINATED GASES 3%

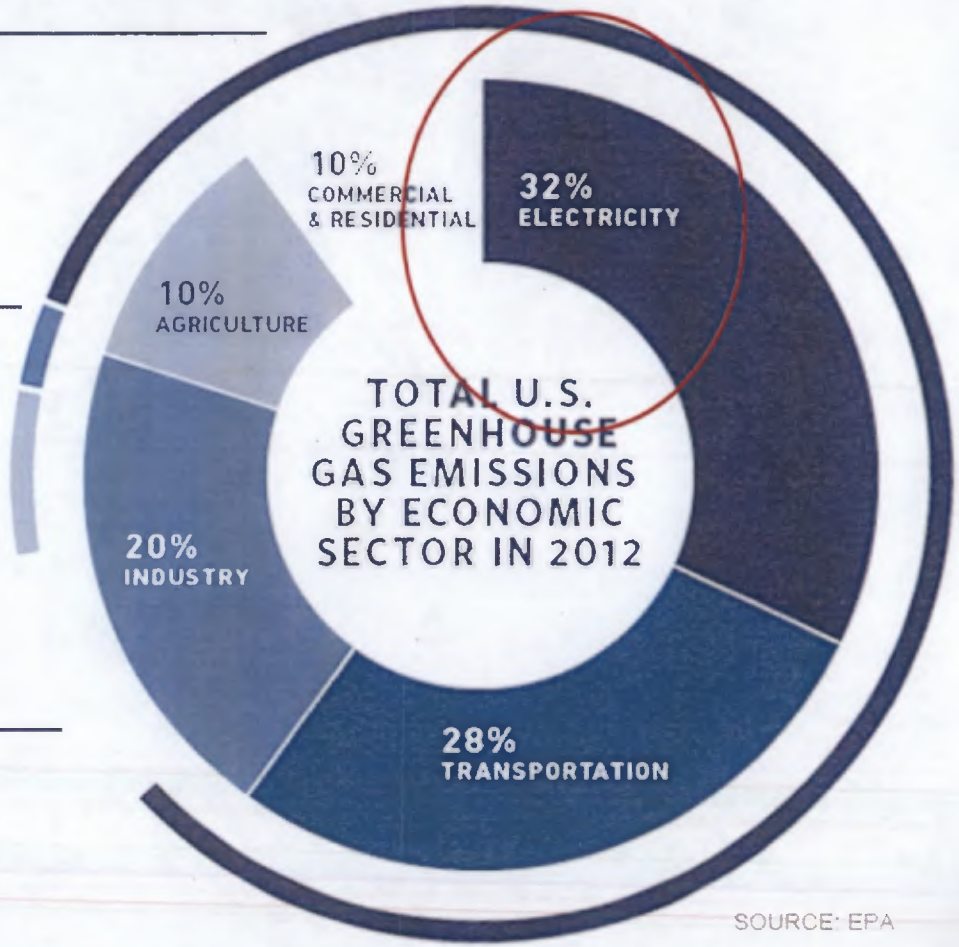
Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes.

NITROUS OXIDE (N2O) 6%

Emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

METHANE (CH4) 9%

Emitted during the production and transport of coal, natural gas, and oil as well as from landfills.



SOURCE: EPA

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Carbon Pollution and Health

- Carbon pollution stays in the atmosphere and contributes to climate change, which is a threat to public health and the environment for current and future generations.
- Unchecked carbon pollution leads to long-lasting changes in our climate, such as rising global temperatures; rising sea level; changes in weather and precipitation patterns; and changes in ecosystems, habitats and species diversity.
- Public health risks include more heat waves and drought; worsening smog (also called ground-level ozone pollution); increasing the intensity of extreme events, like hurricanes, extreme precipitation and flooding; and increasing the range of ticks and mosquitoes, which can spread disease such as Lyme disease and West Nile virus.
- Our most vulnerable citizens, including children, older adults, people with heart or lung disease and people living in poverty are most at risk from the impacts of climate change.

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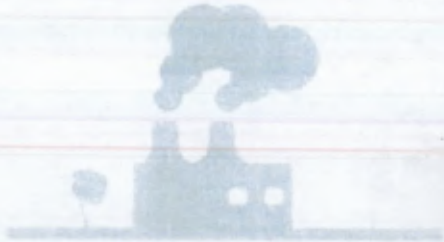
Reducing Carbon Pollution From Power Plants

President's Directive to EPA:

- Develop carbon pollution standards, regulations or guidelines, as appropriate, for:
  1. New power plants—111(b)
     - Proposed on September 20, 2013
  2. Modified and reconstructed power plants—111(b)
     - Proposed on June 2, 2014
     - Final: June 2015
  3. Existing power plants—111(d)
     - Proposed Guidelines on June 2, 2014
     - Final Guidelines: June 2015
     - State Plans due: June 2016



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Clean Air Act Section 111

- **Authorized in 1970**
- **Establishes a mechanism for controlling air pollution from stationary sources**
  - Applies to sources for which the Administrator, in her judgment, finds "causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare"
  - Can apply to new, existing, modified and reconstructed sources
- **More than 70 stationary source categories and subcategories are currently regulated under section 111**
  - A full list is available in 40 CFR Part 60

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Clean Air Act Section 111

- Lays out different approaches for new and existing sources
  - **New sources under section 111(b)**
    - Federal standards for new, modified and reconstructed sources
  - **Existing sources under section 111(d)**
    - State programs for existing sources that are equivalent to federal guidelines

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Proposed Carbon Pollution Standards for New Sources

- **EPA is proposing to set separate standards for new natural gas-fired turbines and coal-fired units.**

- **The standards apply to new**
  - natural gas-fired stationary combustion turbines
  - fossil fuel-fired utility boilers and integrated gasification combined cycle (IGCC) units

- **More information** at: http://www2.epa.gov/carbon-pollution-standards

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Proposed Carbon Pollution Standards for New Sources

Natural gas-fired stationary combustion turbines

- Standard based on the performance of modern natural gas combined cycle (NGCC) units
- Proposing 2 limits depending on the size of the unit.
- Proposed limits are:
  - 1,000 pounds of CO_2 per megawatt-hour (lb CO_2/MWh gross) for larger units (>850 mmBtu/hr)
  - 1,100 lb CO_2/MWh gross for smaller units (≤850 mmBtu/hr)

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Proposed Carbon Pollution Standards for New Sources

Fossil fuel-fired utility boilers and IGCC units

- Standard based on performance of a new efficient coal unit implementing partial carbon capture and storage (CCS)
- Limits would lead to capture of only a portion of the CO_2 from a new unit (roughly 30%-50%)
- Proposing two limits, depending on the compliance period that best suits the unit.
- Proposed limits are
  - 1,100 lb CO_2/MWh gross over a 12-operating month period, or
  - 1,000-1,050 lb CO_2/MWh over an 84-operating month period

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Flexibility for New Coal Plants

- Proposing option for coal-fired units to use an 84-operating month rolling average of CO_2 emissions to meet the proposed standard, rather than meeting the standard over 12-months.
  - Emission limit would be more stringent (request comment on a range between 1,000 - 1,050 lb CO_2/MWh)
- Maintains the flexibility for units using partial CCS to optimize the system over several months, while setting a more reasonable time period for reporting and assuring compliance with the standard.

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Proposed Standards In Line with Power Sector Trends

- According to new capacity projections made by EIA – and confirmed by additional EPA analysis -- the rule is not projected to require changes in the design or construction of new units.
- Most new electricity generating capacity is forecast to be either natural gas-fired or renewable.
- These units would already meet the standards proposed in this rule or are not covered by this rule
- The North American Electric Reliability Corporation's (NERC) Long Term Reliability Assessment, which is based on utility plans for new generating capacity over a 10-year period, [1] reinforces this likelihood by stating that "gas-fired generation [is] the primary choice for new capacity."

1. NERC, Long-Term Reliability Assessments for 2009 (Table 5) and 2012 (Figure 51). Capacity includes both planned and conceptual resources as defined by NERC.

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Clean Air Act Section 111

- Lays out different approaches for new and existing sources
  - New sources under section 111(b)
    - Federal standards for new, modified and reconstructed sources
  - Existing sources under section 111(d)
    - State programs for existing sources that are equivalent to federal guidelines

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Proposed Clean Power Plan

- Summary of Proposal
- Background on Clean Air Act Section 111(d)
- Pre-proposal Outreach & What We Heard
- Setting State Goals
- State Plans for Meeting Goals
- Costs and Benefits
- Next Steps

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Summary

This proposal will:

- Reduce carbon pollution from existing power plants, for which there are currently no national limits.
- Maintain an affordable, reliable energy system.
- By 2030, reduce nationwide carbon dioxide (CO_2) emissions, from the power sector by approximately 30% from 2005 levels.
  - Significant reductions begin by 2020.
- Cut hundreds of thousands of tons of harmful particle pollution, sulfur dioxide and nitrogen oxides as a co-benefit.
- Provide important health protections to the most vulnerable, such as children and older Americans.
- Lead to health and climate benefits worth an estimated $55 billion to $93 billion in 2030.
- From soot and smog reductions alone, for every dollar invested through the Clean Power Plan – American families will see up to $7 in health benefits.

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Summary (Cont'd)

- Build on actions states, cities and businesses across the country are already taking to address the risks of climate change.
- Spur investment in cleaner and more efficient technologies, creating jobs and driving innovation.
- Require a reasonable emission reduction glidepath starting in 2020.
- Provide a flexible timeline—up to 15 years from guideline issuance—for all emission reduction measures to be fully implemented in 2030.
  - Recognizing that investments in infrastructure can take time to put in place and
  - Avoiding stranded assets.
- Provide an array of tools states can use to formulate approvable plans.

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Background: Clean Air Act Section 111(d) Best System of Emission Reduction

- Previous EPA rules under this section of the Clean Air Act have considered "add-on" control technologies – like scrubbers -- that are technically feasible to deploy at virtually any facility.
- In contrast, there are a wide variety of ways to reduce carbon pollution that are commercially available, technically feasible, and cost effective.
- The opportunities vary from state to state, depending on how electricity is generated, energy infrastructure, and other factors.
- In this proposal, EPA took an approach that viewed the Clean Air Act factors in determining Best System of Emission Reduction in light of the interconnected nature of power generation.
- BSER factors
  - Costs
  - Size of reductions
  - Technology
  - Feasibility

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Early Outreach Informed This Proposal

- EPA conducted a robust pre-proposal stakeholder engagement process.
  - Participated in meetings with over 300 utility, consumer, labor and environmental groups since June 2013.
  - Held 11 public listening sessions around the country.
    - 3,300 people attended.
    - More than 1,600 people offered oral statements.
- Reached out to all 50 states.
  - Some states noted their programs to address carbon evolved because of:
    - The need to address carbon pollution;
    - Electric system that is dynamic, and in the midst of market changes; and
    - Modernizing the power sector is good for the economy.
- Common themes included reliability, flexibility, affordability, time for plans and implementation.

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State Actions are Foundation of Proposal

- What we learned during the engagement process about what states are already doing has informed EPA's proposal.

- State actions provide the foundation for our analysis.
  - 10 states with market-based GHG emission programs.
  - 38 states with renewable portfolio standards or goals.
  - 47 states with utilities that run demand-side energy efficiency programs.
  - 27 states with energy efficiency standards or goals.

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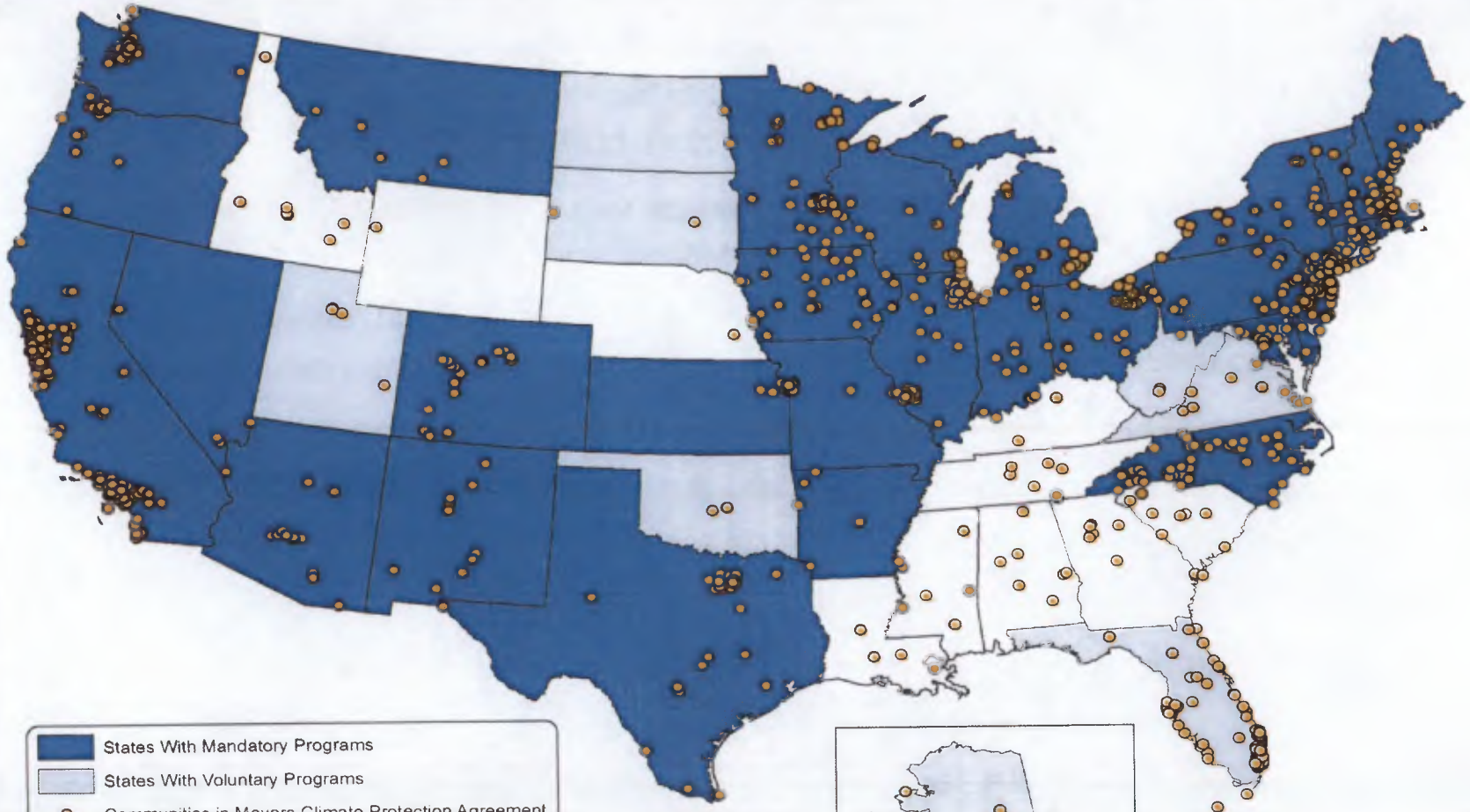
States and Communities with Programs That Reduce Carbon Pollution



State programs that reduce carbon include carbon cap and trade programs and energy efficiency and renewable energy standards or goals.

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EPA Establishes a Goal for Every State

- EPA analyzed the practical and affordable strategies that states and utilities are already using to lower carbon pollution from the power sector.
- Proposed goals are based on a consistent national formula, calculated with state and regional specific information.
- The result of the equation is the state goal.
- Each state goal is a rate – a statewide number for the future carbon intensity of covered existing fossil-fuel-fired power plants in a state.
  - Encompasses the dynamic variables that ultimately determine how much carbon pollution is emitted by fossil fuel power plants.
  - Accommodates the fact that CO_2 emissions from fossil fuel-fired power plants are influenced by how efficiently they operate and by how much they operate.
- The state goal rate is calculated to account for the mix of power sources in each state and the application of the "building blocks" that make up the best system of emission reduction.
- States will need to meet an interim goal and a final goal.

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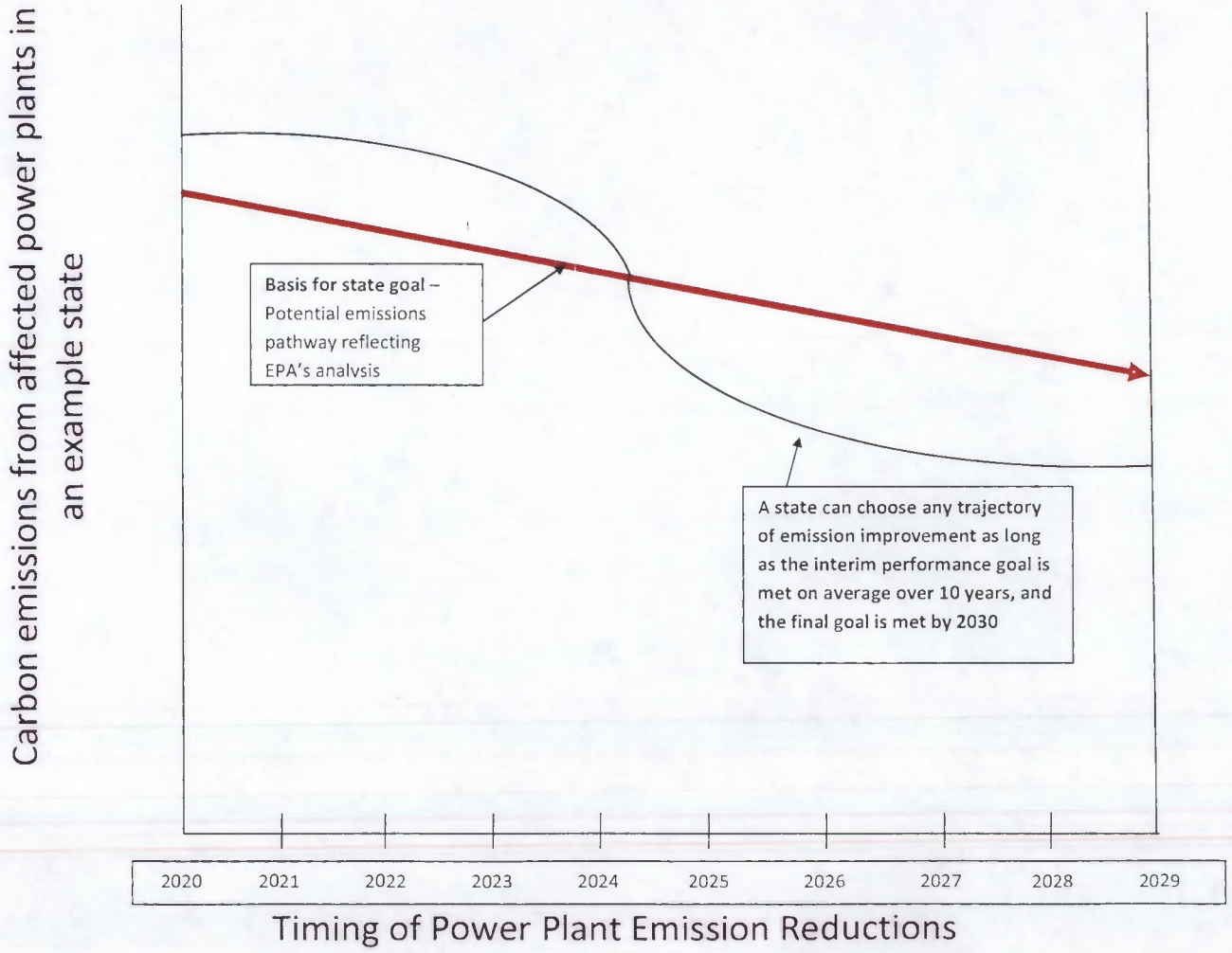
States Have Flexibility

As an example, states could do less in the early years, and more in the later years, as long as on average it meets the goal



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Four Building Blocks

Building Block	Strategy EPA Used to Calculate the State Goal	Maximum Flexibility: Examples of State Compliance Measures
1. Make fossil fuel-fired power plants more efficient	Efficiency Improvements	Efficiency improvements Co-firing or switching to natural gas Coal retirements Retrofit CCS (e.g., WA Parish in Texas)
2. Use lower-emitting power sources more	Dispatch changes to existing natural gas combined cycle (CC)	Dispatch changes to existing natural gas CC
3. Build more zero/low-emitting energy sources	Renewable Energy Certain Nuclear	New NGCC Renewables Nuclear (new and up-rates) New coal with CCS
4. Use electricity more efficiently	Demand-side energy efficiency programs	Demand-side energy efficiency programs Transmission efficiency improvements Energy storage

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Flexibilities Available To States

- Timing:
  - Up to 15-year window in which to plan for and achieve reductions in carbon pollution.
  - Up to two or three years to submit final plans.
- Form of goal: States can use either a rate-based or mass-based goal.
- Single or multi-state plans: States can collaborate and develop plans on a multi-state basis.
- Selection of measures:
  - States will choose how to meet the goal through whatever collection of measures reflects its particular circumstances and policy objectives.
  - State measures may impact and, in fact may be explicitly designed to reduce, CO2 emissions from utilities on a regional basis.
  - EPA would support building off existing reduction programs.

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Benefits and Costs

- Nationwide, by 2030, this rule would help reduce CO_2 emissions from the power sector by approximately 30% from 2005 levels.
  - Also by 2030, reduce by over 25% pollutants that contribute to the soot and smog that make people sick.
- These reductions will lead to public health and climate benefits worth an estimated $55 billion to $93 billion in 2030.
- Proposal will avoid an estimated 2,700 to 6,600 premature deaths and 140,000 to 150,000 asthma attacks in 2030.
- Health and climate benefits far outweigh the estimated annual costs of meeting the standards.
  - Estimated at $7.3 billion to $8.8 billion in 2030.
- Proposal protects children and other vulnerable Americans from the health threats posed by a range of pollutants.
- Move us toward a cleaner, more stable environment for future generations.
- Ensures an ongoing supply of the reliable, affordable power needed for economic growth.

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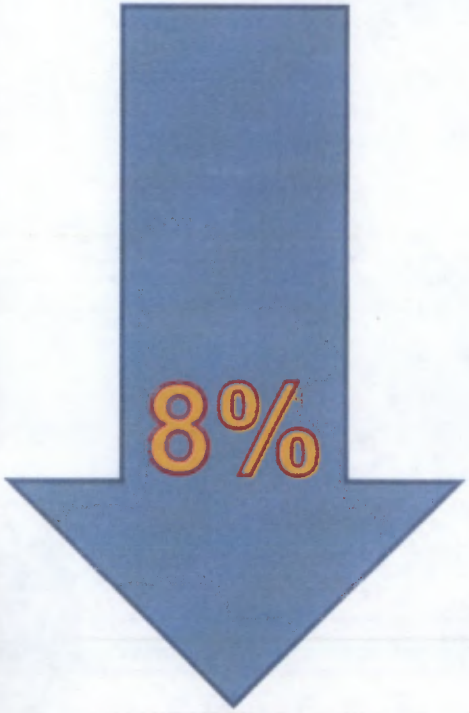
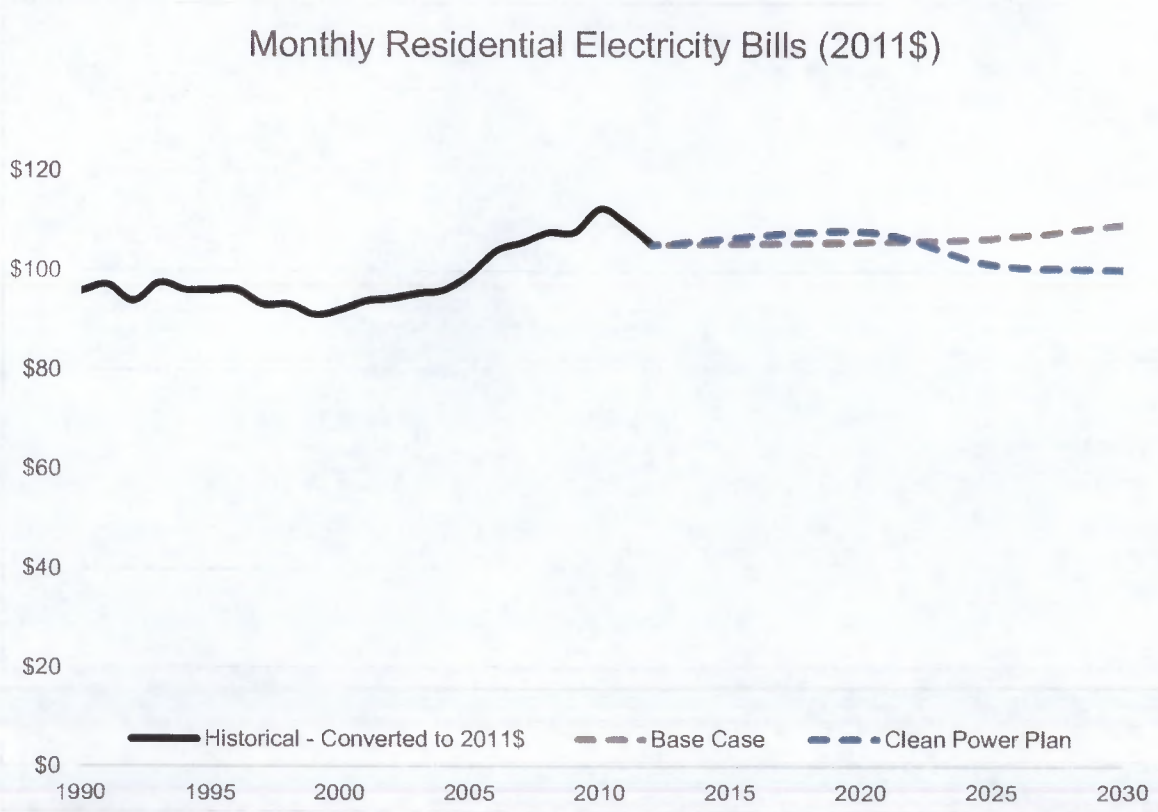
Other Impacts

Electricity bills down 8% in 2030





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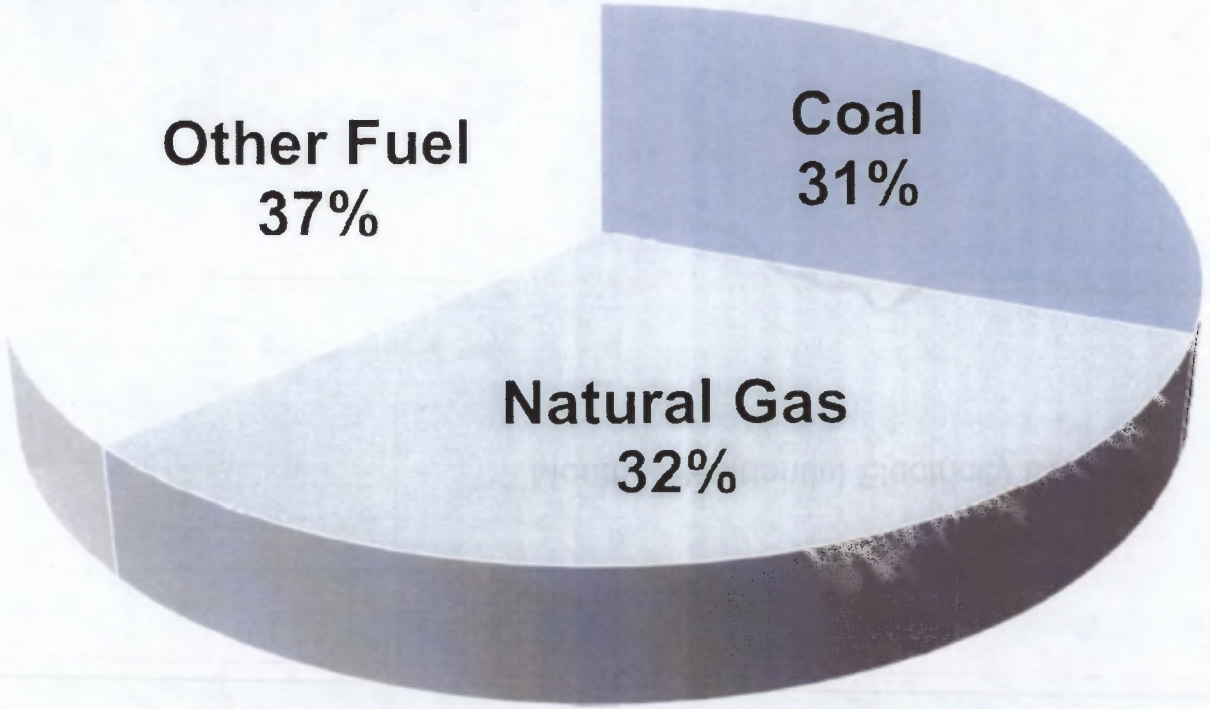
After Proposal, Coal & Natural Gas Remain Leading Sources of Electricity Generation

Each more than 30% of projected generation in 2030



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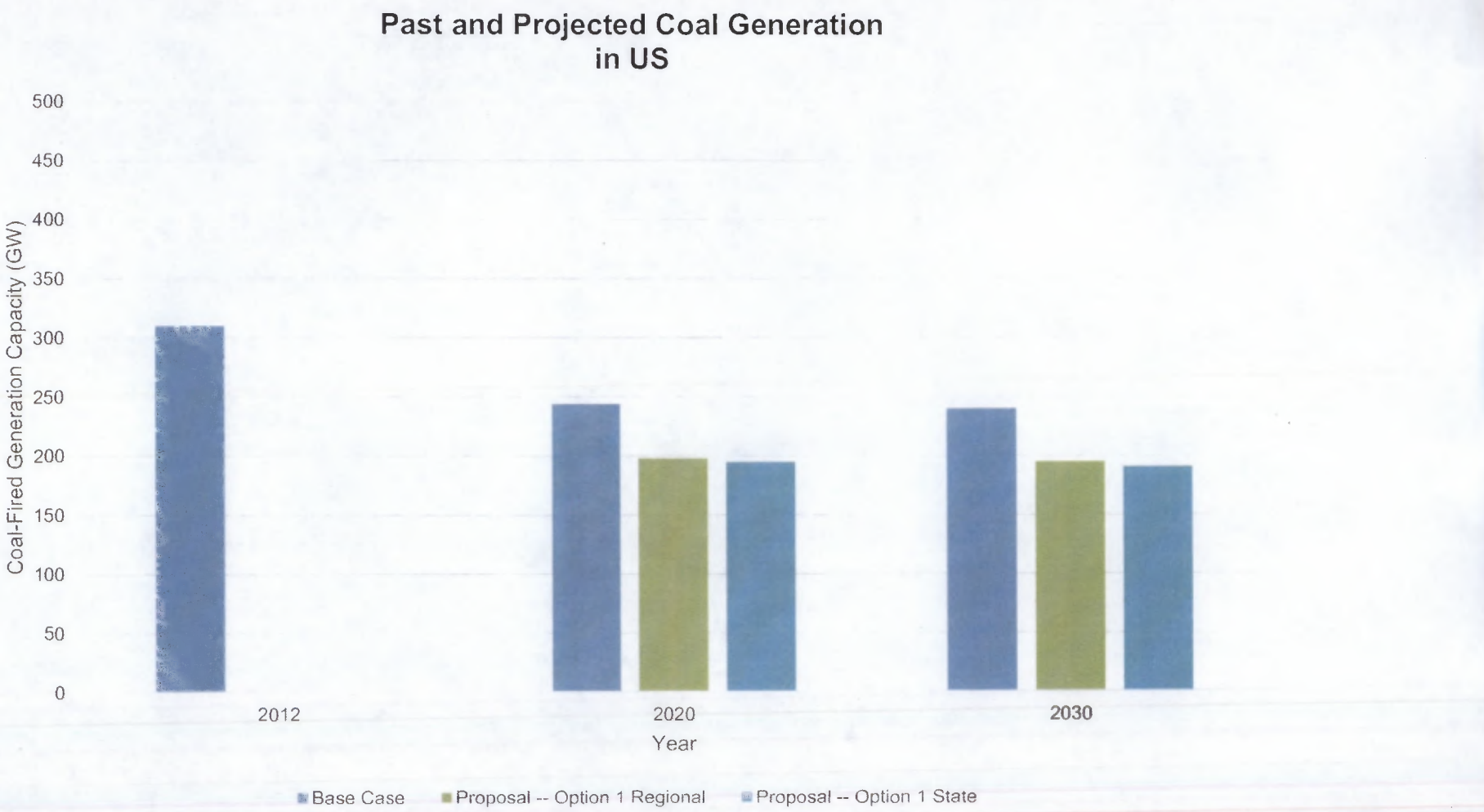
Other Impacts



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For More State-By-State Information

http://www.epa.gov/cleanpowerplan

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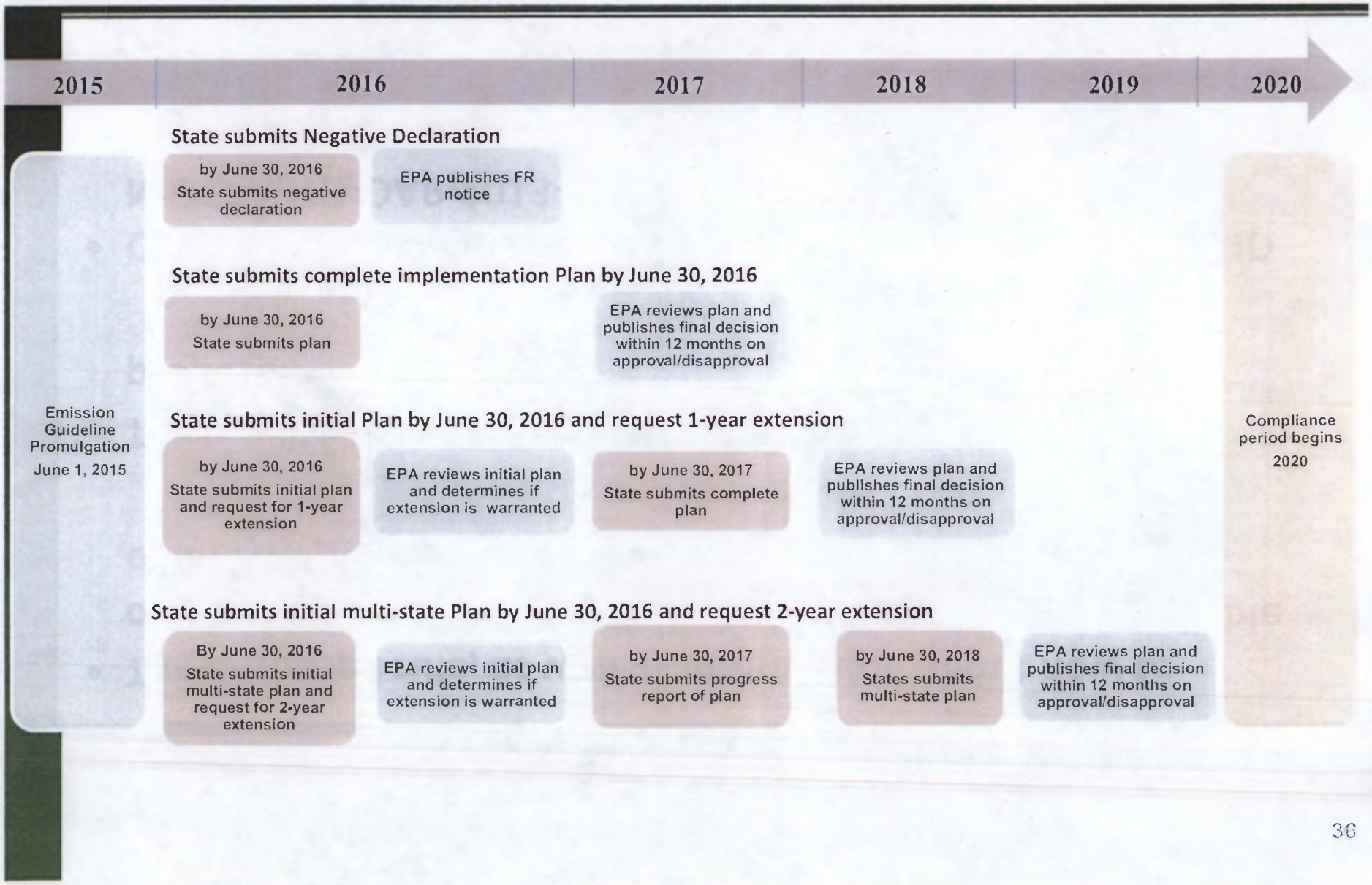
Next Steps

- The proposed rule, as well as information about how to comment and supporting technical information, are available online at: http://www.epa.gov/cleanpowerplan
- There will be a 120-day public comment period on the proposal.
- Comments on the proposal should be identified by Docket ID No. EPA-HQ-OAR-2013-0602.

Proposed Implementation Timeline



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MERCURY AND AIR TOXICS STANDARDS (MATS)

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Mercury and Air Toxics Standards: Overview of Action

- On December 16, 2011 EPA finalized the Mercury and Air Toxics Standards, *the first national standards* to reduce emissions of mercury and other toxic air pollutants from new and existing coal- and oil-fired power plants.
  - Published in the Federal Register on Thursday, February 16, 2012.
  - Revisions regarding limits on new power plants published April 24, 2013.
- Standards will reduce emissions of:
  - Metals, including mercury (Hg), arsenic, chromium, and nickel
  - Acid gases, including hydrogen chloride (HCl) and hydrogen fluoride (HF)
  - Particulate matter
- Air toxic pollutants are linked to cancer, IQ loss, neurological damage, heart disease, lung disease, and premature death.
- Standards create uniform emissions-control requirements based on proven, currently in-use technologies and processes.
- For more information on these Mercury and Air Toxics Standards: http://www.epa.gov/mats.

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Toxic Emissions from Power Plants Are a Serious Public Health Concern

- Power plants emit mercury, arsenic, other metals, acid gases, and particles into the air that harm people's health.
  - Uncontrolled releases of mercury from power plants damage children's developing nervous systems, which can reduce their IQ and impair their ability to think and learn.
  - Mercury and many of the other toxic pollutants also pollute our nation's lakes and streams, and contaminate fish.
  - Other metals such as arsenic, chromium, and nickel can cause cancer.
  - Acid gases cause lung damage and contribute to asthma, bronchitis and other chronic respiratory disease, especially in children and the elderly.
  - Particles cause premature death, increased numbers of hospital admissions and emergency department visits, and development of chronic respiratory disease.
- The standards will also result in additional reductions of SO_2, which will reduce fine particles in the air we breathe and prevent thousands of deaths and hundreds of thousands of illnesses each year.
- The value of the improvements to health alone total $37 billion to $90 billion each year for those health benefits we were able to quantify.
- The estimated annual costs of this final rule are $9.6 billion. This means that for <u>every dollar spent to reduce this pollution, we will get $3-$9 in health benefits.</u>

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MATS Timing

- EPA expects most facilities will comply with this rule through a range of strategies, including the use of existing emission controls, upgrades to existing emission controls, installation of new pollution controls, and fuel switching.

- Existing sources generally will have up to 4 years if they need it to comply with MATS.
  - This includes the 3 years provided to all sources by the Clean Air Act. EPA's analysis continues to demonstrate that this will be sufficient time for most, if not all, sources to comply.
  - Under the Clean Air Act, state permitting authorities can also grant an additional year as needed for technology installation. EPA expects this option to be broadly available.

- EPA is also providing a clear pathway for reliability critical units to obtain a schedule with up to an additional year to achieve compliance. This pathway is described in a separate enforcement policy document. The EPA believes there will be few, if any situations, in which this pathway will be needed.

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Sources Can Achieve MATS Standards

- Proven control technologies to reduce these emissions such as scrubbers, fabric filters, and activated carbon injection are widely available.
- Many units already use one or more of these technologies.
- As a result of this standard, some power plants will upgrade existing controls (especially particulate matter controls like electrostatic precipitators).
- Power plants may also install new controls (such as fabric filters, dry sorbent injection, or activated carbon injection).

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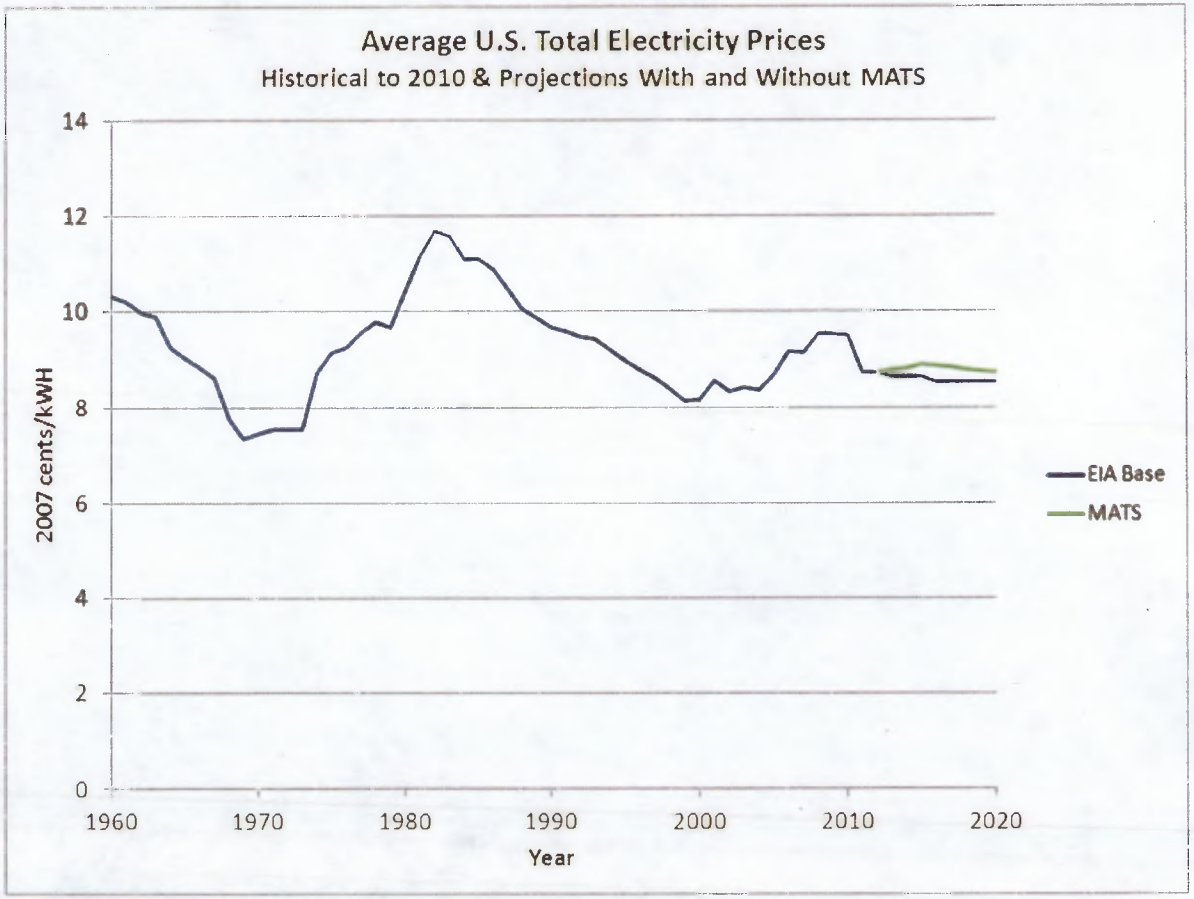
Any Effect On Future Electricity Costs Will Be Small and Within Normal Historical Fluctuations

- The graph shows the effect MATS may have on future electricity prices.
- The **blue line** shows historical electricity rates and what projected electricity rates would be without MATS (both from EIA).
- The green line shows how cleaning up power plants under MATS may lead to a slight increase in these prices in the future.
- However, the effect is small and keeps costs well within the normal historical fluctuation of electricity prices.
- In fact, even with MATS, electricity rates are projected to stay below historical highs.



Sources: EIA Historical (Annual Energy Review – October 2011); EIA Projected (Annual Energy Outlook 2011); EPA modeling of projected price increases using the Integrated Planning Model

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TRANSPORTED AIR POLLUTION

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Emissions Trading Programs Address Multi-State Air Pollution Challenges

Programs create *emission budgets* (total allowable emissions) while individual generators use *tradable allowances* (authorizations to emit tons) within those budgets

NO_x Budget Trading Program (NBP) covered ozone-season (summer) nitrogen oxide (NO_X) emissions in selected eastern states for fossil-fuel electricity generation and other large stationary sources. Program phased in from 2003 to 2007.

Acid Rain Program (ARP) covers annual sulfur dioxide (SO_2) emissions from most fossil fuel electric generation units. The program was implemented in two phases: 1995 for largest SO_2 emitters; 2000 for all others.

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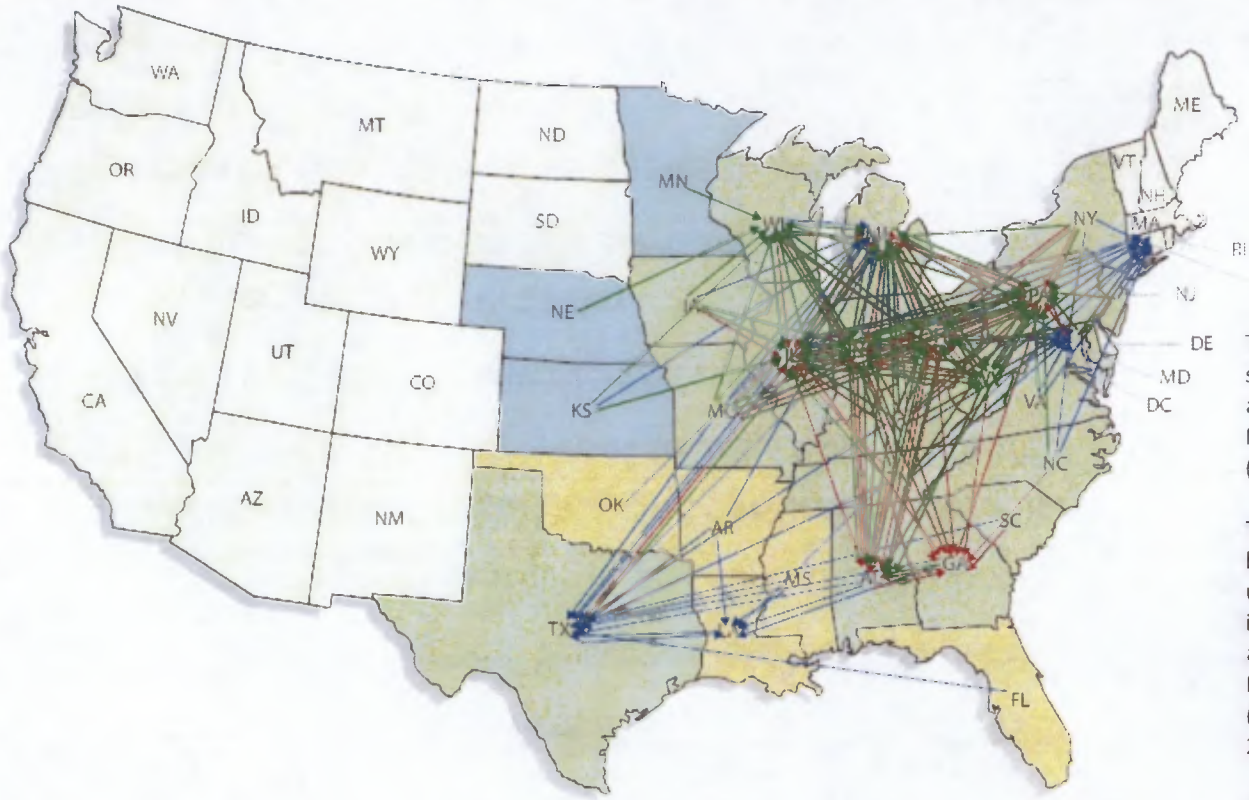
CSAPR Example of Air Transport Upwind-Downwind Linkages



Transported air pollution from upwind states frustrates downwind states' ability to attain and maintain compliance with National Ambient Air Quality Standards (NAAQS).

This map shows the CSAPR "linkages" between states where pollution from upwind states is linked to one or more areas in downwind states that have problems attaining or maintaining the 1997 ozone National Ambient Air Quality Standards (NAAQS), 1997 annual $PM_{2.5}$ NAAQS, and the 2006 24-hour $PM_{2.5}$ NAAQS.

CSAPR would require emission reductions in these upwind states to reduce the impacts of transported air pollution on downwind air quality problems.

Legend

- States controlled for both fine particles (annual SO_2 and NOx) and ozone (ozone season NOx) (20 States)
- States controlled for fine particles only (annual SO_2 and NOx) (3 States)
- States controlled for ozone only (ozone season NOx) (5 States)
- States not covered by the Cross-State Air Pollution Rule

Key to Arrows

- Upwind-Downwind Linkage for Ozone
- Upwind-Downwind Linkage for Annual PM2.5
- Upwind-Downwind Linkage for Daily PM2.5

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Key Elements of Emissions Trading

- **Emissions budget**: Establishes a fixed quantity of allowances for each compliance period (year, season, or other)
  - Budget is the mechanism to achieve and maintain the environmental goal
- **Coverage**: Determines which sources and/or sectors included (existing and new)
  - Coverage should capture large share of emissions but be administratively manageable
- **Emission monitoring, reporting, and verification:** Requires complete, accurate measurement and timely reporting of emissions to assure accountability and provide public access to data
  - Leads to program integrity and confidence
- **Allowance distribution:** Provides initial allowances to regulated community and others through mechanisms such as government allocation and auctioning
- **Allowance trading:** Allows companies to choose (and change) compliance options – leads to significant cost savings
- **Stringent, automatic penalties:** Ensure the environment is made whole and penalizes non-compliance
- **Assessment:** Determines program effectiveness and whether more emission reductions are needed to maintain environmental and human health protection

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Cross-State Air Pollution Rule (CSAPR)

- In 2008, the D.C. Circuit Court of Appeals found legal flaws in the Clean Air Interstate Rule (CAIR); the Court allowed CAIR to go into effect but directed EPA to replace CAIR with a rule addressing the identified flaws.
- CSAPR was finalized in July 2011, addressed the legal flaws identified in CAIR, and would require states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states. CSAPR was scheduled to replace CAIR starting January 1, 2012.
- However, CSAPR was stayed by the D.C. Circuit prior to implementation and was later invalidated by the same Court in August 2012.
- On April 29, 2014 the U.S. Supreme Court reversed the D.C. Circuit opinion (thereby undoing the vacatur of CSAPR) and remanded the remaining litigation back to the D.C. Circuit. The Supreme Court's opinion stated that:
  - "EPA's cost-effective allocation of emission reductions among upwind States, we hold, is a permissible, workable, and equitable interpretation of the Good Neighbor Provision."
  - "Satisfied that EPA's cost-based methodology, on its face, is not 'arbitrary, capricious, or manifestly contrary to the statute,' *Chevron*, 467 U. S., at 844, we uphold the Transport Rule [CSAPR]. The possibility that the rule, in uncommon particular applications, might exceed EPA's statutory authority does not warrant judicial condemnation of the rule in its entirety."
- On June 26, 2014, EPA asked the D.C. Circuit Court to lift the stay of the rule and to allow it to go into effect beginning January 1, 2015.
- At this time, CAIR remains in place and no immediate action is required by states or sources.

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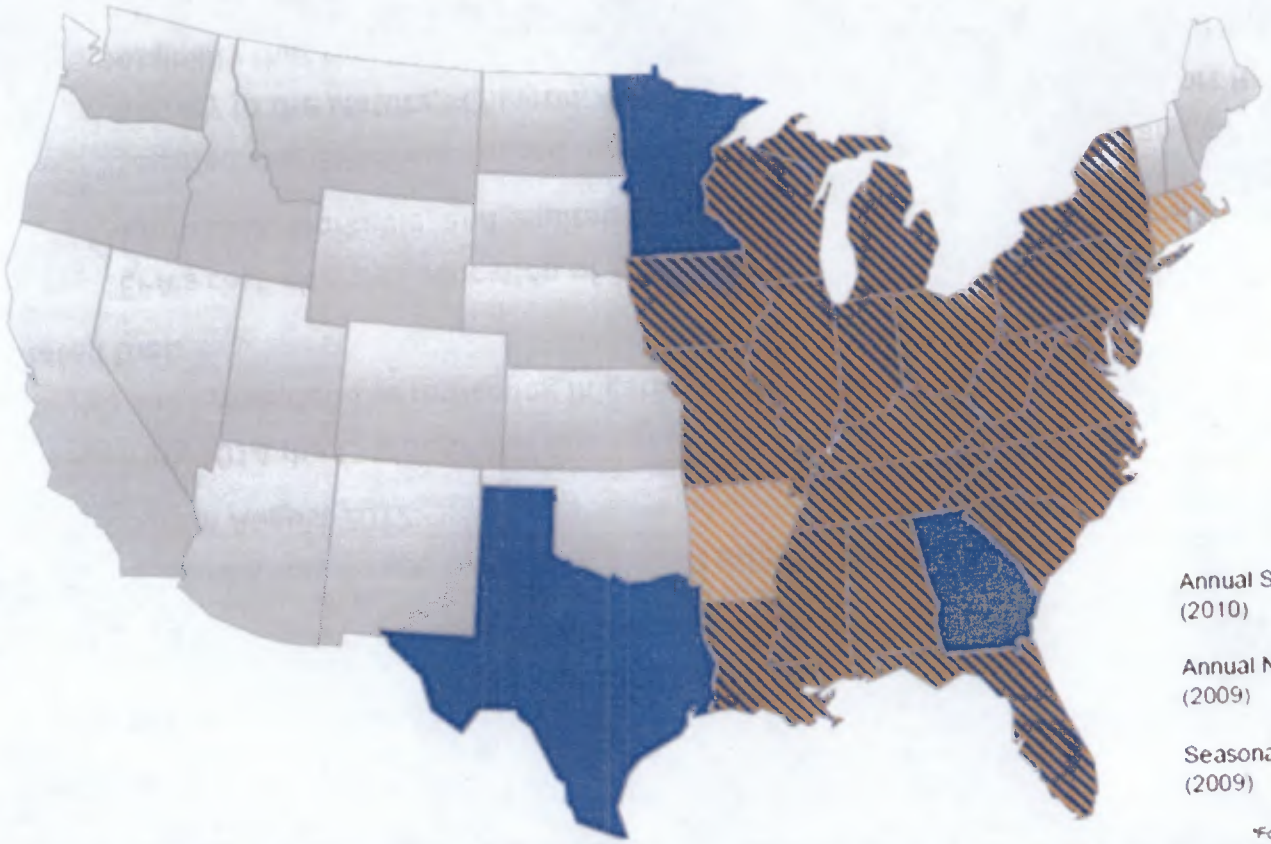
Clean Air Interstate Rule (CAIR)



Emission Caps*
(million tons)

	2009/2010	2015
Annual SO_2 (2010)	3.7	2.6
Annual NOx (2009)	1.5	1.3
Seasonal NOx (2009)	58	48

*For the affected region

- States not covered by CAIR
- States controlled for fine particles (annual SO_2 and NOx)
- States controlled for both fine particles (annual SO_2 and NOx) and ozone (ozone season NOx)
- States controlled for ozone (ozone season NOx)

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NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

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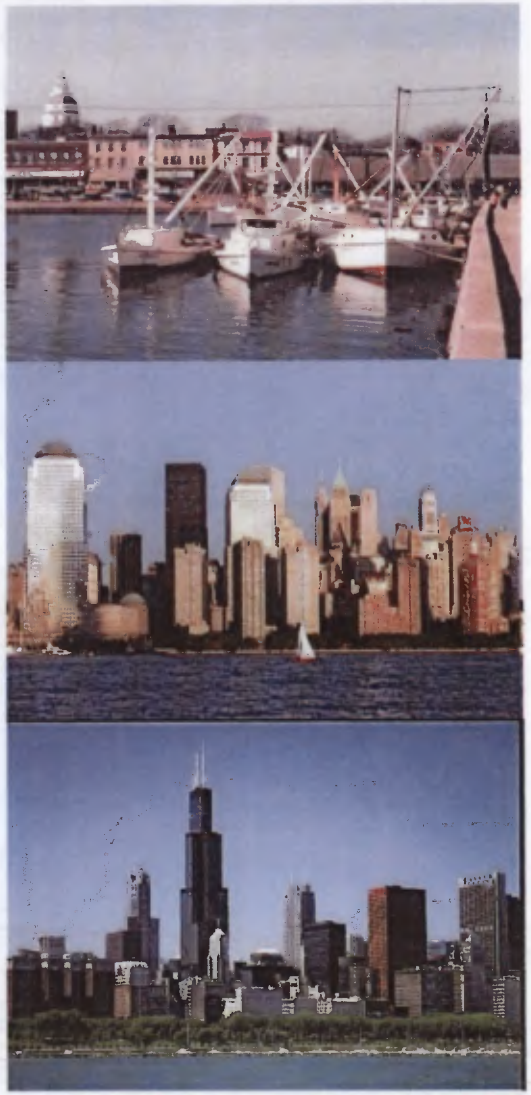
National Ambient Air Quality Standards (NAAQS)

- 1997: PM2.5 NAAQS and 8-hour Ozone NAAQS established
  - Regional programs such as NOx SIP Call and Clean Air Interstate Rule led to substantial EGU emission reductions that helped many areas attain these standards.
- 2006: 24-hour PM2.5 NAAQS revised
  - 32 areas were designated nonattainment. Plans were due in December 2012.
- 2008: 8-hour Ozone NAAQS revised
  - 46 areas designated nonattainment in 2012.
- 2010: 1-hour NO_2 NAAQS established
  - No areas designated as nonattainment.
- 2010: 1-hour SO_2 NAAQS established
  - 29 areas designated nonattainment in July 2013.
- 2012: Annual PM2.5 NAAQS revised
- 2015: 8-hour Ozone NAAQS to be revised
  - Court-ordered schedule: 12/1/14 proposal, 10/1/15 final
- States develop State Implementation Plans (SIPs) to attain the NAAQS
  - Account for ongoing emission reductions from existing regulations (e.g., CAIR, MATS, mobile source engine and fuel standards).
  - Include any new state regulations as necessary, from a range of sources
  - Source-specific emission limitations are then included in Title V permits.



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REGIONAL HAZE

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Regional Haze Rule

- EPA requires an assessment of "Best Available Retrofit Technology", or BART, for certain types of industrial facilities emitting air pollutants that reduce visibility at 156 federal Class 1 areas. These pollutants include $PM_{2.5}$, and compounds which contribute to $PM_{2.5}$ formation, such as SO_2 and NO_X.
  - Includes utility boilers in operation between 1962 and 1977, that have the potential to emit > 250 tons/year of visibility-impairing pollution.

- States are implementing EPA's Regional Haze Rule through regional haze SIPs, which include long-term goals for attaining natural visibility conditions at affected Class 1 areas, a determination of facilities subject-to-BART, and a determination of BART emission limits or BART alternatives. BART controls must be in place no later than 5 years after EPA approves a state's plan.

- EPA's review of state regional haze SIPs for the first 10-year implementation period ending in 2018 is nearly complete. In a few cases where the state plan does not adequately or completely address the Regional Haze Rule requirements, including BART, federal plans have been put into place.

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PSD AND NNSR

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CAA's Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR)

- **What is it?**
  - Pre-construction federal permitting programs intended to:
    - Ensure that economic growth is balanced with preservation of clean air resources.
    - Protect public health and welfare from adverse effects.
    - Preserve, protect, and enhance air quality in "clean and pristine" areas (such as National Parks and Wilderness areas).
- **What does it apply to?**
  - "Major" new stationary sources
  - "Major Modifications" to existing major stationary sources
- **What is a major modification?**
  - Any physical change or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant covered by CAA.
  - "Physical changes" and "changes in the method of operation" do not include:
    - Routine maintenance, repair and replacement.
    - Use of an alternative fuel or raw material under certain circumstances.
    - An increase in the hours of operation or in the production rate, unless such change would be prohibited under any federally enforceable permit condition.
    - Any change in ownership at a stationary source.
- **What controls are required?**
  - Best Available Control Technology (BACT) for PSD; Lowest Achievable Emission Rate (LAER) for NNSR.
  - For electric utilities: SCR or SNCR for NO_X, Baghouse or ESP for PM, and Scrubber for SO_2.

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ENERGY EFFICIENCY AND RENEWABLE ENERGY

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EPA Efforts to Advance EE/RE and Implement Solutions

- **ENERGY STAR Program: Products & Buildings**
  - Residential, commercial, and industrial focus includes building benchmarking, retrofitting resources, tools to reduce energy use, and voluntary product labeling.
  - Serves as a platform for most energy efficiency programs run by utilities or other entities.

- **Integration of Clean Energy into EPA Regulatory Programs:**
  - Ongoing evaluation of opportunities to reduce emissions through EE/RE programs.
  - Example: EE/RE in SIPs Roadmap (www.epa.gov/airquality/eere/).

- **State and Local Climate and Energy Program:**
  - Work with state and local policymakers to advance cost-effective EE/RE & CHP through sharing of best practices and lessons learned.

- **CHP and Green Power Partnerships:**
  - Accelerate the adoption of CHP and renewable power through voluntary partnerships with private sector and key stakeholders.

- **State Energy Efficiency Action Network:**
  - Goal: Help the nation achieve all cost-effective energy efficiency by 2020.
  - State and local government led initiative to take energy efficiency to scale, facilitated by U.S. DOE and U.S. EPA.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

CLEAN AIR MARKET PROGRAMS

Visit the Clean Air Markets web site to view emissions data, allowance transfers, program rules and guidelines, and program progress reports.

Clean Air Markets: www.epa.gov/airmarkets

Air Pollution Transport: http://www.epa.gov/airtransport/

Mercury & Air Toxics Rule: www.epa.gov/mats

Climate Change: www.epa.gov/climatechange

Energy Efficiency: www.epa.gov/cleanenergy/

Proposed Clean Power Plan: http://www.epa.gov/cleanpowerplan

White House Climate Action Plan:

http://www.whitehouse.gov/share/climate-action-plan

EPA's Clean Power Plan

- On June 2, 2014, the U.S. Environmental Protection Agency, under President Obama's Climate Action Plan, proposed a plan to cut carbon pollution from power plants
- The "Clean Power Plan" proposes a goal for each state
- Each goal is a pollution-to-power ratio that a state must meet in 2030 after implementing the measures they choose
- The basic formula for the state goal is a rate: CO2 emissions from fossil fuel-fired power plants in pounds divided by state electricity generation from fossil-fuel fired power plants and certain low- or zero-emitting power sources in megawatt hours (MWh)
- Each state's goal is different, because each state's mix of emissions and power sources to plug in to each part of the formula are different

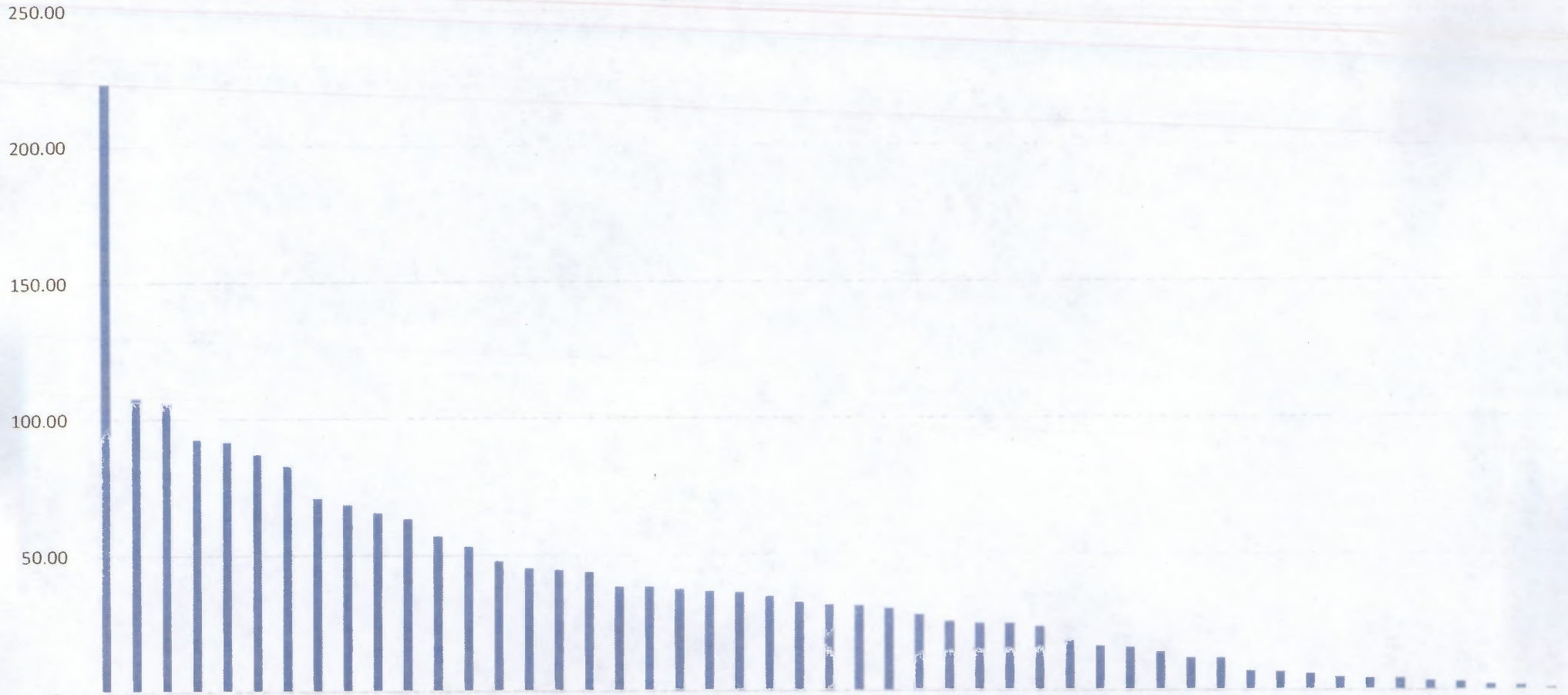
EPA's Clean Power Plan *(continued)*

- These state goals are not requirements on individual fossil fuel fired electric generating units and they do not lay out a set of required mechanisms a state must use to reduce carbon pollution
  - Rather, each state has broad flexibility to lower the state's pollution-to-power ratio to meet the goal by 2030
- To set the goals, EPA analyzed the practical and affordable strategies that states and utilities are already using to lower carbon pollution from the power sector to determine the Best System of Emission Reduction (BSER)
- Because the power sector is interconnected, EPA determined that a set of 4 measures together are the best system to reduce carbon pollution from fossil fuel fired power plants

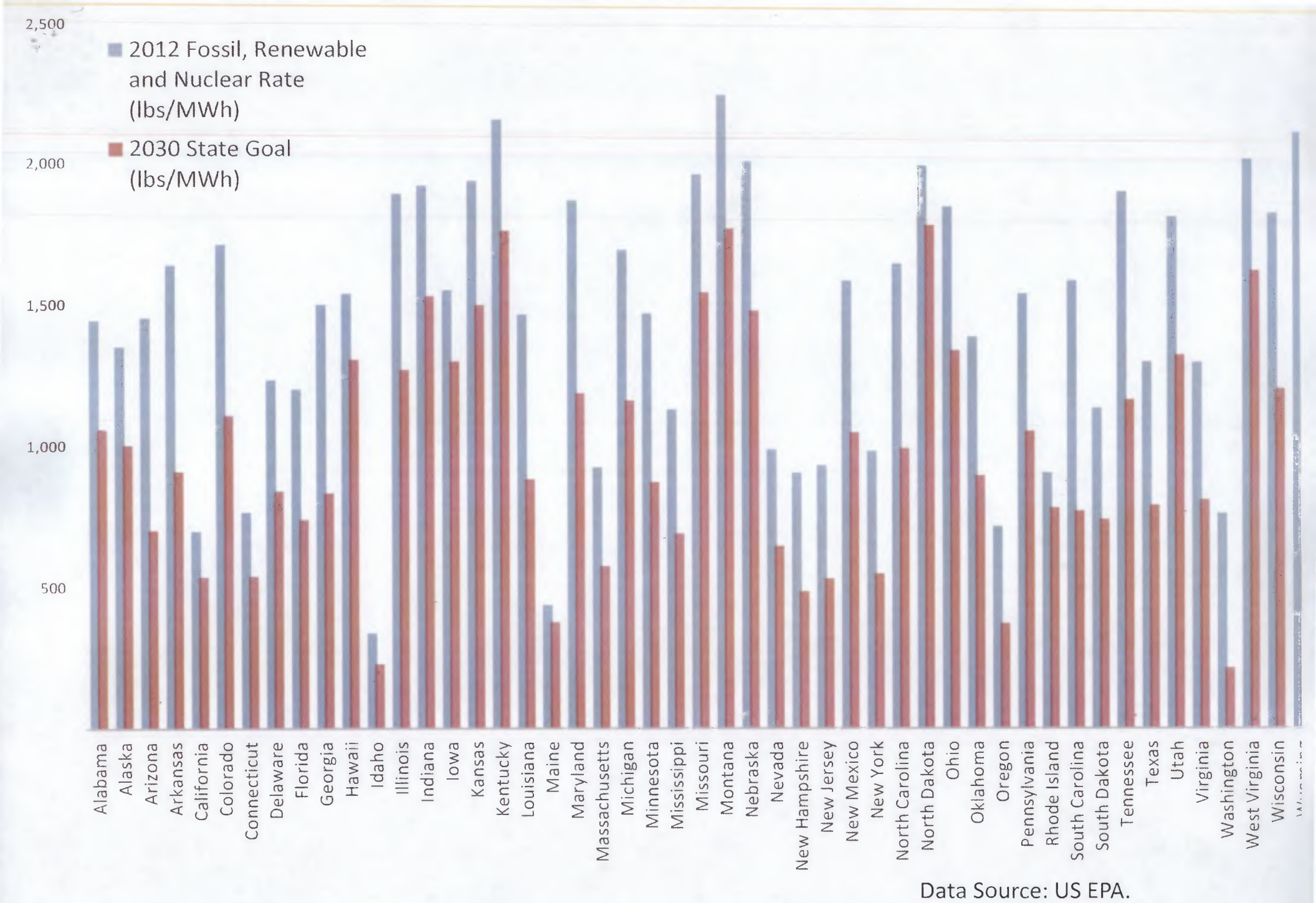
EPA's Clean Power Plan *(continued)*

- The best system is made up of four building blocks that are being implemented now by states and utilities and can be implemented more broadly across the power system
  - (1) measures to make coal plants more efficient,
  - (2) increased use of high efficiency, natural gas combined cycle plants,
  - (3) generating electricity from low/zero emitting facilities, and
  - (4) demand-side energy efficiency
- Each state has the flexibility to choose how to meet the goal using a combination of measures that reflect its particular circumstances and policy objectives
- States are in charge of these programs and can draw on a wide range of tools – not just these building blocks

State 2012 emissions from fossil fuel-fired power plants (million metric tons)

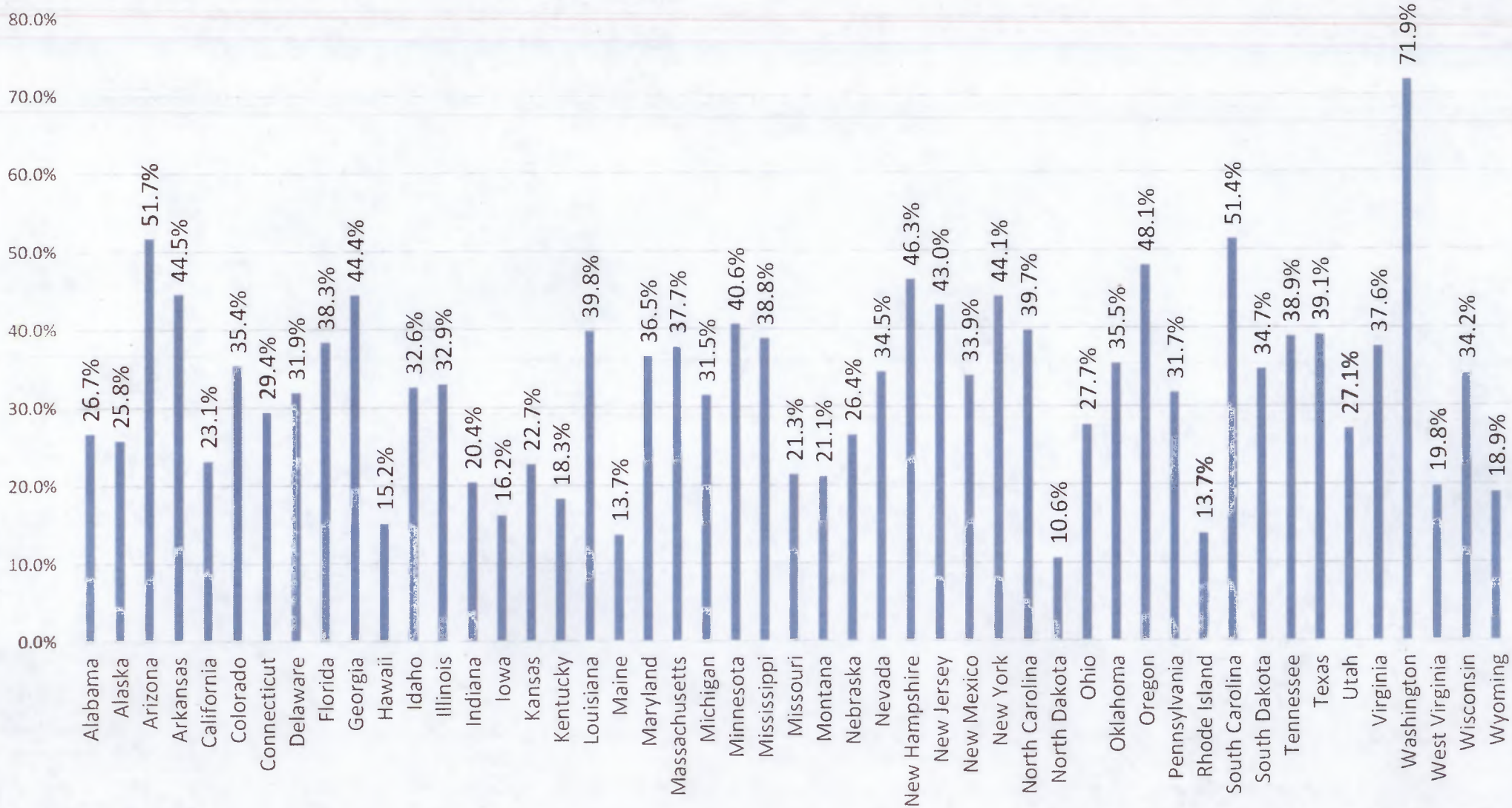


Data Source: US EPA.



Data Source: US EPA.

Percent Reduction



Data Source: US EPA.