

Legislative Action to Limit GHGs

- Cap and Trade bills
 - Waxman Markey went the furthest- passed House with a putative 17% reduction in GHG emissions by 2020
- Cap and Dividend
- Carbon Tax

What Happened In Senate

Total Fail!



Into the Legislative Vacuum..

- *Massachusetts v. EPA*- US Supreme Court rules GHG air subject to CAA regulation
- EPA makes “endangerment finding” necessary to trigger regulatory authority under CAA
- EPA begins to promulgate rules under the Clean Air Act

CAA Utility Regulation

- Cross-State Air Pollution Rule
- Mercury/Toxics Rule
- GHG tailoring rule
- GHG New Source Performance Stds

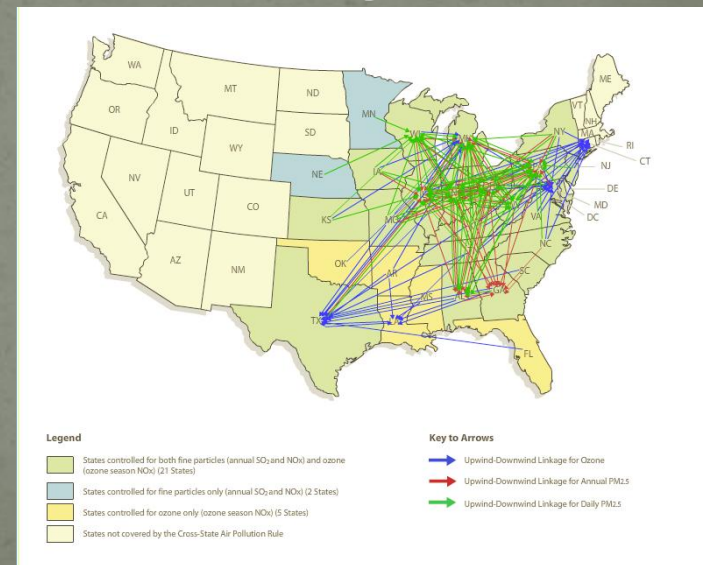
Cross-State Air Pollution Rule

- The rule requires significant reductions in sulfur dioxide (SO_2) and nitrogen oxide (NO_x) emissions that cross state lines
- Applies in eastern US



Cross-State Air Pollution Rule

- Deals with SO_2 and NO_x under provision of CAA called the “good neighbor” provision
- Air pollution in another state contributing to non-attainment for ozone or PM
- Currently invalidated by court order
- On appeal to US Supreme Ct



Cross-State (cont'd)

- Emission reductions starting January 1, 2012 for SO₂ and annual NO_x reductions, and May 1, 2012 for ozone season NO_x reductions
- By 2014 the Cross-State Air Pollution Rule would reduce:
 - power plant SO₂ emissions by 73 percent
 - NO_x emissions by 54 percent from 2005 levels in the CSAPR region.

Impact of regulating the eastern US

- <http://www.epa.gov/mats/where.html>

GHG Tailoring Rule

- Two phases
- Uses Prevention of Significant Deterioration authority under CAA (PSD)



Tailoring Rule GHGs

- The final rule addresses emissions of a group of six GHGs:
 1. Carbon dioxide (CO₂)
 2. Methane (CH₄)
 3. Nitrous oxide (N₂O)
 4. Hydrofluorocarbons (HFCs)
 5. Perfluorocarbons (PFCs)
 6. Sulfur hexafluoride (SF₆)



Tailoring Phase 1

- o Only sources currently subject to the PSD permitting program (i.e., those that are newly-constructed or modified in a way that significantly increases emissions of a pollutant other than GHGs)
- o For these projects, only GHG increases of 75,000 tpy or more of total GHG, on a CO₂e basis, would need to determine the Best Available Control Technology (BACT)
- o Similarly for the operating permit program, only sources currently subject to the program (i.e., newly constructed or existing major sources for a pollutant other than GHGs) would be subject to title V requirements for GHG.

Tailoring Phase 2

PSD permitting requirements will cover for the first time new construction projects that emit GHG emissions of at least 100,000 tpy even if they do not exceed the permitting thresholds for any other pollutant.

Modifications at existing facilities that increase GHG emissions by at least 75,000 tpy will be subject to permitting requirements, even if they do not significantly increase emissions of any other pollutant.

In Step 2, operating permit requirements will, for the first time, apply to sources based on their GHG emissions even if they would not apply based on emissions of any other pollutant. Facilities that emit at least 100,000 tpy CO₂e will be subject to title V permitting requirements.

Mercury Rule

- 50% US mercury emissions from power plants (coal fired and oil fired)
- <http://www.epa.gov/mats/powerplants.html>
- Puts pressure on to upgrade or retire old, inefficient powerplants
- Business has sued to block rule

GHG NSPS

- “As a result of legal petitions filed by a number of states and environmental groups challenging the USEPA’s failure to establish greenhouse gas new source performance standards for fossil fuel power plants, the agency entered into a settlement agreement in December 2010”
- “Under the modified settlement agreement, the USEPA was to propose greenhouse gas new source performance standards for fossil fuel power plants by September 30, 2011, and a final rule no later than May 26, 2012. The agency missed the September 30 proposal deadline.”
- From: <http://www.nescaum.org/>

EPA Announces NSPS Rule

- Carbon Pollution standard for New Power Plants
- Applies to NEW EGU plants > 25 MW that burn fossil fuels
- These plants ≤ 1000 lbs of CO_2 /MWh
- Natural Gas Combined Cycle plants can meet this target
- Coal or petroleum coke need tech such as CCS

Obama Climate Action Plan

- 3 Pillars
 - Cut Carbon Pollution in America
 - Prepare US for Impacts of Climate Change
 - Lead International Efforts to Combat Climate Change and Deal with its Effects



Update to NSPS- 9/30/13

- EPA is proposing two limits for fossil fuel-fired utility boilers and IGCC units, depending on the compliance period that best suits the unit. These limits require capture of only a portion of the CO₂ from the new unit. These proposed limits are:
 - 1,100 lb CO₂/MWh gross over a 12-operating month period, or
 - 1,000-1,050 lb CO₂/MWh gross over an 84-operating month (7-year) period
- EPA is proposing two standards for natural gas-fired stationary combustion units, depending on size. The proposed limits are based on the performance of modern natural gas combined cycle (NGCC) units. These proposed limits are:
 - 1,000 lb CO₂/MWh gross for larger units (> 850 mmBtu/hr)
 - 1,100 lb CO₂/MWh gross for smaller units (≤ 850 mmBtu/hr)

Comment for 60 days

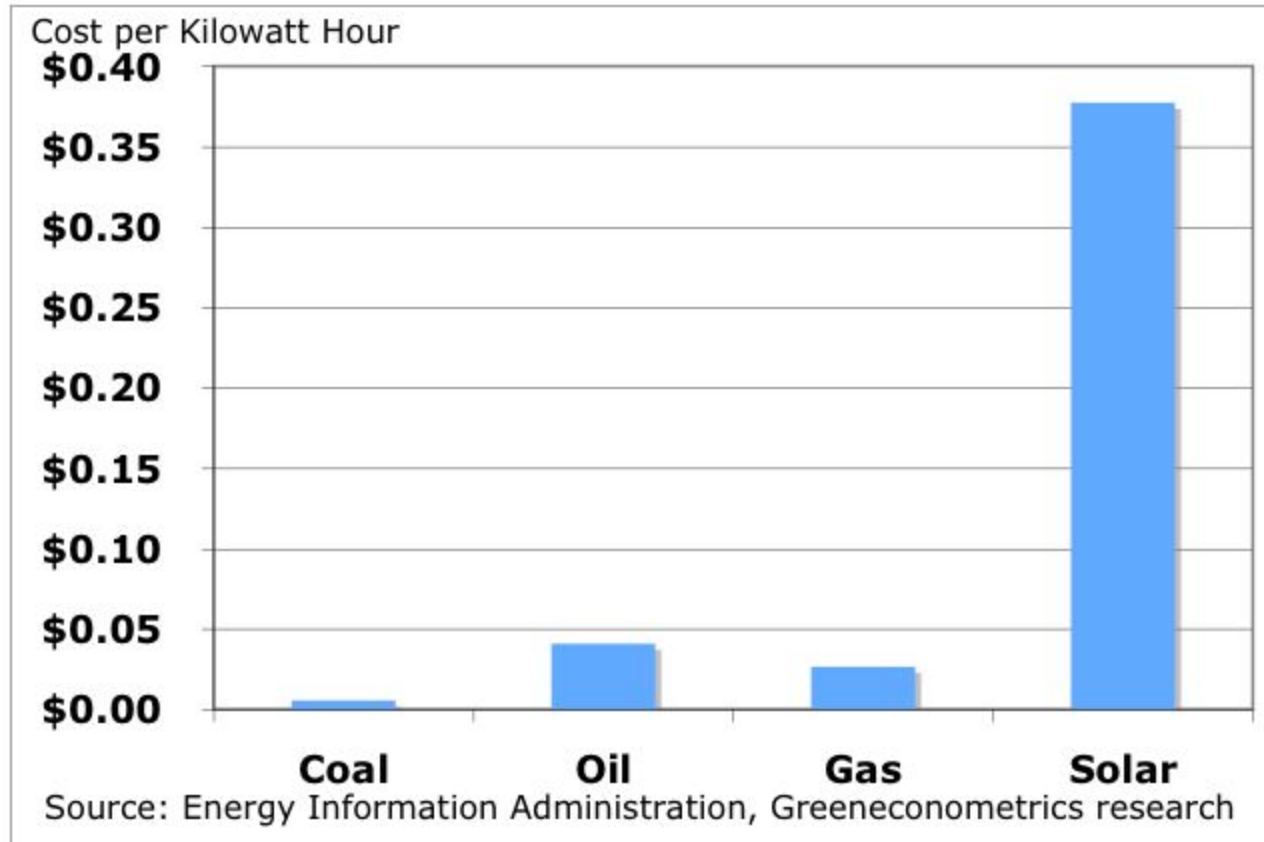
Comments on the proposed standard should be identified by Docket ID No. EPA-HQ-OAR-2013-0495. All comments may be submitted by one of the following methods:

- www.regulations.gov: Follow the on-line instructions for submitting comments.
- E-mail: Comments may be sent by electronic mail (e-mail) to a-and-r-Docket@epa.gov.
- Fax: Fax your comments to: 202-566-9744.
- Mail: Send your comments to: Air and Radiation Docket and Information Center, Environmental Protection Agency, Mail Code: 2822T, 1200 Pennsylvania Ave., NW, Washington, DC, 20460.

Existing Plant Standards to Follow

- <http://www.youtube.com/watch?v=4k-cNN8J6wY>

Energy Cost per Kilowatt Hour



From: http://greenecon.net/understanding-the-cost-of-solar-energy/energy_economics.html

Costs of Pollution Control Technology

- http://peswiki.com/index.php/Directory:Cents_Per_Kilowatt-Hour

Results

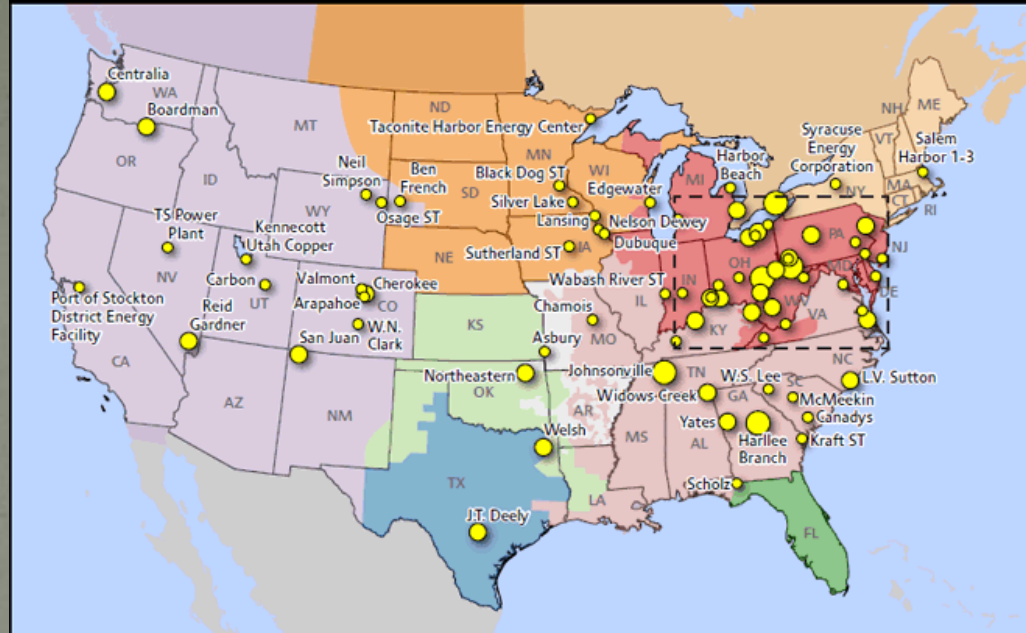
- <http://www.startribune.com/business/134647533.html>
- <http://www.ohio.com/news/break-news/firstenergy-closing-6-coal-fired-power-plants-1.257090>
- <http://www.jsonline.com/business/clean-air-rules-cloud-future-of-up-power-plant-5c340j8-134219868.html>
- <http://www.post-gazette.com/pg/12012/1203000-56-o.stm>

Analysis of EGU Closures

- 64 plant closures announced in 2011
- Represents 223 million tons of CO₂ emissions
- Represents about 3.2% of total US emissions CO₂eq in 2010
- Sources:
 - CARMA 2007 CO₂ figures www.carma.org
 - Plant closure listing www.sourcewatch.org
 - EPA emissions estimate
<http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>

2012 + Closures

Planned coal capacity retirements 2013-2022

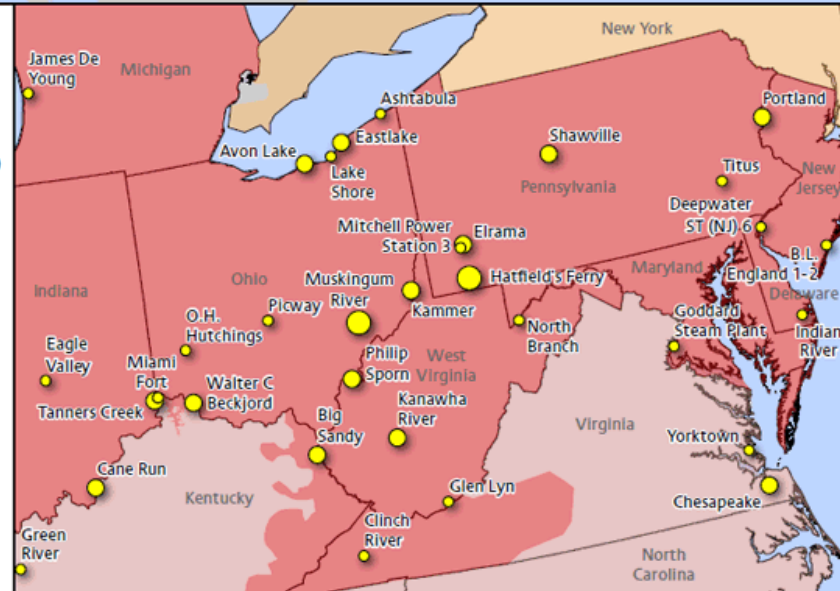


Capacity (MW)

- 10 - 350
- 351 - 1,030
- 1,031 - 1,710

NERC region

- FRCC
- MRO
- NPCC
- RFC
- SERC
- SPP
- TRE
- WECC



As of Aug. 19, 2013
 Source: SNL Energy
 Map credit: Whit Varner

Coal units switched to other fuels from 2008-2012

Unit	NERC region	State	Operating		Switching year	New fuel type	Ultimate parent
			capacity (MW)	Original In-service year			
Austin Northeast ST 1	MRO	MN	29	1971	2012	Gas	Austin City of MN
Blount Street ST 6	MRO	WI	50	1957	2012	Gas	MGE Energy Inc.
Blount Street ST 7	MRO	WI	50	1961	2012	Gas	MGE Energy Inc.
City of Columbia ST 8	SERC	MO	35	1970	2008	Gas	Columbia City of Missouri
Cornell University CC TG1	NPCC	NY	2	1988	2009	Other nonrenewable	Cornell University
Cornell University CC TG2	NPCC	NY	6	1988	2009	Other nonrenewable	Cornell University
Deepwater (NJ) ST 6	RFC	NJ	82	1954	2011	Gas	Calpine Corp.
DTE Stoneman (E J Stoneman) ST 1	MRO	WI	15	2010	2010	Biomass	DTE Energy Co.
DTE Stoneman (E J Stoneman) ST 2	MRO	WI	35	2010	2010	Biomass	DTE Energy Co.
Dubuque ST 3	MRO	IA	29	1952	2012	Gas	Alliant Energy Corp.
Dubuque ST 4	MRO	IA	36	1959	2012	Gas	Alliant Energy Corp.
East Campus Utility Plant STG	RFC	OH	1	2010	2012	Gas	University of Cincinnati
Edge Moor ST 3	RFC	DE	86	1954	2011	Gas	Calpine Corp.
Edge Moor ST 4	RFC	DE	174	1966	2011	Gas	Calpine Corp.
Florence Mill ST GEN3	SERC	SC	75	1987	2012	Biomass	Rock-Tenn Co
Haverhill Cogen ST SCKG1	RFC	OH	53	2008	2011	Other nonrenewable	SunCoke Energy Inc.
Henderson (MS) ST 1	SERC	MS	12	1960	2010	Gas	Greenwood Utilities Commission
Henderson (MS) ST 3	SERC	MS	19	1967	2010	Gas	Greenwood Utilities Commission
Hunlock CC 3	RFC	PA	44	1959	2008	Other nonrenewable	UGI Corp.
Mobile Energy Services Company ST GEN5	SERC	AL	56	1985	2012	Biomass	Multi-Owned
Mobile Energy Services Company ST GEN6	SERC	AL	34	1985	2012	Biomass	Multi-Owned
Mt Poso Cogeneration CFB TG01	WECC	CA	44	1989	2012	Biomass	Multi-Owned
CH Resources Niagara CFB GEN1	NPCC	NY	49	1991	2008	Biomass	US Renewables Group LLC
Norton Powerhouse ST GEN1	NPCC	MA	3	1939	2012	Gas	Compagnie de Saint-Gobain
Norton Powerhouse ST GEN2	NPCC	MA	3	1954	2012	Gas	Compagnie de Saint-Gobain
Rhineland Mill ST GEN3	MRO	WI	2	1940	2010	Gas	Wausau-Mosinee Paper Corp.
Rhineland Mill ST GEN5	MRO	WI	7	1951	2010	Gas	Wausau-Mosinee Paper Corp.
Riverside (MN) CC ST7	MRO	MN	174	1987	2009	Other nonrenewable	Xcel Energy Inc.
Roxboro NC ST GEN1	SERC	NC	56	1987	2010	Biomass	Capital Power Corp.
S A Carlson ST 5	NPCC	NY	23	1951	2012	Gas	Jamestown Board of Public Utilities
S A Carlson ST 6	NPCC	NY	23	1968	2012	Gas	Jamestown Board of Public Utilities
Seaford, Delaware Plant ST GEN1	RFC	DE	9	1939	2010	Gas	Koch Industries Inc.
Seaford, Delaware Plant ST GEN3	RFC	DE	9	1939	2010	Gas	Koch Industries Inc.
Sonoco Products Co ST 3	SERC	SC	10	1947	2012	Gas	Sonoco Products Co.
South Charleston Plant ST GEN8	RFC	WV	6	1953	2011	Gas	Dow Chemical Co.
Southport NC ST GEN1	SERC	NC	54	1987	2010	Biomass	Capital Power Corp.
Southport NC ST GEN2	SERC	NC	54	1987	2010	Biomass	Capital Power Corp.
Spreckels Sugar Company ST 1	WECC	CA	9	1948	2012	Gas	Spreckels Sugar Co.
Sutherland (IA) ST 1	MRO	IA	28	1955	2012	Gas	Alliant Energy Corp.
Sutherland (IA) ST 3	MRO	IA	79	1961	2012	Gas	Alliant Energy Corp.
Urquhart ST 3	SERC	SC	94	1955	2012	Gas	SCANA Corp.
Wyandotte ST 5	RFC	MI	24	1958	2012	Gas	Wyandotte Municipal Service Commission
Wyandotte ST 6	RFC	MI	8	1969	2012	Gas	Wyandotte Municipal Service Commission

Includes only operating and out-of-service units switching from bituminous and subbituminous coal primary fuel types to other fuel types on the 2012 EIA 860 ER and 2011-2007 EIA 860.

New fuel types for 2012 primary fuel switches taken from 2012 EIA 860 ER.

As of Aug. 19, 2013

Sources: SNL Energy and U.S. Energy Information Administration

UN Framework Convention on Climate Change

- Created at 1992 Rio Earth Summit
- Goal: avoid climate change that would result in dangerous interference with Earth's climate system
- Basic Principles
 - Common but differentiated responsibilities
 - Developed nations would lead
 - Nationally appropriate actions in the context of sustainable development

Common but Differentiated

- Responsibility to act keyed to development status
- Historical contribution to climate change

Kyoto Protocol

- In effect 2008-2012
- Common but differentiated embodied in hard emissions reduction targets for developed countries (Annex I)
- Also in the Clean Development Mechanism that was intended as an offset under Kyoto but also could jump start sustainable energy development in developing countries (non-Annex I)
- US signed but never ratified

US Position Post-Kyoto

- Bush Administration took the position that developing countries like China and India needed to agree to real reductions in emissions before US would commit
- As Obama Administration followed China surpassed US in total GHG emissions, becoming worlds largest emitter
- Obama government negotiators also pressed for Chinese participation in emissions reductions as a necessary precursor to US commitments

Copenhagen

- Developed countries pushed for reductions so that temp would not increase by more than 2 C.
 - Developing countries balked feeling “level of ambition” of developed was too low
 - <http://www.youtube.com/watch?v=Vg6owxCtSqs>
 - <http://www.youtube.com/watch?v=JwwQq03SfiE>
- 5 am 12-19 COP webcast Grenada at 1:10:45
- http://cop15.meta-fusion.com/kongresse/cop15/templ/play.php?id_kongresssession=2761&theme=unfccc
- Chinese were key players- refusing to go lower for temp target

Cancun

- Developing countries agreed to Nationally Appropriate Mitigation Actions as part of an overall agreement
- Reshaped the meaning of common but differentiated

Durban

- Kyoto parties agreed to extend the protocol to 2020 with uncertain level of reduction commitments
- Agreement to negotiate a successor agreement by 2015 that would go in place in 2020
- No hard commitments made

Doha

- Retired some negotiating frameworks (i.e., AdHoc Working Group on Kyoto)
- Now just the SBSTA and Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP)

On to Warsaw!

- Lingering issues about the level of ambition
- Emissions are on track for 4 C increase according to a World Bank analysis
- China and US have yet to agree to anything binding

Chinese-US cooperation

- Xie Zhenhua
 - Deputy Director of the National Development and Reform Commission
 - Co-Chair of the China-US Working Group on Climate Change
- China: an ideal agreement would reflect the principle of common but differentiated responsibilities. “It should be a fair and reasonable agreement that is acceptable to all and one that reflects the pace and level of a country’s development. China will play a constructive role towards achieving the goal”

China-US Agreement

- 5 New Action Initiatives
 - Reduce emissions from heavy duty vehicles
 - Increase carbon capture, utilization and storage
 - Increasing energy efficiency in building industry and transport
 - Improving GHG data collection
 - Promoting smart grids