Stationary Source Regulations

NSPS, NESHAPs, NSR

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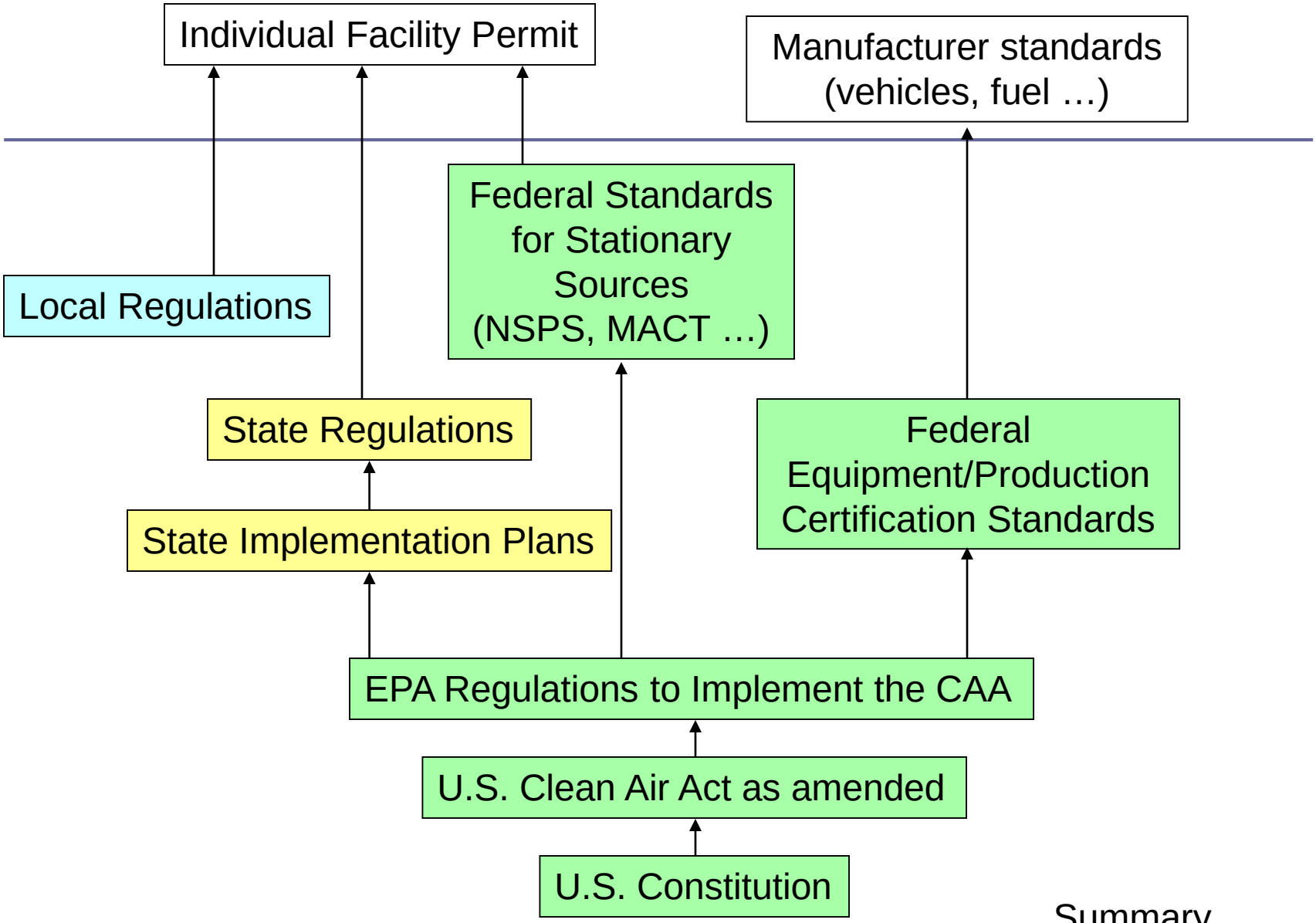
Objectives

- Understand the implementation mechanisms used in US air quality regulations
  - Focus in this section on emissions standards for stationary sources
- Investigate their scientific and technical information requirements
- Recognize the opportunity for public (and expert) participation
- Learn where to go for more information


Individual Facility Permit
Manufacturer standards (vehicles, fuel …)
Federal Standards for Stationary Sources (NSPS, MACT …)
Local Regulations
State Regulations
Federal Equipment/Production Certification Standards
State Implementation Plans
EPA Regulations to Implement the CAA
U.S. Clean Air Act as amended
U.S. Constitution

Summary

U.S. Clean Air Act & Regulations

Statutory language

- http://epa.gov/air/caa/text.html

Implementing regulations

- http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr60_main_02.tpl

New regulatory proposals, e.g.,

- http://www.epa.gov/groundlevelozone/actions.html
- https://www.federalregister.gov/articles/2014/12/17/2014-28674/national-ambient-

Clean Air Act Goals and Standards

- National Ambient Air Quality Standards
  - Primary: human health
  - Secondary: welfare
- Hazardous Air Pollutants
  - 189 listed pollutants
  - Maximum achievable control; residual risk goals
- Prevention of Significant Deterioration
  - Increments; air quality related values
- Visibility Protection
  - Restore natural conditions in parks and wilderness areas
- Acid Rain Mitigation

Implementation Mechanisms

- Ambient Standards/State Implementation Plans
  - Set based on threshold levels for health effects
  - Or set based on cost-benefit balancing
- Performance-Based Emissions Standards
  - Numerical limits (e.g., lb SO_2/MMBtu)
  - Technology, work practice and fuel standards; product bans
- Emissions Fees or Taxes
  - Full fees/taxes equate marginal costs & benefits of control
  - Commonly set below this level
  - May be used to raise revenues, not to deter excess emissions
- Cap and Trade Programs
  - Designed to equate marginal costs across polluters

Direct Regulation of Stationary Sources

- New Source Performance Standards (§ 111) (EPA)
  - Set by EPA, apply uniformly across country to all new sources within category
- New Source Review (§ § 165, 172) (states)
  - Case by case determinations
  - Best Available Control Technology – PSD areas
  - Lowest Achievable Emissions Rate – NA areas
- Nonattainment Area State Implementation Plans (§ 110) (states)
  - Reasonably Available Control Technology
- Hazardous Air Pollutants (§ 112) (EPA)
  - Maximum Achievable Control Technology

New Source Performance Standards

- Categories that "cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare"
- NSPS for > 70 source categories or subcategories
- Published in the Code of Federal Regulations
  - http://www.gpoaccess.gov/cfr/index.html
  - 40 CFR Part 60
  - http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr60_main_02.tpl
- New or modified sources: § 111(b)
- Existing sources: § 111(d) if pollutant isn't regulated through NAAQS or as a HAP
- Updated every 8 years (nominally)

New Source Performance Standards

CAA § 111(a)(1) The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

Development of New Source Performance Standards

- Proposal:
  - https://www.federalregister.gov/articles/2015/09/18/2015-21023/oil-and-natural-gas-sector-emission-standards-for-new-and-modified-sources
- Regulatory Impact Analysis:
  - http://www3.epa.gov/airquality/oilandgas/pdfs/og_prop_ria_081815.pdf
- Technical Support Documents:
  - http://www3.epa.gov/airquality/oilandgas/methane.html

Development of New Source Performance Standards

- Final Rule:
  - https://www.federalregister.gov/articles/2016/06/03/2016-11971/oil-and-natural-gas-sector-emission-standards-for-new-reconstructed-and-modified-sources
- Codified Rule:
  - 40 CFR Part 60 Subpart OOOO
  - http://www.ecfr.gov/cgi-bin/text-idx?node=sp40.7.60.oooo

NSPS for Municipal Solid Waste Landfills

Source: Watershed Geo

- Finalized July 15, 2016 (revised from 1996 standards)
- NSPS for new, modified or reconstructed landfills
- Emissions guidelines for existing landfills
- Requires a “well-designed & operated landfill gas collection system” with captured gas combusted for energy recovery, processed for sale, or flared.
- Applies to landfills with capacity > 2.5 M metric tons (~ 850 LF to install controls)

NSPS & NESHAPs for Oil and Gas

April 17, 2012
(rev'd from 1985 NSPS)
NSPS for new, modified or reconstructed equipment
- Green completions
- Bleed limits for pneumatic controllers
- Tank controls -> route vapors to flare

May 12, 2016
- Green completions for HF oil wells
- Leak detection and repair
- Information Collection Request to start developing regulations for existing sources

Clean Power Plan

- Finalized October 2015, Stayed Feb. 2016 pending judicial review
- NSPS under 111(b) for new, modified or reconstructed fossil fuel electricity generating units
- Added GHG limits to prior limits for conventional air pollutants (SO2, NOx, PM …)
- Limits based on supercritical pulverized coal with partial carbon capture & sequestration
- < 1400 lb CO_2/MWh (v. 2000 lb/MWh)
- Emissions guidelines under 111(d) for existing sources

Clean Power Plan (Cont'd)

- BSER based on three "building blocks"
  - Heat rate improvements
  - Substituting electricity generation from natural gas for electricity generation from coal
  - Substituting electricity generation from renewable energy for generation from fossil fuels
- States required to develop and implement plans to meet their goals
- Final goals to be met by 2030 with "glidepath" requirements in the interim
- Emissions trading is encouraged
- EPA expects CPP to reduce CO_2 emissions from the power sector by 32% below 2005 levels

Pre-1990 Clean Air Act § 112

- Required EPA to establish National Emissions Standards for Hazardous Air Pollutants (NESHAPS) to "provide an ample margin of safety to protect the public Health"
- From 1970 – 1990, developed standards for only seven HAPs
- NRDC v. EPA (D.C. Cir. 1987) "The Vinyl Chloride Case"; court held EPA must
  - (1) determine what level is safe, based *only* on health risks at a particular emissions level; then
  - (2) determine how much further to go to provide the ample margin, taking costs and feasibility into account.
- Led EPA to withdraw pending standards for vinyl chloride, radionuclides, and benzene

Pre-1990 Clean Air Act § 112

- 1989 proposed rule for benzene (54 Fed. Reg. 38044)
- (1) What level is safe? (for carcinogens)
  - Conservatively estimate Maximum Individual Risk (MIR) (24 h/d, 70 years)
    - Presumptively acceptable if cancer risk is no higher than 1/10,000
  - Also consider overall incidence of cancer or other serious health risks, and
  - Consider weight of evidence of carcinogenicity or other health risks
- (2) What additional reductions are required to provide an ample margin of safety?
  - (1) strive to limit risk to 1/1,000,000 for as many people as possible
  - (2) considering costs, technical feasibility, and other factors

1990 Clean Air Act Amendments § 112

- Congress listed 189 HAPs § 112(b)(1)
- Required EPA to list source categories of all these pollutants (§ 112(c)(1)) and establish emissions standards for each pollutant and category
- For major sources, standards must reflect maximum achievable control technology (MACT) § 112(d)(3)-(4), which
  - for existing sources can't be less stringent than the best performing 12% of sources in the category, and
  - for new sources must match the performance of the best controlled source
- Risk and Technology Review § 112(f)
  - Post-MACT: are more reductions needed?

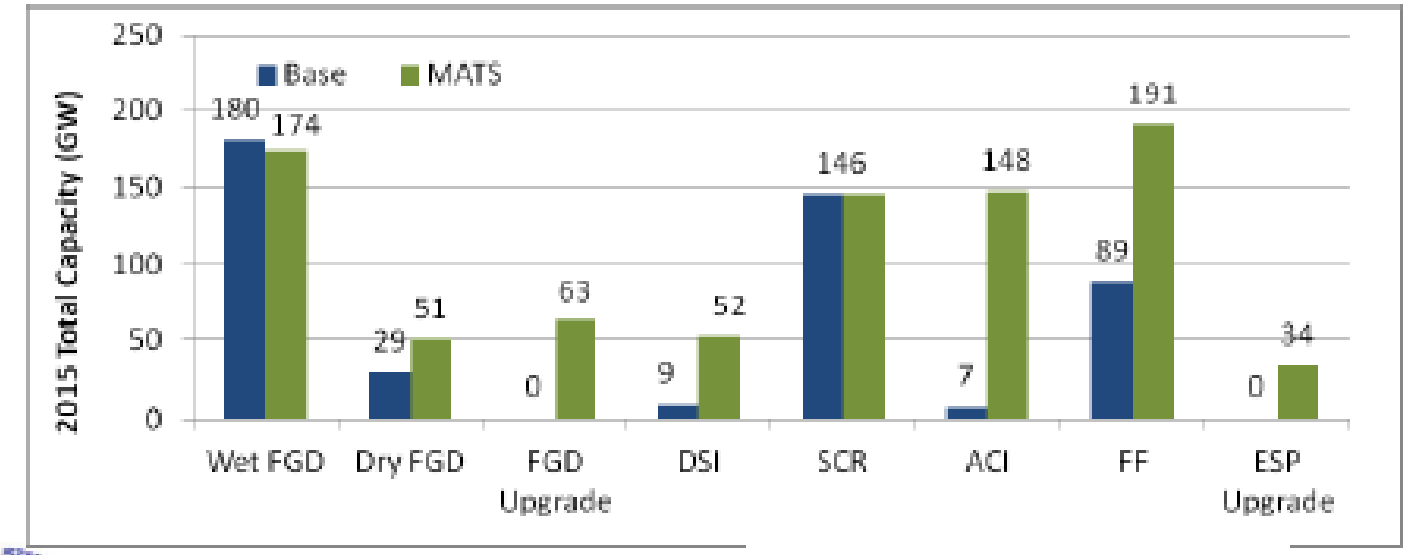
NESHAPS

- Source categories:
- > 120
- Aerospace, Asphalt, Autobody Refinishing … Wood Preserving, Wool Fiberglass Manufacturing
- https://www3.epa.gov/ttn/atw/mactfnlalph.html

Mercury Air Toxics Rule

- Finalized December 2011 - NESHAPs for coal and oil-fired power plants
- Affects 1400 units, new & existing
- Sets numerical emissions limits for mercury and other air toxics
- Supreme Court remanded in June 2015, requiring EPA to do supplemental analysis of control costs, under § 112(n) necessary & appropriate standard
- Supplemental analysis issued April 2016

Mercury Air Toxics Rule



Retrofit pollution control installations on coal-fired capacity (by technology) with the base case and with the final MATS, 2015 (measured in GW capacity). Source: Integrated Planning Model run by EPA, 2011

FGD: flu gas desulfurization (scrubber)
DSI: dry sorbent injection

SCR: selective catalytic reduction
ACI: activated carbon injection
FF: fabric filter

New Source Review

- Dynamic process that continually advances technology and requirements
- Applies to new construction and significant modifications
- Best Available Control Technology (BACT) for attainment areas, Lowest Achievable Emissions Rate for nonattainment areas
- See RACT-BACT-LAER Clearinghouse
  - http://cfpub.epa.gov/RBLC/
  - Search database of air permits
  - Find lowest emissions rate

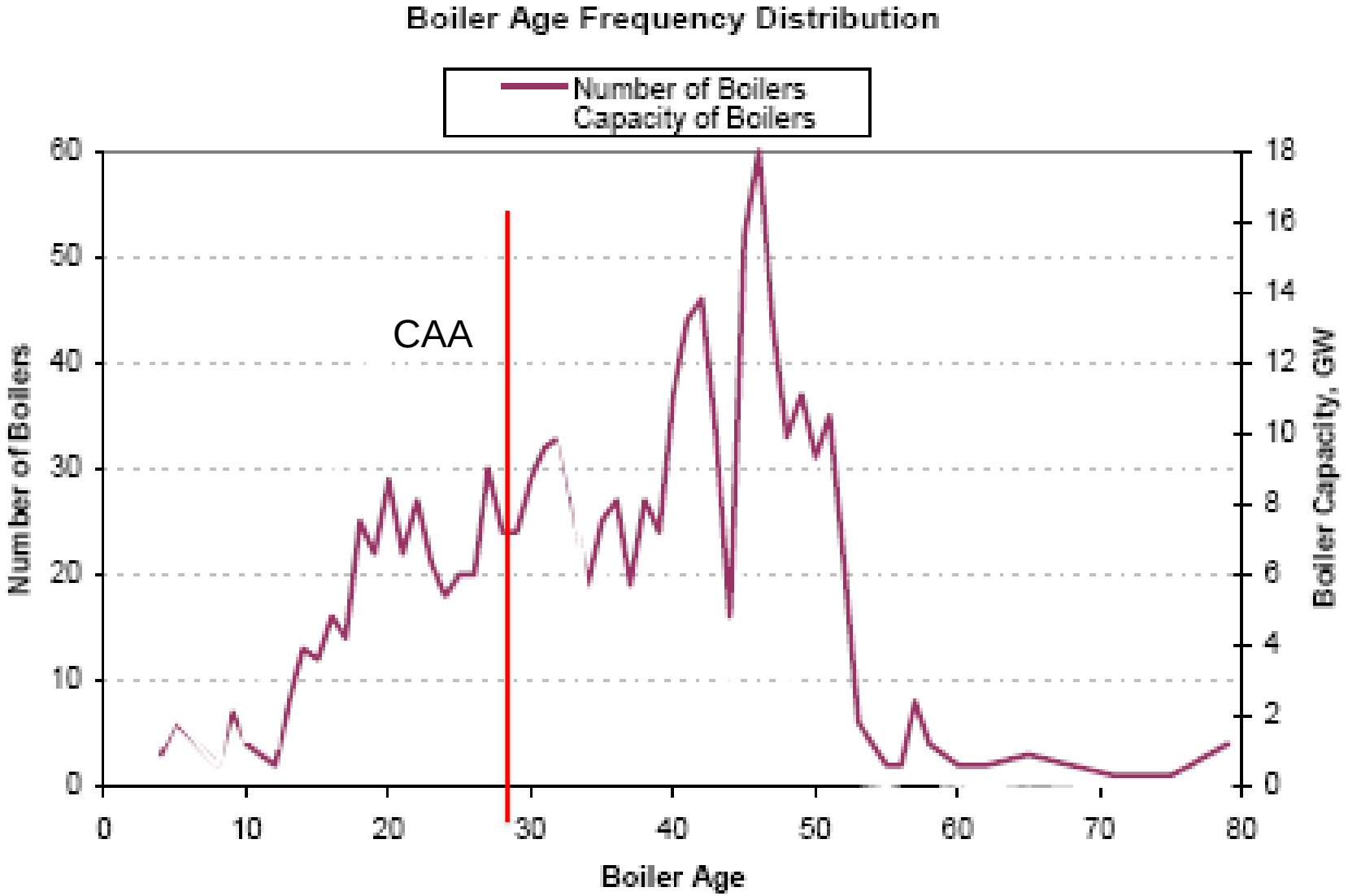
New Source Review: What is BACT?

CAA §169(2)(C)(3)

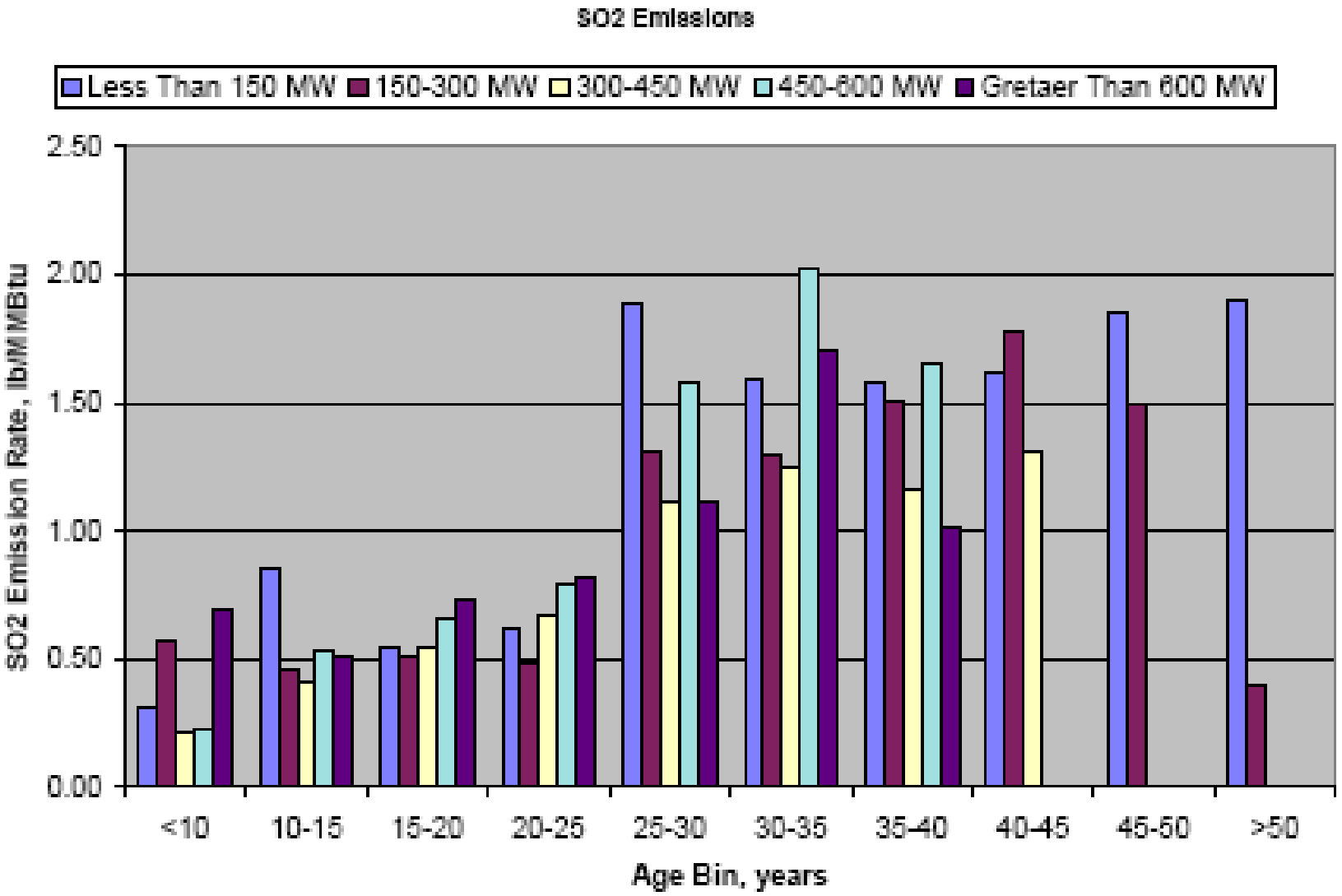
The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant … which the permitting authority on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques.

What Sources Are Subject to NSR & NSPS?

- New sources
- Modified sources
- Why are modified sources included?
- What constitutes a modification?



NETL Coal Power Plant DataBase, May 2002



NETL Coal Power Plant DataBase, May 2002

New v Existing Sources

- Should new sources be treated differently from existing ones?
- Is a “modification”-based approach the best way to get at interminable life extensions? What other approaches could be considered?

How Should Reductions in CO_2 and Other Greenhouse Gases be Managed?

- Ambient standards like NAAQS?
- Emissions standards like NSPS or BACT?
- Cap and trade as in the acid rain program?
- Emissions fees or taxes?

Clean Air Act Tutorial

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EPA Authority to Regulate Under the Clean Air Act

- Many substances are listed explicitly
- If not, EPA may still have authority to regulate if
  - Substance is an air pollutant
  - And threshold finding for specific provision is met
    - E.g., presents "a threat of adverse human health effects" (section 112)
    - "may reasonably be anticipated to endanger the public health or welfare" (sections 201, 211)

What is an Air Pollutant?

- Criteria Pollutants
  - Carbon monoxide, sulfur dioxide, nitrogen dioxide, photochemical oxidants (ozone), particulate matter, lead
  - EPA can add others …
- Hazardous Air Pollutants
  - 1990 Amendments listed 189 substances
  - EPA can add to or delete from the list
- Title VI: substances that destroy the stratospheric ozone layer, e.g., CFCs

What is an Air Pollutant?

- CAA section 302(g)

The term “air pollutant” means any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive substance or matter which is emitted into or otherwise enters the ambient air. Such term includes any precursors to the formation of any air pollutant ...

What is meant by welfare?

CAA section 302(h)

All language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being ...

Massachusetts v. EPA (2007)

- Established that greenhouse gases such as CO_2 are air pollutants subject to regulation under the Clean Air Act

Criteria Pollutants

CAA § 108 – … the administrator shall publish … and from time to time revise a list which includes each air pollutant –

(A) Emissions of which … cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare

(B) The presence of which in the ambient air results from numerous or diverse mobile or stationary sources

Is Formaldehyde

- An Air Pollutant?
- A Candidate for Listing as a Criteria Pollutant?

If EPA Were to List Formaldehyde

- What level and averaging time should be used for the standard?
- Should primary and secondary standards be the same?

If EPA Were to List Formaldehyde

- What information does EPA need to use to designate areas as in or out of attainment with a NAAQS? What is the status of this information for HCHO?
- Could satellite data be used to help monitor HCHO and assess attainment?

If EPA Were to List Formaldehyde

- If cities like Atlanta or Houston are designated nonattainment for HCHO, what sources should the states of Georgia and Texas target for controls?
  - Are they limited to sources that emit HCHO directly?

If EPA Were to List Formaldehyde

- Assuming a NAAQS is set, what other CAA mechanisms could EPA employ to help states achieve the HCHO NAAQS?