

# U.S. Environment Policy

---

## Lecture 21

# Today's Agenda

- Politics of regulation, esp. environmental regulation
- Case study: US regulation of SO<sub>2</sub> from power plants
- Trading regimes: in general & for SO<sub>2</sub>
- Briefly: performance of the Clean Air Act

# Wilson's taxonomy of the politics of regulation:

		Benefits of regulation	
		Concentrated	Dispersed
Costs of Regulation	Concentrated	<b>Interest Group:</b> Fed Maritime Commission	<b>Entrepreneurial:</b> environmental, FDA, ...
	Dispersed	<b>Client Politics:</b> milk prices, airline regulation?	<b>Majoritarian:</b> antitrust legislation?

- Maritime: Hawaiian interests v. shipping lines (invisible)
- Milk: public v. dairy farmers
- Majoritarian: no clear, organized groups
- **Entrepreneurial/ social movement:** Clean Air Act, Civil Rights, FDA regulation of prescription drugs...

# Air Pollution Regulation by EPA (1)

- Who works in a regulatory agency (per J.Q. Wilson)?
  - Careerists: want to rise within and with the agency
  - Politicians: want to go on to outside elective/appointed jobs
  - Professionals: want to gain status within their professions
- EPA is an executive branch agency, political support is from the environmental movement. Early workers?
  - Professional environmentalists, careerists
  - Favored tight rules, vigorous enforcement; v. Dept. of Energy
- EPA also does water, toxics, & radiation; air most closely related to energy
- Sets & revises NAAQS for 6 “criteria pollutants”:  
ozone, particulates, CO, NO<sub>x</sub>, SO<sub>x</sub>, & lead
  - All (with leaded gasoline) driven by energy use

# Air Pollution Regulation by EPA (2)

- Required to set NAAQS to “protect human health with an adequate margin of safety” (can’t consider costs)
  - Law assumes thresholds, which probably don’t exist
- Reviews state SIPs, which use command & control (MIT parking)
- EPA doesn’t use Pigouvian taxes; little trading early except bubbles & offsets (how to PROVE offsetting reductions?)
- Mainly “command and control”: set performance and/or or technology standards like NSPS. **Pluses & Minuses?**
  - + Can ease enforcement: just check device (if it works)
  - + Avoids hot spot problem – e.g., toxics that don’t travel
  - + Enviros traditionally disapprove of markets (Sandel): need stigma (but toxics v. CO<sub>2</sub>), shared sacrifice; no rich buyout...
  - Problem: imposes different marginal costs across sources
  - Problem: no reward for innovation, beating the standard

# Types of Early Trading

## Summary of Emissions Trading Activity

Activity	Estimated Number of Internal Transactions	Estimated Number of External Transactions	Estimated Cost Savings (millions)	Environmental Quality Impact
Netting	5,000-12,000	None	\$25-\$300 in permitting costs; \$500-\$12,000 in emissions control costs	Insignificant in individual cases; probably insignificant in aggregate
Offsets	1,800	200	Probably large, but not easily measured	Probably insignificant
Bubbles:				
Federally approved	40	2	\$300	Insignificant
State approved	89	0	\$135	Insignificant
Banking	<100	<20	Small	Insignificant

Image by MIT OpenCourseWare.

Source: Hahn, Robert W., and Gordon L. Hester. "Where Did All the Markets Go? An Analysis of EPA's Emissions Trading Program." *Yale Journal on Regulations* 6, no. I (1989): 138.

# Because EPA is in the executive branch, its regs must pass OIRA cost-benefit test (since Carter)

- Cost-benefit more commonly done to defend a decision than to make a decision
  - Should select alternative with highest net benefits...
- EPA, other agencies always find that their decisions pass the test – often an internal fight
- Some current C-B-related controversies
  - CO<sub>2</sub> found to be dangerous, so must regulate – though US-only reg will have no benefits...
  - Shadow price of carbon emissions, discount rate, value of a statistical life – settled by OMB/WH directives
  - Lives or quality-adjusted life years (“senior discount”) – who votes?
  - “Contingent valuation”: “How much would you be willing to pay?” Answers not sensitive to e.g., # of birds saved

# EPA and the 1971 NSPS

- What were the interest groups involved in influencing the 1971 NSPS decision?
  - At least eastern coal, western coal, and the utilities
- What made the problem hard politically?
- The 1971 NSPS was a simple performance standard: 1.2 lbs. of SO<sub>2</sub> per million BTU (MBTU) burned
  - What cost/benefit analysis supported this standard?
  - What thinking led to this standard?
  - What happened when this standard was challenged in court?
- If you had been head of EPA in 1971, any obviously better approach – consistent with the law?

# The 1977 CAA Amendments

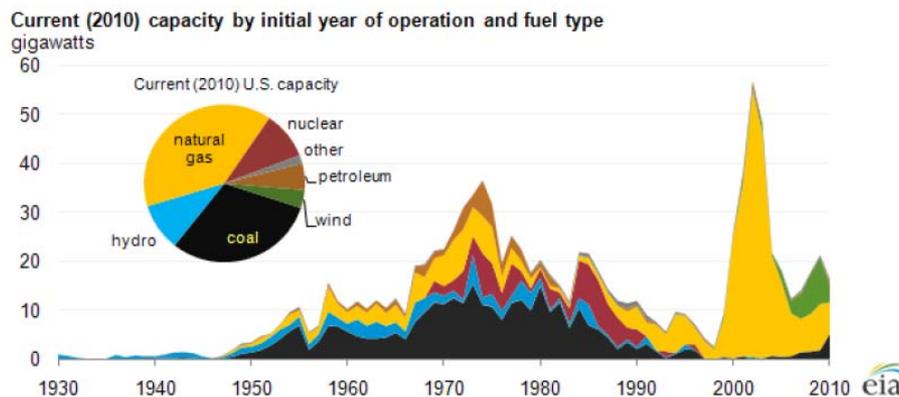
- What put scrubbing on the table during 1976-77 debates in Congress?
  - Earlier litigation (esp. Navahos'), courts' rejection of SIPs that let clean areas get dirty, tall stacks
- What were the interest groups involved in writing the 1977 NSPS legislation & report?
  - Eastern coal, western coal, environmentalists, western states
- Where did the Carter administration stand?
  - Pro-scrubbing, to sell enviros on more use of coal for security
- Who favored the final (confused) outcome and why?
  - Enviros & eastern coal, since it leaned toward scrubbing
- Was this outcome “irrational”?

# Developing the 1979 NSPS

- **What were the initial positions within the administration?**
  - Planning, RARG, DOE (1.2 → 0.55) v. Air (1.2 + 90% scrubbing)
  - 0.55 would require scrubbing, but not as intense with W coal
- **How had interest group alliances shifted?**
  - Enviros could count the 0.55 standard as a win
  - Eastern coal (couldn't scrub to 0.55) & utilities wanted 1.2 & 90%
- **What ended the impasse? What was the new NSPS?**
  - Dry scrubbing appeared as an option (*though none operating*): cheaper but only 70% removal
  - Led to a two-tier NSPS: either 1.2 with 90% or 0.6 with 70%
  - Eastern coal economic in the east; low-sulfur coal in the west
- **What would you have done instead?**

# Enacting the 1990 Acid Rain Program

- Because new sources had to meet stricter standards than old sources, strong incentive to prolong the life of old sources
  - WEPCO Rule: What can you do to an old source without making it new?
- This “new source bias” & slow demand growth → in 1985 83% of power plant SO<sub>2</sub> was from old plants that failed the **1971 NSPS!**
- This pattern continues...



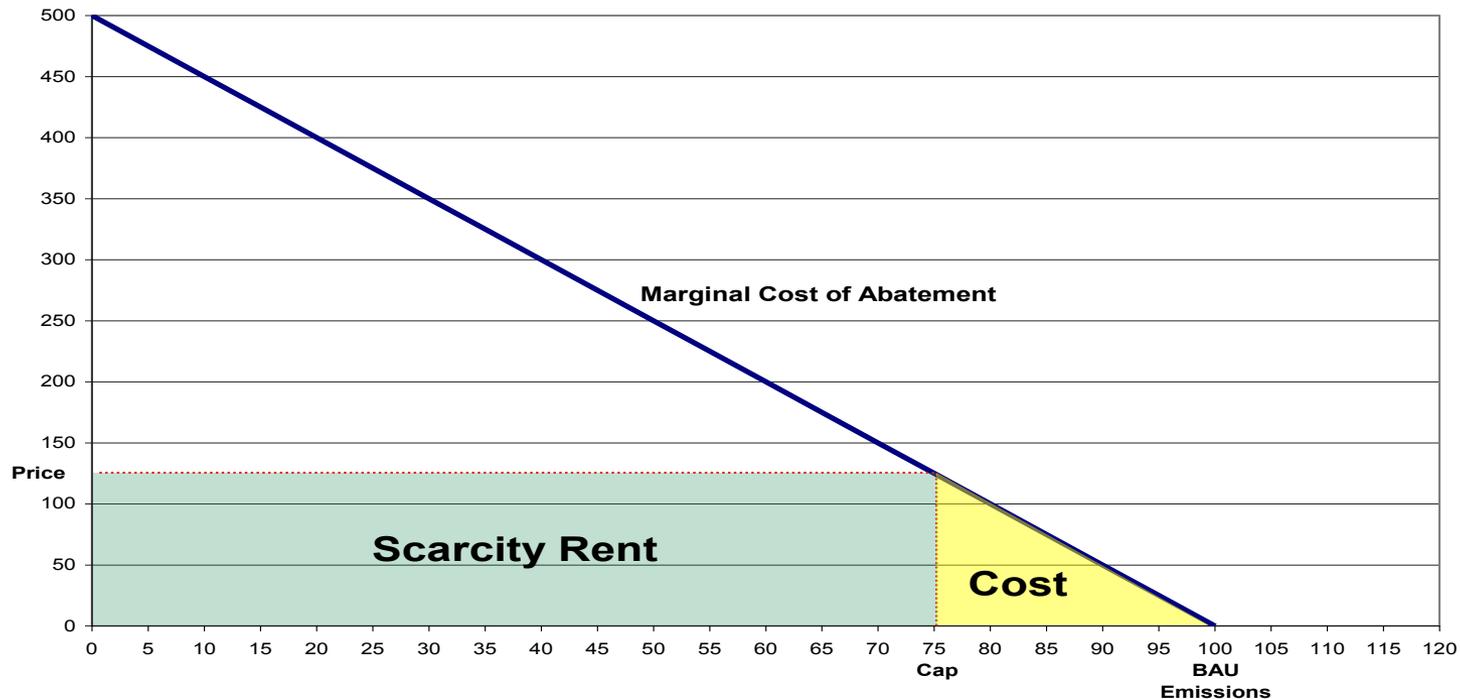
- Acid rain from old dirty plants emerged as a issue in the 80s; state SIPs couldn't address, **what to do?**

# Trading in Filth – for a while; Read (B)

- Because old plants had vastly different cleanup costs, standard-setting would have had very high costs
  - Clean areas resisted scrubbing, national electricity tax
  - Dirty areas resisted cleanup
- With environmental (EDF) cover, Bush administration proposed a national cap-and-trade (“allowance trading”)
  - Other enviros held their noses; no alternative way forward
  - Allowance allocations were used to build a coalition
  - Small part of big clean air bill
  - Once passage seemed likely, wild scramble for allowances
- **Does national trading make sense for all pollutants?**
- Took effect in 1995, on schedule, and...

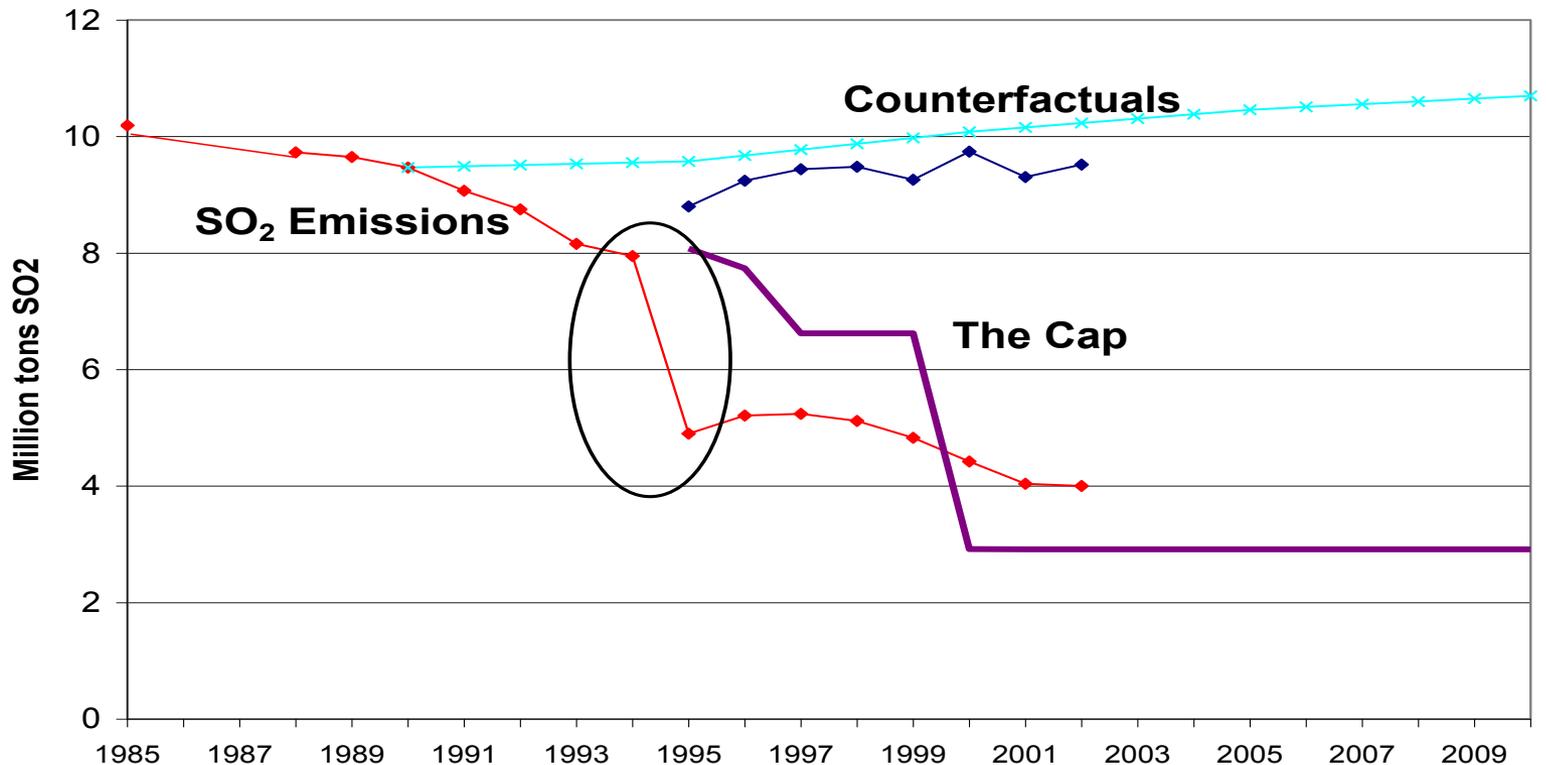
# A Valuable Asset Was Created & Given Away

(A windfall under competition since prices will rise to reflect opportunity cost of allowances; more complicated under regulation)



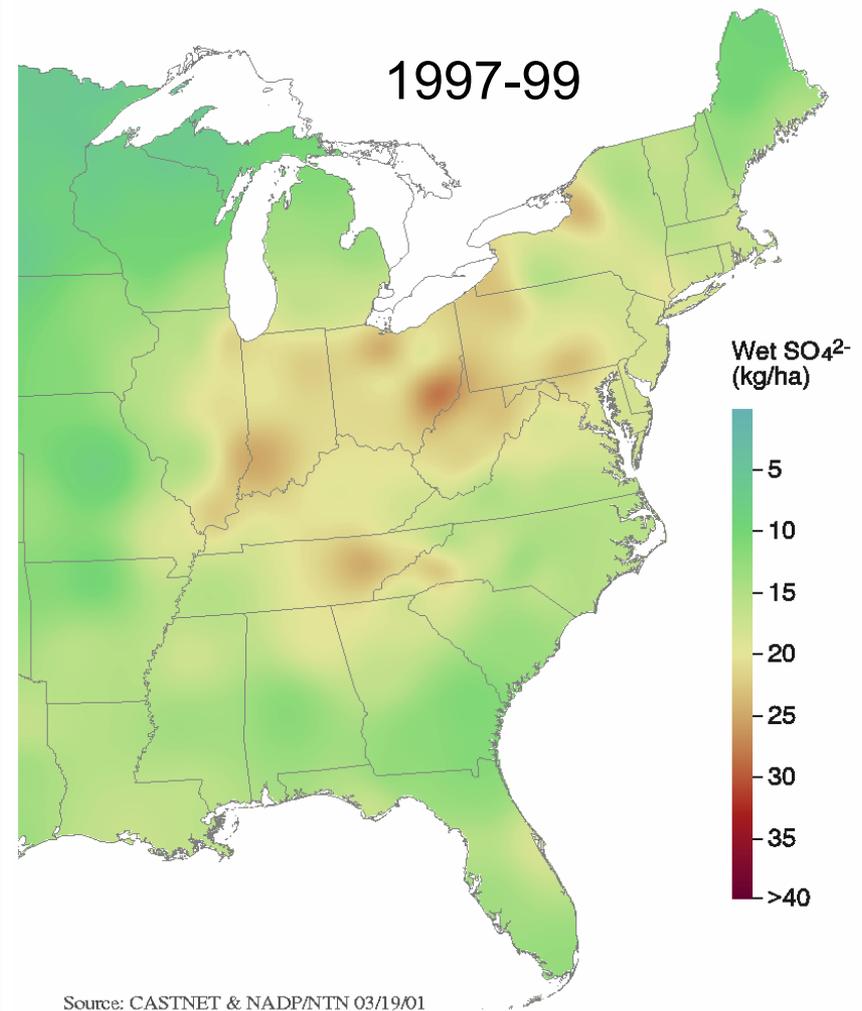
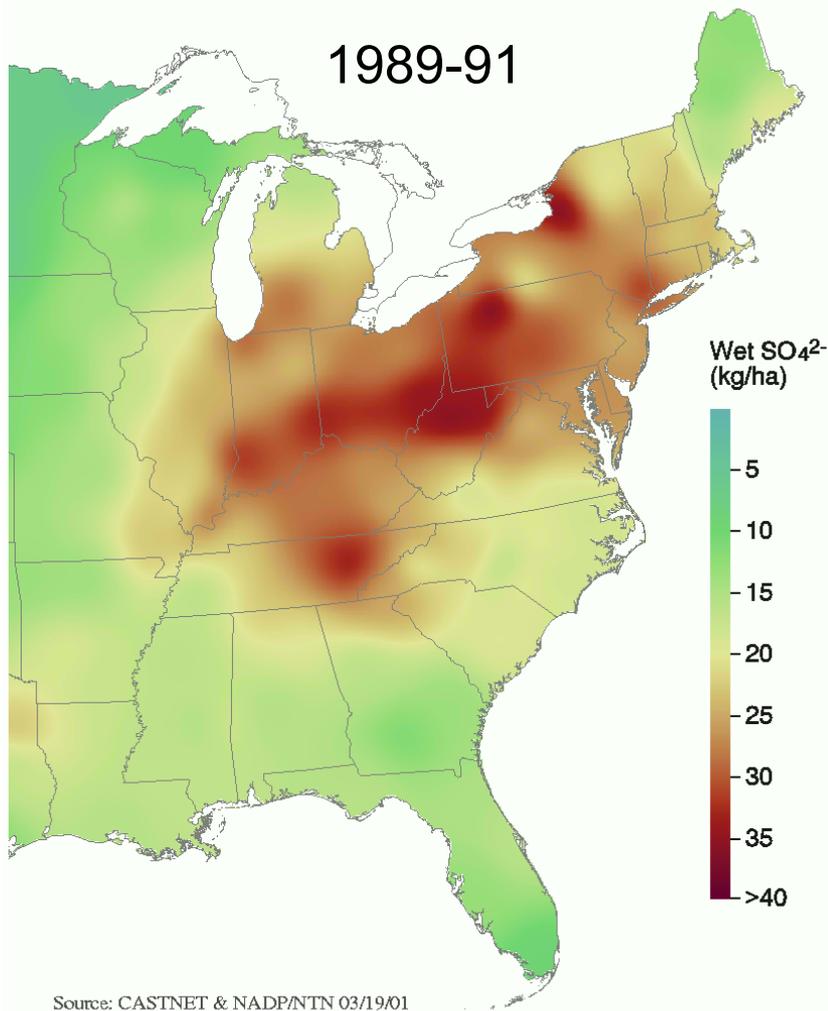
Note: Marginal Cost curve is Demand for Allowances curve, normalized to 100 at Price = 0

# Aggregate Emissions Were Cut Drastically:



Vs. standards, always have an incentive to cut, no matter how clean  
Produced considerable innovation: e.g., coal blending, cheap scrubbers

# Acid Rain Declined: Monitored reduction in wet sulfate deposition due to Acid Rain Program



Source: U.S. Environmental Protection Agency. "Annual Wet Deposition." <http://www.epa.gov/castnet/javaweb/precipchem.html>.

# Prices moved more than some expected

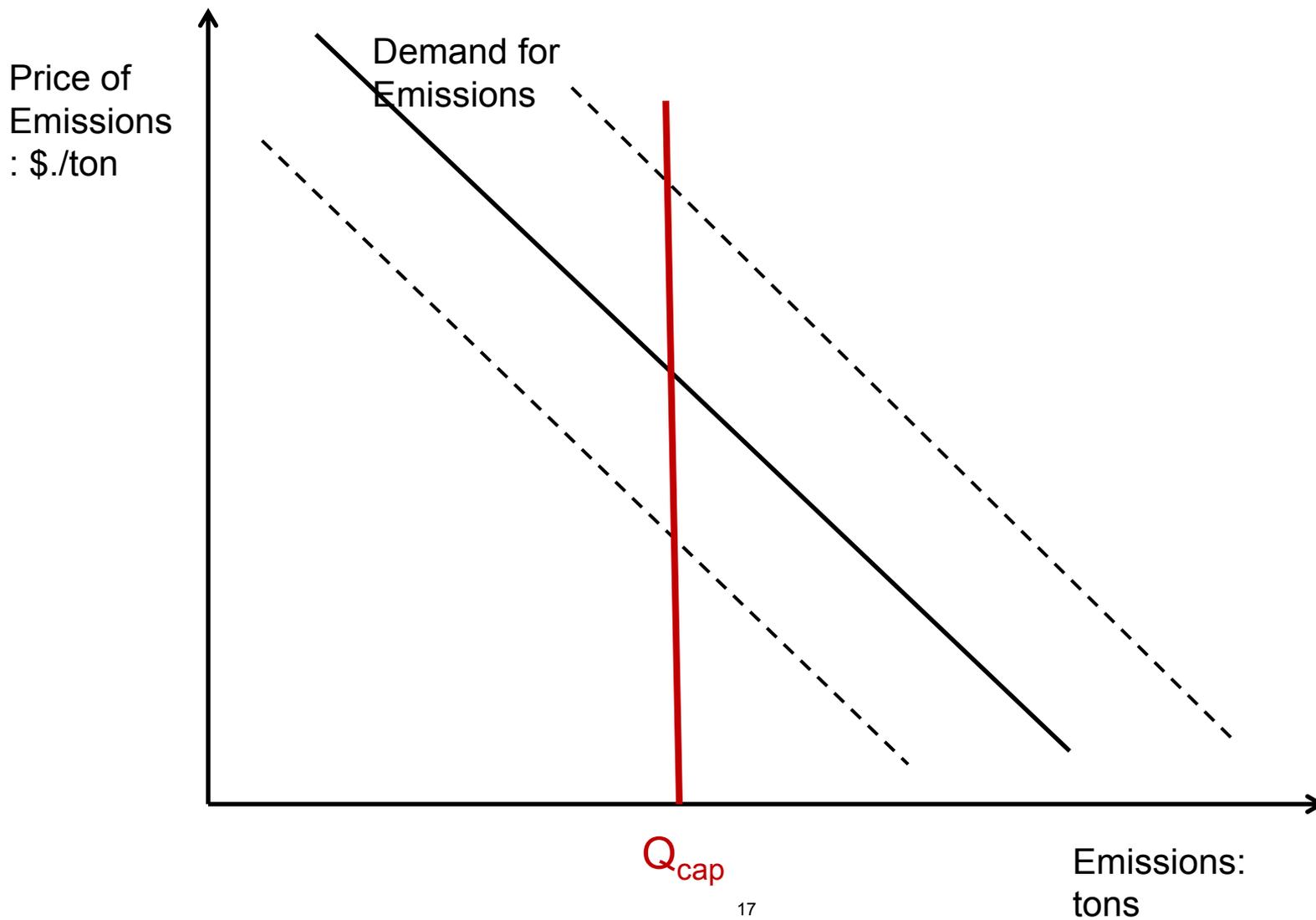
## SO<sub>2</sub> Allowance Price Index

Source: Cantor Fitzgerald



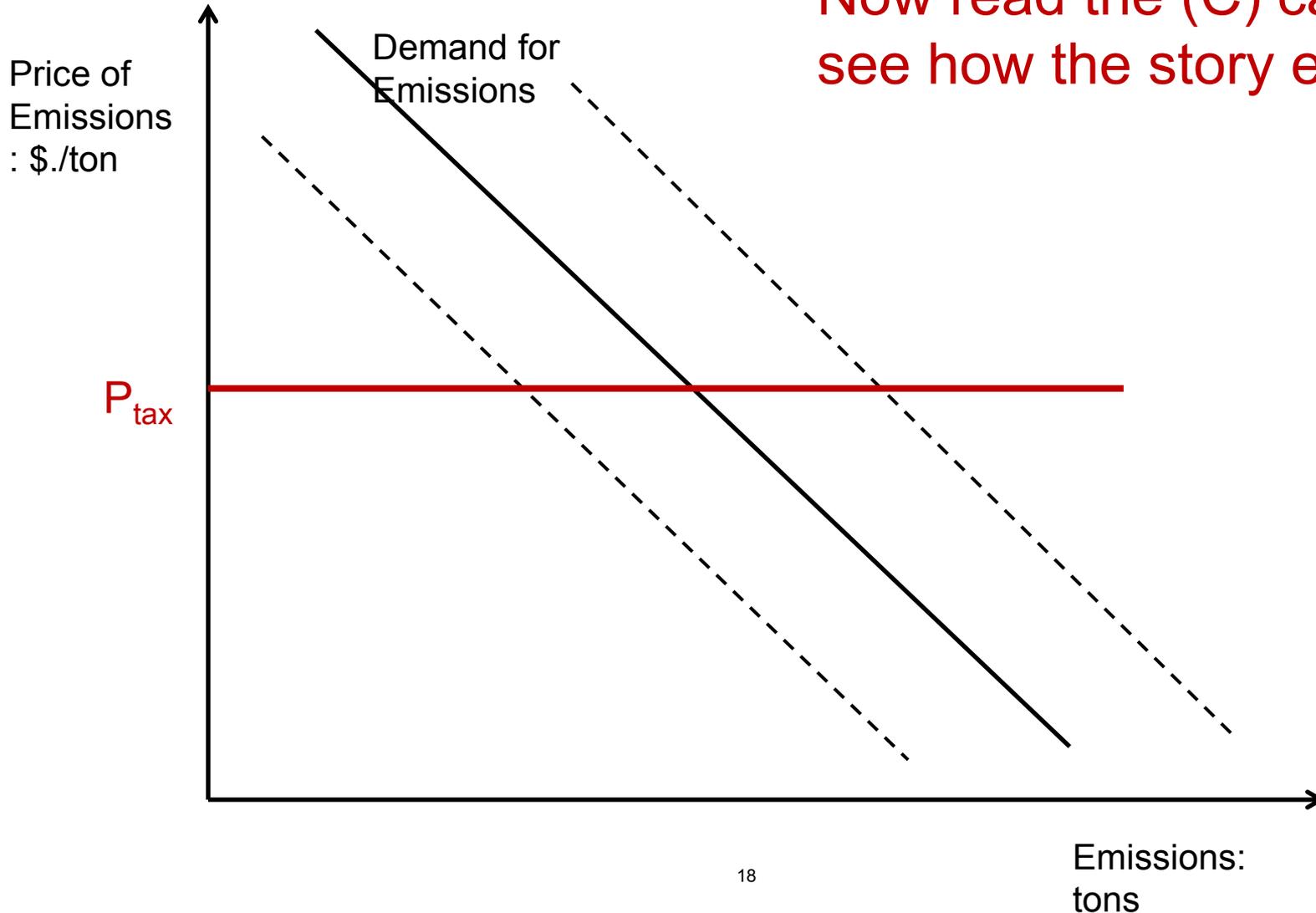
Source: U.S. Environmental Protection Agency. "Acid Rain Report: 2003 Progress Report." September 2004.

Not a great surprise when you think about it; short-run demand inelastic, supply perfectly inelastic, but bothers both industry and enviros.

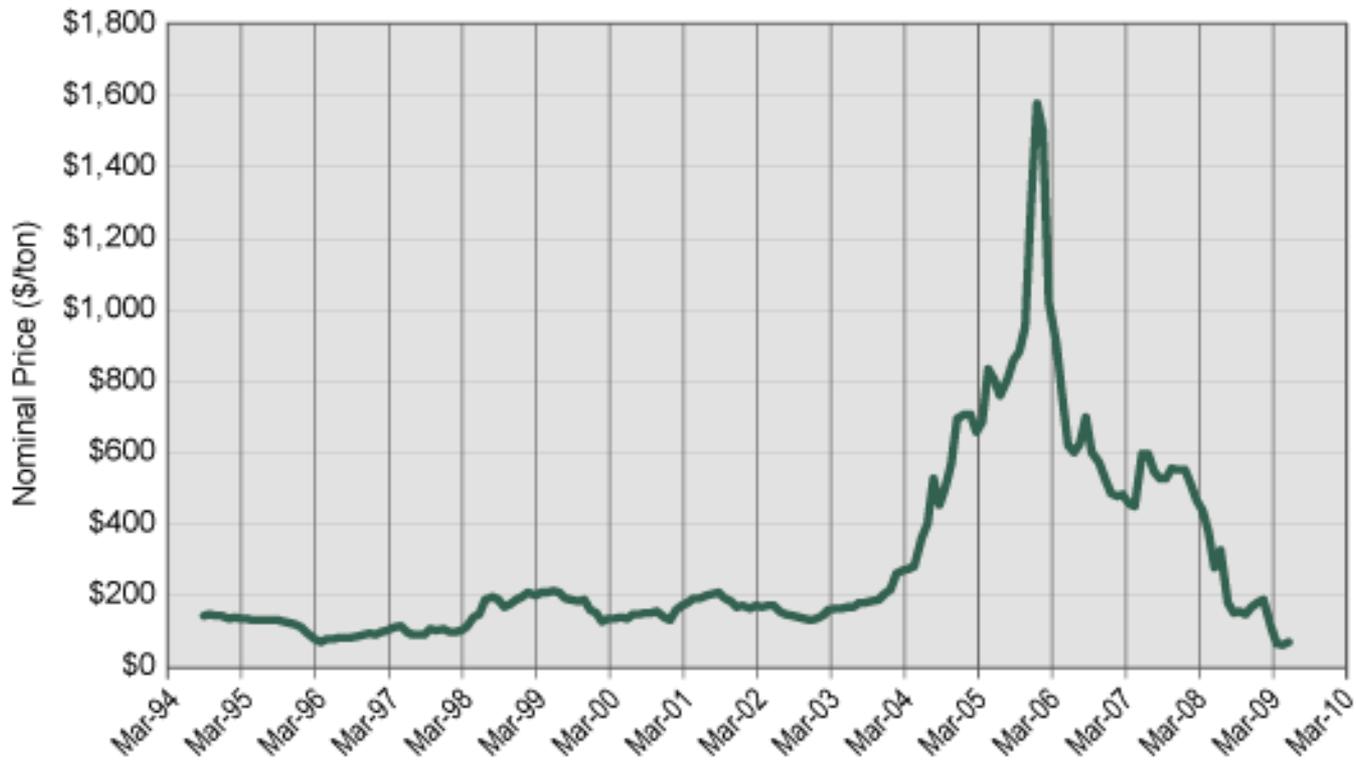


A tax would have given price stability but quantity risk (enviros hated) and greater burden on utilities (they hated)

Now read the (C) case to see how the story ended



# Fear of CAIR spiked prices, but the new rule will effectively end interstate trading

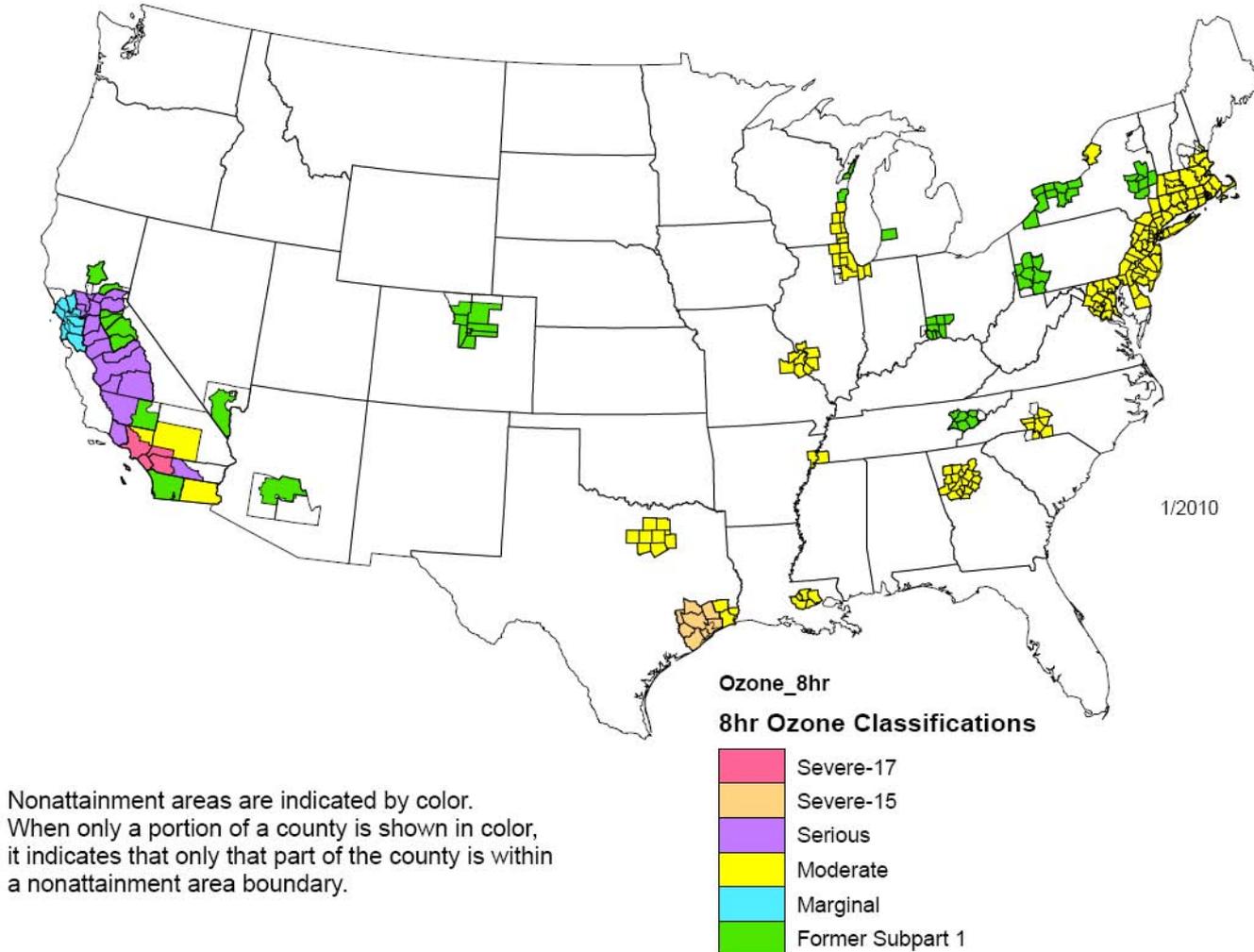


# Has The CAA Architecture Worked?

- From 1970 to 2005, real GDP increased 195%; vehicle miles traveled increased 178%; but
- Lead emissions decreased 99% (unleaded gasoline!)
- Large PM decreased 83% (but small PM – more dangerous – down only 13% since 1990)
- CO down 55% (better fuels, complete combustion)
- SO<sub>2</sub> down 52% (1990 Act's trading important)
- NO<sub>x</sub> down 29% (cars, old power plant standards)
- Volatile organics (ozone precursors) down 52% (catalytic converters)

# But Ozone is Stubborn (esp. in CA, BOS-NY-DC),

8-hour Ozone Nonattainment (1997 Standard)

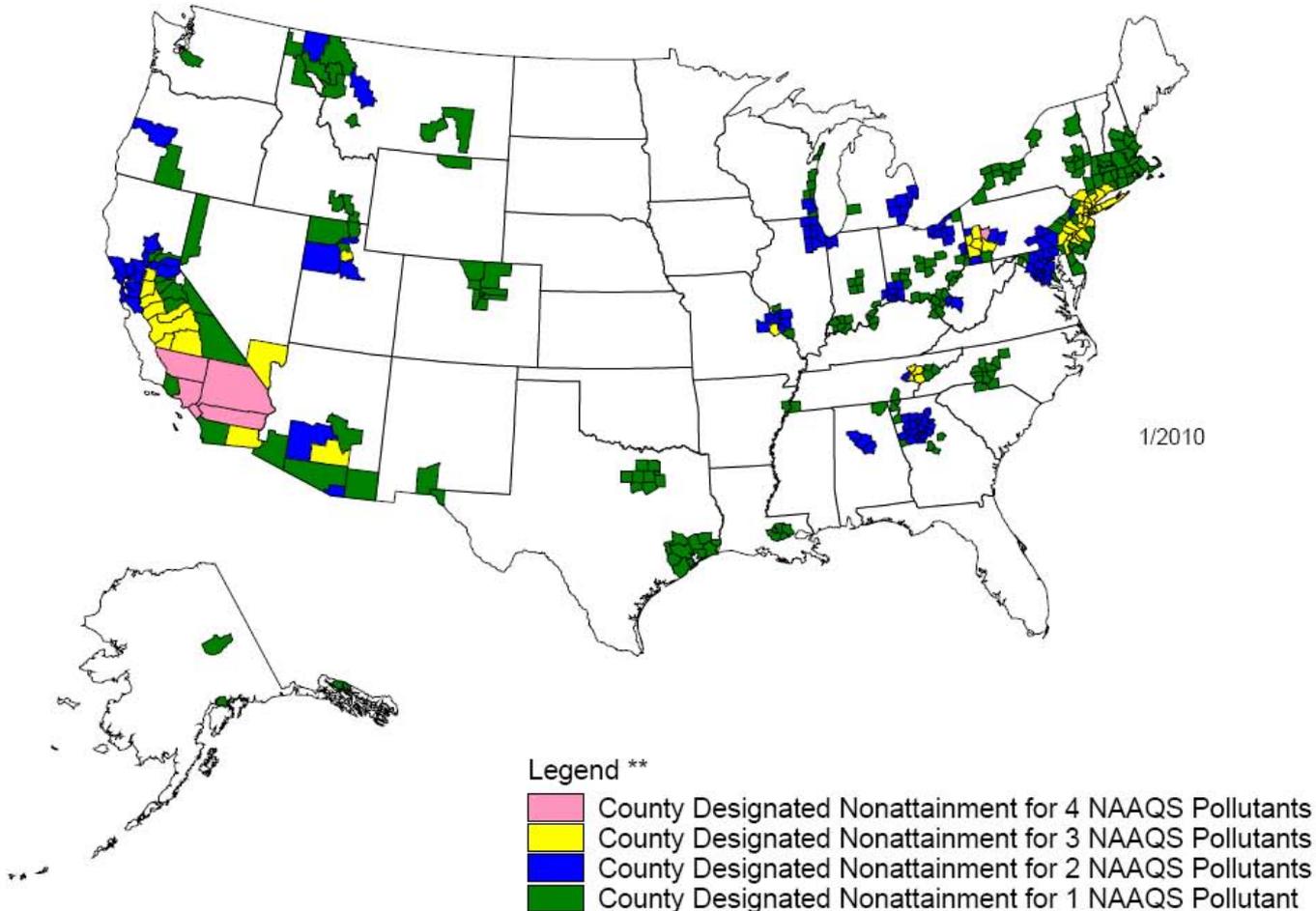


Nonattainment areas are indicated by color. When only a portion of a county is shown in color, it indicates that only that part of the county is within a nonattainment area boundary.

# & other Criteria Pollutants persist in some places

## Counties Designated "Nonattainment"

for Clean Air Act's National Ambient Air Quality Standards (NAAQS) \*



Source: U.S. Environmental Protection Agency. "8-hour Ozone Nonattainment (1997 Standard)." <http://www.epa.gov/airquality/greenbook/mapnpoll.html>.

MIT OpenCourseWare  
<http://ocw.mit.edu>

15.031J / 14.43J / 21A.341J / 11.161J Energy Decisions, Markets, and Policies  
Spring 2012

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.