

US Environmental Policy: An overview

TBES

- Technology Based Effluent Standards are the cornerstone of command and control regulations in the US.

Standards: Emission per unit

- Output
 - Water permit system gives discharge permits as function of plant capacity.
 - Since plants don't run at capacity much, system doesn't constrain plants much.
- Input
 - 95% of the sulfur in the coal must be removed.
 - Notorious predecessor to Clean Air Act acid rain provisions
- Alphabet Soup: CAA is clean air act, CWA is clean water act.

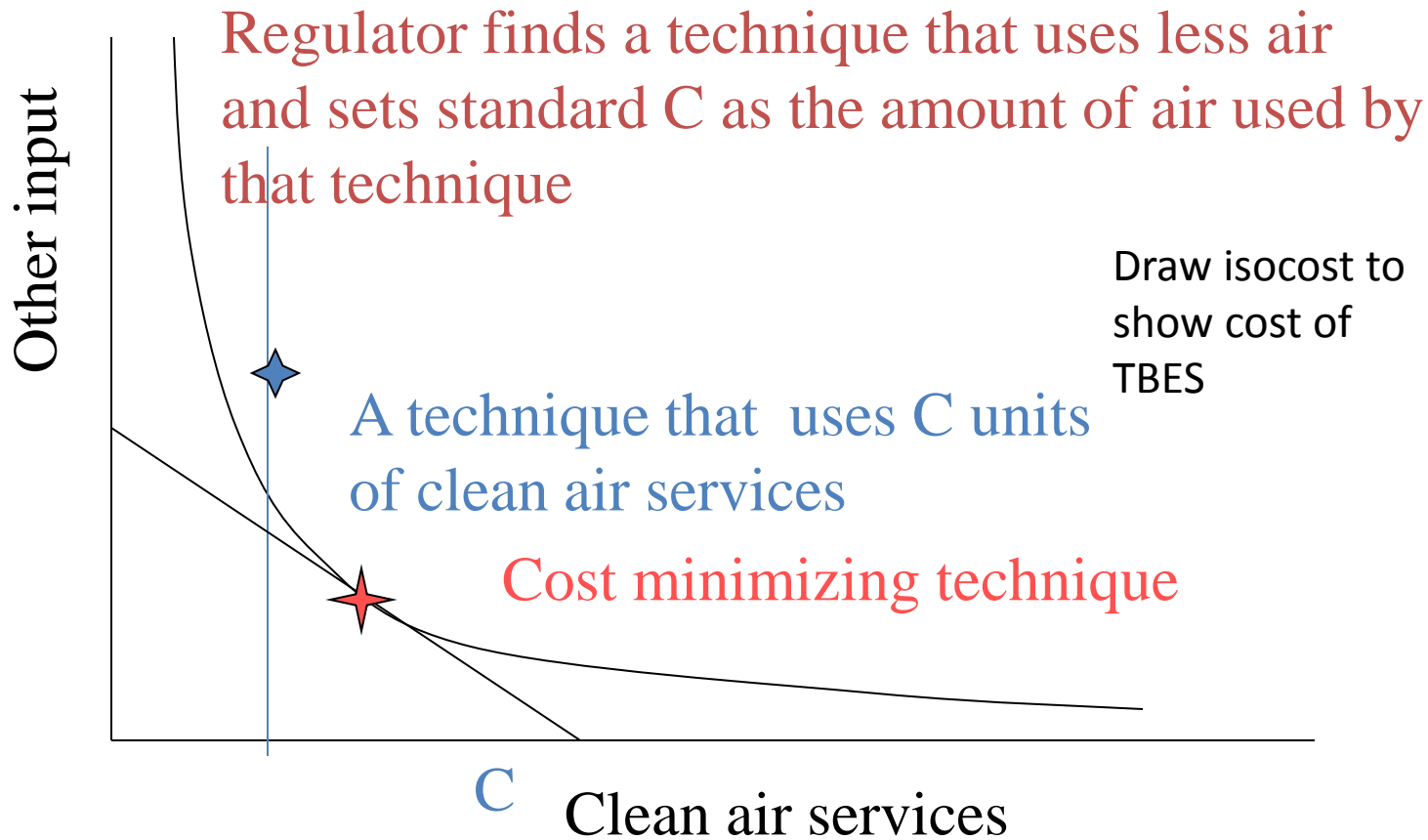
Technology Standards

- Building codes
 - Must use insulated windows
- E.g. Must use catalytic converter on car
- Compare to x gms per mile, an emission/output standard, which is met with a catalytic converter (CAA act does this)

Technology Based Effluent Standards

- TBES
- Used in CAA and CWA
- An emissions standard
- Level is set as that which can be achieved with a reference technology
- E.g. A 6 speed transmission can reduce co2 emissions by 12%, therefore cars must abate 12% (by any method they choose.)

Technology Based Effluent Standard in a standard isoquant/isocost diagram



MAJOR LAWS IN THE US

NEPA is the master law

- National Environmental Policy Act
 - Policy not planning because planning was communist.
- Purely procedural. It is a Planning act.
- Must prepare Environmental Impact Statement
- <http://www.epa.gov/compliance/basics/nepa.html>
- Increased transaction costs for all development projects

NEPA

- Who: Any project that is a major federal action. Includes projects that need a permit from a federal agency, such as filling a small amount of wet land. Or displacing a spotted owl.
- What: Prepare a detailed written analysis of the project and alternatives to the project including a no action alternative. Explain all the environmental impacts of the alternatives. Explain all the benefits of the alternatives.

NEPA

- **When:** Before you start the project. The process includes preparing a draft EIS, getting comment, responding to comment, issuing final EIS.
- **Why:** Belief that if only US agencies knew the full extent of their environmental impact they would choose other alternatives.

NEPA

- What happened: EIS's are defective if they miss an issue (e.g. kit fox in Merced). Environmental movement went to court to make agencies redo their EIS reports. This process was effective in delaying or even killed projects.

ESA, LEDPA process,

FEDERAL LAND USE

Endangered Species Act

- May not take an endangered species. That includes harass, cut down its home etc.
- Take permits needed to develop land
- Habitat Conservation Plans
- Typical: deed some portion of property to conservation use in exchange for take permit.
- Conservative View: This is simply an uncompensated taking.

Least Environmentally Damaging Practicable Alternative

- Section 404 of Clean Water Act requires preservation of wetlands.
- It is very rough. First have to show that the project *can't* be done somewhere else. Hard showing.
- Then have to mitigate. For instance buy the salt ponds in SF bay and return them to wetlands in exchange for a runway at SFO.

Limitations to Section 404

- To waterways of the US. (navigable and also a claim under commerce clause)
- A non connected quarry isn't a wetland.
- A vernal pool that eventually makes it into a river is.
- Navigable means could drag a canoe up it.
- So most waterways in US fall within act.

And EIS

- Any large greenfield project in Calif will involve both small amounts of wetland and potential endangered species.
- Hence any large project will need a fill permit under LEDPA and a take permit for ESA.
- Hence they will require an EIS.

Example: University of California, Merced

- As built required a small amount of vernal pools and hence the LEDPA process, which took close to 5 years.
- Required examination of alternatives.
- Required extensive biological work to rule out the existence of kit fox on the land.
- Required 20, 000 plus acres of mitigation vernal pool land for a couple of dozen acres taken.

Local Land Use

- Localities can use zoning, including zoning for agriculture only, or urban growth boundaries to rule out development.
- Localities can also deny development by refusing to supply water.
- States (CA) can require that projects that need only state permits follow a process similar to the Federal process (CA Env. Impact Report)

Result

- All development projects, including an addition to your neighbors house, can be hindered or stopped using a combination of state, local, and federal regulation.
- At least if one is willing to spend enough time and money to do so.
- Development is a very messy process.

Clean Air Act

- Landmark legislation
- Sets out comprehensive scheme to control air pollution
- Has underlying standards and 5 logical parts

0. National Ambient Air Quality Standards.

A. The EPA sets goals for how clean the air must be based upon public health. See <http://www.epa.gov/air/criteria.html> for the current standards. The criteria pollutants regulated by NAAQS include NOX, SOX, etc.

- B. The States are required to make regulations on stationary sources that will bring the state's air into compliance with NAAQS. The State does this by writing a State Implementation Plan.

NAAQS

- Nonattainment areas have to have plans to come into attainment
- Plans limit emissions from stationary sources, like power plants
 - Typically, bigger plants got more emission rights
 - But, the rights don't increase if the plant gets bigger

Meeting NAAQS

- Every airshed must be brought into compliance with NAAQS, and if in compliance is not allowed to deteriorate.
- So the law says.
- Fixed sources are regulated through the SIP process, direct regulations of toxics, trading of so₂, and new source standards. All at the same time.
- Mobile sources have their own section.

1. States and SIP

- States through SIP process must control emissions to produce an improvement in air quality
- And *eventual* compliance with NAAQS
- USEPA must certify SIP.
- SIP was meant for state regulated point sources, but wait and see what happened.

Source Control

- Each point source is analyzed by seeing what control devices can be used on it.
- E.g. a power plant could be controlled with a tuning of its boiler temperature to reduce nox or with a selective catalytic reduction unit to remove the nox in the stack.
- A state was expected to impose TBES on its point sources so that the remaining emissions would lead to NAAQS compliance.
- The list of measures was the State Implementation Plan, and when approved by the USEPA had the force of Federal, not local, law.

Extreme Response to SIP: RECLAIM

- South Coast Air Quality Management District has responsibility for stationary sources in LA basin (delegated from CA Air resources board, CARB)
- Could not find anything else to clean up! And the air was still dirty.
- Runs a cap and trade program in NOX, SOX and ROG.
- Supplants TBES in State Imp. Plan
- Interesting the CAA had flexibility to accommodate this response.
- RGGI is second program (NE power plants also trade)

Marketing Air Pollution

- Long history of Bubbles and Other trading Schemes in the CAA. These allow limited trading between sources in the same locality or within a firm.
- South Coast allows market in pollution RECLAIM
 - amount of permits decrease each years
 - “solves” problem of mc different for different firms
 - Reductions at the coast affect more people than those inland and that is accounted for in the scheme.
 - RECLAIM was only for large emitters.

Much new empiricism: start with

- Greenstone:
<http://www.nber.org/papers/w8484>
- CAA rearranged investment in us away from non-compliant counties
- <http://www.sciencedirect.com/science/article/pii/S0095069604001202>
- Becker; PACE survey shows that polluters do spend more on pollution control.
- Kellogg. CAA works.

2. NSPS

- New Source Performance Standards
- (For the statute:
-

http://www.access.gpo.gov/nara/cfr/waisidx_99/40cfr60_99.html). New sources of air pollution are limited in their emissions. These emission standards are tighter in areas that have worse air. Hence, it is thought to be better for your regions economy not to be a non-attainment area. TBES is the form of NSPS.

NSPS

- But even in pristine areas a new source must limit its emissions
- Limits trading of pollution and jobs from dirty to clean places
- Phrased as non deterioration.

NSPS Politics

- Power plants in operation in '72 were *grandfathered*
 - They can continue to emit more than permitted by NSPS
 - So long as they do not have any physical modification
 - Idea was that as the plants deteriorated and were replaced new plants would be cleaner
 - But no major disruption from standards.

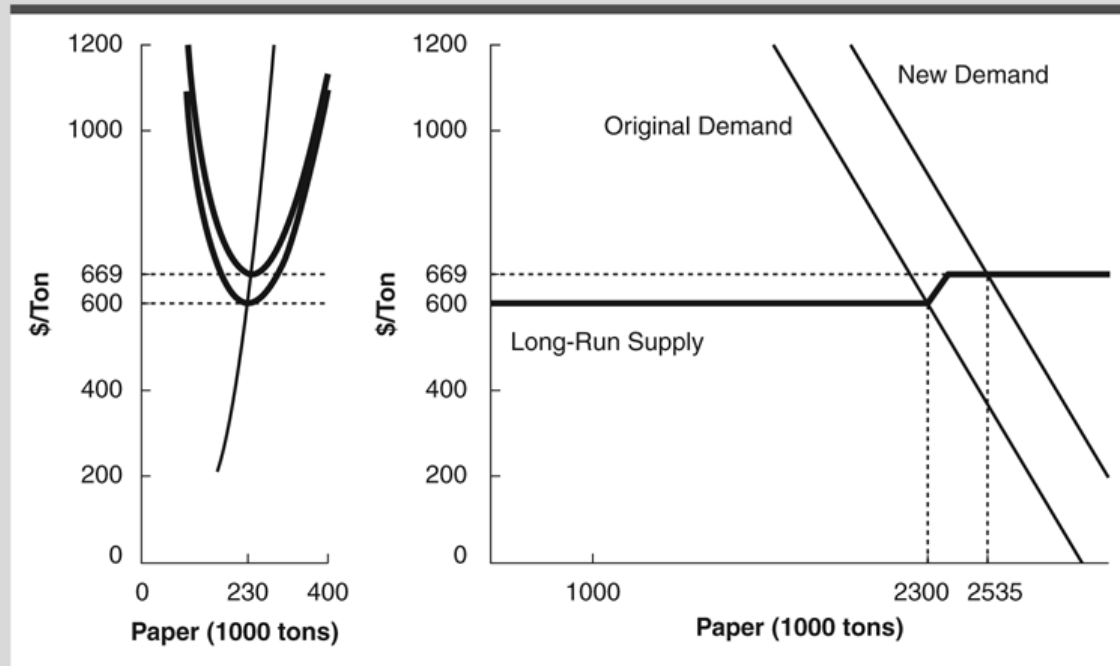
Grandfathering

- Old sources do not have to adopt as strict pollution control technology as new sources.
- Therefore they have lower costs.

Grandfathering.

FIGURE 9.13 Grandfathering.

Ten grandfathered firms have the lower AC; any new entrants have the higher AC. As long as the price is below \$669/ton, no new firms enter. For production up to $10 * 230\text{kt} = 2,300\text{kt}$, the supply curve is based only on production from the 10 grandfathered firms. Between prices of \$600/ton and \$669/ton, the supply curve follows the short-run supply curve of the grandfathered firms. The equilibrium between the original demand curve and long-run supply is at the beginning of this upward-sloping portion. When demand increases, the new long-run equilibrium is at the intersection of the long-run supply curve and the new demand curve, at a price of \$669/ton and a quantity of 2,535 kt.



Coal

- Is naturally dirty
- Gives rise to sox, nox, and particulates
- Pm10, pm2.5. Can also be toxic
- Mercury is common
- Is expensive to clean up
 - Low sulfur coal is cheap
 - Scrubbers are expensive
 - Nox removal, mercury removal, expensive

Clinton

- Found that coal fired power plants had knowingly made major modifications and not come into compliance with NSPR.
- Sued. finally settled
- Bush admin promised more industry friendly rules
- Court eventually struck down rule that ?20% of capital costs per year were mere maintenance.
 - Duke Energy—Supreme court sided against companies. AEP settled.

3. National Emission Standards for Hazardous Air Pollutants.

- For instance for radiation: http://www.epa.gov/radiation/nes_haps
- Much stricter than *criteria* pollutants like sox and nox.
- Calif threatened to prove diesel exhaust was a hazardous air pollutant as a way to make EPA allow State regulation of trucks and other sources that were meant to be exclusively regulated by USEPA.

4. Mobile Sources.

- The EPA directly regulates mobile sources and sets the limits of what they may emit for NOX and so on.
- Of the States, only California may adopt more stringent regulations and if it does so other states may follow California.
- CA regulated cars before the CAA, hence the grandfathered first mover right. Also much worse air.

GHG: waiver of federal preemption

- CA has exploited its special status in the CAA to regulate GHG
- Required a 25% cutback in fleet average GHG output.
- Typical CAA: First found health hazard. Then found technologies (6 speed transmissions). Then set emission standard.

Green Mountain v. Crombie

- Automobile manufacturers association went to court to stop CA from regulating GHG. Claimed among other things that another Federal law regulates car mileage, and that law pre empts the CAA.
- Court found that since the CAA is for public health and the other act is not, no pre emption.
- Also found that GHG were covered in the CAA (they are explicitly mentioned in 1972!)
- And that humans are causing climate change.
- And that Calif will be differently affected.
- And that the TBES was proper.
- Hence CA was able to force change in autos, despite their being no national GHG policy. And other states came along.

Clean Air: Non-point Sources

- cars: grams of NOX per mile;
 - Calif: mandatory zero pollution vehicles as part of fleet
- Heavy Trucks and Trains
 - FIP versus the SIP: Calif goals
 - 40%?! of remaining cleanup-able pollution in South Coast
- Boats: Water vs. Air Pollution and MTBE

Big deal

- Calif wrested authority away from the Federal government to regulate interstate trucks, ports, airplanes, etc.
- Shifted the center of environmental regulation to Sacramento.

Mobile: Role of Econ

- Choosing technologies within a certain cost range.
- Only in CA:
 - explicit calculation of cost per ton cleaned up
 - Impact on state gdp, jobs etc.
 - No fed regulation for this type analysis

5. Acid Rain

- National trading program in SOX from power plants.
- Cap and trade.
- Auction of some rights
- <http://www.epa.gov/airmarkets/arp/>
- (also extensive econ literature)

Cost of acid rain

- The program is for trading of allowances, but
 - Firms also subject to new source standards
 - And SIP regulations
- So it is trading after already cleaned up somewhat.
- Powder river basin coal.

Responsible to Whom?

- Plant in LA could be
 - In Reclaim
 - Subject to NSPS
 - Hazardous air pollutants
 - Acid rain trading
- So would be responsible to state and feds and in 4 different programs!
- Just for Air!!

Demand Side Measures for energy and hence Air pollution

- Public utilities used to charge $AC < MC$ for their services.
- Welfare would increase when energy saving appliances/insulation was purchased with an effective subsidy per unit of power of $MC-AC$.
- Subsidy of mass transit.
- Welfare would also increase if price were increased to MC .
- Less energy implies less pollution.

Water

- 1972 Water Pollution Control Act Amendments
 - The Clean Water Act
- Goal of NO Discharge
 - impossible
 - Unmet

Three Strings in the Bow

- 1. Direct Subsidy of Sewage Treatment.
- 2. NPDES. A nationally run TBES system for effluent discharge to water.
- 3. TDML. A state run program to further reduce discharge.

Sewage

- US used to subsidize sewage treatment
- Reasons to turn it off: Liberals-it encouraged sprawl. Conservatives-it cost money
- I think this was spectacularly effective. Can swim in little neck bay; beaver in bronx river; shipworms in the hudson.
- Baltic region has exactly this type of problem with sewage. Everyone wants cleanup but not everyone thinks it is worth paying.

2. NPDES

- Every point source discharge must be permitted by USEPA

NPDES-TBES

- Industrial sources have TBES
- some say that the TBES are tantamount to a technology standard because doing what EPA says seems to grant immunity
- Existing sources now held to Best Available Control Tech. (more stringent than best practicable which has cost/benefit test, which BAT does not.
 - backlash
 - now confused system depends upon toxicity
- new sources more stringent regs.

Form of the Standard

- Plant capacity is determined
- Emission permits are given as fraction of capacity.
 - Water discharge permits almost always exceed actual discharge. (Why?)

TDML

- CWA requires states to set water ambient water quality standards for each body of water. (e.g. swimmable, drinkable, fishable, etc)
- Once a standard is set, state must find Total Daily Maximum Loads (total emissions) that lead to that quality
- Then they must limit point sources so that TDML's are not exceeded.

No Federal Forcing

- Unlike CAA, CWA has no equivalent to the Federal Implementation Plan, so USEPA cannot force states to set standards (e.g. swimmable)
- or to back up standards with TDML's (total emissions) and back those up with emissions permits by firm (except by lawsuit)

Why Clean other States Water?

- Missouri River in Montana has too much N and other pollutants to be purifiable with a portable filter.
- Most of the US is downstream..
- I benefit, you cost! Why clean up.
- Montana had set TDML's for only small streams on national forests last time I looked.

Non Point Water Pollution

- epa leaves to the states!
- Porter Cologne does NOT exempt ag. (CA)
- Agriculture is exempt from CWA
- (cf. Baltic region agreement on K and N runoff)
- But CAFO's are treated like industry.

CWA

- Act is simply recognizing the historical situation where the states were primary in the water field.
- Primacy of the states without Federal forcing has made the CWA very hard to enforce.
- Where Ag and mining interests are paramount, little or no progress.

FIFRA: Pesticides--registered and permitted

- now being de-registered
- residue controlled
- leaking to groundwater regulated by state
 - In CA by initiative
- <http://www.epa.gov/pesticides/regulating/> for FIFRA
- CA regulation requires reporting, hence we know by crop by time.

Resource Conservation and Recovery Act

- Toxic waste
 - Manifest--tracking of waste
 - Proper disposal
- Very different from Mexico where there are not sufficient dumps and there is no tracking. Barrels fall off trucks.

TRI. Voluntary disclosure of emissions

- <http://are.berkeley.edu/~sberto/TRI-Draft.pdf>
- Jason Scorse shows the effect of being in the top ten polluters.

CERCLA. Superfund

- CERCLA--Superfund
- Fund to pay for cleanup of old wastes
 - Original money was tax on chem industry
 - To be replenished by payments from polluters
- Love Canal
 - Buried waste in old canal
 - School District took land for school
 - Barrels resurfaced and killed yards
 - Hence an act to take care of things like this

Superfund II

- One who finds waste being discharged to environment must report.
- EPA identifies potentially responsible parties
 - Strict liability: any responsible can be made to pay whole cost
 - Since buried wastes leak after you bury them,
 - All owners of site are responsible, not just the burrier!
 - You Touched It, You're Responsible
- After much litigation, responsibles must pay for cleanup.
- PCB's on bottom of hudson
- PCB's on bottom of Umealven (sweden) same deal.
- 100's of millions of \$

Damages

- Ability to sue for Natural Resource Damages
- Exxon Valdez
 - Clean up
 - Damage to fishery
 - Existence value for locals.
- This act spawned the fight over CV between Exxon(Diamond, McFadden et al) and Alaska (Carson, Hanemann et al.)

Swedish Policy

- Big reliance on taxes
 - But not for industry as much as households
 - Carbon, Nox, mining all pay
 - Gas is 6-8 USD/gallon all over Europe
- Strict liability everywhere
- NEPA like process that results in trials on the merits (not process)
- Government is sovereign and can step in and build a project anyway.

Sweden, con't

- Nuclear, hydro, and waste make heat and electricity using district heating plants
- No combustion in homes at all.
- Slow but noticeable cleanup of paper mills to closed bleach cycle odorless plants
- Emphasis on rail, compact cities, public transport, yet subsidies! For commuting from outlying small villages

Bottom Line

- Carbon targets with EU exceeded.
- One can both breathe and swim, nearly everywhere.
- And this done with steel, autos, etc—they are Detroit not Calif.

China

- Population policy will save at least .4 billion people from consuming. Nobody else makes this kind of sacrifice.
- Rebuild cities so that walk to subway < 300m. Everywhere in Beijing. E.g. a 16 million person version of Paris.
- Turn off junk plants from great leap forwards
- Many other policies—but not big gas tax yet.