Some approaches to environmental policy

- **Command and control (end of pipe):** government regulation; limits/standards/quotas set; penalties for violations
- **Green taxes (subsidies):** charges on environmentally harmful products, activities
- **Marketable permits:** firms can buy/sell/trade permits to emit certain amounts of pollutants
- Voluntary instruments (CSR, ecolabelling …)

Command and Control

- **A command-and-control (CAC)** approach

a) mandates the behavior in law,

b) then uses whatever enforcement machinery—courts, police, fines, and so on—are necessary to get people to obey the law.

In the case of environmental policy, the command-and-control approach consists of relying on **standards**

of various types to bring about improvements in environmental quality.

Standards

- E.G: An emission (performance) standard is a maximum rate of emissions that is legally allowed.

If you want people not to do something, simply pass a law that makes it illegal, then send out the authorities to enforce the law.

Compliance Costs

- the firm reduces emissions in accordance with the standard →

it incurs some amount of abatement costs.

- These total ABATEMENT costs are the **compliance costs** of meeting the standard.

The Economics of Enforcement

The typical pollution-control law calls for

- emissions **reduction from current levels** or
- the adoption of specified pollution-control technologies.

Ex ante, penalties will be sufficient to produce complete compliance, but this is in fact never the case.

  - Pollution-control laws, like any others, require **enforcement**.

Enforcing Emission Standards

Penalties arise when firms are detected to be exceeding their emission standard.

- In many cases, fines have been set too low—lower than the abatement costs required to meet the standards
- If too high? corruption
- Frequency of controls (which are costly for the GOV!)

Reasons for the popularity of Standards

- They appear to be simple and direct.
- They apparently set clearly specified targets.
- Standards also appear to be congenial to our ethical sense that pollution is bad and ought to be declared illegal.

The legal system is geared to operate by defining and stopping illegal behavior, and

the standards approach conforms to this mindset.

Types of Standards

3 main types of environmental standards: ambient, emission, and technology.

Ambient Standards

- refers to the qualitative dimensions of the surrounding environment (state of the environment).
- are normally expressed in terms of average concentration levels over some period of time.

Emission (or effluent) Standards

- are “never-exceed levels” applied directly to the quantities of emissions coming from pollution sources.
- are normally expressed in terms of quantity of material per some unit of time; for example, grams per minute or tons per week.

Link Between Emissions and Ambient Quality

- The link between emissions and ambient quality is determined by human decisions.
- A classic case is automobiles.
  - As part of the mobile-source air-pollution program, emission standards have been set for new cars in terms of emissions per mile of operation.
  - No effective way of controlling either the number of cars on the roads or the total number of miles each is driven, so total pollution and, thus, ambient air quality, is not directly controlled.

Technology Standards

- There are numerous standards that don't actually specify some end result, but rather the technologies, techniques, or practices that potential polluters must adopt.
- The requirement that cars be equipped with catalytic converters, or seat belts, is a technology standard.
- If all electric utilities were required to install stack-gas scrubbers to reduce SO_2 emissions, these would be in effect technology standards because a particular type of technology is being specified by central authorities.

Emission vs. Technology Standards

- The basic point of **difference** is that a performance standard, such as an emission standard,

sets a constraint on some performance criterion and

then allows people to choose the best means of achieving it.

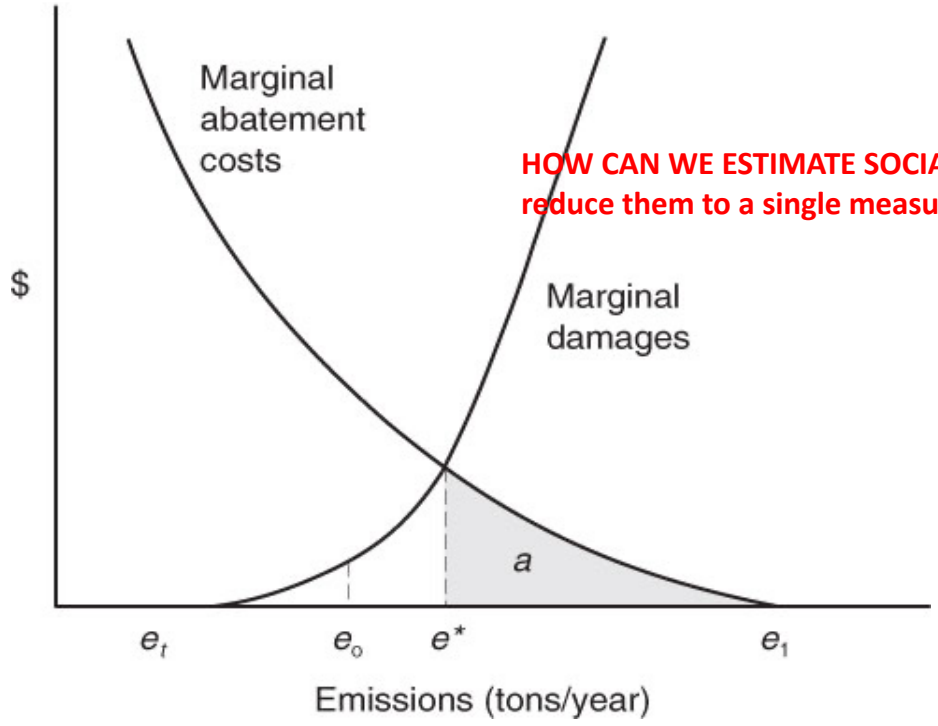
- A technology standard actually dictates certain decisions and techniques to be used, such as particular equipment or operating practices to be used by polluters.

Problems with Standards

1) HOW MUCH? Level of standard
2) Dynamic incentives?
3) HETEROGENEITY of subject to the standard:

Different marginal abatement costs.

HOW MUCH:
balancing social damages with abatement costs



HOW CAN WE ESTIMATE SOCIAL DAMAGES, reduce them to a single measure, money?

How much? Discussed later …

Dynamic incentives?

A basic problem is that standards are
all-or- nothing—
either they are being met or they are not

If they are being met, there is no incentive to do better than the standard, even though the costs of further emission reductions may be quite modest

E.G.: technology Standards provide no incentive to find cheaper ways of reducing emissions.

technology standards, which dictate the procedures that polluters must follow, even though other procedures may be available to achieve the goal at lower cost.

GENERAL PROBLEM:

Standards in practice tend
to take decision flexibility away from polluters,
wrong incentives

TAXES

Emission TAXES provide incentives to find cheaper ways of reducing emissions.

Taxes

Simple case: Tax on a heavily polluting good, x

A unitary tax (on quantity), t, on the production x of firms (perfect competition, price taker)

profit $\pi(x) = p_x x - TC(x) - tx$

TC≡total cost

Max profit → Marginal revenue (MR) = Marginal cost (MC)

$p_x - t = MC(x)$

The higher t the lower production

Px=80

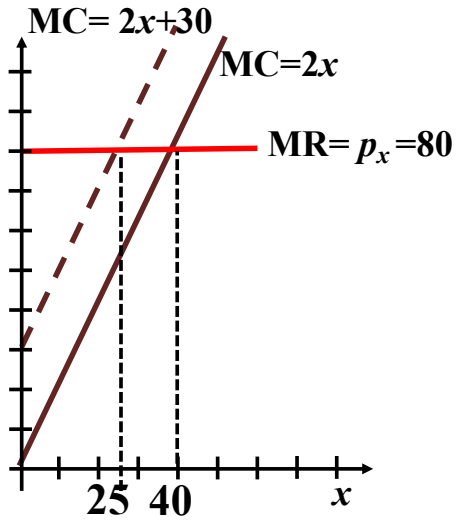
$TC = x^2$

$MC = 2x$

t= 0 → $x = 40$

t = 30 →

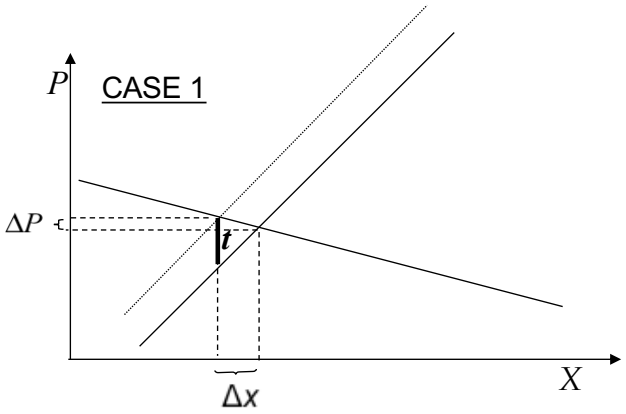
$x = 25$



Lower production → lower pollution

Aggregate market for good x, with many firms

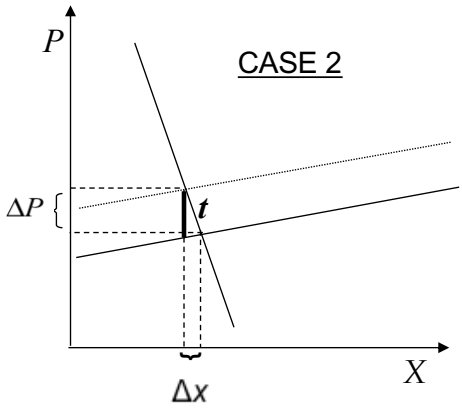
Demand elasticity >>supply elasticity (CASE 1)



Mainly quantity response, prices do not increase much.

Most of the tax remains at sellers.

Demand elasticity << supply elasticity (CASE 2)



Mainly price response, quantity does not decrease much.

Most of the tax is transferred to consumers.

Standard or taxes?

If
Perfect information
Identical firms
Given technology
Same efficacy of
Economic dis/in-centives
and *command and control, (i.e. quantity constraints)*