



EXTERNALITIES: ENVIRONMENTAL PROTECTION PART II

We have forgotten how to be good guests, how to walk lightly on the earth as its other creatures do.

Barbara Ward



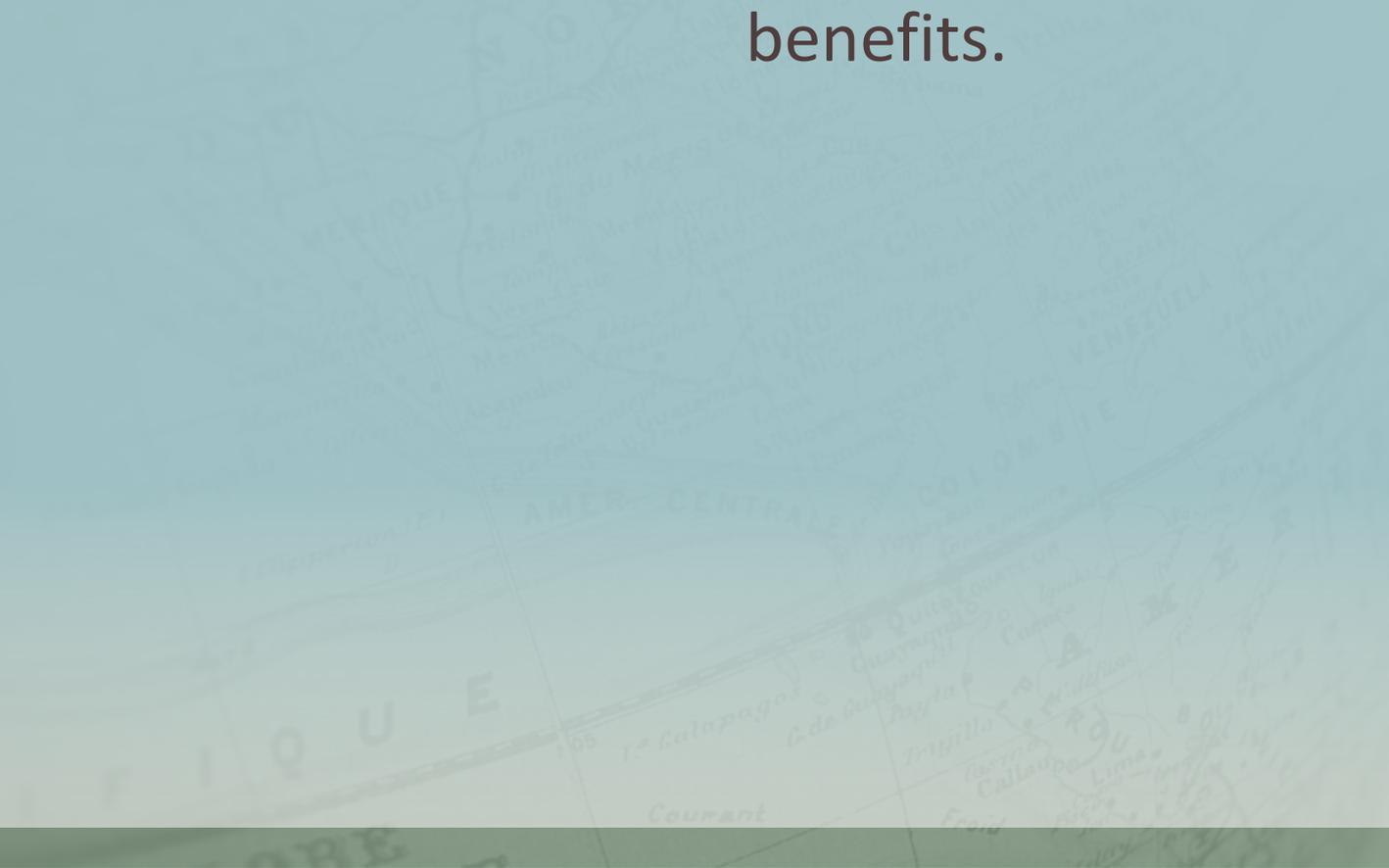
COST-BENEFIT ANALYSIS

- Marginal analysis tells us that a zero-pollution goal isn't economically desirable.
- Some studies suggest the cost/benefit ratio is extraordinarily high.



BALANCING BENEFITS AND COSTS

Protecting the environment entails costs as well as benefits.





OPPORTUNITY COSTS

- The use of our scarce resources to clean the environment involves an opportunity cost.
 - **opportunity cost** – the most desired goods or services that are foregone in order to obtain something else



OPPORTUNITY COSTS

The environmental expenditures contemplated by present environmental policies represent only 1% - 3% of total output.



THE OPTIMAL RATE OF POLLUTION

The **optimal rate of pollution** is the rate of pollution that occurs when the marginal social benefit of pollution control equals its marginal social cost.

optimal rate of pollution : *marginal social benefit of pollution control* = *marginal social cost of pollution control*



THE OPTIMAL RATE OF POLLUTION

- A totally clean environment is not economically desirable.
- The costs of environmental protection are substantial and must be compared to the benefits.

STRATEGIES FOR ENVIRONMENTAL PROTECTION



- There are two general strategies for environmental protection.
 - **Alter market incentives** in such a way that they discourage pollution.
 - **Bypass market incentives** with some form of regulatory intervention.



APPROACHES TO ENVIRONMENTAL POLICY

1. **Command-and-control** – government sets strict legal limits and punishments, subsidies (government giveaway of cash or publicly owned resources) used to promote particular activities
2. **Green taxes (pollution taxes)** – discourage undesirable activities by taxing activities and products that cause undesirable environmental impacts, becomes a tool for policy as well as a way to fund government, don't have much support in US although they have been widely instituted in Europe



APPROACHES TO ENVIRONMENTAL POLICY

3. **Subsidies** – can be used to promote environmentally sustainable activities but often have been used to prop up unsustainable ones, tried widely on the local level
4. **Markets in permits** – government can issue marketable emissions permits to individual polluters, which they may buy, sell and trade, provides financial incentives to reduce pollution (i.e. cap-and-trade efforts at carbon dioxide reduction)
5. **Ecolabeling** – tells consumers which brands use environmentally benign processes (i.e Fair Trade and USDA organic products)



COMMAND-AND-CONTROL OPTIONS

- With a command-and-control option, the government *commands* firms to reduce pollution and then *controls* the process for doing so.
- Excessive process regulation may raise the costs of environmental protection and discourage cost-saving innovation.



COMMAND-AND-CONTROL OPTIONS

- When process regulation raises the cost of environmental protection, we have government failure.
 - **government failure** – government intervention that fails to improve economic outcomes



CENTRAL PLANNING ECONOMIES

- Some of the worst evidence of government failure exists in the most regulated economies.
- Government-directed production isn't more environmentally-friendly than market-directed production.



GREEN TAXES

- An efficient way to control pollution is to make those who cause it bear some of the costs through green taxes.
- Green taxes run the gamut from retail taxes on gasoline to landfill charges on waste disposal.



EMISSION CHARGES

- An **emission charge** is a fee imposed on polluters, based on the quantity of pollution.
- An emission charge increases private marginal cost and encourages lower output and cleaner technology.

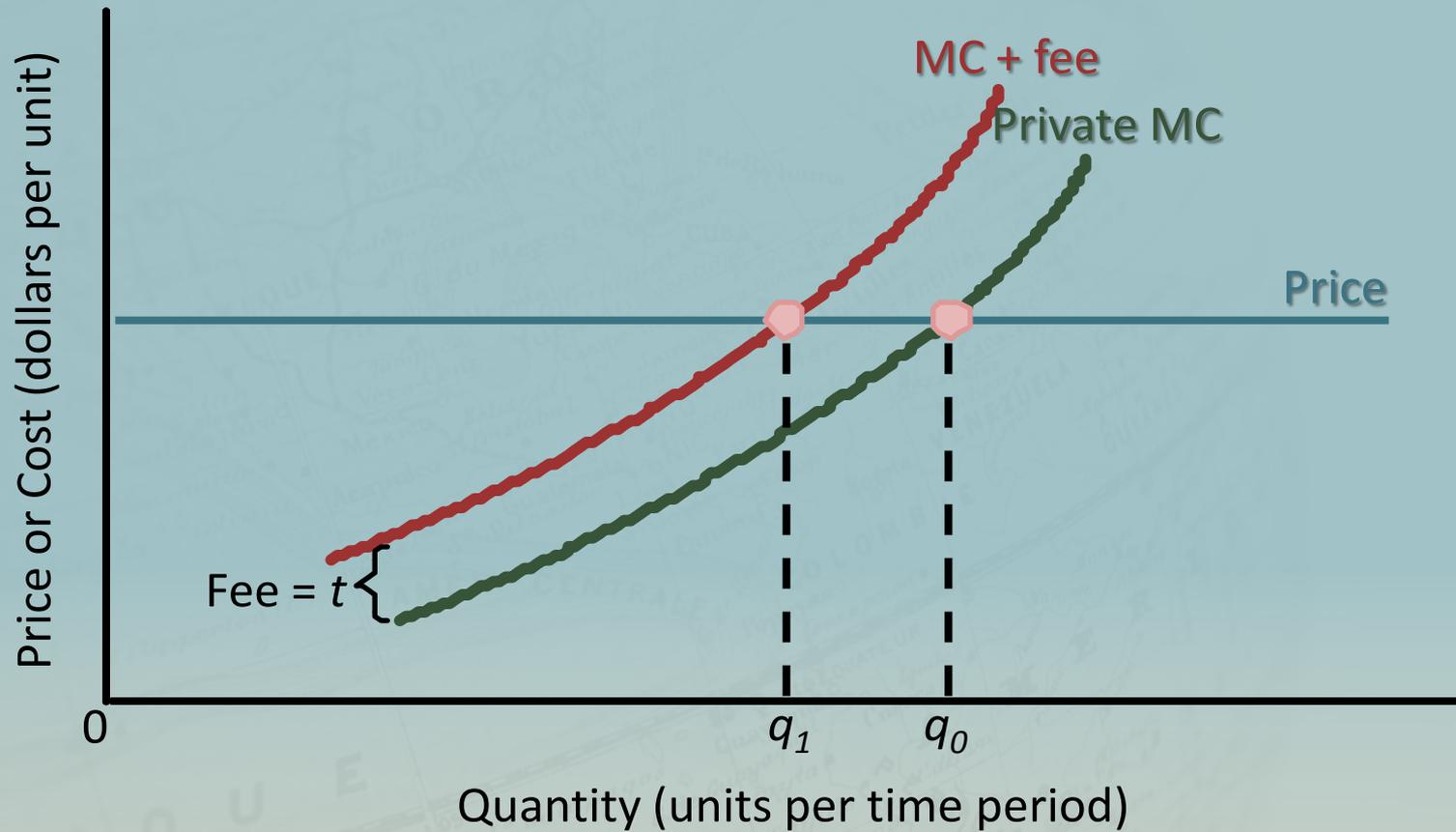


EMISSION CHARGES

- An emission charge might persuade firms to incur higher fixed costs.
- If emission charges are high enough, firms will install new technology to avoid the charges.



CHART: EMISSION CHARGES





HIGHER USER FEES

Raising the price consumers pay for scarce resources encourages them to use less.



POLLUTION FINES

Imposing fines or liability for cleanup costs changes the incentive structure for firms.



MARKET-BASED OPTIONS

Market incentives can be used to reduce or eliminate the divergence between private and social costs.





TRADABLE POLLUTION PERMITS

- Tradable pollution permits let firms *purchase* the right to continue polluting.
- The key to the success of polluting permits is that they are bought and sold among private firms.



TRADABLE POLLUTION PERMITS

- The system starts with a government-set standard for pollution reduction.
- Firms reducing pollution by more than a certain amount earn pollution credits that they may sell to other firms.
- The Kyoto Treaty (1997) encourages nations to develop a global system of tradable pollution permits to encourage cost efficiency and reduce CO₂ emissions.



TRADABLE POLLUTION PERMITS

- The principal advantage of pollution permits is their incentive to minimize the cost of pollution control.
- Entrepreneurs now have an incentive to discover cheaper methods for pollution abatement.



TABLE: PRICING POLLUTION PERMITS

Marginal Cost of Pollution Abatement

Reduction in Emissions (in tons)	Marginal Cost of Pollution Abatement	
	Copper Smelter	Electric Utility
1	\$200	\$100
2	\$250	\$150
3	\$300	\$200



RECYCLING MATERIALS

- A producer has no incentive to use recycled materials unless they offer superior cost efficiency and greater profits.
- A bonus that emission charges offer is an increased incentive for the recycling of materials.



WHO WILL PAY?

Whether producers or consumers pay the cost of reducing pollution depends on how much competition exists in the polluting industry and the price elasticity of demand.



WHO WILL PAY?

- If producers can pass the cost of pollution control along to the consumer, higher prices reduce pollution in two ways:
 - Higher prices help to pay for pollution-control equipment.
 - Higher prices encourage consumers to buy less polluting goods.



US ENVIRONMENTAL POLICY – 1ST WAVE

- First wave of US environmental policy addressed land management.
- The early environmental laws were intended to promote settlement and the extraction and use of the West's abundant natural resources.
- The Western lands were considered practically infinite, and inexhaustible in natural resources.
 - *General Land Ordinances of 1785 and 1787* (Thomas Jefferson's Township and Range System) provided a mechanism and structure for taking Native American lands.



36	30	24	18	12	6
35	29	23	17	11	5
34	28	22	16	10	4
33	27	21	15	9	3
32	26	20	14	8	2
31	25	19	13	7	1

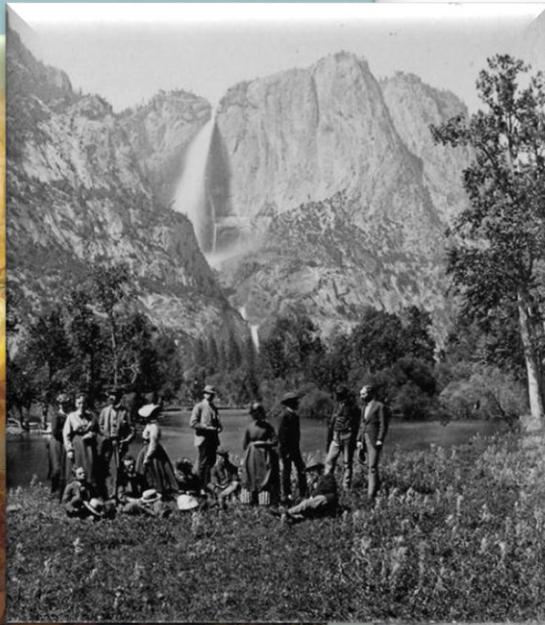


US ENVIRONMENTAL POLICY – 2ND WAVE

- Addressed the impacts of the first wave.
- During this time the government created national parks, wildlife refuges and the forest system.



Grand Canyon of the Yellowstone, 1872 by Thomas Moran



John Muir & Teddy Roosevelt in Yosemite



US ENVIRONMENTAL POLICY – 3RD WAVE

- The third wave responded largely to pollution.
- The NEPA (National Environmental Policy Act, 1970) was signed in 1970.
 - Requires an EIS (Environmental Impact Statement) for any federal action.
 - Creates the Environmental Protection Agency (EPA).
- Other prominent laws followed: Two major laws were the Federal Water Pollution Control Acts (1965 and 1972) and the Clean Water Act (1977).



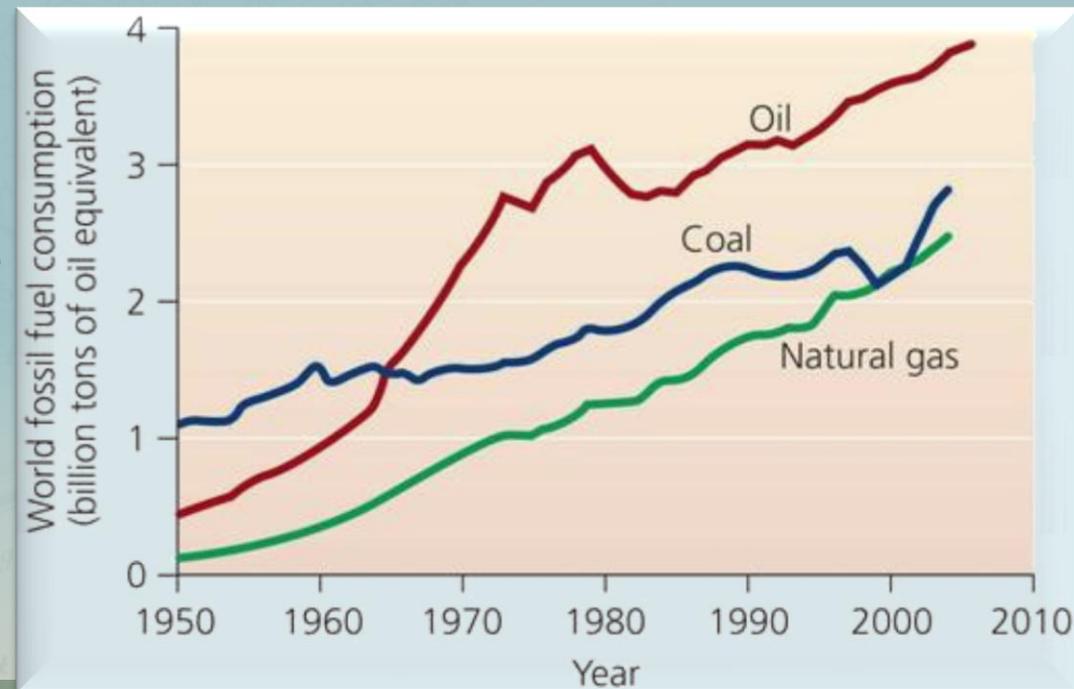
US ENVIRONMENTAL POLICY – 4TH WAVE

- Make the market tell the truth.
 - “If communism collapsed because it did not allow the market to tell the economic truth, capitalism is likely to collapse if it does not allow the market to tell the ecological truth.” Lester Brown, Earth Policy Institute
- Market forces are a powerful tool for improving efficiency and changing consumption patterns.
- However, this is true only if we properly account for environmental damage. Moreover, free markets do not work in the “commons.”
- Enron accounting (leaving costs off the books) is dangerous. It’s what we do on a worldwide basis. Bankruptcy will be the result unless we calculate and include indirect costs.



US ENVIRONMENTAL POLICY – 4TH WAVE

- Break fossil fuel addiction.
- One gallon of gas contains the energy equivalent of about 600 hours of human manual labor.
- The average American uses almost three gallons of gas per day or roughly the equivalent of 1,800 hours of manual labor.
- The world consumes about 3,528,000,000 gallons of gas per day.





US ENVIRONMENTAL POLICY – 4TH WAVE

- Have a sense of purpose and urgency.
- These challenges present an opportunity: fighting to save civilization is an inspiring cause.
- A cleaner, greener world will be a better, healthier world. It is not a sacrifice; it's an improvement!
- We can make products that work with nature, not against it. Biomimicry will be key.
- Science can and should lead the way.
- We have the technologies we need. What's in shortage is political will.



POSSIBLE GOVERNMENT INTERVENTIONS

- Initiate an “Apollo Mission” for clean energy now.
- Eliminate all subsidies and tax breaks for dirty energy production.
- Require green accounting practices.
- Ban or limit the most destructive practices, especially in the oceans, rivers and atmosphere (i.e. trawling, tuna fishing, CFCs, toxic pollution).
- Most radically: shift gradually from income taxes to pollution taxes.



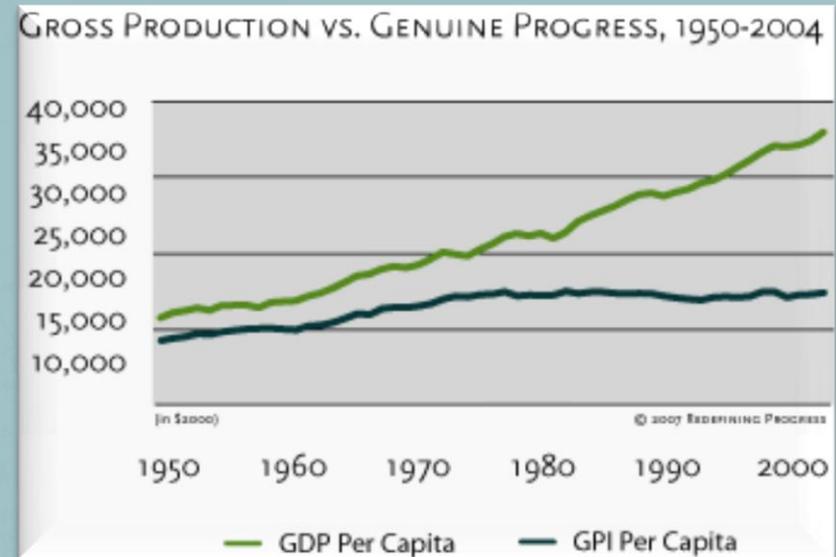


GENUINE PROGRESS INDICATOR (GPI)

When calculating whether or not economic activities have actually increased well being GPI takes externalities into account, such as:

- cost of resource depletion
- cost of crime
- cost of ozone depletion
- cost of family breakdown
- cost of air, water and noise pollution
- loss of farmland
- loss of wetlands

Debated by the EU and Canada. It is being used as a component of legislative decisions in these countries.



At least 11 countries including Austria, England, Sweden and Germany have recalculated their gross domestic product using the GPI. The data for European countries and the US show a steady decline over the last 30 years.



GLOBAL EXTERNALITIES

- One thing is certain, all forms of pollution are global externalities that the market has to account for.
- Without some form of government intervention, there is little likelihood that market participants will voluntarily reduce pollution .



IF YOU WANT TO GET INVOLVED

- 350.org www.350.org
- Natural Resources Defense Council www.nrdc.org
- World Wildlife Fund www.worldwildlife.org/
- The Sierra Club www.sierraclub.org
- Friends of the Earth www.foei.org/
- Treehugger.com www.treehugger.com/



THE END