Applications: The Environment

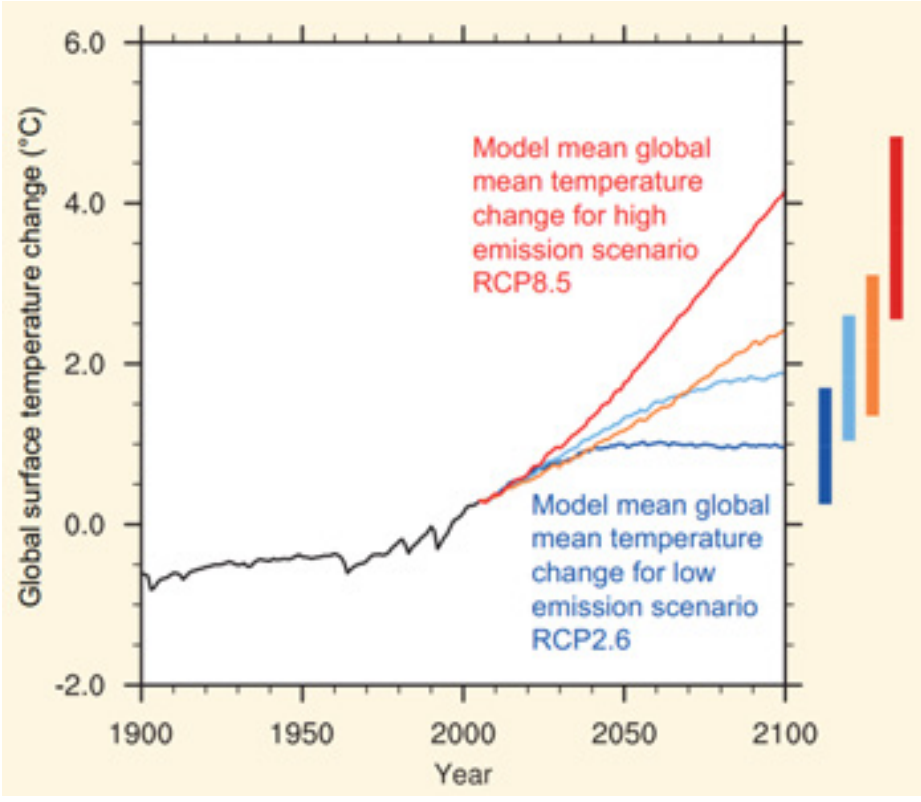
Backdrop: Climate Change

- Humans are changing the global climate by emitting greenhouse gases, which trap solar energy in the Earth's atmosphere.
- These greenhouse gases, particularly carbon dioxide, are slowly warming the planet.

Backdrop: Climate Change

- The Intergovernmental Panel on Climate Change (IPCC) has estimated that global temperatures will rise between 3.5 and 8 degrees Fahrenheit by the year 2100.
- These changes may melt polar ice caps, alter weather patterns, create extreme storms, modify crop yields, etc.

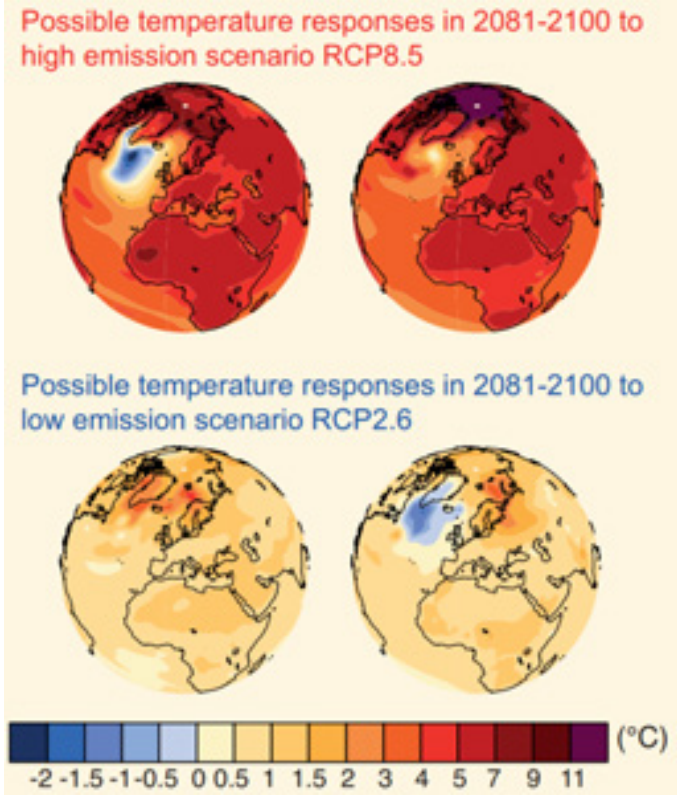
Backdrop: Climate Change



Intergovernmental Panel on Climate Change, 2018

`https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter12_FINAL.pdf`

Backdrop: Climate Change



Intergovernmental Panel on Climate Change, 2018

`https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter12_FINAL.pdf`

Political & Economic Outcomes of Climate Change

Political & economic harms of climate change:

- Temperature rise associated with slower economic growth (Dell, Jones, Olken 2008)
  - Effect is most pronounced in poor states
  - $1^{\circ}\mathrm{C}$ increase, reduces annual economic growth by 1.1%
  - Temperature spikes increase risk of irregular leadership changes

- Rainfall shocks increase likelihood of civil war (Miguel et al. 2004)
  - Droughts reduce economic output in sub-Saharan Africa
  - Slower growth increases the risk of civil conflict

Private incentives and public goods

Tragedy of the commons

Villages in Europe once had a "commons" that was open to the animals of all villages for grazing.

- Incentives for overuse lead to resource exhaustion.
- 1700s-1800s, the commons was divided into private tracts ("enclosure movement")

Garret, Harding. 1968. "The Tragedy of the Commons," *Science*.

Tragedy of the commons

Cambridge Common 1808

Image courtesy of Harvard Art Museums on Wikimedia Commons. This image is in the public domain.

Private incentives and public goods

Many aspects of environmental politics require cooperation

- but states tend to **free ride** on the efforts of others.
- this creates a prisoner's dilemma where each state has incentives to defect

Collective Action and the Environment

Incentives to free ride and the problem of collective action occur because our choices produce externalities.

- An **externality** is created when a decision creates costs or benefits for stakeholders **other than** the actor making the decision.

In the case of a negative externality, **too much** of the good will be produced from the collective viewpoint.

In the case of a positive externality, **too little** of the good will be produced.

When externalities exist, independent decisions of individual actors can lead to **Pareto sub-optimal results**.

Common pool resources

Common pool resources

- these are non-excludable but **rival** in consumption.

$\rightarrow$ Thus are different than public goods

Over-exploitation, when actors overuse a resource, is likely to occur

Common pool resources

TABLE 13.1 ***Private versus Public Goods, and Their Variants***

	EXCLUDABLE	NONEXCLUDABLE
RIVAL	Private goods	Common-pool resources
NONRIVAL	Club goods	Public goods

Solving Collective Action Problems

Five factors:

1. Group size (smaller means less free-riding)
2. Complexity of the problem
3. iteration/repeated interaction
4. Whether public and private goods can be bundled
5. Is there a hegemon or "privilaged group?"

Solving Collective Action Problems

Group size

- The larger the group of actors affected by an externality, the more likely they are to free ride on one another.
- Each actor's contribution is a small proportion of the total

Solving Collective Action Problems

Iteration

- Example: farmers in Nepal have shared irrigation networks for centuries.
  - Their mutual dependence maintains cooperation

Solving Collective Action Problems

Public goods bundled with private goods.

- These are called "joint products"
- E.g., tax breaks by government to buy efficient cars

For joint products, the public good is provided as a by-product of efforts to obtain the private good.

- There will be less free-riding since private benefits increase along with the public good

But at the international level joint goods are more infrequent...one potential role for foreign aid.

Solving Collective Action Problems

Privileged groups / hegemony

Actors may vary in the intensity of their preferences for public goods.

- In this case, a privileged group may emerge

A privileged group is composed of one or a few actors who receive benefits themselves from the public good.

- This group is willing to bear the cost of providing that good for everyone

Distributional politics

Collective action is made worse by the redistributive implications of alternative policy solutions.

Some will gain, some will lose

Those that would lose from policies to prevent climate change are politically powerful.

Very similar dynamic to what we've seen with trade and development:

- Domestic winners and losers
- International winners and losers
- Inter-generational winners and losers

Who should bear the costs of addressing climate change?

Domestic winners and losers

Domestic winners and losers

Policies that enhance environmental protections tend to create redistributive conflicts between groups.

If you work in the coal industry then carbon emission regulations are probably bad for your livelihood.

- Actors become less likely to cooperate as these redistributive effects increase

Domestic winners and losers

A "dirty" industry enhances its profits by not paying the full costs of production and imposing negative consequences on others.

Industries that produce goods that harm the environment have interests in less strict environmental laws.

Domestic winners and losers

Regulations tend to have relatively specific targets

- Groups that lose from stricter environmental regulations are generally small in number.
- These potential losers have a strong motive to influence government policy

Larger groups of individuals that benefit from protection face collective action problems.

Domestic winners and losers

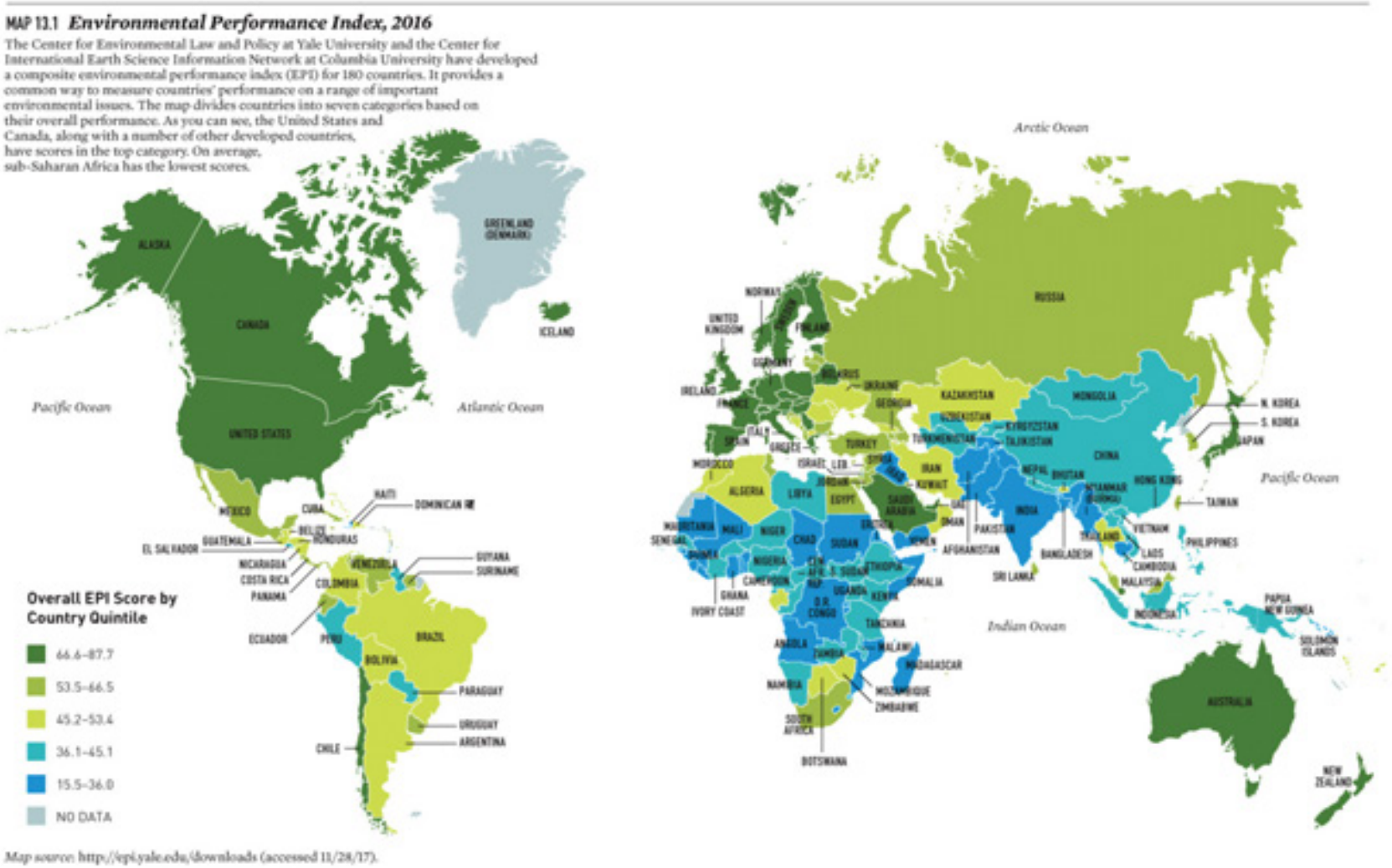
Political system is biased towards existing rather than future industries.

- Industries such as oil companies have real employees and stockholders whose livelihoods depend on that industry.
- Other industries, such as solar power firms, exert comparatively little influence on policy (less existing capital!)

International winners and losers

International winners and losers

International winners and losers



International winners and losers

- Since 1950, 70% of CO2 emissions have been released by rich states in Europe and North America.
  - The US emits 23% of the world's CO_2
- Yet, the future source of *new* pollutants will come from developing countries.

International winners and losers

As China continues to industrialize, its emissions of greenhouse gases will grow rapidly and dramatically.

- But a cleaner path to production is costly and would slow developing countries' rates of economic growth.
- Studies show that national income per capita must rise somewhere above $\$16,000$ a year before environmental quality improves.

Discussion:

Should US citizens and companies pay money to developing countries as compensation for emissions we have already put into the atmosphere?

Don't governments provide public goods?

Governments can help

- Produce public goods
- Regulate the use of common pool resources

Internally, things like CPR regulation and property right enforcement are relatively easy.

But externalities don't stop at national borders!

International Institutions

International Institutions

Most environmental treaties are "soft law:"

- aspirational (though aimed at precise commitments)
- Participation is voluntary
- enforced through national level legislation.

Key benefits are facilitating decision-making, setting standards, verifying compliance, resolving disputes.

Facilitating decision-making

States can negotiate and agree on general principles

- **Framework Convention on Climate Change** (UNFCCC) 1994

This helps facilitate decision-making between states by:

- Identifying the relevant states
- Identifying areas of consensus and disagreement
- Regularizing discussions
- Creating special international public-private partnerships on the environment.

Sometimes formal agreements come out of frameworks.

- Kyoto Protocol 2005 (privatizes the atmosphere for greenhouse emissions)
- Paris Agreement 2016 (requires greenhouse gas commitments)

Setting standards

Ambigious standards are hard to monitor and enforce.

Precise standards have environmental and distributional consequences:

- What size of migrating fish can be harvested?
- What species are "threatened"?
- What is the acceptable parts per million for chemical release into the environment?
- What chemicals can be used in industrial production?

Ex ante, the exact levels, or standards, are unclear.

Verifying compliance

Just setting standards might help some, but if no one else is following the standards then your country might not want to.

This means you need some technology for **monitoring** and **enforcement**

- Monitoring provides information on the behavior of other states, AND information about your state to the international community
- Enforcement entails being able to punish some sovereign state after an infraction is detected

Important to remember: both monitoring and enforcement is costly, and their benefits aren't easily excludable.

Verifying compliance

Environmental transnational advocacy networks (TANs) often play the role of "fire alarm" and call attention to governments who violate agreements.

Other roles for non-state actors?

Should MIT divest from oil companies?

The Campaign to Save the Whales

The Campaign to Save the Whales

The International Whaling Commission (IWC) was created in 1946 to *"provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry."*

The IWC has banned the killing of whales for commercial purposes since 1982.

. . . so what happened?

The Campaign to Save the Whales

In 1960, the numbers of whales dropped drastically:

- Commercial whaling technology got really really good
- Factory ships

Image courtesy of the Freshwater and Marine Image Bank at the University of Washington. Source: Wikimedia Commons. This image is in the public domain.

The Campaign to Save the Whales

Environmentalists could mobilize a sympathetic public:

- Whales are an animal with which humans can identify.
- Many people go on whale watching trips.

The Campaign to Save the Whales

The IWC allows any state that pays to join it, and gives all member countries one vote.

What would you do if you were an environmentalist?

- Environmentalists used this rule and encouraged anti-whaling states to join
- Some groups even paid the membership dues for small, poor countries that would not have otherwise joined
- By 1982, environmentalists had shifted the power balance in the IWC to those that supported a ban on whaling.

The Campaign to Save the Whales

Why was the campaign effective?

- The ban was a clear standard.
- The US created a law that violators lose access to US fishing grounds.
- Industrial usefulness of whale products declined over time.
- The only country that continues to whale on a commercial basis is Norway.
- Some claim that Japan is currently attempting to overturn the ban by giving foreign aid to other smaller states if they support commercial whaling.

The Campaign to Save the Whales

Environmental transnational advocacy networks (TANs) play the role of "fire alarm" and call attention to governments who violate agreements.

International Convention on the Prevention of Pollution of the Sea by Oil

International Convention on the Prevention of Pollution of the Sea by Oil

International Convention on the Prevention of Pollution of the Sea by Oil

- In 1954, countries set standards that cut down the amount of oil ships could release into the ocean when cleaning their oil tank
- These regulations were widely ignored until 1978, when countries required all tanker ships to either purchase new segregated ballast technologies or use a crude oil washing technique that minimized discharges.

This new technology made it easy to verify which ships met the new standard.[47]

Ozone Depletion and CFCs

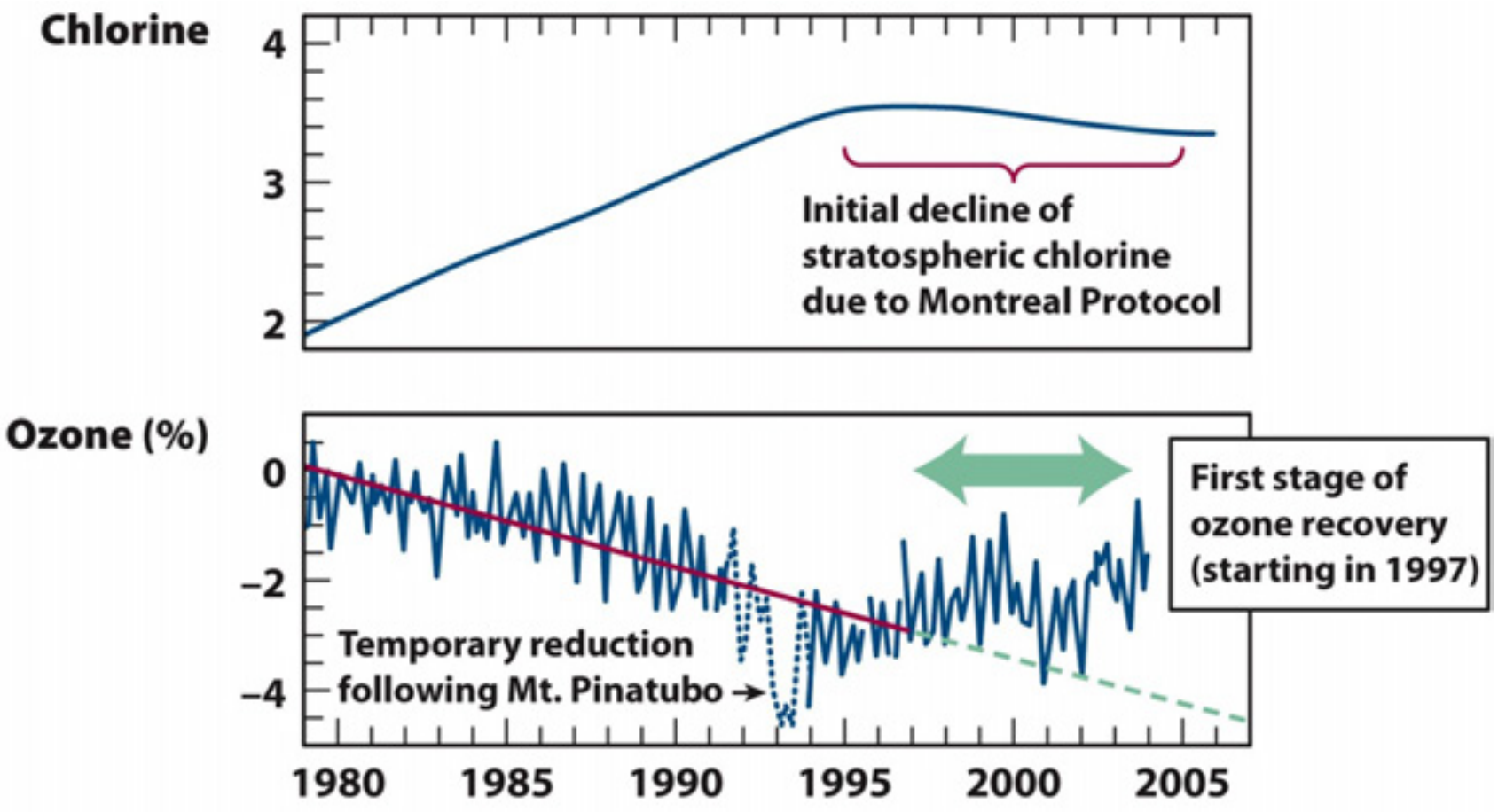
Ozone Depletion and CFCs

The **ozone layer** is 6 to 30 miles above the earth.

- blocks ultraviolet (UV) radiation from reaching the earth's surface.

Ozone depletion is caused by releasing **chlorofluorocarbons** (CFCs) into the atmosphere

Ozone Depletion and CFCs



Ozone Depletion and CFCs

Why the turn-around?

Relatively small number of firms and countries were involved, reducing the costs of collective action.

Ozone Depletion and CFCs

The **Vienna Convention for the Protection of the Ozone Layer** (1985)

- framework agreement in which States agree to cooperate in research and scientific assessments of the ozone problem
- agree to adopt "appropriate measures" to prevent activities that harm the ozone layer
  - The obligations are general and contain no specific limits on chemicals that deplete the ozone layer

Followed by the **Montreal Protocol** (1989)

- Specified cuts in emissions and enforced stricter rules

Ozone depletion vs. Climate change

Why has stopping ozone depletion been more successful than preventing climate change?

- A smaller number of firms and countries were involved, reducing the costs of collective action

But everyone emits CO_2!

Costs to deal with greenhouse gases will be

- Immediate, large, and continuous

Ozone depletion vs. Climate change

Since 2005, Europe has used an Emissions Trading Scheme (ETS).

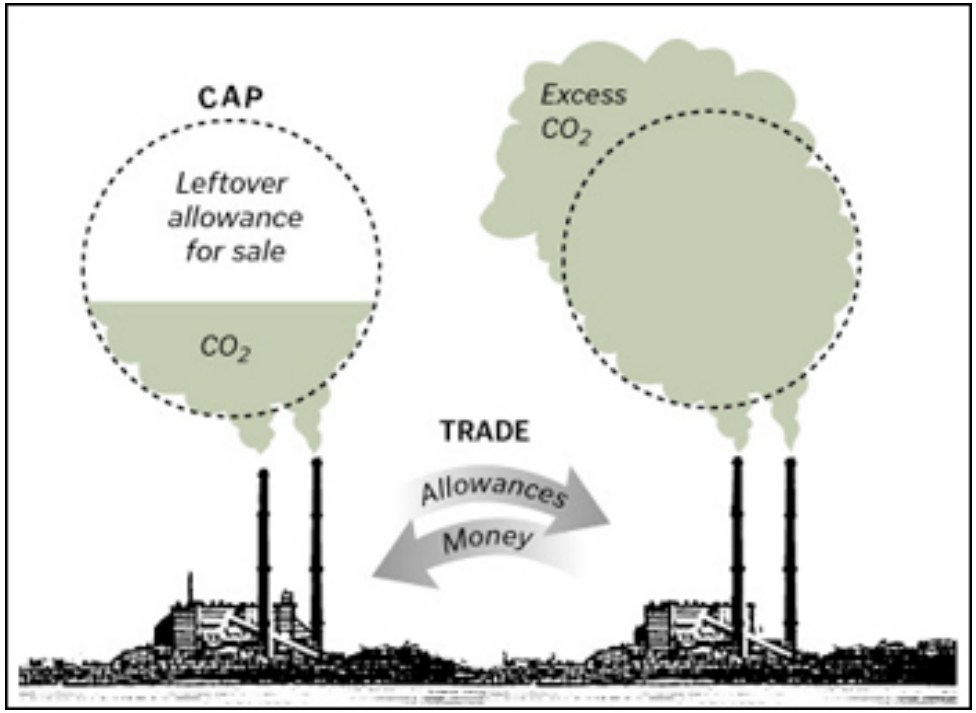
- Industries are given tradable allowances for greenhouse gases up to an emissions limit

These firms may purchase credits from other firms if they want to exceed those levels.

Ozone depletion vs. Climate change

The ETS helps create incentives for businesses to reduce emissions by selling unused credits.

- This helps lead to more efficient allocations of emissions



Ozone depletion vs. Climate change

International environmental cooperation on climate change is going to be really hard

- Severe public goods problem
- Substantial, powerful, entrenched, economic interests

What will save us?

- Technology (nuclear, renewables)
- New economic incentives–"Give us a price on carbon"
- Activism (should MIT divest?)

Conclusion

Why is it politically difficult to solve environmental problems?

Are some problems harder to solve than others? Why?

What do you think is most likely to work for our current problems?

17.41 Introduction to International Relations

Spring 2023