

# Global Carbon Pricing: A Better Climate Commitment

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The World Bank, 24 February 2010

# Roadmap to Global Cooperation

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1. **Not the cap-or-tax fight**
2. **Copenhagen**
3. **Games / strategy / treaty design**
4. **How price commitment works**
5. **Why price carbon? Cheap & effective**
6. **Why pricing is the right design**
7. **Oil security, China and climate**

(1) Not the Cap-or-Tax Fight

## **INTERNATIONAL AGREEMENT**

# Pricing Is Not Taxing

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- **Make an international commitment to a *price*, and use**
  - cap and trade
  - a carbon tax
  - both
  
- **Make an international commitment to a *cap*, and use**
  - cap and trade
  - a carbon tax
  - both

*International commitment* and *national policy*  
are distinct

# What Do We Want in a Commitment?

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1. A high goal like “1.5° C,” or “80% by 2050?”
2. A stable, cooperative agreement?
  - ❑ First establish cooperation then set high goals
  - ❑ Costly goals + free-riders inhibit agreement

(2)

**COPENHAGEN**

**APPENDIX I: QUANTIFIED ECONOMY-WIDE EMISSIONS TARGETS FOR 2020**

<b>DEVELOPED COUNTRY</b>	<i>Quantified economy-wide emissions targets for 2020</i>	
	Emissions reduction in 2020	Base year

**APPENDIX II: NATIONALLY APPROPRIATE MITIGATION ACTIONS OF DEVELOPING COUNTRY PARTIES**

<b>DEVELOPING COUNTRY</b>	<i>Actions</i>

# The Copenhagen Accord (China)

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“China will endeavor to lower its carbon dioxide emissions per unit of GDP by 40-45% by 2020 compared to the 2005 level. **Fine Print:** the above-mentioned autonomous domestic mitigation actions are voluntary in nature.”

- ❑ DOE (May 2009) estimated China would reduce intensity 45% over this same period.
- ❑ China decreased intensity 44.4% over the previous 15 years.

<http://www.global-energy.org/lib/2009/09-08>



# The Copenhagen Accord (U.S.)

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“In the range of 17%, ... recognizing that the final target will be reported to the Secretariat **in light of enacted legislation.**”

—UN summary

# Not in the Accord

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Any mention of targets or caps  
for developing countries

# Not Monday-Morning Quarterbacks

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“The focus has been on targets and timetables. ... [for] an international agreement, it doesn't make any sense.

—Scott Barrett, pre-Copenhagen

“Developing countries will not accept internationally set caps. ... a global carbon price can provide a fair and effective standard, and it is the best hope for international cooperation.

—Stoft, 2008

“The targets approach is destined, I believe, quickly to reach an impasse.

—Stiglitz, 2007

(3) What's Been Missing?

**GAMES / STRATEGY / DESIGN**

# The Current Game: Perverse Incentives

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1. The commitment: a **risky** and **unfair** cap
2. If you do **not commit**,
  - you get **profitable** Clean-Development-Mechanism projects instead
  - you might get more Green Funds
3. There is **no enforcement**
4. If rich countries commit to deeper cuts, poor countries will get more CDM profits
5. 100 unique commitments are needed, and
6. Weaker commitments are rewarded monetarily

# A Cap Is Risky

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- ❑ US wants China to cap itself below its trend line.
- ❑ In 2000, its trend line pointed to 3.5B tons in 2010.
- ❑ It's BAU turned out to be above 7.0B tons.
- ❑ Commitment to this cap would have meant buying 3.5B permits on the world market for ~ \$100B.
- ❑ **Committing to a price** would mean collecting and **keeping** \$100B in carbon revenue.

# Caps Appear Unfair

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- ❑ If India accepted a trend line cap. It would be capped at under 1.5 tons/person.
- ❑ That is less than the US emitted in 1880.
- ❑ Why should India be capped so low just because others have emitted so much?

# The Public Goods Game

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- The non-cooperative policy game is a:
- Multi-player
  - Indefinitely repeated
  - Prisoners' Dilemma (PD) game

## Challenges:

- Many players
- Large asymmetries
- Short-sighted decision makers
- Limited information
- Lack of enforcement

<b>Player #1</b>		
<b>#2</b>	<b>Abate</b>	<b>Pollute</b>
<b>Abate</b>	4 / 4	6 / 0
<b>Pollute</b>	0 / 6	2 / 2



# Change the Game

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- Focus on
  - Cooperation
  - Incentives
  - Enforcement
  - Simplicity

**Here's our design ...**

(4) A Better Commitment

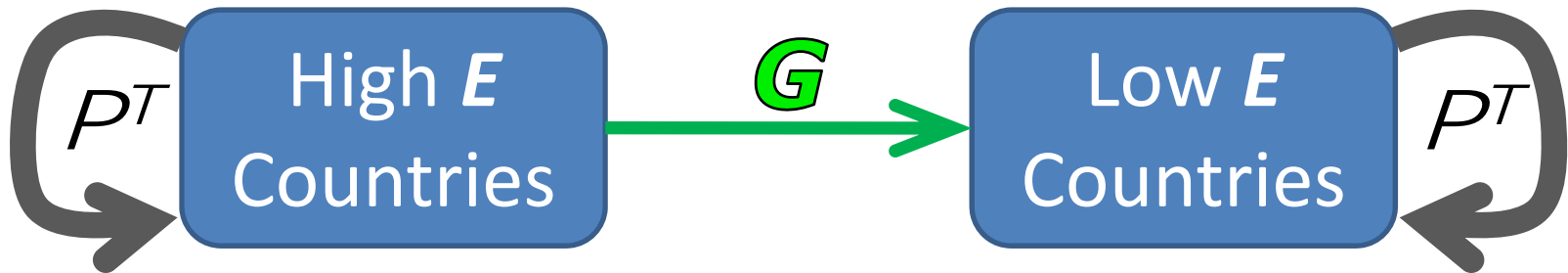
## **FLEXIBLE GLOBAL CARBON PRICING**

# Pricing Overview

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## Two global parameters

- Global carbon price target =  $P^T \sim \$30/\text{ton}$
- Global Green-Fund price =  $G \sim \$2/\text{ton}$   
(Clean Development Incentive, CDI)



$E$  = the country's emissions / person

# Rule #1: National Policy Flexibility

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- The global price target can be met at the national level with
  - Cap-and-Trade
  - Carbon tax
  - Both

# Rule #2: Carbon Price Flexibility

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- ❑ What if you don't meet the global **price target**?
  - Buy **carbon revenue credits** from another country
- ❑ Buy/Sell **revenue credits** in a central “market”
- ❑ Target revenue:  $R^* = Emissions \times P^T$

The country must pay  $Z \times (R^* - R)$ , where  $Z \approx 10\%$

# #3: Hitting the Carbon Price Target

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□ Higher  $Z \rightarrow$  Higher global carbon revenues

□ Global Average Price =

(total revenues) / (total emissions)

□ Adjust  $Z$  annually

to make Global Average Price =  $P^T$

**(the price target)**

# #4: Green Fund Payments (example)

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- ❑ World average emissions,  $E \approx 5$  tons/capita/year
- ❑ Consider a country with  $E = 10$  tons/capita/yr
- ❑ Assume  $G = \$2/\text{ton}$

❑ The country pays  $(E - E) \times G$

$$(10 - 5) \times \$2 = \$10/\text{capita}/\text{yr}$$

- ❑ A country emitting 1 ton/cap/yr would pay

$$(1 - 5) \times \$2 = -\$8/\text{capita}/\text{yr}$$

# #5: The Clean Development Incentive

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- ❑ The Green Fund (CDI) replaces the CDM
- ❑ It *rewards* cooperation with global pricing.
- ❑ If a country's carbon price,  $P$ , is less than  $P^T$  its GF (CDI) payment is scaled back by:  $P / P^T$
- ❑ CDI also rewards information and research programs that are missed by carbon pricing



# What Counts as Carbon Pricing?

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1. Carbon *permits used* under *cap and trade*
  2. Any *tax on fossil fuels*
  3. *Feebates*. E.g. \$1/ton of lifetime auto emissions
- ❑ But not subsidies or command and control policies

# Enforcement with Trade Sanctions

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- The World Trade Organization's sea-otter case
  - ➔ trade sanctions for environmental reasons are fine
- Since compliance is easy a flexible, this should rarely be needed.

(5) Why Price Carbon?

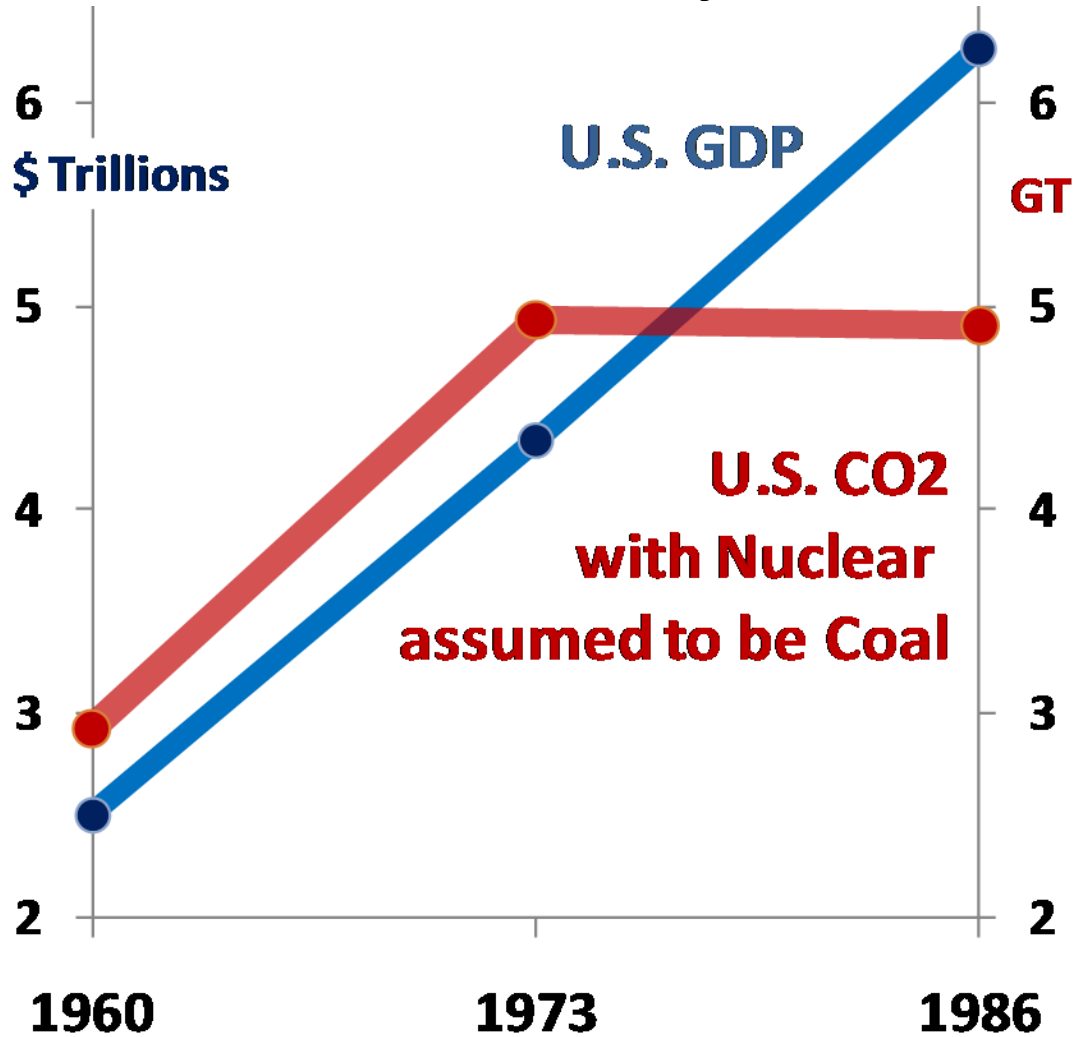
**CHEAP AND EFFECTIVE**

# The Most Effective Climate Policy Ever

By its end it was saving 2 gigatons/year of CO<sub>2</sub>  
— just in the U.S.

All told it has likely saved 100 gigatons of CO<sub>2</sub>

# OPEC: The Best and Worst Climate Policy Ever



# U.S. EPA: Carbon Pricing Is Cheap

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**Abatement Cost =  $\frac{1}{2}$  × Price × Abatement**

- ❑ The  $\frac{1}{2}$  is because sensible abatements cost between \$0 and the price of carbon.
- ❑ For several reasons this is likely too high.

Example:  $P^T = \$30/t$ ,  $G = \$2/t$

	Starting Emissions per Capita	Abatement Costs	Green Fund Cost	Total Cost
	(tons/year)	( cents / person / day )		
India	1	0.8 ¢	- 1.7 ¢	- 0.9 ¢
Average Country	5	4.1 ¢	0.0 ¢	4.1 ¢
United States	20	16.4 ¢	6.6 ¢	23.0 ¢

Assumes **emissions reduced by 20%** from values shown.  
China is close to average.

(6) A Pricing Commitment

**WHY IT'S THE RIGHT DESIGN**



# Why Commit to a Price?

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## **Capping also prices carbon, but ...**

- ❑ A price commitment reduces political costs to India, China, etc.
- ❑ It treats them equally
- ❑ It reduces their risks
- ❑ The Green Fund makes it fair

# It's Easier to Negotiate

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- ❑ There is only **1** target to negotiate—**not 100**
- ❑ Self-interested countries want **emission targets that do nothing.**
- ❑ On average self-interested countries want a **price target that is just about right.**

# It's Easier to Enforce

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- ❑ It's easier to comply with pricing, so countries like Canada will likely succeed—less enforcement is needed.
- ❑ End-of-year evaluations mean problems are caught before they are too big to manage.

(7) The U.S. and China

## **OIL SECURITY AND CLIMATE**

# The Oil-Climate Alignment

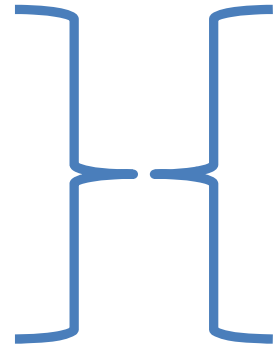
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- Using less oil reduces:
  - GHG emissions
  - The world price of oil
- Half of **IEA's** purpose:
  - To reduce oil use
- Half of **Kyoto's** purpose:

# The Oil–Climate Conflict

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1. Shale oil, etc.
2. Off-shore drilling
3. Corn ethanol



Help with Oil  
Harm the Climate

- ❑ Price carbon to discourage these
- ❑ They do not protect from price shocks
- ❑ Don't encourage them

# How Strong Is the Effect?

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- ❑ MIT on caps: **oil price** down 34 – 47% in 2050
- ❑ IEA on a tight-oil market:  
A 1% cut in use → a 9% cut in price
- ❑ Six models, including DOE, found ***at least***:  
**A 1% cut in use → a 1.5% cut in price**

# What's It Worth to Save a Barrel?

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- ❑ Cut oil use by 1 barrel when price = \$100
- ❑ That saves \$100
- ❑ And reduces the cost of all other barrels  
Enough to save \$150.
- ❑ Is this a free lunch?
- ❑ No, it's OPEC's lunch.



# We Need an Oil Consumers' Cartel

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Producers:	supply ↓	price ↑	A Producers' Cartel (OPEC)
Consumers:	demand ↓	price ↓	A Consumers' Cartel (OPIC)

“The immediate objective [of the **IEA**] is ... the *consumers' counter-cartel*.”

—New York Times, 1974

“the dread words ... the Tokyo [G7] agreement amounts to a *consumers' cartel*.”

—New York Times, 1979

# How Well Would It Work?

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<b>\$115</b>	<b>Oil price in 2020 (DOE)</b>
<b>20%</b>	<b>Decrease in oil demand by cartel</b>
<b>67%</b>	<b>Of world oil use covered</b>
<b>\$23</b>	<b>Decrease in world oil price</b>

- ❑ Could we achieve a 20% reduction? Yes, using auto feebates or CAFE standards.

# It Could Pay for Climate Policy

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(savings /year)	China
<b>\$49B</b>	<b>Imported-oil cost</b>
<b>\$33B</b>	<b>Climate-policy</b>

(savings /year)	U.S.
<b>\$41B</b>	<b>Imported-oil cost</b>
<b>\$25B</b>	<b>Climate-policy cost</b>

# Conclusion

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1. If we don't design the treaty, it won't work
2. Cooperation first, then high goals
3. Cap or Tax? Let each country decide
4. One price target, not 100 caps
5. Green Fund? Make it an incentive for pricing
6. Oil savings brings immediate benefits unlike distant and uncertain climate benefits