



# Engaging the Developing World in Climate Change Mitigation

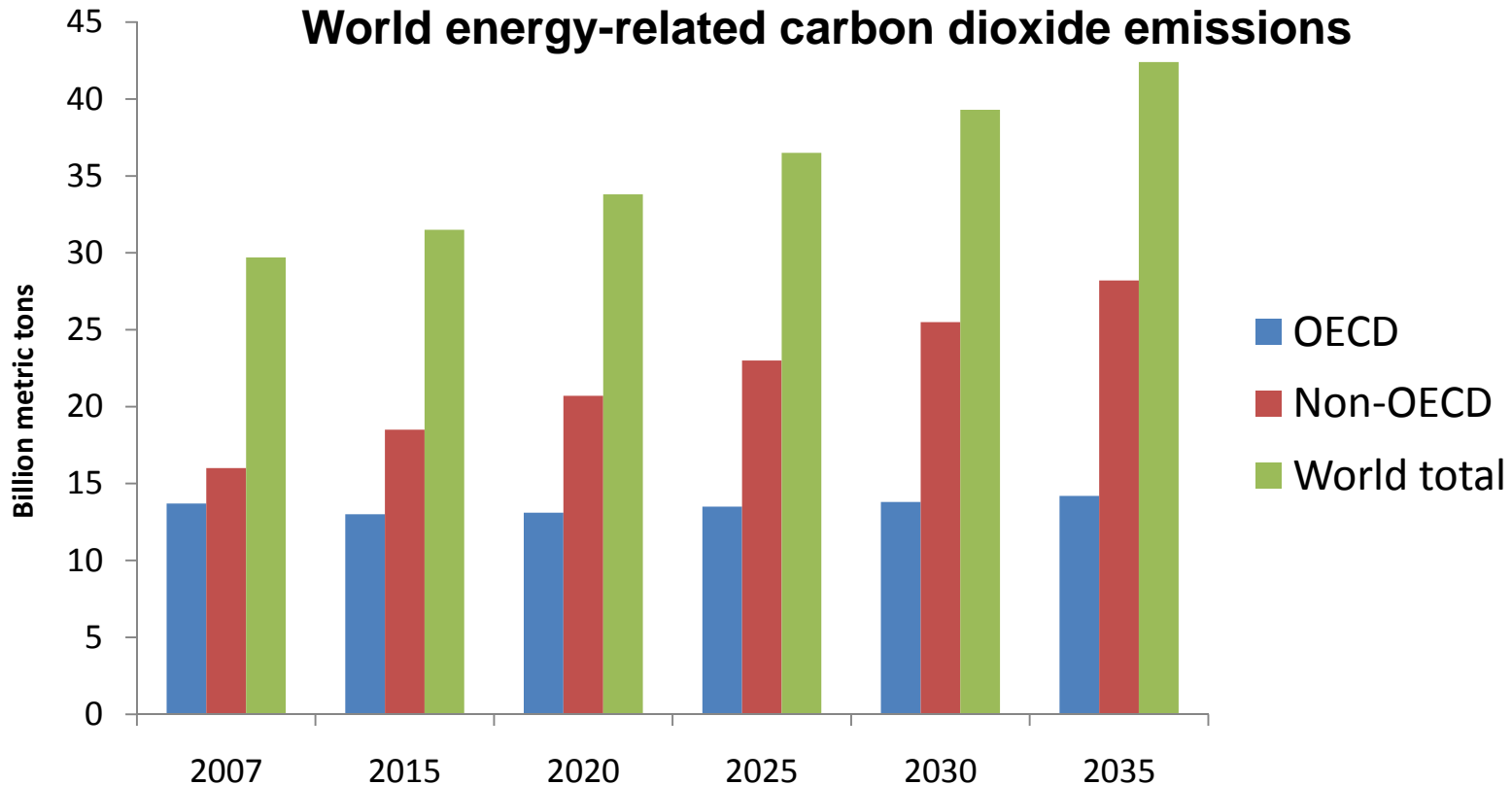
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# Outline

- Part I: Why offsets? Addressing Emissions Growth in the Developing World
- Part II: Do Offsets Work? Lessons from the CDM Experiment
- Part III: Post-Kyoto Market Fragmentation – Innovative New Models and Markets

# Developing Countries Drive Global Emissions Growth



- Chinese energy CO<sub>2</sub> emissions expected to grow 90% from 2007 to 2030
- Indian energy CO<sub>2</sub> emissions expected to grow 161% from 2007 to 2030
- Coal is the largest driver: non-OECD coal use projected to jump 87% by 2030

Source: Chart data from US EIA, IEO 2010. China/India emissions growth and coal demand forecast from IEA WEO 2009.

# Mitigating Emissions with Offsets

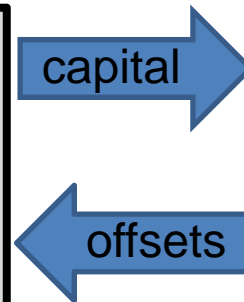
## The Logic of Offsets

- Key objectives:
  - Engage developing nations not willing to take emissions caps
    - Offset payments may create perverse incentives to avoid caps
  - Cheaper CO<sub>2</sub> reductions for capped economies
- Key co-benefits:
  - Directs private capital to green development
    - \$100 B in climate aid promised in Copenhagen – most will have to come from markets, not government
    - Offsets are at present the only politically viable mechanism operating at scale to finance climate mitigation in developing economies
  - Develops emissions mitigation and measurement capacity in developing world

# What is an Offset?

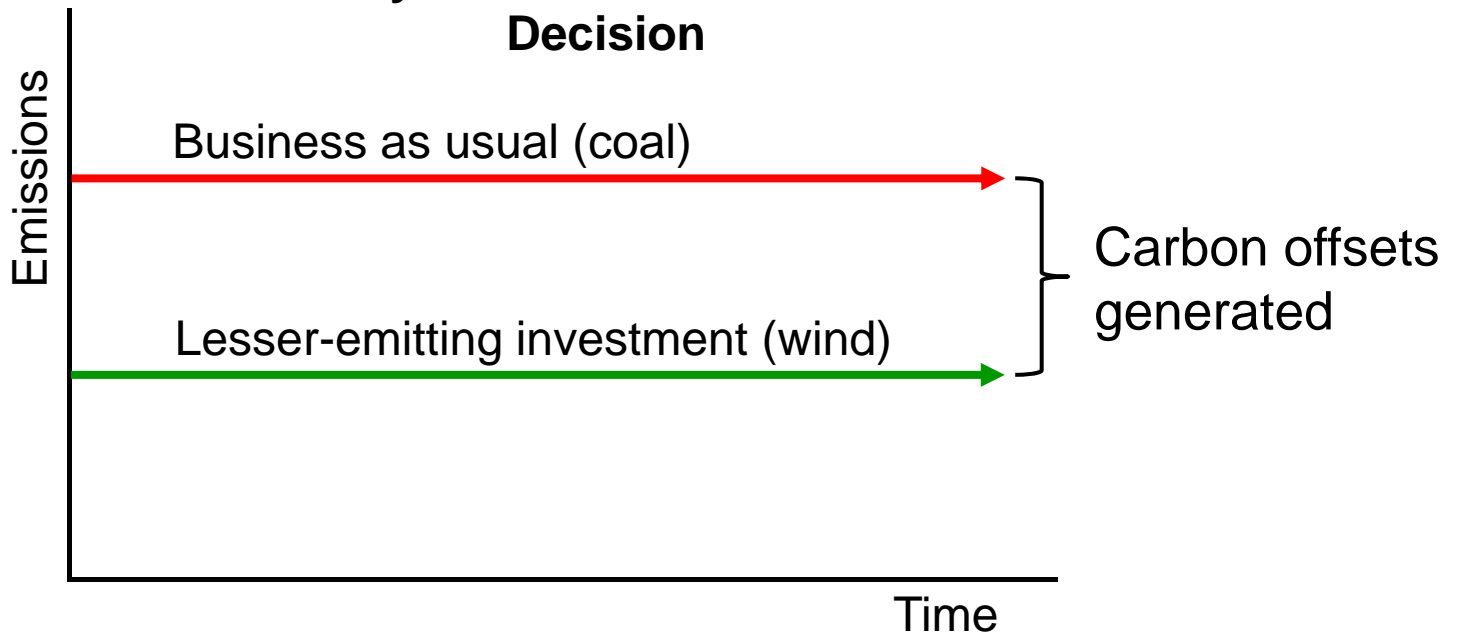


Abatement cost: \$25 / ton CO<sub>2</sub>



Abatement cost: \$10 / ton CO<sub>2</sub>

## Carbon Payments Alter BAU Investment Decision



# Additionality: Easy to define, hard to implement

## Defining Additionality:

- “A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.” – Marrakesh Accords
- Additionality is an unobservable counterfactual

## Implementing Additionality:

- Impossible to design a system that can prove “what would have happened otherwise” with 100% certainty
- Need to demonstrate two key facts:
  1. Prove what investment “would have happened otherwise” (unobservable counterfactual)
  2. Prove that carbon offset investment is what changed “what would have happened otherwise” to “what actually happened”
- Higher degree of certainty = higher costs, bigger verification burden
- Inherent trade-off: environmental integrity (credibility of assumed reduction) vs. system efficiency/transaction costs

**Key question for policy design: Offsets can't be “proved”. So what policy design is “credible enough” given need to transfer capital and transaction cost pressure?**

# Part II: Do Offsets Work? Lessons from the CDM Experiment

# CDM is the World's Largest Offset Market

Landscape of Global Carbon Markets

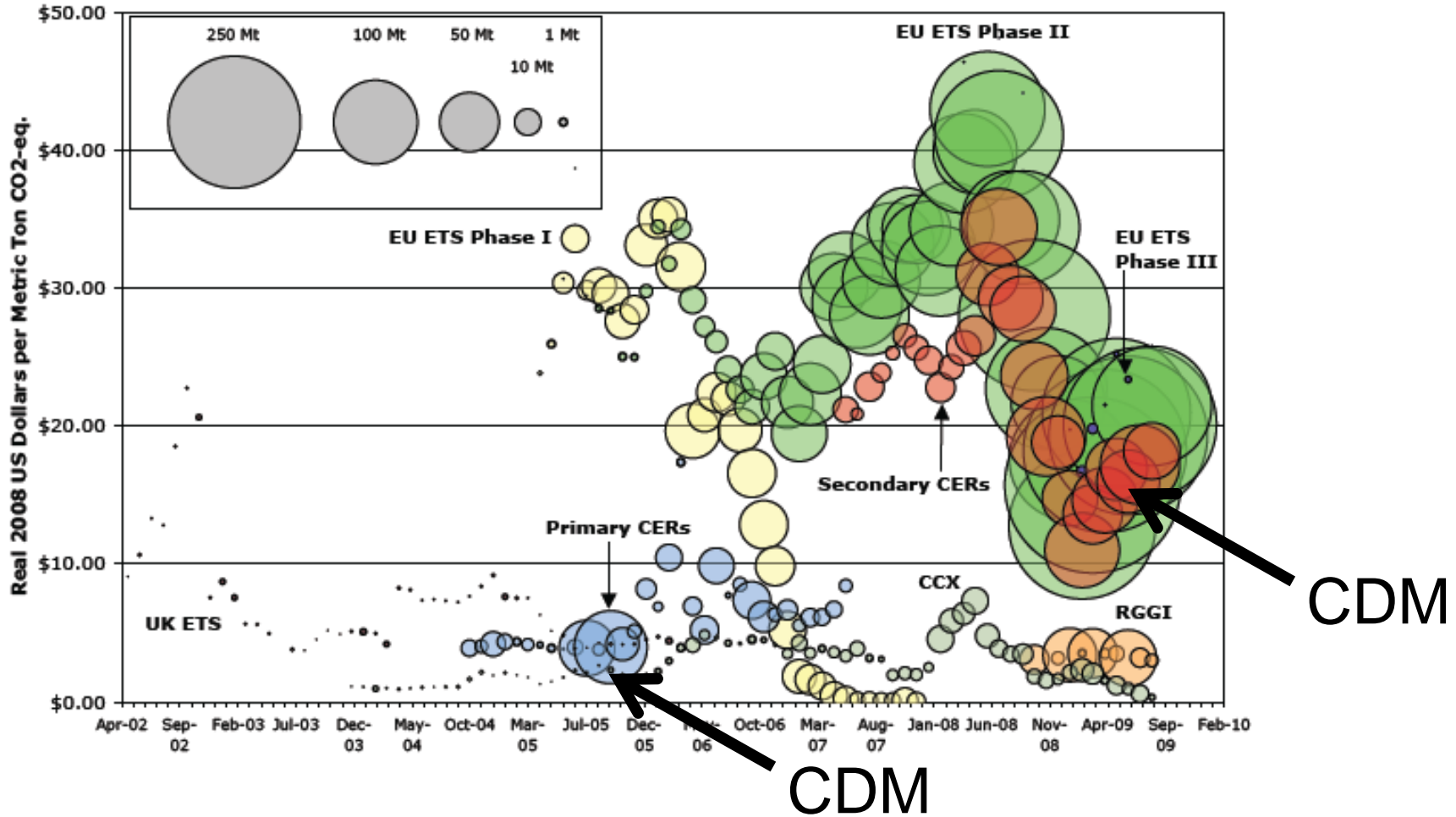
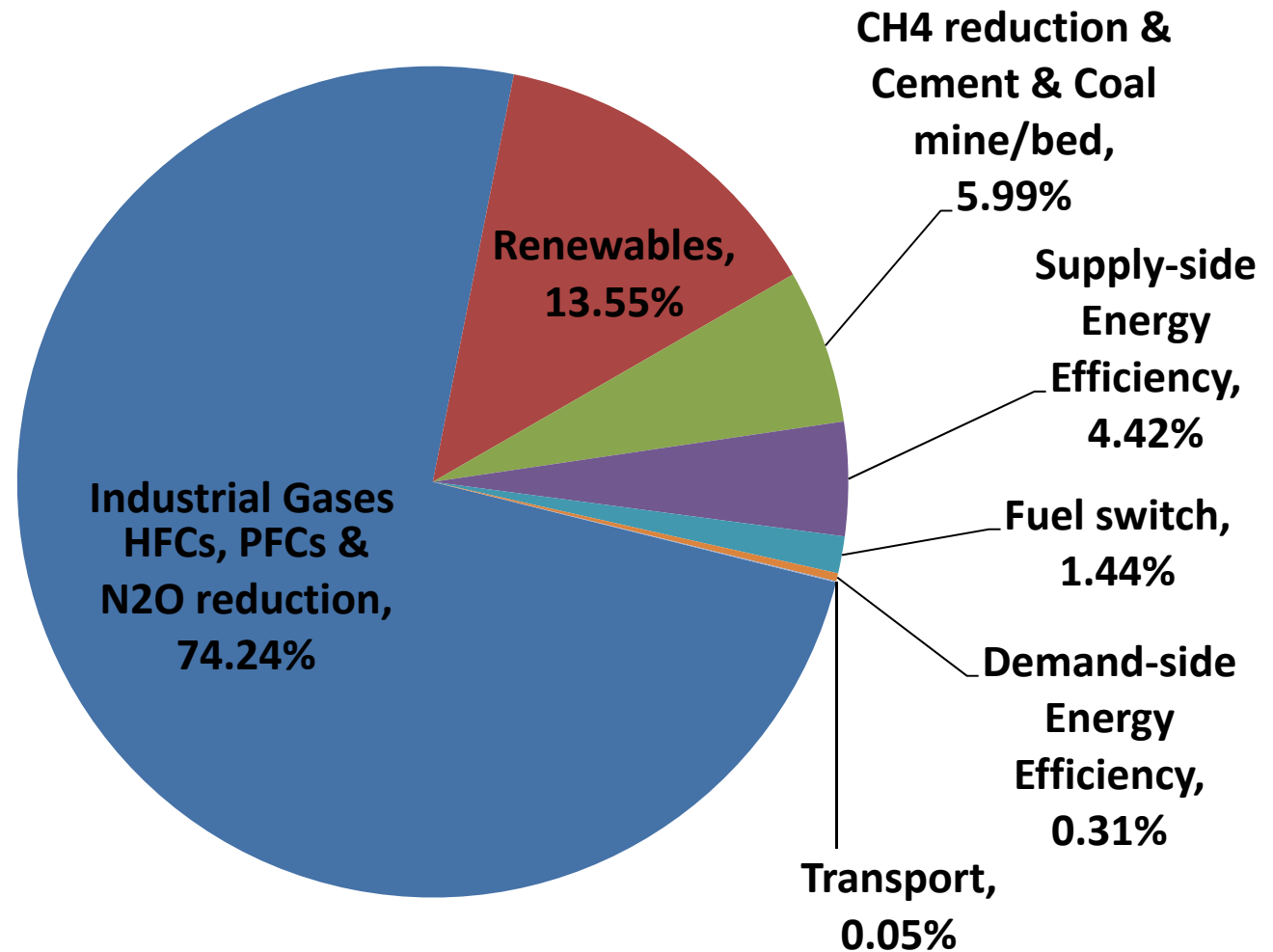


Chart from Danny Cullenward, Stanford.

# Industrial Gases *Have Dominated* Offset Supply

## Sources of Issued CER Supply

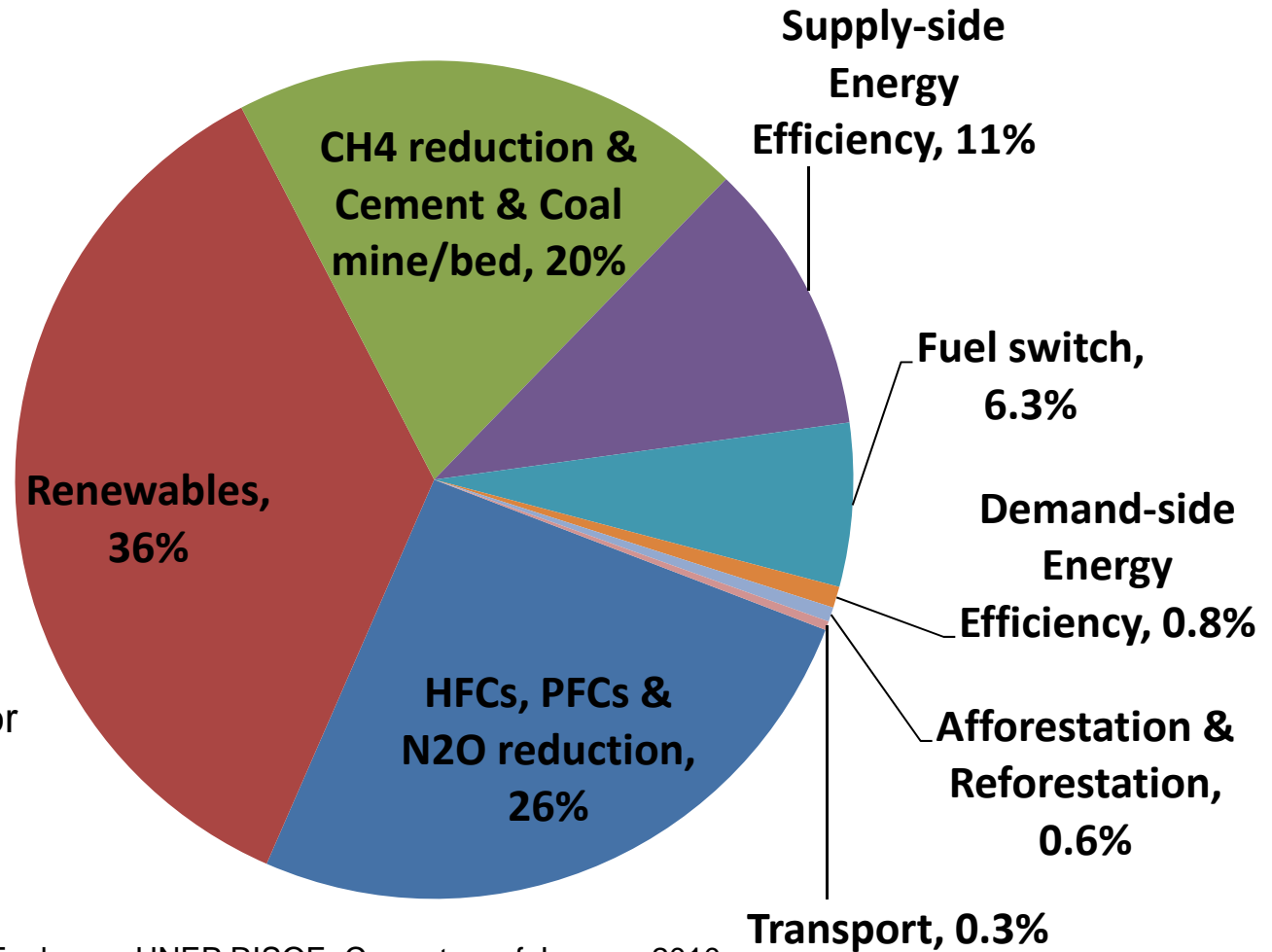


China accounted for 72% of all supply in 2009.

Source: Data from Joergen Fenhann, UNEP RISOE. Current as of January 2010.

# Renewable Energy *Will Dominate* Offset Supply

Sources of Expected CER Supply to 2012



The EU accounted for 84% of all demand in 2009.

Source: Data from Joergen Fenhann, UNEP RISOE. Current as of January 2010.

# Majority of CDM Offset Supply is Problematic

## Major Criticism #1: HFC and Industrial Gas

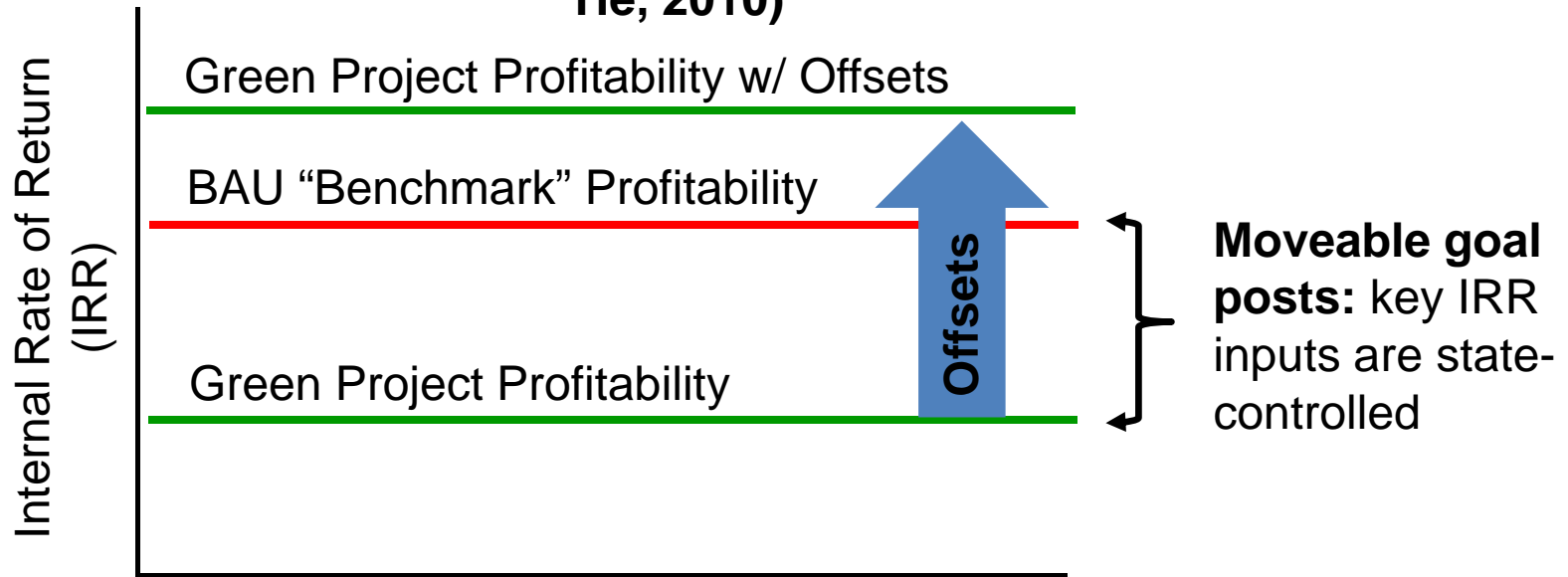
- One ton HFC-23 is 11,700 times more potent than one ton CO<sub>2</sub>
- CDM revenues to HFC producers for destroying HFC-23 dwarf revenues from producing their actual product (HFC-22)
- HFC producers are accused of gaming the CDM to inflate HFC-23 production (Wara, PESD, 2008; CDM-Watch 2010)
- CDM creates perverse incentives: maximize pollution to earn maximum offsets (Wara)
- CDM is economically inefficient solution – HFCs could be destroyed for a fraction of the cost of CERs (Wara)
- CDM Executive Board now contemplating rule changes that could pull 300-450 MT off the market before 2020 (Barclays estimate) – equivalent to several years worth of annual CDM supply
- EU contemplating post-2012 HFC prohibition anyway
- Kerry-Lieberman prohibited HFC offsets

**Offsets are not the right policy tool for industrial gases**

Note: Trifluoromethane (HFC-23), is a highly potent GHG and a byproduct of chlorodifluoromethane (HCFC-22).

# Major Criticism #2

## IRR-based Additionality Doesn't Work in non-Market Environments (Morse and He, 2010)

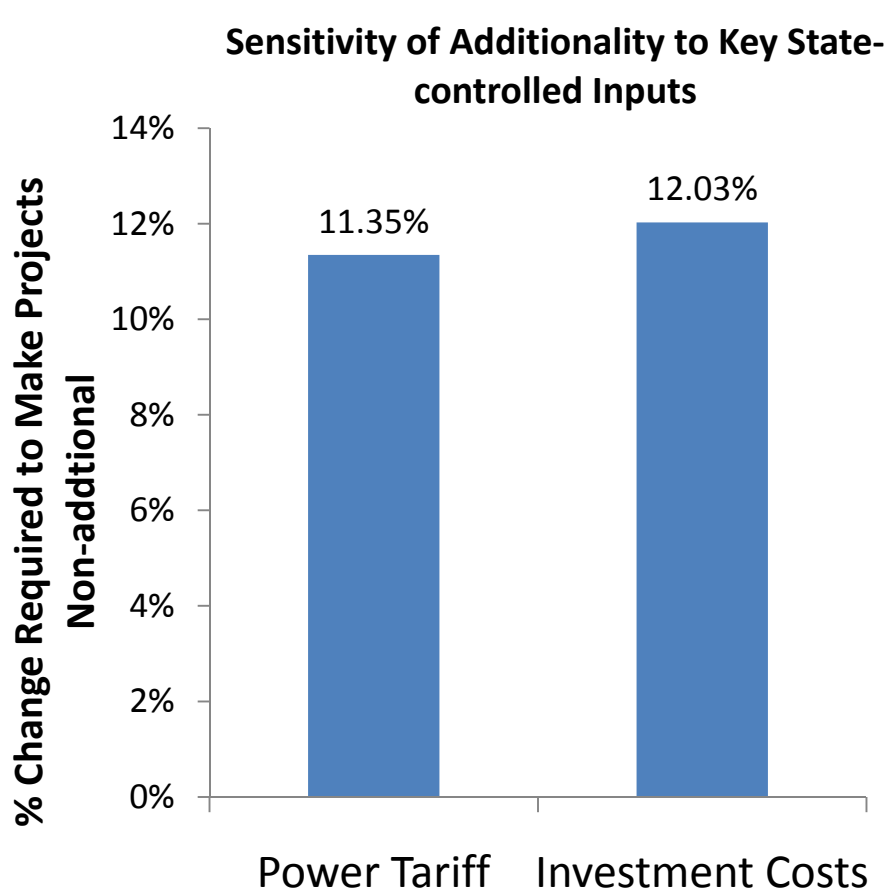


## CDM Gives Host Country Control Of Offset Outcomes in Power Sector



# Chinese Wind Controversy: CDM is Incompatible with China's Power Market

**Is China reducing power tariffs in order to make renewable energy less financially viable so it can get offsets?**



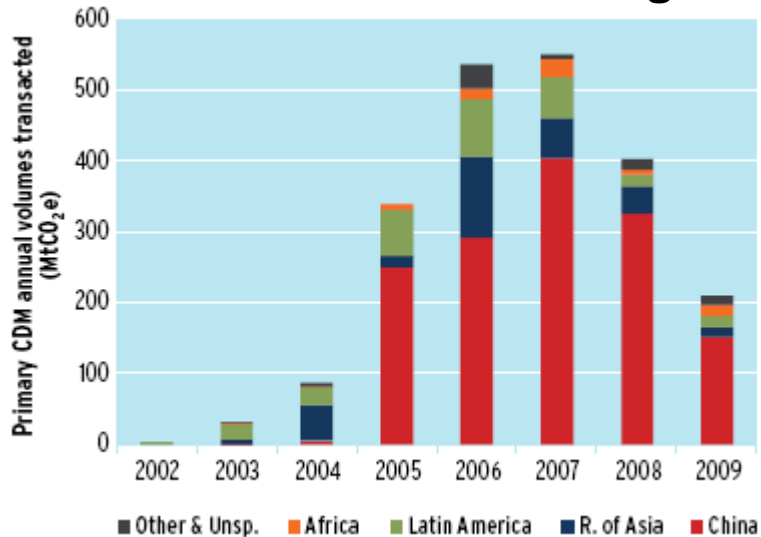
Note: Analysis for Chinese CDM Wind projects by Morse and He.

## The Chinese Wind Controversy

- Billions (USD) of China wind investment has been rejected by UN on additionality grounds
- PESD proved that power tariff is the single largest factor determining additionality
- China's power prices are set in a non-market, non-transparent manner by China's regulator
- PESD proved China's regulator therefore directly controls additionality, and the UN can't credibly verify outcomes
- This problem applies in all countries with state-controlled power sectors – nearly the entire developing world!

# Kyoto Protocol Ends in 2012 – What Next?

## CDM is Contracting



Source: World Bank, 2010.

## Offset Policy Outlook

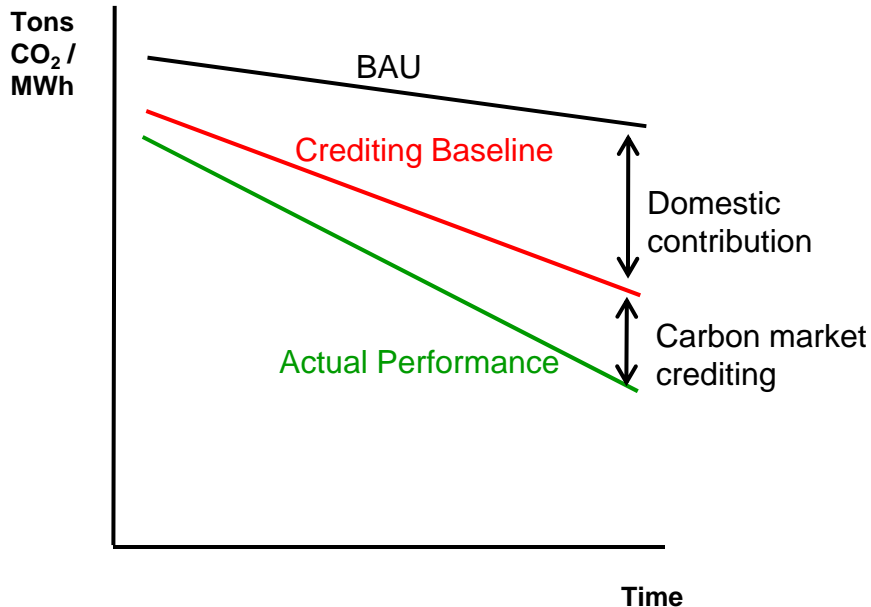
- No clear pathway to Kyoto successor – negotiations gridlocked
- Lack of US policy is a key impediment
- Investment is fleeing without policy certainty
- Some EU demand is the only guarantee past 2012 – but possible EU “quality restrictions” on offsets looming

- **Carbon market fragmentation is the new paradigm**
- **National “bottom up” policy models replacing global “legally binding international treaties”**

# Part III: Post-Kyoto Market Fragmentation – Innovative New Models and Markets

# Innovation 1: “No lose” Sectoral Crediting

## Indicative Sectoral Crediting Baseline Set for the Power Sector



## Viable Sectors and Relevant Metrics

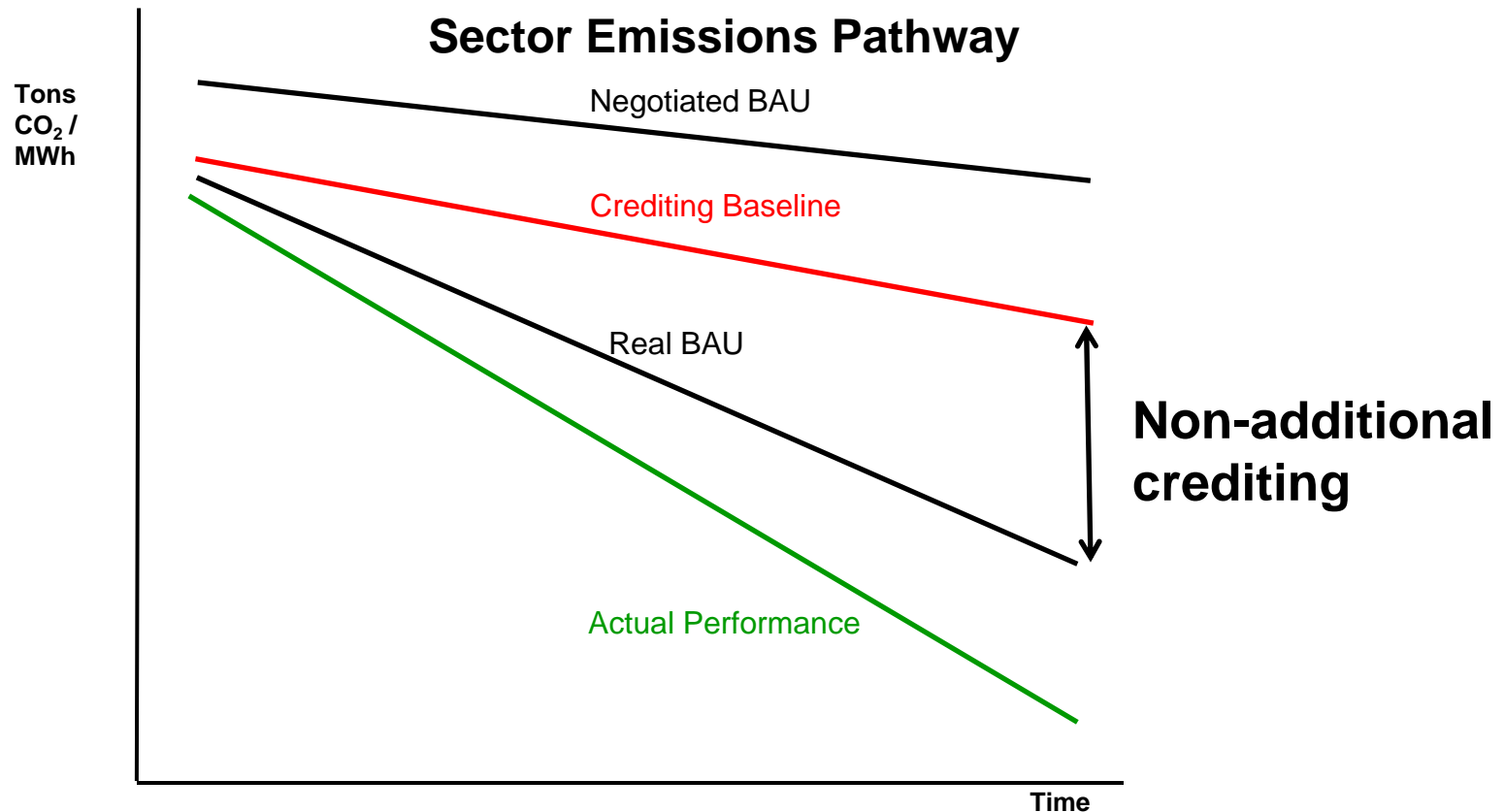
Sector	Metric
Iron and Steel	Kg CO <sub>2</sub> / ton crude steel
Cement	Kg CO <sub>2</sub> / ton cement
Aluminum	Kg CO <sub>2</sub> / equivalent ton primary aluminum
Transport	gCO <sub>2</sub> / kilometer
Power	Tons CO <sub>2</sub> / MWh

- Sectoral crediting envisions scales up offset crediting from project-level to sector-level
- Key improvements:
  - Addresses mitigation at large scale
  - Addresses projects and technologies CDM does not (nuclear, CCS)
  - Avoids project-based additionality and administrative constraints of the CDM

# Two Key Obstacles to Sectoral Crediting

## Key Obstacle # 1:

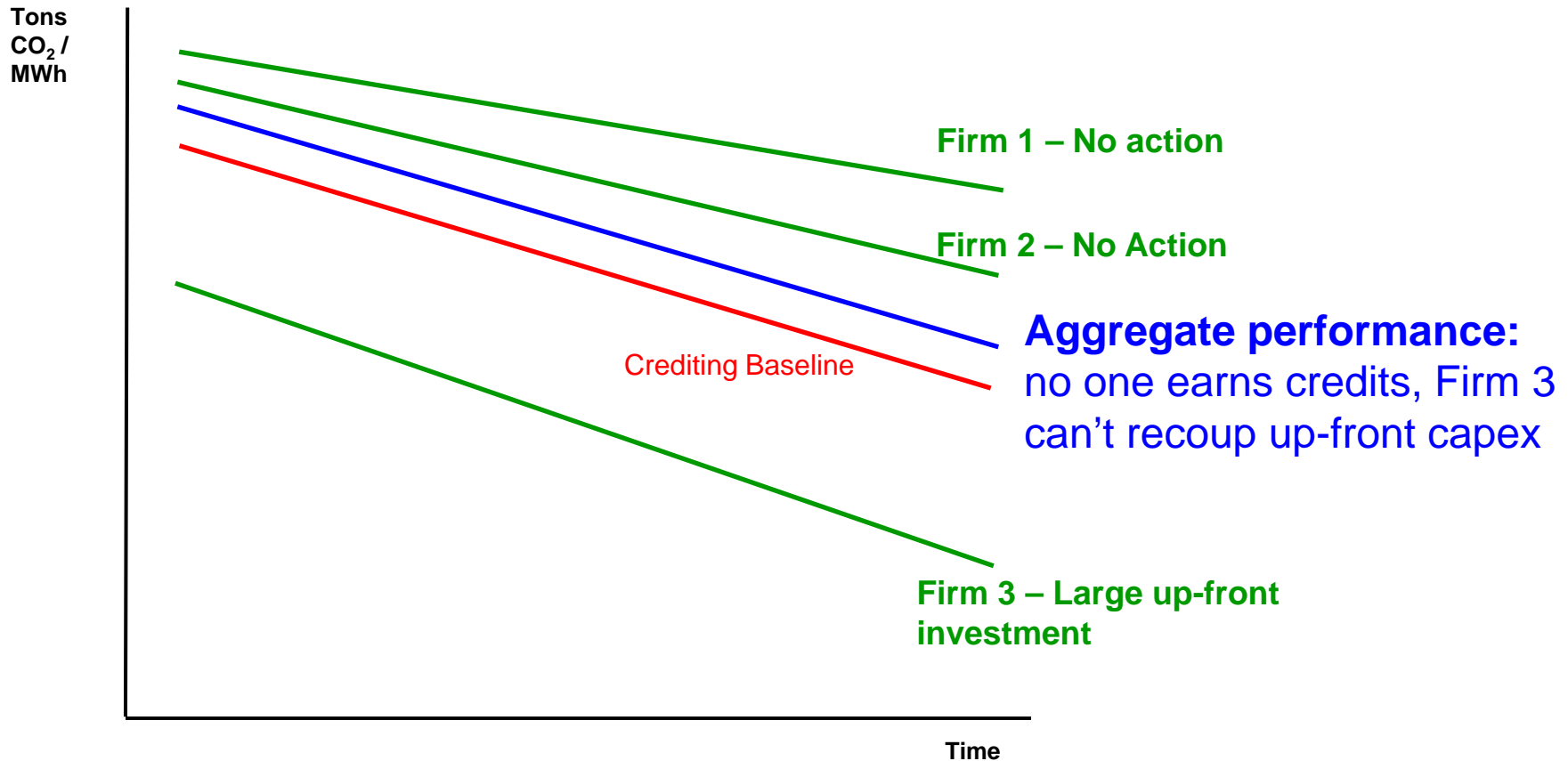
- Finding the real BAU is essential or “fake” credits get issued on a massive scale – additionality “counterfactual problem” all over again but bigger
- Requires measurement (MRV) capacity that is an “economic competitiveness issue” and a major political obstacle



# Key Obstacle #2: Incentive and Risk Structure

## Key Obstacle # 2:

- Maintaining incentives for firms to invest requires host government to:
  1. Pay the investment costs or guarantee firm ROI
  2. Take sector wide performance risk / massive financial risk



# Innovation 2: Bilateral Offset Regimes

New Japanese offset model under development offers key innovations

## Key Parameters of Mechanism:

- **Independent of UN Process:** bilateral offset agreements
- **Streamlined Additionality:** new technology-based additionality standards could reduce transaction costs
- **Larger Scale Projects:** deploys large scale projects in key sectors (power, steel, transport)
- **Domestic Political Appeal:** creates export markets for key Japanese manufacturers
- Financial backing currently from Japanese government
- Scaling up long term will require a clear carbon price signal

**Could this model be exported to the US?**

# Thank You

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