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 CO₂ emissions expected to grow 90% from 2007 to 2030
• Indian energy CO₂ emissions expected to grow 161% from 2007 to 2030
• Coal is the largest driver: non-OECD coal use projected to jump 87% by 2030

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 CO₂ 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 CO₂

Capped Economy

Uncapped Economy

Abatement cost: $10 / ton CO₂

Carbon Payments Alter BAU Investment Decision

Emissions

Business as usual (coal)

Lesser-emitting investment (wind)

Time

Carbon offsets generated
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

- Industrial Gases: HFCs, PFCs & N2O reduction, 74.24%
- Renewables, 13.55%
- CH4 reduction & Cement & Coal mine/bed, 5.99%
- Supply-side Energy Efficiency, 4.42%
- Fuel switch, 1.44%
- Demand-side Energy Efficiency, 0.31%
- Transport, 0.05%

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

- **Renewables, 36%**
- **HFCs, PFCs & N2O reduction, 26%**
- **CH4 reduction & Cement & Coal mine/bed, 20%**
- **Transport, 0.3%**
- **Afforestation & Reforestation, 0.6%**
- **Demand-side Energy Efficiency, 0.8%**
- **Fuel switch, 6.3%**
- **Supply-side Energy Efficiency, 11%**

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 CO₂
• 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)

- Green Project Profitability w/ Offsets
- BAU “Benchmark” Profitability
- Green Project Profitability

Moveable goal posts: key IRR inputs are state-controlled

CDM Gives Host Country Control Of Offset Outcomes in Power Sector

State-controlled Inputs

Black Box

Additionality Outcomes
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?

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

- 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

### Viable Sectors and Relevant Metrics

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<th>Sector</th>
<th>Metric</th>
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<tr>
<td>Iron and Steel</td>
<td>Kg CO2 / ton crude steel</td>
</tr>
<tr>
<td>Cement</td>
<td>Kg CO2 / ton cement</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Kg CO2 / equivalent ton primary aluminum</td>
</tr>
<tr>
<td>Transport</td>
<td>gCO2 / kilometer</td>
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<tr>
<td>Power</td>
<td>Tons CO2 / MWh</td>
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### Indicative Sectoral Crediting Baseline Set for the Power Sector

- BAU: Baseline Actual Performance
- Crediting Baseline
- Carbon market crediting
- Domestic contribution

<table>
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<th>Time</th>
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<td>Tons CO2 / MWh</td>
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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

- Firm 1 – No action
- Firm 2 – No Action
- Firm 3 – Large up-front investment

Aggregate performance: no one earns credits, Firm 3 can’t recoup up-front capex
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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