Global Climate Change and Carbon Financing Opportunities for Bangladesh

The international business of climate change: global context of carbon markets and trading

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Outline of Presentation

Overview of global carbon markets
  • Brief history and current trends
  • Expected future directions
Allowance-based markets
  • European Union Emissions Trading Scheme (ETS)
  • Other allowance-based markets
Project-based financing mechanisms
  • Clean Development Mechanism (CDM)
  • Joint Implementation (JI)
  • Voluntary markets – formal and informal
Development assistance – appropriate roles
Overview of global carbon markets (1)

What are they and what do they do?
- Market-based mechanisms to reduce greenhouse gas emissions
- Commoditise GHGs for trade like barrels of oil or tonnes of rice

How created and by whom?
- Established under Kyoto Protocol to UNFCCC in 1997 (more later)
- Three mechanisms established:
  - Joint Implementation (Article 6)
  - Clean Development Mechanism (Article 12)
  - Emissions Trading (Article 17)

Source: UNFCCC Kyoto Protocol
Overview of global carbon markets (2)

How do you commoditise an atmospheric gas?

- Measured in units of carbon dioxide equivalent (CO$_2$e), expressed in metric tonnes to be able to standardize – similar to selling oil in barrels
- Other GHGs expressed in CO$_2$e based on contribution to global warming measured over 100 yrs.

What is actually being sold?

- Assigned Amount Units (AAUs) for Annex B countries – measure of allowed emissions under first commitment period of Kyoto (2008-2012)
- Certified Emission Reductions (CERs) from CDM projects
- Emission Reduction Units (ERUs) from JI projects
- Removal Units (RMUs) from LULUCF activities such as reforestation
- Voluntary Emissions Reductions (VERs) – voluntary markets (pre-CER)

<table>
<thead>
<tr>
<th>Greenhouse Gas</th>
<th>Chemical Symbol</th>
<th>CO$_2$e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>CH$_4$</td>
<td>19</td>
</tr>
<tr>
<td>Nitrous Oxide</td>
<td>N$_2$O</td>
<td>281</td>
</tr>
<tr>
<td>Sulfur Hexafluoride</td>
<td>SF$_6$</td>
<td>21,682</td>
</tr>
</tbody>
</table>
### Overview of global carbon markets (3)

<table>
<thead>
<tr>
<th>Market – arranged by value of transactions in 2008 (WB)</th>
<th>Market type</th>
<th>2007 volume (MtCO₂e)</th>
<th>2007 value (M$US)</th>
<th>2008 volume (MtCO₂e)</th>
<th>2008 value (M$US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union Emission Trading Scheme (ETS)</td>
<td>Allowance - compulsory</td>
<td>2,060&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$49,065&lt;sup&gt;1&lt;/sup&gt; $50,097&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3,093&lt;sup&gt;1&lt;/sup&gt; 2,982&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$91,910&lt;sup&gt;1&lt;/sup&gt; $94,972&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Secondary market Clean Development Mechanism</td>
<td>CER futures market</td>
<td>240&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$5,451&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>1,072&lt;sup&gt;1&lt;/sup&gt; 623&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$26,277&lt;sup&gt;1&lt;/sup&gt; $15,585&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Primary market Clean Development Mechanism</td>
<td>Project-based – compliance</td>
<td>552&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$7,433&lt;sup&gt;1&lt;/sup&gt; $7,426&lt;sup&gt;2&lt;/sup&gt;</td>
<td>389&lt;sup&gt;1&lt;/sup&gt; 400&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$6,519&lt;sup&gt;1&lt;/sup&gt; $6,118&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Other Kyoto mechanisms (AAUs and JI ERUs)</td>
<td>Allowance or project-based</td>
<td>41&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$499&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>38&lt;sup&gt;1&lt;/sup&gt; 24&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$505&lt;sup&gt;1&lt;/sup&gt;  $2,517&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Regional markets – includes Australia, New Zealand, others</td>
<td>Allowance - regulated</td>
<td>25&lt;sup&gt;1&lt;/sup&gt; 27&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$224&lt;sup&gt;1&lt;/sup&gt; $238&lt;sup&gt;2&lt;/sup&gt;</td>
<td>96&lt;sup&gt;1&lt;/sup&gt; 61&lt;sup&gt;2&lt;/sup&gt;</td>
<td>$429&lt;sup&gt;1&lt;/sup&gt; $292&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Over-the-counter (OTC) [informal voluntary]</td>
<td>Project-based – voluntary</td>
<td>43&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$263&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>54&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$397&lt;sup&gt;1,2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Chicago Climate Exchange (CCX) [formal voluntary]</td>
<td>Project-based – voluntary</td>
<td>23&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$72&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>69&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>$309&lt;sup&gt;1,2&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>2,985&lt;sup&gt;1,2&lt;/sup&gt;</strong></td>
<td><strong>$63,007&lt;sup&gt;1&lt;/sup&gt; $64,046&lt;sup&gt;2&lt;/sup&gt;</strong></td>
<td><strong>4,811&lt;sup&gt;1&lt;/sup&gt; 4,213&lt;sup&gt;2&lt;/sup&gt;</strong></td>
<td><strong>$126,346&lt;sup&gt;1&lt;/sup&gt; $120,189&lt;sup&gt;2&lt;/sup&gt;</strong></td>
</tr>
</tbody>
</table>

**Sources:**
Allowance markets

European Union Emission Trading Scheme

- Established by European Parliament in 2003 as mechanism for trading in allowable emissions according to Kyoto commitments – allocated by industry in each member state according to historic emissions levels
- By far the most important at this stage in carbon market development
  - Accounted for 64% of total volume and 73% of total value in 2008
  - Average price of different vintages over past months: €15 (US$22.50)
  - Experienced 87% year-on-year growth, measured in value terms, over 2007
- Recession hit hard but growth continued despite volatility
  - Price in July 2008 was nearly double that of July 2009
  - Some of late-2008, early 2009 volume was sales of credits obtained free from EU
  - Plans to have full auction may now be postponed due to effects of recession

Other Allowance markets

- Australia and New Zealand have functioning (sort of) but small markets
- Japan and US are still thinking about it; local US markets are interesting
Project-based markets (1)

Kyoto mechanisms

- **Clean Development Mechanism (CDM)**
  - Established under Article 12 of Kyoto Protocol; became operational in 2003
  - Most Certified Emission Reduction credits (CERs) are bought by private companies based in European Union – UK was largest buyer of credits (almost 40%) last year
  - Vast majority (84%) of projects to date have been in China; India and Brazil strong
  - Growth was steady 2003-2008, from <50 MtCO$_2$e to approximately 550 Mt in ‘08
  - Secondary market emerged in 2$^{nd}$ half ‘08 and 1$^{st}$ half ‘09 as more active (>1 billion)
  - Energy efficiency, hydropower, and wind account for 75% of project types

- **Joint Implementation (JI) mechanism**
  - Established under Article 6 of Kyoto Protocol; became operational in 2000
  - Emission Reduction Units (ERUs) issued only from beginning 2008
  - Only eligible activities are between two Annex B countries (industrial economies)
  - Russia has 68% market share of projects; Ukraine 18% as of March 2009
  - Only LULUCF project is for afforestation of degraded agricultural land in Romania
Project-based markets (2)

CDM projects by type - 2008; percent of volume

- Hydro, 21%
- Wind, 17%
- N₂O, 1%
- CMM, 2%
- HFC, 3%
- LFG, 3%
- Waste mgmt., 3%
- Biomass, 6%
- Other Renewables, 1%
- Other, 6%
- Agroforestry, 0.1%
- EE + Fuel s., 37%

Source:
Project-based markets (3)

Voluntary markets

• Chicago Climate Exchange (CCX) – formal, regulated
  ✓ Voluntary (not compulsory), membership-based network of markets; since
  ✓ World’s first legally-binding system for “cap-and-trade” emissions reductions
  ✓ Set up along lines similar to Kyoto mechanisms; rules-based, regulated by CFTC
  ✓ Trade units: CCX Carbon Financial Instruments (CFIs) = 100 tCO$_2$e; also traded: RGGI allowances, CDM CERs, Climate Registry’s Climate Reserve Tons (CRTs)
  ✓ Growth strong from very small base: 2 Mt in 2004 to 69 Mt in 2008 (<1.5% of total)
  ✓ Price on Tuesday: US$0.10 (less than 7 Taka) per tonne; has been low for months

• Over-the-Counter (OTC) market – informal, unregulated
  ✓ Not one market; rather, a wide range of transactions not under emissions caps
  ✓ Because it is outside of allowances systems; all projects are for carbon offsets
  ✓ Account for <3% of total volume, 0.6% of total value of world carbon markets
  ✓ Aspires to be the “retirement home” of emissions; i.e., taken off resale market
  ✓ Transaction volumes and price provide indication of environment as market driver
Project-based markets (4)

Transaction Volume by Location, OTC, 2008

Land-based credits sold in OTC markets, 2008

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Vol. Land-based credits (ktCO₂e)</th>
<th>Market share of total land-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Afforestation and Reforestation</td>
<td>646</td>
<td>1%</td>
</tr>
<tr>
<td>Afforestation or Reforestation</td>
<td>3,399</td>
<td>7%</td>
</tr>
<tr>
<td>REDD - avoided deforestation</td>
<td>730</td>
<td>1%</td>
</tr>
<tr>
<td>Improved forest management</td>
<td>431</td>
<td>1%</td>
</tr>
<tr>
<td>Agricultural soil management</td>
<td>267</td>
<td>0.5%</td>
</tr>
<tr>
<td>Other land-based projects</td>
<td>130</td>
<td>0.3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,603</td>
<td>11%</td>
</tr>
</tbody>
</table>

Ongoing dynamics – markets meet politics

Biggest players engaging

• United States
  ✓ Environmental Protection Agency (EPA) asserted authority to regulate C “pollution”
  ✓ Waxman-Markey bill (H.R. 2454) passed House of Representatives June 2009
  ✓ Kerry-Boxer bill introduced in Senate last month; hearings to begin in November
  ✓ Consensus around “cap-and-trade” rather than carbon tax or other mechanisms
  ✓ Highly affected industries pushing back hard with various lobbying campaigns
  ✓ Bottom line is that Administration is willing; Congress less certain to pass legislation

• China
  ✓ Officially became largest emitter in latest IPCC Assessment Report
  ✓ Heavily engaged using CDM funding to transform energy sector away from coal
  ✓ Continued resistance to efforts to place themselves under emissions cap
  ✓ Prefer limiting per capita emissions; untenable to others (except perhaps India)
  ✓ Reported to be working internally on reaching viable consensus by Copenhagen
Possible future trends – speculative “best guesses”

Reduced Emissions from Deforestation & Forest Degradation (REDD+)
- Perhaps furthest developed mechanism for agreement in Copenhagen
- Would allow countries to sell stored carbon on markets, IF verified eligible
- Attempting to address shortcomings of CDM for terrestrial carbon projects
- Methodological issues remain – permanence, leakage, accounting rules
- Perhaps biggest impediments are related to institutional capacity at all levels

Agricultural, rangeland, and wetlands soil carbon
- Much less consensus but lots of interesting research on how it may be done
- World Bank and others optimistic; many thorny issues and challenges remain
- Again linked to tenure systems, legal frameworks, livelihood & rights issues
- Likely remain niche voluntary market for foreseeable future – “guilt carbon”
- REDD processes being watched closely as possible model for formal adoption
Official development assistance – potential roles?

Project development costs
- Markets interested in products for sale, not community organizing costs
- Significant up-front transaction costs e.g., inventory, packaging, etc.

Build institutional capacity
- Carbon accounting methodology within relevant entities
- Land, tree, and especially carbon tenure systems, legal frameworks
- Carbon registry, standards organization, 3rd party auditors

Buy down risk
- Investor confidence levels low; similar to other types of FDI
- Creative use of credit guarantees, other mechanisms may alleviate

Optimize co-benefits
- Broader development objectives unlikely to be subsidized by C markets
- Co-benefits can be substantial, yet unrecognized in Convention
THANK YOU!