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# **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



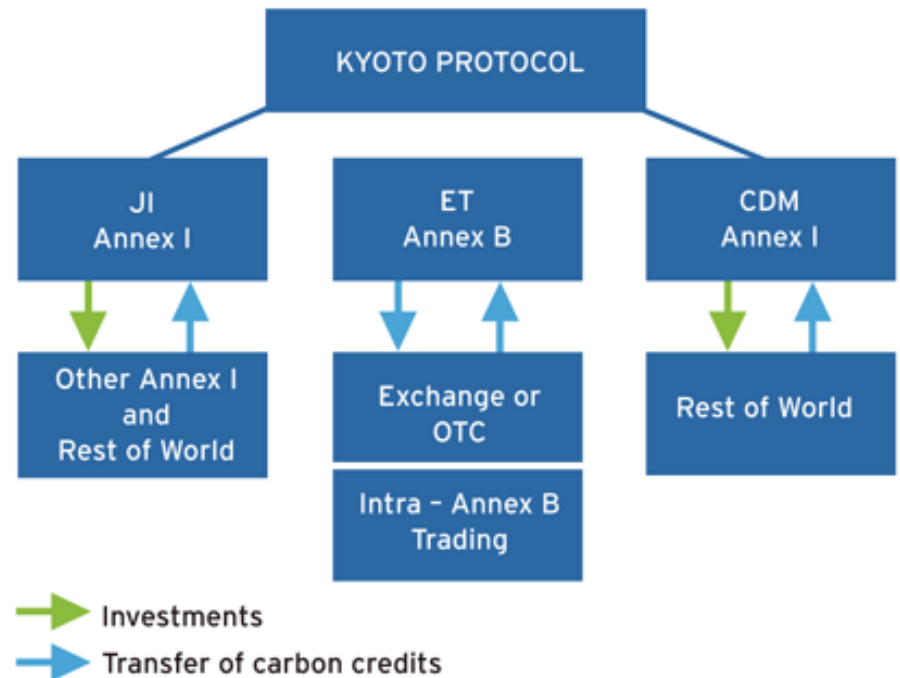
## Overview of global carbon markets (1)

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 ( $\text{CO}_2\text{e}$ ), expressed in metric tonnes to be able to standardize – similar to selling oil in barrels
- Other GHGs expressed in  $\text{CO}_2\text{e}$  based on contribution to global warming measured over 100 yrs.:

Greenhouse Gas	Chemical Symbol	$\text{CO}_2\text{e}$
Methane	$\text{CH}_4$	19
Nitrous Oxide	$\text{N}_2\text{O}$	281
Sulfur Hexafluoride	$\text{SF}_6$	21,682

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)



## Overview of global carbon markets (3)

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

Sources:

1. Capoor, K. and Ambrosi, P. (2009). *State and trends of the carbon market 2009*. Washington, DC: World Bank.

2. Hamilton, K., Sjardin, M., Shapiro, A., and Marcello, T. (2009). *Fortifying the Foundation: State of the voluntary carbon markets 2009*. Washington, DC: Ecosystem Marketplace and New Carbon Finance.



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## 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



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## Project-based markets (1)

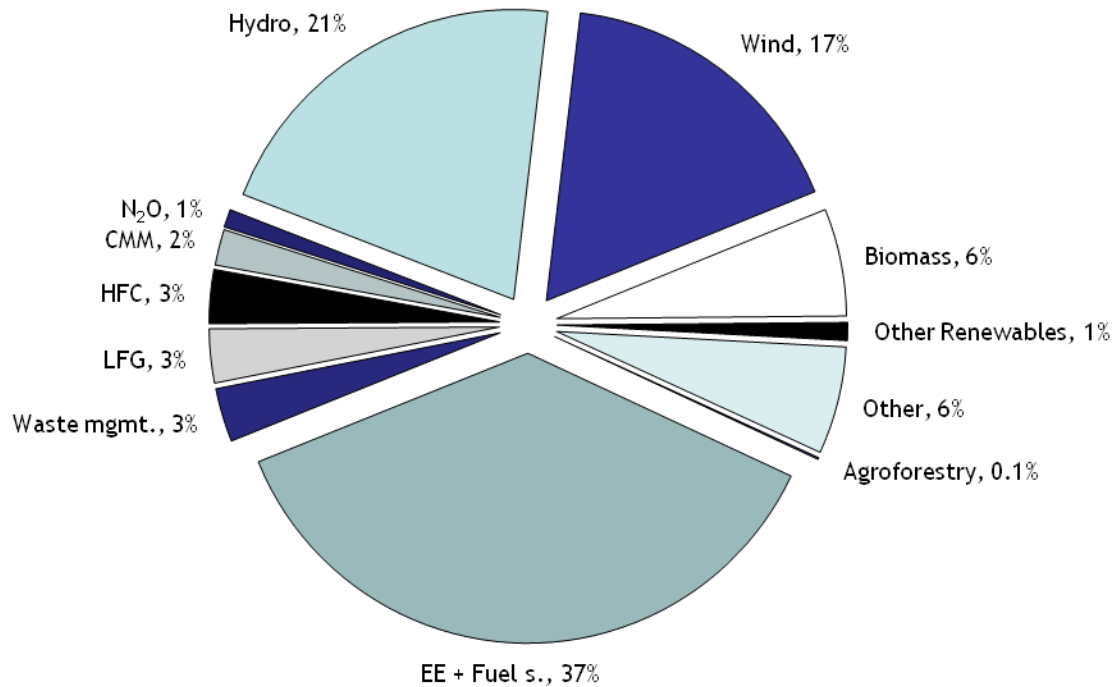
### Kyoto mechanisms

- **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<sub>2</sub>e to approximately 550 Mt in '08
  - ✓ Secondary market emerged in 2<sup>nd</sup> half '08 and 1<sup>st</sup> 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



Source:

Capoor, K. and Ambrosi, P. (2009). *State and trends of the carbon market 2009*. Washington, DC: World Bank.





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## Project-based markets (3)

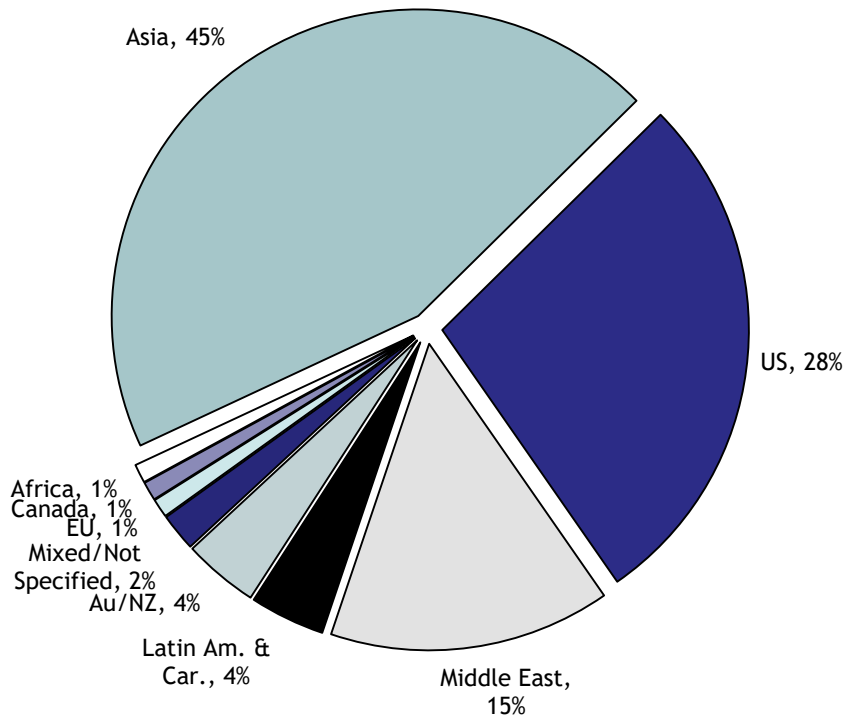
### Voluntary markets

- **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<sub>2</sub>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

Project Type	Vol. Land-based credits (ktCO <sub>2</sub> e)	Market share of total land-based
Mixed Afforestation and Reforestation	646	1%
Afforestation <u>or</u> Reforestation	3,399	7%
REDD - avoided deforestation	730	1%
Improved forest management	431	1%
Agricultural soil management	267	0.5%
Other land-based projects	130	0.3%
<b>TOTAL</b>	<b>5,603</b>	<b>11%</b>

Source: Hamilton, K., Sjardin, M., Shapiro, A., and Marcello, T. (2009). *Fortifying the Foundation: State of the voluntary carbon markets 2009*. Washington, DC: Ecosystem Marketplace and New Carbon Finance.



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## 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



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## 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



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## 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, 3<sup>rd</sup> 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



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