

Overview of Markets for Carbon Credits

Global Offset and Countertrade Association (G.O.C.A.) and the Defense Industry Offset Association

25 September 2007

Scott Settelmyer
TerraCarbon LLC



About TerraCarbon

- TerraCarbon LLC formed in 2006, with locations in the U.S. and Austria.
- Provides consulting and advisory services to buyers and developers of land use and forestry projects.
- Active in both international and domestic carbon markets.



Agenda

1. Climate Change and Market Mechanisms
2. Overview of Carbon Markets
3. Carbon Credits and Transaction Considerations

Climate Change and Market Solutions

- Growing consensus that climate change is happening and is related to human activities.
- Market based solutions are preferred over traditional, command and control regulation.
 - Allow for least-cost solutions, and
 - Provide flexibility in terms of when and how reductions are made
- Market mechanisms play an integral role in:
 - International programs, such as the Kyoto Protocol
 - National programs in Europe,
 - Proposed regional (and federal) compliance programs in the U.S.

Greenhouse Gases and CO₂e

Symbol	Name	Common Sources	Global Warming Potential (GWP) and CO ₂ equivalent (CO ₂ e)	% of US GHG emissions
CO ₂	Carbon Dioxide	Fossil fuel combustion, forest clearing, cement production, etc.	1	85%
CH ₄	Methane	Landfills, production and distribution of natural gas & petroleum, fermentation from the digestive system of livestock, rice cultivation, fossil fuel combustion, etc.	21	8%
N ₂ O	Nitrous Oxide	Fossil fuel combustion, fertilizers, nylon production, manure, etc.	310	5%
HFC's	Hydrofluorocarbons	Refrigeration gases, aluminum smelting, semiconductor manufacturing, etc.	140 to 11,700	2%
PFC's	Perfluorocarbons	Aluminum production, semiconductor industry, etc.	6,500 to 9,200	
SF ₆	Sulfur Hexafluoride	Electrical transmissions and distribution systems, circuit breakers, magnesium production, etc.	23,900	

GWP= Global Warming Potential: potency of gas to contribute to global warming; measured in carbon dioxide equivalents. Source: IPCC



Market Mechanisms

- Cap and trade system
 - A maximum level of emissions is set (the “cap”) and an equivalent amount of allowances are issued or auctioned off to participants.
 - Allowances can be traded.
 - At the end of each compliance period, emitting participants retire allowances equal to their actual measured emissions.
 - Excess allowances can be sold or used for future compliance



Market Mechanisms

- Offset-credit program
 - Credits are issued to project owners who undertake voluntary project based activities to reduce GHG emissions relative to a standard (project baseline).
 - Cap-and-trade systems generally allow for the import of credits from project-based transactions.
 - Examples include:
 - Clean energy (hydro, wind, biomass)
 - Industrial gas destruction
 - Landfill and agricultural methane
 - Afforestation



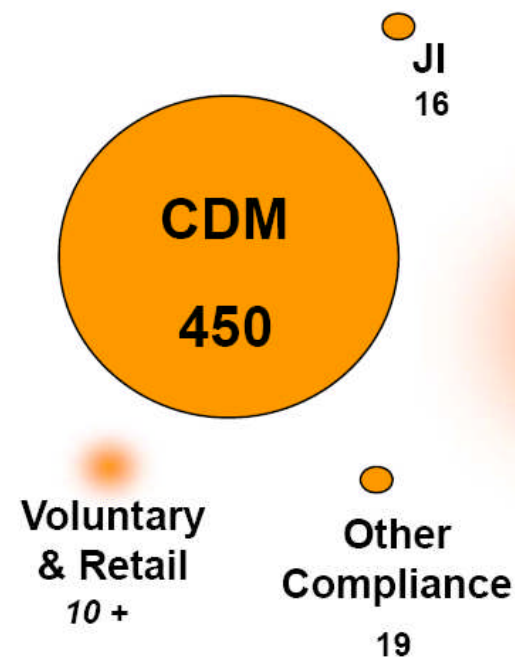
Overview of Carbon Markets

Type of Market	Cap and Trade Program	Crediting Program	Participants
International (Kyoto Protocol)	International Emissions Trading	Clean Development Mechanism (CDM) and Joint Implementation (JI)	Governments
National	European Union Emission Trading Scheme (EU ETS)	CDM and JI	European corporates
Subnational	Regional Greenhouse Gas Initiative (RGGI)	RGGI	Utilities in the Northeast U.S.
Voluntary – Compliance	Chicago Climate Exchange (CCX)	CCX	U.S. corporates
Voluntary – Non-compliance	N/A	Voluntary Standards	Social/environmentally responsible corporates

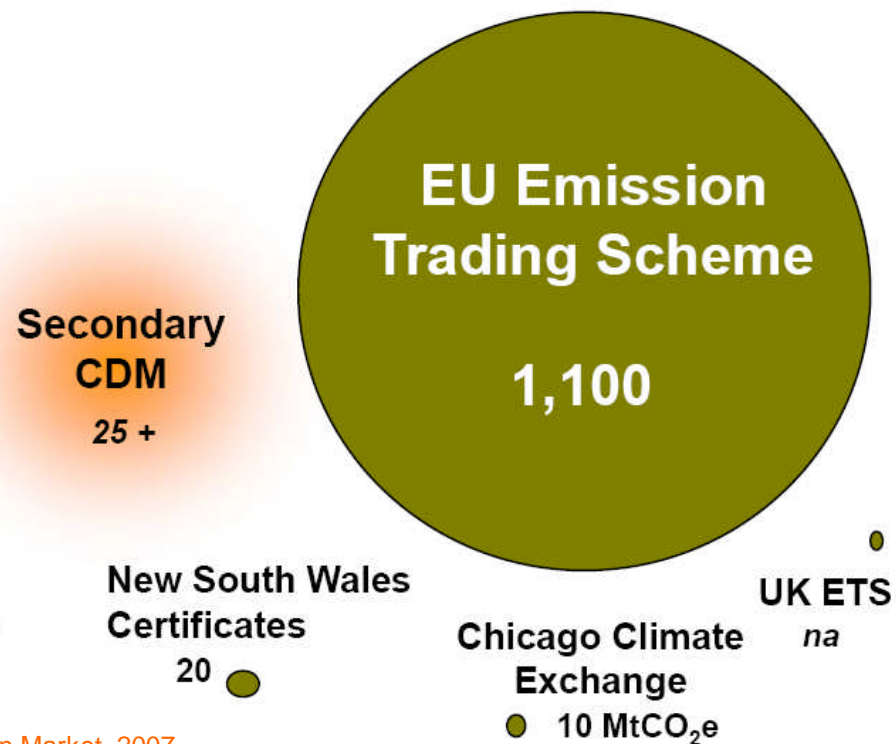
Carbon Markets

Volumes transacted in 2006 (in MtCO₂e)

Project-Based Transactions



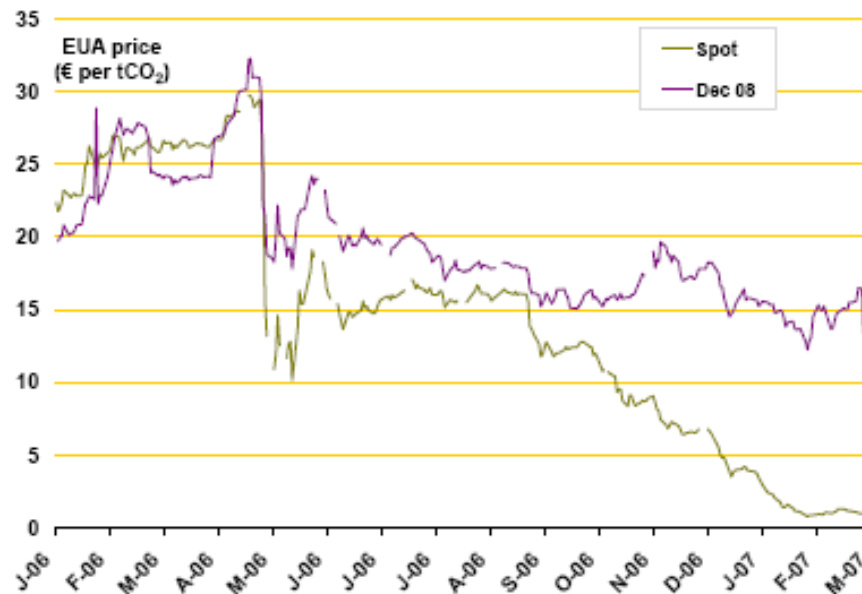
Allowance Markets



Allowance Markets - the EU ETS

- Liquid and standardized
- Prices determined by allocation of allowances

Figure 1: Spot and Dec'08 Prices for EUAs 2006-Q1'07 (Source: Powernext, ECX)



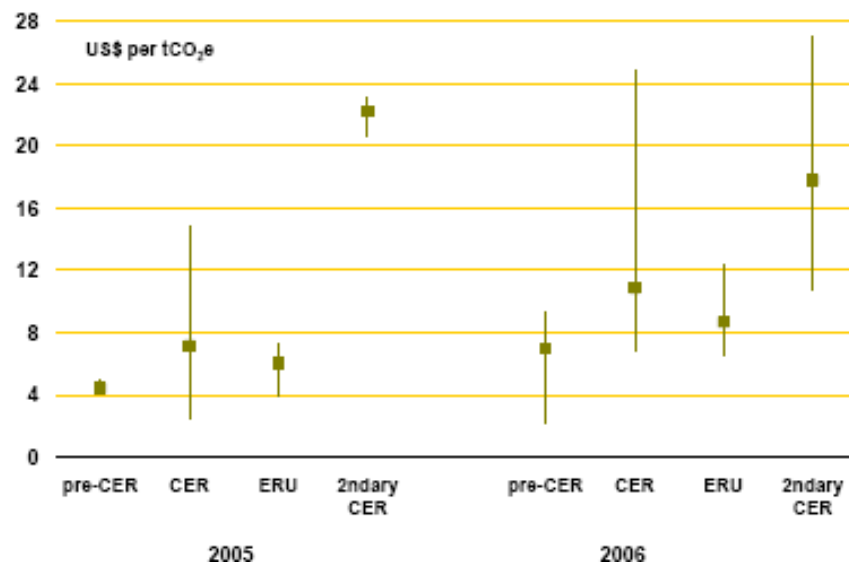
Legend
EUA = European Union
Allowance



Project Based Transaction (Credit) Markets

- Illiquid and non-standardized prior to issuance
- Prices determined by project risk and substitutes (allowances)

Figure 8: Observed Prices for Project-based Transactions in 2005 & 2006



Legend
CER = Certified Emission Reduction
(from Clean Development Mechanism)
ERU=Emission Reduction Unit
(from Joint Implementation)



Project Based Credits – Transaction Agreements

- Letter of Intent/Letter of Exclusivity (LOI/LOE)
 - Agree on key terms and conditions including price, subject to a final agreement
 - Generally includes an exclusivity period (3-6 months) to negotiate final agreement
- Emission Reduction Purchase Agreement (ERPA)
 - Final agreement with elaborated terms and conditions
 - Generally, one buyer and ERPA per project

Project Based Credits – Terms and Conditions

- Forward basis
 - Purchase credits that are generated and issued during the term of the agreement
- Term
 - Up to 2012 (end of first commitment period of the KP), or
 - Until the end of the initial crediting period (7 years, 2x renewable or 10 years, 1x renewable)
- Non-guaranteed delivery
 - Sellers agrees to sell all credits that are generated and issued (registration and project performance risk with buyer)
 - Lower price but also lower risk



Project Based Credits – Terms and Conditions

- Upfront payments
 - Still not common, but may be considered in competitive projects where timing of start-up is critical
- Fixed prices
 - Based on project risks including registration risk, implementation risk and operation risk
 - Projects that are further developed can transact at better prices
 - Some deals with floating prices tied to allowances (e.g., EUAs)

Contact Information

Scott Settelmyer
scott.settelmyer@terracarbon.com

Office: +1-309-693-9303

Mobile: +1-309-361-9363

www.terracarbon.com

