



The Voluntary Carbon Market:

Status & Potential to Advance Sustainable Energy Activities

Presentation Overview

- International Carbon Trading & the Voluntary Market
- Characteristics & Trends
- Participation Costs
- Participation Benefits
- Conclusions

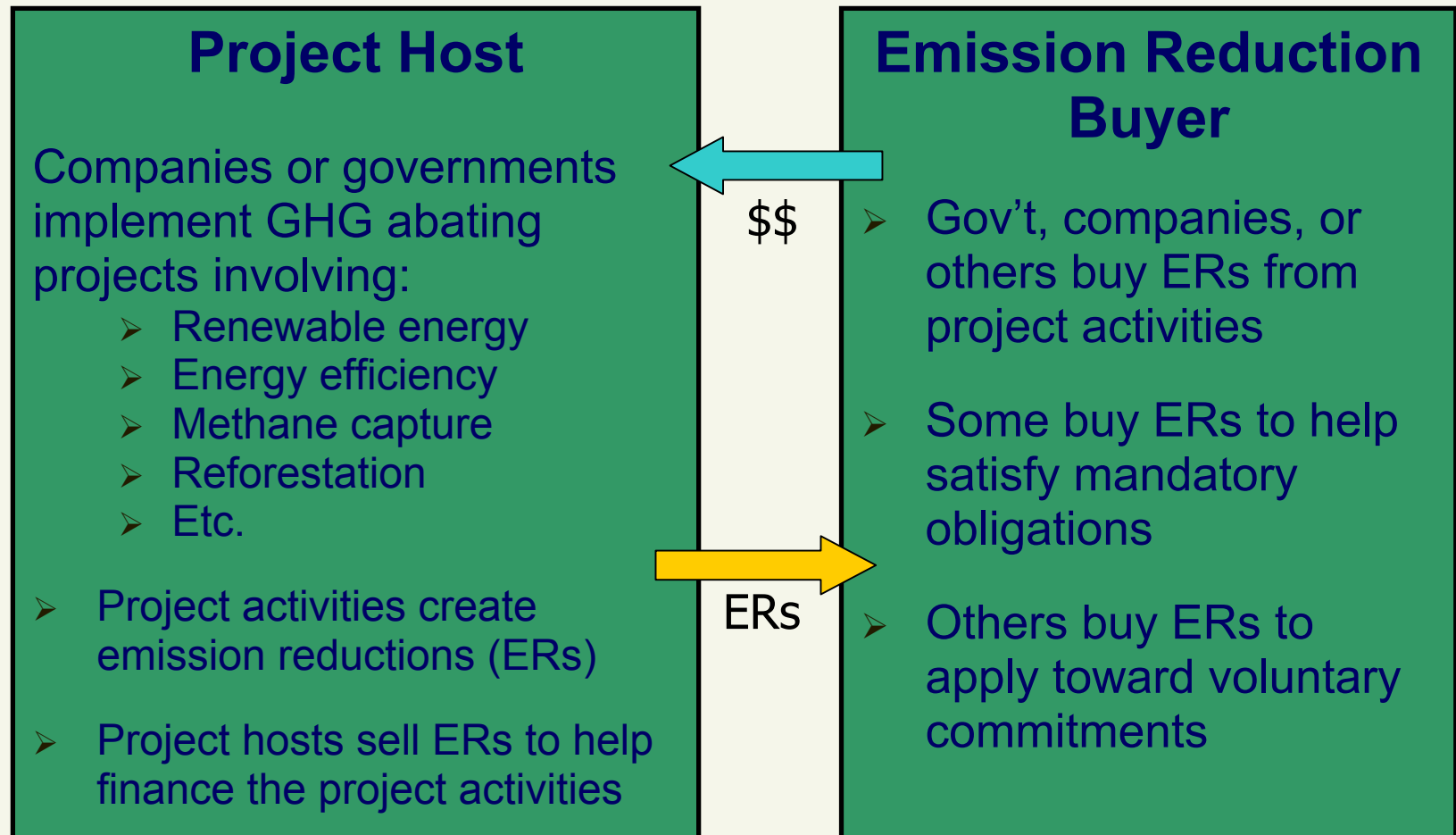


International Carbon Markets

- International trade in greenhouse gas reductions is now a large and rapidly growing market
- Motivated by requirements of the Kyoto Protocol and regional programs, and by voluntary initiatives, governments, private companies, and individuals have collectively committed billions of dollars to buy emission reductions
- The international carbon markets have resulted in new capital flows that are supporting sustainable energy and other climate protection activities



The Concept of Project-Based Carbon Trading



Selected Carbon Market Programs

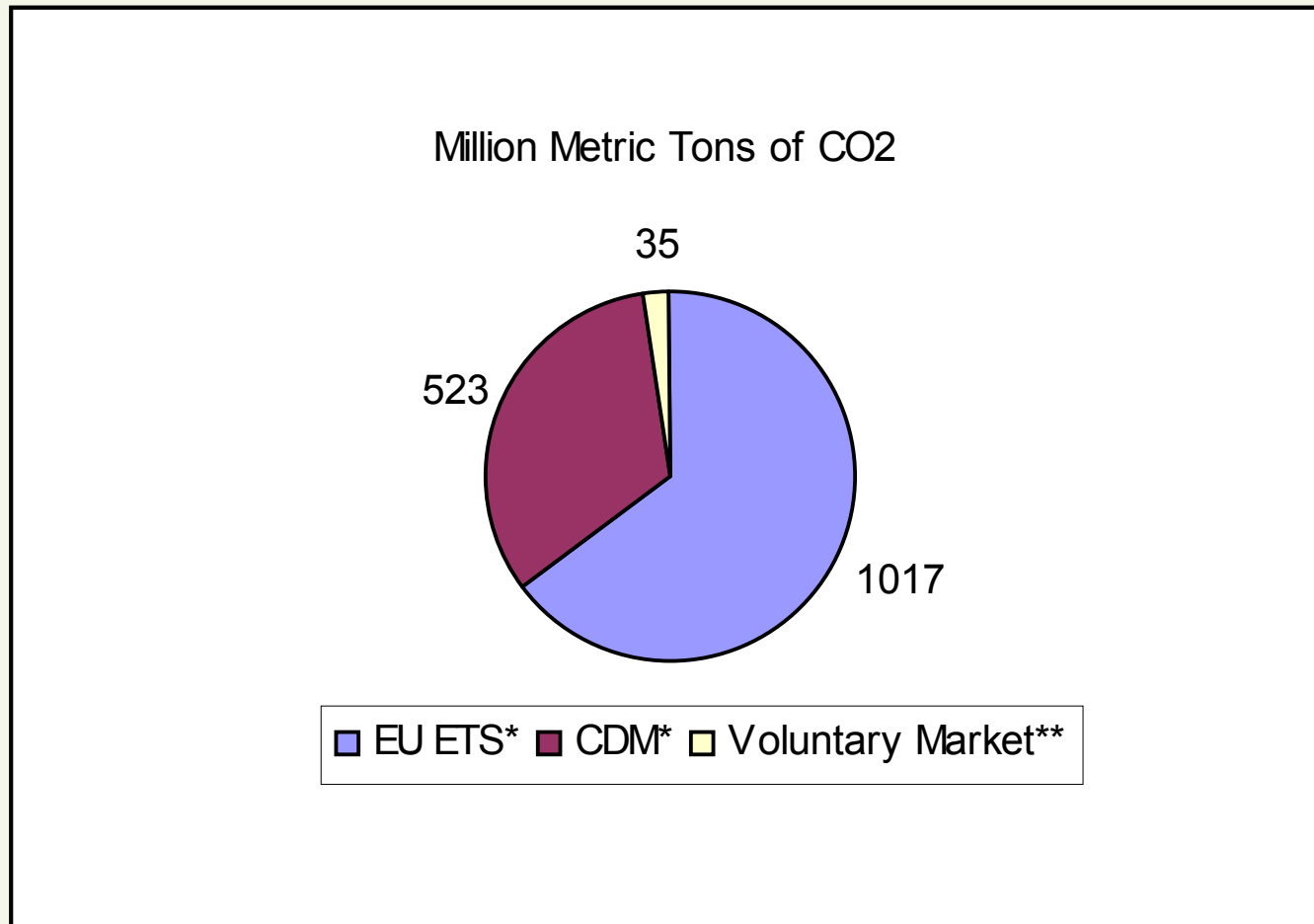
Carbon Market Program	Voluntary vs. Regulatory	Notes
Clean Development Mechanism (CDM)	Regulatory	Certified Emission Reductions (CERs) can be used for compliance with Kyoto commitments
European Union Emission Trading System (EU ETS)	Regulatory	EU ETS regulates emissions from power generation and other industries in the EU
Voluntary Offsets Markets	Voluntary	Companies, individuals, and events buy emission reductions to reduce their carbon footprint

Voluntary Market Niche

- The voluntary market generally applies to companies, individuals, and other entities and activities not subject to mandatory limitations that wish to offset GHG emissions
- The voluntary market has been very small compared to the regulatory market, but has been growing quickly according to many reports
- Some analysts expect the voluntary market to become quite substantial



Relative Volumes of Carbon Traded in 2006



*From Point Carbon publication: Carbon 2007 - A new climate for carbon trading

**A rough estimate based on various sources

Estimated Potential Voluntary Carbon Market Growth

- An ICF Consulting report suggests the voluntary market could expand from 10 million–25 million tons (Mt) of CO₂e in 2005 to a mid-range estimate of 400Mt CO₂e by 2010*
- Michael Molitor of Climate Wedge estimates that demand in the voluntary market could grow to over 500Mt in the next three years**

*Source: Environmental Finance article by Mark Kenber, The Climate Group, March 2007

**Source: Ecosystem Marketplace Article, April 2006



Carbon Trading Prices

Carbon Market Program	Approx. US\$/TonCO₂e (March 2007)
Clean Development Mechanism (CDM)	\$6 to \$16
European Union Emission Trading System (EU ETS - for 2008 allowances)	\$18 to \$23
Voluntary Offsets Markets	\$5 to \$20+

Regulatory Versus Voluntary Carbon Markets

Market Characteristics

Market Programs	Relative Market Size	Participation Requirements / Transaction Costs
Kyoto Compliance Market (CDM, JI)	Large	Rigorous / High
Voluntary Offsets Market	Small, but significant	Variable / Less than regulatory market programs, but can be high depending on standards

Voluntary Market: Who Buys, Who Sells

- Buyers include companies that buy offsets for their own operations, companies that buy offsets on behalf of their customers (e.g., airlines & travel agents, automobile & petroleum companies), events (e.g., 2005 Gleneagles G8 Summit, 2006 World Cup football/soccer), and individuals
- Sellers include retailers and wholesalers who buy and resell offsets, and project developers who develop GHG abating activities and sometimes sell direct
- Market intermediaries include brokers who connect project developers and resellers with institutional ER buyers, and consultants who help clients select ER suppliers and prepare offsets portfolios



Example Project Activities in the Voluntary Market

Activity Category	Project Type
Renewable energy <ul style="list-style-type: none">➤ Grid connected➤ Off grid	<ul style="list-style-type: none">➤ Small hydro➤ PV home lighting systems
Energy efficiency <ul style="list-style-type: none">➤ Grid connected➤ Non-electric	<ul style="list-style-type: none">➤ Compact florescent lamps➤ Fuel efficient wood stoves
Methane capture <ul style="list-style-type: none">➤ Landfill➤ Agricultural	<ul style="list-style-type: none">➤ Landfill gas to energy➤ Pig manure to energy
Forestry <ul style="list-style-type: none">➤ Tree planting➤ Conservation	<ul style="list-style-type: none">➤ Watershed reforestation➤ Forest protection

Standards in the Voluntary Market

- Various standards, certification processes, and emissions registry services exist, but there is no universally accepted standard for what constitutes an offset in the voluntary market, which is unregulated
- Some standards are now widely recognized and accepted as a designation of credibility. Examples include: the Voluntary Gold Standard; the GHG Protocol for Project Accounting; and the Climate, Community and Biodiversity Project Design Standards



Market Participation Costs

Activity	Estimated Example Cost - \$US		
	Full Scale CDM Project	Small Scale CDM Project	Voluntary Gold Standard*
Project Design Document Preparation	45,000	20,000	7,500
Stakeholder Consultation & Host Country Approval	10,000	5,000	2,500
Validation	30,000	12,500	5,000
Registration Fee	30,000	5,000	NA
Transaction Negotiation & Contracting	20,000	10,000	5,000
Project Monitoring (Periodic)	varies	varies	varies
Initial Verification	15,000	7,500	2,500
Periodic Verification (Cost Per Verification)	10,000	5,000	2,500
Approximate Total:	>160,000	>65,000	>25,000

Note: Actual costs will vary considerably depending on several factors.

*This illustration is for a “micro-scale” project <5,000 tCO₂/Yr. The costs for larger-scale projects would tend to be substantially higher.



Example Revenue Potential Before Participation Costs

Example Technology Application	System Capacity	Example System Cost	Example tCO ₂ Reduced/Yr.	Gross Carbon Revenue as % of System Cost*
PV Home Lighting, Central America	35 Wp	\$500	0.36	5%
Wind Power, South America	2 MW	\$2,500,000	7,200	22%
Solar Water Heating, South Asia	1.4 kWth	\$350	1.5	32%
Micro-hydro Power, Southeast Asia	15 kW	\$27,500	218	59%
Biogas Stove, South Asia	Residential	\$300	4.9	123%
Efficient Wood Stove, East Africa	Residential	\$10	2.5	469%**

*Assumptions: \$7.50/tCO₂ emission reduction price; undiscounted 10 yr crediting. Actual emission reductions and equipment costs will vary depending on local conditions.

**In this example the improved efficiency cooking stoves are assumed to have a 2.5 year life, so emission reduction revenue is based on crediting for just 2.5 years.



Example Revenue Potential After Participation Costs

Example Project	Total Installed System Cost	Net ER Revenue, 1st Year	Net ER Revenue, 10 Year Crediting	Net Carbon Revenue as % of System Cost*
1,000 PV Home Lighting Systems	\$500,000	-\$22,300	\$2,000	0.4%
2 MW Wind Farm	\$2,500,000	\$29,000	\$515,000	21%
1,000 Home Solar Water Heaters	\$350,000	-\$13,750	\$87,500	25%
15 Micro-hydro Systems	\$412,500	-\$475	\$220,250	53%
1,000 Biogas Stoves	\$300,000	\$11,750	\$342,500	114%
5,000 Efficient Wood Stoves	\$50,000	\$68,750	\$209,375**	419%**

*Assumptions: \$7.50/tCO₂ emission reduction price; undiscounted 10 yr crediting; carbon market participation costs of \$25,000 over the project life. Actual market participation costs, emission reductions, and equipment costs could vary considerably.

**In this example the efficient stoves are assumed to have a 2.5 year life, so emission reduction revenue is based on crediting for just 2.5 years. Due to monitoring needs, participation costs for such a project could substantially exceed the assumed \$25,000, so net revenue could be substantially lower than the figures presented.



Carbon Market Benefits for Project Developers

Carbon market participation can provide new resources to overcome financial and other barriers by:

- Supplying additional revenue
- Improving project economics (increasing IRR)
- Enhancing project viability in other ways (e.g., emission reduction purchase agreement from creditworthy buyer can increase investor confidence in underlying project financing)



Conclusions

- Motivated mostly by mandatory reduction requirements, international trade in greenhouse gas reductions is now a multi-billion dollar market
- The voluntary carbon market has been comparatively very small, but is growing rapidly
- Emerging standards could help to drive the market further, but using these may be cost prohibitive for very small projects
- In some cases, carbon market participation can provide a substantial boost to sustainable energy activities





For Further Information, see:
www.green-markets.org/voluntary.htm

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