Green Markets International

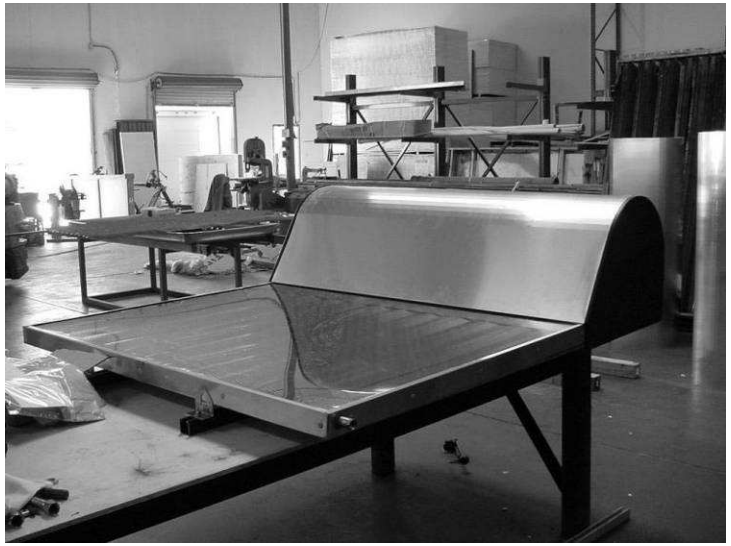
The International Carbon Reduction Market:

Opportunities to Boost Renewable Energy in the Caribbean

March, 2006

Overview of Presentation

- International Carbon Trading
- Kyoto & Clean Development Mechanism (CDM)
- CDM Eligibility Rules & Small-Scale Projects
- Carbon Markets Trends
- Benefits of Participation
- Conclusions



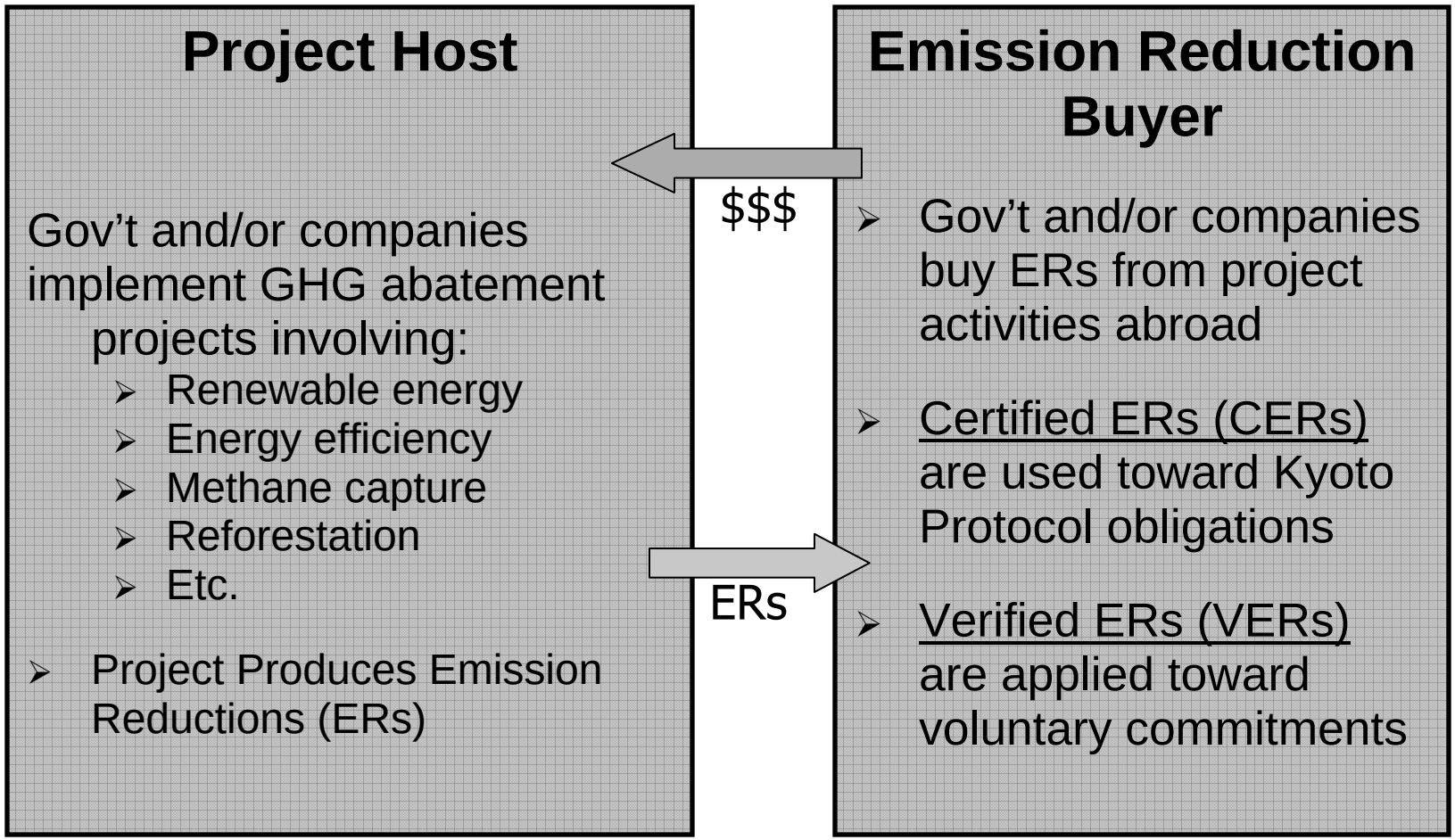
Green Markets International

International Carbon Markets

- International trade in greenhouse gas reductions is a large and rapidly growing market
- Motivated by requirements of the Kyoto Protocol and regional programs, and by voluntary commitments in some cases, governments and private companies in industrial countries have already committed billions dollars for emission reductions from projects outside their borders
- The international carbon market offers an important opportunity to help boost renewable energy activities in many parts of world

Green Markets International

Illustration of the Carbon Trading Concept



Green Markets International

The Kyoto Protocol

- The Kyoto Protocol, established in 1997, commits industrialized “Annex B” (or “Annex 1”*), nations to legally binding greenhouse gas (GHG) emission reductions
- Annex I countries’ GHG reduction commitments average 5.2% below 1990 levels during a first “commitment period” from 2008-2012
- The Kyoto Protocol entered into force on February 16, 2005

*Countries with emissions caps under the Kyoto Protocol are technically “Annex B” countries, though they are called here Annex 1 referring to Annex 1 of the UN Framework Convention on Climate Change. In practice, these terms are commonly used interchangeably.

Green Markets International

Carbon Trading under the Kyoto Protocol

Kyoto Protocol established three mechanisms for cross-border trading in greenhouse gas (GHG) emissions reductions:

- International Emissions Trading (IET)

  Trading blocks of emissions credits between emissions-capped industrialized countries at the national level

- Joint Implementation (JI)

  Project-based trading between Annex 1 countries

- Clean Development Mechanism (CDM)

  Project-based trading between Annex 1 and non-Annex 1 countries

Green Markets International

Clean Development Mechanism (CDM)

- Under the CDM, eligible projects in developing nations can qualify to generate Certified Emission Reductions (CERs)
- CERs can be used by Annex 1 nations to meet their reduction commitments during 2008-2012
- CDM projects can begin to generate CERs prior to 2008
- CDM project emission reductions can be credited for fixed a 10 yr. period, or a 7 yr. period renewable up to 2 times for a maximum of 21 yrs.

Green Markets International

CDM Eligibility Requirements

CDM Projects Must:

- Be implemented in a non-Annex 1 country that is a party to the Kyoto Protocol
- Be additional to what would occur in the absence of the project activity
- Support sustainable development in the host country
- Obtain approval of host country's Designated National Authority for the CDM
- Result in real, measurable, long-term climate change benefits

CDM Projects Must Not

- Divert Official Development Assistance (ODA)
- Involve nuclear power

Green Markets International

Kyoto Status of CARILEC Member Company Countries

A: Kyoto Protocol Ratified: Currently Eligible for CDM Participation

B: Party to Climate Convention but Kyoto Protocol not yet Ratified: Would become Eligible for CDM Participation once Kyoto Protocol is Ratified

C: Could Potentially Join UK's Kyoto Ratification and become Eligible for JI Participation (JI is similar to CDM, for emissions trading between Annex 1 countries)

D: Cannot Join Kyoto Protocol with Netherlands, US, or Independently: Not Eligible for CDM or JI

Country Status	Number of CARILEC Member Utility Companies Located in Countries by Category			
	A	**B**	**C**	**D**
Independent States	15	2		
UK Territories			7	
Dutch Territories				5
US Territories				1
TOTAL	15	2	7	6

Sources: A&B, UNFCCC Secretariat; C, UK Dept. of Environment, Food, And Rural Affairs – Global Atmosphere Division; D: Netherlands: SenterNovem

Green Markets International

Regulatory Versus Voluntary Carbon Markets

Market Characteristics			
Market Programs	**Relative Market Size**	**Participation Requirements / Transaction Costs**	**Caribbean Jurisdiction Eligibility**
Kyoto Compliance Market (CDM, JI)	Large	Rigorous / High	Yes for some but not all Caribbean Jurisdictions
Voluntary Carbon Market	Small	Variable / Less than regulatory market programs	Yes for all Caribbean Jurisdictions

Green Markets International

Selected Carbon Market Programs

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

Green Markets International

Example Project Types

Renewable energy ➢Grid Connected ➢Off grid	➢Geothermal power plants ➢PV home lighting systems
Energy efficiency ➢Supply-side ➢Demand side	➢High efficiency turbines ➢Compact florescent lamps
Fuel switching	Diesel to Bio-fuel
Industrial processes	Cement manufacturing innovations
Methane destruction	Landfill gas to energy
Reforestation	Community forestry

Green Markets International

Small-Scale Projects in the CDM

To reduce transaction costs, which can be proportionally much higher for small-scale projects, Parties to the climate convention instructed the CDM Executive Board to develop simplified modalities & procedures, including:

- Simplified Project Design Document
- Simplified baseline setting & monitoring methodologies
- Same Designated Operational Entity can validate and verify & certify emissions reductions for a specific SSC project
- Lowered project registration fees

Under the CDM rules, small-scale projects are defined as:

- Renewable energy systems with less than 15 MW capacity
- Energy efficiency projects less than 15 GWh/year
- Other projects emitting less than 15 kilotonnes CO_2/year

Green Markets International

Approved Small-Scale Activities Categories*

Project Type	Project Activity Category
I. TYPE I:	I.A. Electricity generation by the user
RENEWABLE	I.B. Mechanical energy for the user
ENERGY	I.C. Thermal energy for the user
PROJECTS	I.D. Renewable electricity generation for a grid
II. TYPE II:	II.A. Supply side energy efficiency improvements – transmission and distribution
ENERGY	II. B. Supply side energy efficiency improvements – generation
EFFICIENCY	II.C. Demand-side energy efficiency programmes for specific technologies
IMPROVEMENT	II.D. Energy efficiency and fuel switching measures for industrial facilities
PROJECTS	II.E. Energy efficiency and fuel switching measures for buildings
	II.F. Energy efficiency and fuel switching measures for agricultural facilities and activities
III. TYPE III:	III. A. Agriculture
OTHER	III. B. Switching fossil fuels
PROJECT	III. C. Emission reductions by low-greenhouse gas emitting vehicles
ACTIVITIES	III. D. Methane recovery
	III. E. Avoidance of methane production from biomass decay through controlled combustion

As of January 1, 2006

Green Markets International

CDM Participation & Transaction Costs

	Estimated Cost - $US	
	Full Scale	Small Scale
Cost Item:	**CDM Project**	**CDM Project**
Project Identification, Project Idea Note Development	20,000	15,000
Project Design Document Preparation	45,000	25,000
Stakeholder Consultation & Host Country Approval	10,000	5,000
Validation by an Operating Entity	30,000	12,500
Registration Fee	30,000	5,000
Transaction Negotiation & Contracting	20,000	15,000
Project Monitoring (Periodic)	varies	varies
Initial Verification by Operating Entity & Certification	15,000	7,500
Periodic Verification (Cost Per Verification Report)	10,000	5,000
Approximate Total:	**>180,000**	**>90,000**

Note: Estimated costs vary considerably depending on various factors.

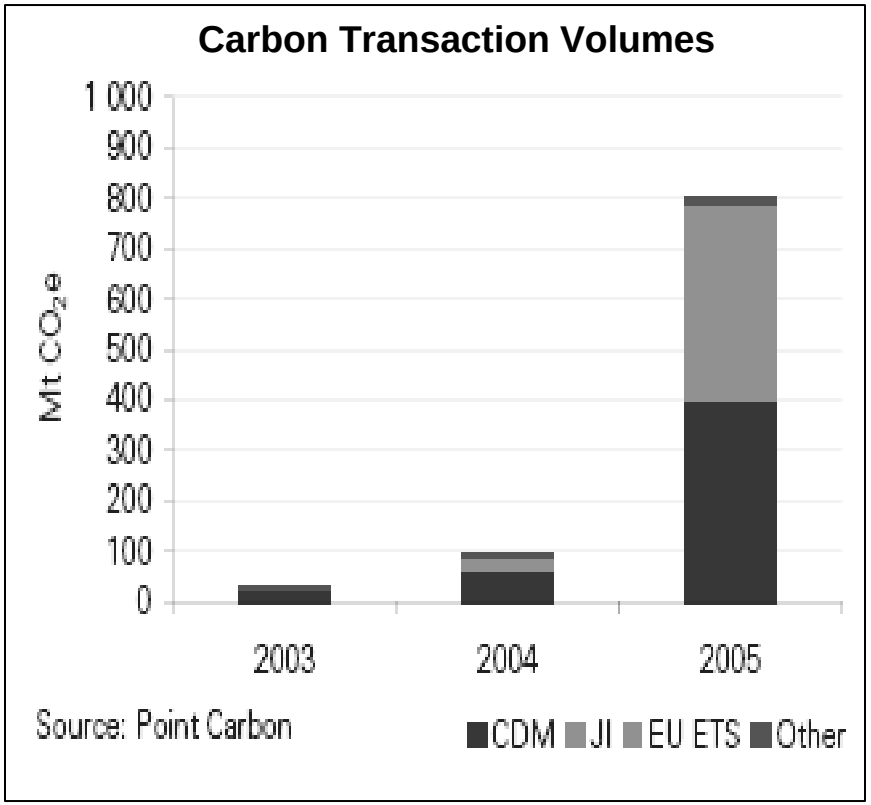
Green Markets International

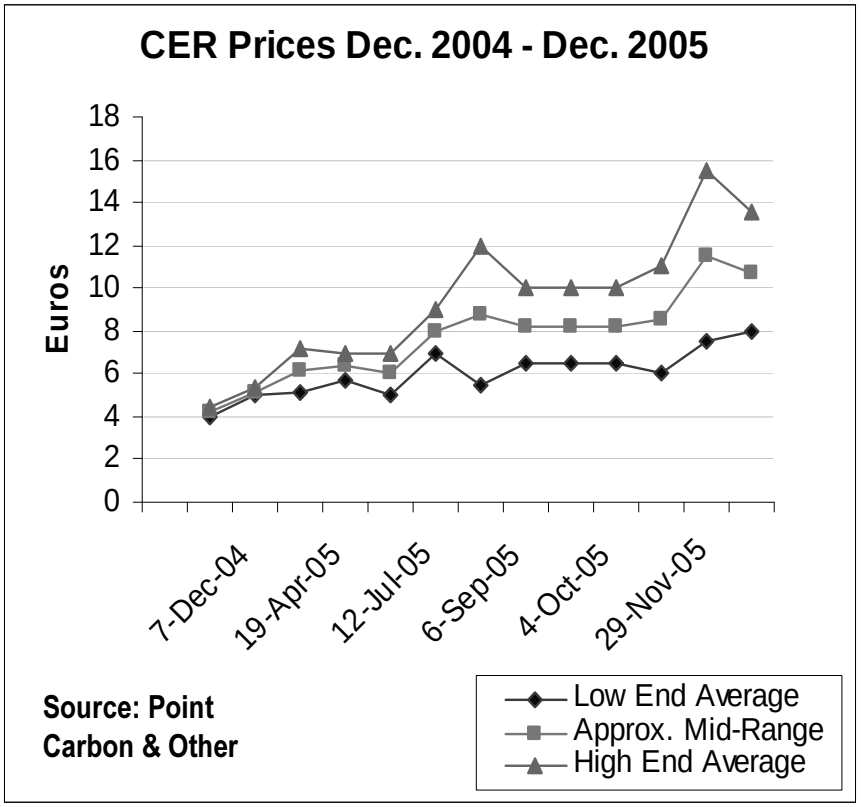
Carbon Trading Prices

Carbon Market Program	Approx. US$/TonCO2e (Early 2006)
Clean Development Mechanism (CDM)	$6 to $17
European Union Emission Trading System (EU ETS)	$26 to $32
Voluntary Markets	$5 to $20

Green Markets International

Carbon Market Trends





Green Markets International

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 commitment from creditworthy buyer can increase investor confidence)

Green Markets International

Carbon Revenue Estimates for Example Activities

Example Technology Application	System Capacity	Example System Cost	Example tCO2 Reduced/Yr.	Carbon sales % of system cost
Solar Water Heating	2.4 kWth	$1,850	2.5	17%
Wind Power	10 MW	$12,500,000	21,000	21%
Hydro Power	1.5 MW	$2,000,000	6,000	38%

Assumptions: $12.50/tCO2 emission reduction; undiscounted 10 yr crediting; 0.8 tCO2/MWh grid emission factor; SWH performance based on RETScreen; wind capacity factor 30%; hydro capacity factor 55%. Actual figures will vary depending on local conditions.

Green Markets International

Opportunities for Utility CDM Participation

- Government and private electric utilities can benefit from CDM participation
- Various project types are possible:
  - Demand Side Energy Efficiency
  - Supply Side Energy Efficiency
  - Renewable energy
  - Landfill gas
  - Etc.

Green Markets International

Conclusions

- The international greenhouse gas reduction market is large and growing rapidly.
- Emission reduction prices have been increasing substantially.
- Renewable energy & energy efficiency activities in the Caribbean can generate substantial revenue due to the comparatively high carbon baseline for electricity generation across most of the region.
- Carbon market participation can provide a significant boost to sustainable energy activities in the Caribbean.

Green Markets International

Thank You!

Green Markets International, Inc.
691 Massachusetts Ave., Suite 7
Arlington, MA 02476 USA
www.green-markets.org