

Making CMM a Reality Through the Flexible Mechanisms of the Kyoto Protocol: The Global Expansion Outlook

**Karl H. Schultz
Climate Mitigation Works Ltd.**

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Why the Connection Between Kyoto and CMM?

- ◆ Carbon market buys at the marginal price of compliance
- ◆ Market: \$10 billion in 2007
- ◆ CMM projects may produce low cost credits
- ◆ CMM developers may find credits the driving revenue stream in future projects

Talk Overview

- ◆ The Kyoto protocol and its “flexible mechanisms.”
- ◆ How emissions markets are forming.
- ◆ CMM projects as credit generators.
- ◆ “Non-Kyoto” emissions markets.
- ◆ How the CMM industry can harness emissions markets.

The Kyoto Protocol

- ◆ Formalizes commitments agreed upon in UN framework convention on climate change
- ◆ Sets binding caps on national emissions (including CO₂ and CH₄) for industrialized countries from 2008-2012
- ◆ Allows for emission reduction credit trades

Reductions from 1990

- ◆ EU countries: -8%
- ◆ Japan: -6%
- ◆ Canada: -6%
- ◆ Russia: -0%
- ◆ U.S.A.*: -7%
- ◆ Australia*: +8%

*Not yet ratified

Kyoto-Based Emissions Credits

Kyoto Units:

- ◆ “Flexible Mechanisms” designed to ease cost and uncertainties in compliance
 - Unit: metric ton of CO₂ equivalent reductions
- ◆ Assigned Amount Units (AAUs): sovereign transfer of surplus allowances
- ◆ Joint Implementation: project-based credits in nations with emission caps
 - Emission Reduction Units (ERUs)
- ◆ Clean Development Mechanism: project-based credits from countries without caps
 - Certified Emission Reductions (CERs)

Kyoto Based Credits

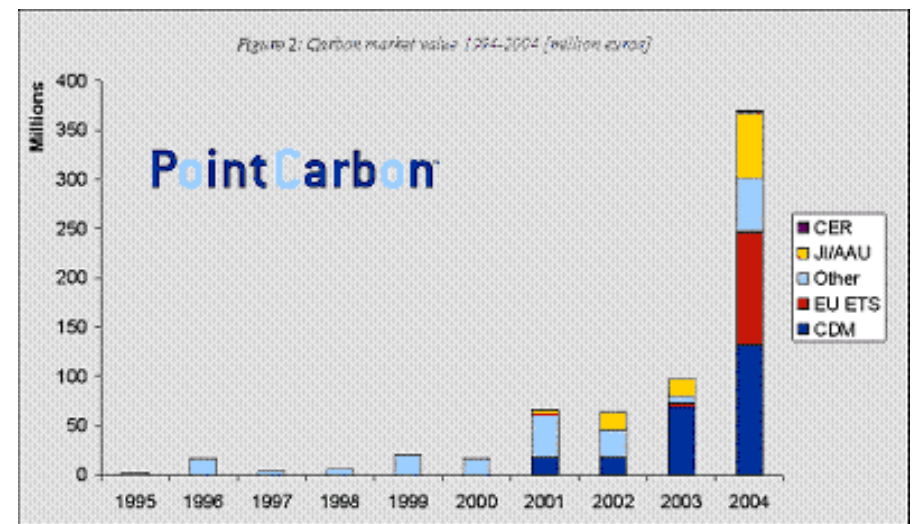
Schemes Subordinate to Kyoto:

- Schemes designed to facilitate national compliance
- ◆ European Union Emissions Trading Scheme (EU ETS)
 - Caps emissions on key industrial facilities, each nation develops allocation plan but trades between companies throughout EU ETS
 - Allows for securing credits from Kyoto Flexible Mechanisms
- ◆ Other national trading schemes (UK, Canada, Norway, etc.)

Credit Demand and Price

- ◆ Demand based on shortage between targets and business as usual emissions
- ◆ Futures markets
 - EU ETS: €7-10/ton
 - Kyoto Units: €3-8/ton
 - Prices sensitive to Kyoto and credit approval risks
- ◆ Expert projections:
 - €2–15/ton
 - Convergence of EU and Kyoto prices

Growth of CO₂ Credit Trades



Source: Point Carbon,
www.pointcarbon.com

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National Emissions “Gaps”

Projected
Demand (2010) in
Million Tons
CO₂e

European Union	321
Japan	156
Canada	199

Mechanisms

 Climate
Mitigation
Works

CMM as Carbon Credit Abatement Option

CMM can be low cost quality option

Methane reductions:

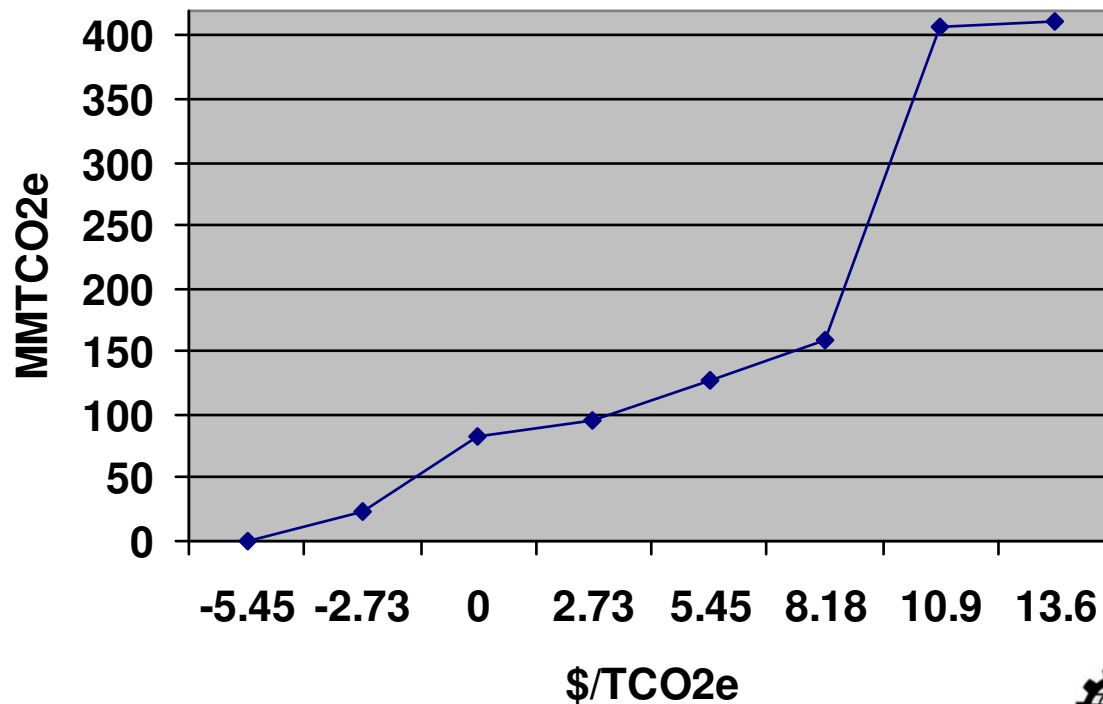
- 1 ton CH₄ = 21 tons CO₂equivalent (CO₂e)
- 1 million m³ = 14,300 tons CO₂e
- 1 Bcf = 404,100 tons CO₂e

CMM “Marginal Costs”

- ◆ Because CMM is energy and is a potent greenhouse gas, millions of tons of credits cost well below existing and future credit prices
- ◆ EPA “marginal abatement cost” analyses indicate 111 million tons CO₂e at < €8.71/ton.

CMM Costs

Global CMM Marginal Cost Curve



Source: Adapted from U.S. Environmental Protection Agency

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Potential Supply of Profitable CMM Credits

Country	Total 2010 CMM Emissions (Million tons CO ₂ e)	Reductions Profitable < €8.71/ton (15% Discount Rate, 40% Tax Rate)
China	357	52
United States*	82	18
Russia*	31	7
Australia*	29	6
Ukraine	24	6
Other	201	22
Total Kyoto Countries	582	80
*Total Non-Kyoto	142	31
Global Total	724	111

Sources:
Adapted from U.S. Environmental Protection Agency, various other sources

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CMM Kyoto Credit Market

- ◆ At mid-case Kyoto credit prices, approximately 4x current CMM gas production becomes profitable.
- ◆ Projects outside of U.S., Australia, and Russia are candidates.
- ◆ If Russia ratifies Kyoto, approximately 66 million tons (218 Bcf) would be profitable.

Impact of Carbon Credits on CMM Financials

- ◆ Additional revenue at €8/ton CO₂e:
 - = €0.10/cubic meter
 - = \$4/mcf
- ◆ Example: enhanced drainage and mine boiler conversion
 - Capital cost: €1,500,000
 - 560,000 tons CO₂e during project life
 - €4,480,000 additional revenue (@€8/ton)

How Kyoto May Change CMM Industry

- ◆ CMM as environmental projects:
 - In some instances energy market less crucial
 - Knowledge and practice of emission credit creation will be important
 - New practices, like ventilation air methane and flaring will become profitable
 - Companies willing to look at emerging markets (e.g. China, etc.) will gain most
 - Need to work with local mines and frequently on smaller-scale projects
 - CMM developers' economic interests will align with policies for strong greenhouse gas limits and emissions trading

“Non-Kyoto” Carbon Markets

- ◆ Two major nations have failed to ratify Kyoto: Australia and United States
- ◆ State governments and private companies have created some credit demand
 - Australia: several states have emission limits, incentives for CMM, discussion of inter-state trading scheme underway
 - U.S.: Northeast and West Coast states, private “Chicago Climate Exchange”

Steps for Developers to Realize Carbon Credits

- ◆ To make a project's emissions reduction creditworthy, developers must:
 - Establish sound baseline
 - Prove “additionality”
 - Present sound monitoring and verification procedures
 - Obtain project approval for credits
 - Identify credit buyers and secure sales contract

Steps: Baseline Identification

- ◆ What would happen to emissions if the project didn't happen?
- ◆ Climate Mitigation Works recommends narrow definition of project boundaries:
 - Not a mine's emissions,
 - Rather, emissions that would occur without project (equals methane destroyed by project)
 - In some instances (e.g., drainage in advance of mining, need to delineate vintage of reductions)
 - In others (e.g., abandoned mine projects), need to prove all gas used would otherwise be emitted.

Steps: Additionality

Additionality: the emissions reductions wouldn't occur under "business as usual." Types of additionality:

- Environmental
 - Investment
 - Technology
 - Policy/regulatory
- ◆ International and host country (sustainable development) criteria

Steps: Monitoring and Verification

- ◆ For CMM, typically straightforward
- ◆ Frequent or continuous monitoring equipment at project site
- ◆ Securing qualified third party verifier
- ◆ In some cases, need to have good time-sequenced accounting or geo-technical data to support credit claims.

Steps: Project Approval Authorities

- ◆ For CDM CER credits, need reviewed by:
 - CDM Executive Board
 - Both buyer and seller host-country Designated National Authorities (DNAs)
- ◆ For JI ERU credits, both buyer and seller governments
- ◆ Other credit regimes all have at least registries; some extensive criteria and approval processes

Steps: Identify Credit Buyers

Types:

- National governments (e.g., Netherlands)
 - Multi-laterals (e.g., World Bank)
 - Private companies
 - Buying pools
 - Equity/debt investment funds
 - Brokered deals
- ◆ Each purchaser has different credit needs, risk profiles, and purchasing approaches; important to target most appropriate purchasers to match with project needs
 - ◆ Expert advice and/or brokerage services may be useful

Conclusions

- ◆ CMM projects are no longer just energy projects; emission credits may be principal driver of project economics
- ◆ Potential for CMM market to quadruple with Kyoto/other credit markets
- ◆ Developers need to understand steps required to capitalize most from emissions markets.

Contacts:

Climate Mitigation Works:

www.climate-mitigation.com

Karl@climate-mitigation.com

Energy Edge

www.energy-edge.net

Karl.Schultz@energy-edge.net

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