

The Impact of the Kyoto Protocol on the Global Coal Mine Methane Industry

Karl H. Schultz

**Climate Mitigation Works International LLC
& Energy Edge Ltd**

Keynote Presentation

2004 International Coalbed Methane Symposium

The University of Alabama

Tuscaloosa, USA

6 May 2004



ENERGY EDGE

Why the Connection Between Kyoto and CMM?

- ◆ Carbon market buys at the marginal price of compliance
- ◆ Market projected to be \$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:

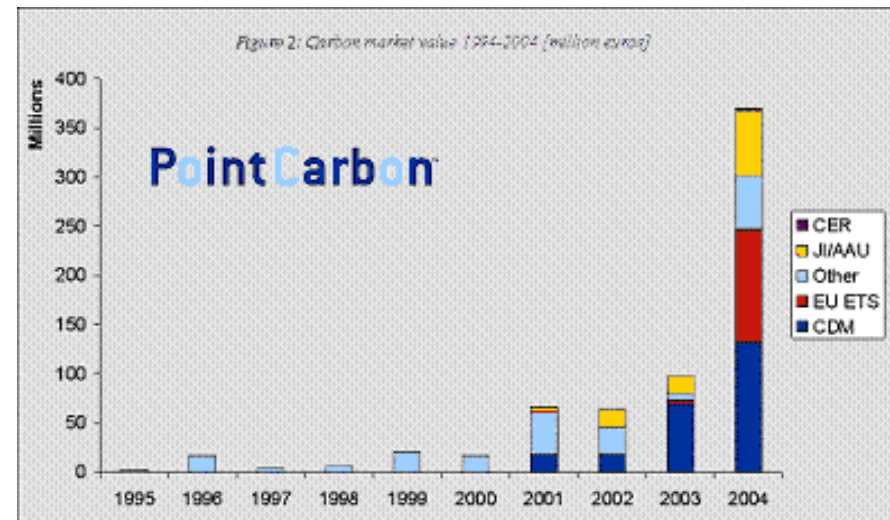
Schemes designed to facilitate national compliance

- ◆ 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: €8/ton
 - Kyoto Units: €4-8/ton
- ◆ Expert projections: €2-15/ton

Growth of CO₂ Credit Trades



Source: Point Carbon,
www.pointcarbon.com

ENERGY EDGE

National Emissions "Gaps"

Projected Demand
(2010) in Million
Tons CO₂e

European Union	321
Japan	156
Canada	199

CMM as Carbon Credit Abatement Option

CMM can be low cost quality option

Methane reductions:

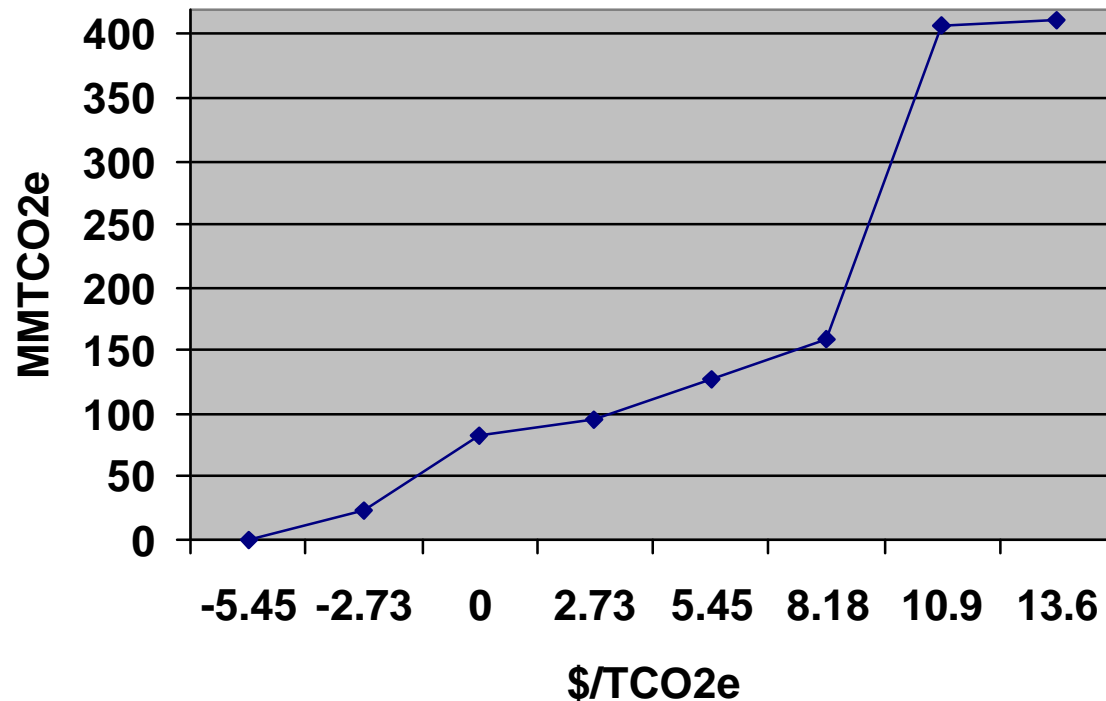
- 1 ton CH₄ = 21 tons CO₂equivalent (CO₂e)
- 1 million m³ = 14,300 tons CO₂e
- 1 Bcf = 404,100 tons CO₂e

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

The Impact of the Kyoto Protocol on the Global Coal Mine Methane Industry

ENERGY EDGE

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

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

- ◆ Three major nations have failed to ratify Kyoto:
Australia, United States, and Russia
- ◆ 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”
- ◆ Internal debate in Russia is slowing progress towards Kyoto, but economic benefit from ratification is large; Russian corporate emission credit pool created

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:



Energy Edge

www.energy-edge.net

action@energy-edge.net