

Analysis of Compliance Options for a Large Industrial Emitter Regulated by the Canadian Framework on GHG Emissions

CANADIAN GOVERNMENT REGULATORY FRAMEWORK

A large regulated industrial emitter is required to reduce by 2010 its carbon dioxide equivalent (CO₂e) emissions intensity by 18% of the 2006 levels.

Large regulated industrial emitter's details:

- Number of production units for reference year 2006	1 million units
- Total CO ₂ e emissions in 2006	10 million metric tons of CO ₂ e
- Emissions per CO ₂ e production unit in 2006	10 metric tons of CO ₂ e per production unit
- Number of specified production units for 2010	1.2 million units
- CO ₂ e total emissions reductions for compliance in 2010 (status quo scenario)	
• Calculation of the reduction target per production unit for 2010	
= 2010 Reduction target x Emissions per CO ₂ e production unit in 2006	
= 18% x 10 metric tons of CO ₂ e per production unit	
= 1.8 metric tons of CO ₂ e per production unit	
• Calculation of the total reduction for 2010	
= Reduction target per production unit x Production units	
= 1.8 metric tons of CO ₂ e per production unit x 1.2 million production units	
= 2.16 million metric tons of CO ₂ e	

INDUSTRIAL EMITTER'S STRATEGIES

Strategies for reducing intensity-based CO₂e emissions involve knowing the price of a Canada CO₂e unit in order to select between all the compliance options available. This price signal is provided by the futures contracts on Canada carbon dioxide equivalent (CO₂e) units (symbol MCX) whose expiry is related to the compliance year.

Scenario 1: Long position on Canada carbon dioxide equivalent (CO₂e) units

The regulated emitter wanting to comply with the mandatory target would benefit from a market solution allowing him to buy units through MCEX futures market:

- if the estimated investment costs for internal reduction are higher than the price of a metric ton of CO₂e in the futures market;
- if the price of a metric ton of CO₂e in the futures market is lower than the contribution rate to the technology fund and/or for the portion of the units that will not be acquired through the technology fund;
- if the price of a metric ton of CO₂e in the futures market is lower than the price of international CER credits related to the Kyoto Protocol.

SETTING

Price of MCX futures contract (expiry: 2010 compliance year)	\$17/metric ton of CO ₂ e
Contribution rate to the technology fund in 2010	\$15/metric ton of CO ₂ e
Price of international CER credits on the secondary market (expiry closest to the MCX futures contract selected)	\$15/metric ton of CO ₂ e
Estimated cost for internal CO ₂ e emissions reduction	\$20/metric ton of CO ₂ e

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In this situation, the regulated emitter believes that it would be advantageous to use the market solution for 20% of his compliance needs (70% via the technology fund, 10% with international CER credits). To secure the price of credits today for compliance in 2010, he could manage the market risk associated to the price of credits by entering into a long position on the MCX futures contract.

Step 1 : Calculate the market-solution proportion of the CO₂e total emissions reduction anticipated for 2010

= Percentage of market solution x Total reduction for compliance in 2010
= 20% x 2.16 million metric tons of CO₂e
= 0.432 million metric ton of CO₂e

Step 2 : Determine the number of futures contracts to buy (1 contract = 100 metric tons of CO₂e)

= Market-solution proportion ÷ Contract size
= 0.432 million metric ton of CO₂e ÷ 100 metric tons of CO₂e
= 4,320 contracts

Scenario 2 : Short position on Canada carbon dioxide equivalent (CO₂e) units

The price signal will encourage some emitters to reduce their CO₂e emissions under the prescribed targets based on the opportunity to finance the reduction effort through the sale of surplus units.

SETTING

Price of MCX futures contract (expiry: 2010 compliance year)	\$17/metric ton of CO ₂ e
Contribution rate to the technology fund in 2010	\$15/metric ton of CO ₂ e
Price of international CER credits on the secondary market (expiry closest to the MCX futures contract selected)	\$15/metric ton of CO ₂ e
Estimated cost for internal CO ₂ e emissions reduction	\$12/metric ton of CO ₂ e
Anticipated internal reduction	2 metric tons of CO ₂ e per production unit

In this situation, the regulated emitter believes that it would be advantageous to use the market solution to sell the credits that he intends to generate through additional reductions. When higher internal reductions causes a surplus for the emitter, the market risk associated with the future price of credits can be managed by entering into a short position on the MCX futures contract in order to secure today the sale price of credits in the 2010 compliance year.

Step 1 : Calculate the total surplus of CO₂e emissions anticipated for 2010

= Total anticipated internal reduction - Total reduction for compliance in 2010
= (2 metric tons of CO₂e per production unit x 1.2 million production units) - 2.16 million metric tons
= 2.4 million metric tons - 2.16 million metric tons
= 0.24 million metric ton of CO₂e

Step 2 : Determine the number of futures contracts to sell (1 contract = 100 metric tons of CO₂e)

= Total surplus of CO₂e emissions for compliance in 2010 ÷ Contract size
= 0.24 million metric ton of CO₂e ÷ 100 metric tons of CO₂e
= 2,400 contracts

Note that, if surplus does not materialize in 2010, the emitter is not obligated to deliver Canada CO₂e units. He could liquidate his position by buying back the contracts sold before the expiry of the contract for the 2010 compliance year.