



Pacific Institute  
for Climate Solutions  
Knowledge. Insight. Action.

Briefing Note 2010-24

13 December 2010

## **Carbon Market Distortions and Diminishing Environmental Returns: The Clean Development Mechanism and China**

[Produced by ISIS – A Research Centre, Sauder School of Business, UBC](#)

Author: Timothy Scolnick, MA, University of Victoria

Editors: Dr. Alison Shaw, Dr. Adam Bumpus, Neil Thomson, Ivan Watson

### **Issue**

HFC gases are subject to regulation both under the Kyoto Protocol's Clean Development Mechanism (CDM) and the Montreal Protocol on Substances that Deplete the Ozone Layer, contributing to contradictory carbon finance incentives. The Montreal Protocol's North-South redistributive mechanism, the Multilateral Fund (MLF), subsidizes the replacement of severely ozone-depleting substances (ODS), and mainly chlorofluorocarbons (CFCs), with the less-damaging hydrochlorofluorocarbon-22 (HCFC-22). The subsidized production of HCFC-22, however, results in the release of a greenhouse gas (GHG) by-product, hydrofluorocarbon-23 (HFC-23). This is a severely potent GHG, which, through carbon emissions reduction (CER) credits, the CDM pays to destroy.

Evidence suggests that Chinese chemical companies, amongst others, have found these contradictory incentives quite lucrative: producing vast and unnecessary amounts of HCFC-22, in order to reap huge profits from the subsequent destruction of HFC-23.<sup>i</sup> As such, the legitimacy of the CDM<sup>ii</sup> has been undermined by HFC-23 credits<sup>iii</sup>. While new HFC destruction projects are no longer being credited by the CDM, this example serves as a cautionary example for the WCI and its partner jurisdictions in discussions around the potential crediting of HFC destruction and CDM projects through the WCI's cap and trade programme.

### **Background**

HCFC-22 is used in hair sprays, air conditioners and some refrigerators and which is to be phased-out completely between 2030 and 2040 under the Montreal Protocol.

Unfortunately, subsidizing its destruction contributes to the by-product HFC-23 that persists in the atmosphere for nearly 270 years and is one of the most potent GHGs; one tonne of HFC-23 has the same global warming potential<sup>iv</sup> as 11,700 tonnes of CO<sub>2</sub>. For every 35 tonnes of HCFC-22 manufactured, approximately one tonne of HFC-23 is also generated.<sup>v</sup> Since HFC-23 is worth up to five times as much as HCFC-22, this by-product gas limits the GHG reduction capacity and effectiveness of carbon trading, and specifically the European Union Emissions Trading Scheme (ETS) carbon market. Because the CDM issues CERs for each tonne of CO<sub>2</sub> this means that 11,700 CERs are issued to mitigate each tonne of HFC-23. While HFC-23 destruction comprises a mere 2.5% of overall CDM projects, it disproportionately accounts for 214 of 407 million tonnes of credits issued to date (or 52.6%).<sup>vi</sup>

HFC-23 can be destroyed for just €0.17 per tonne of CO<sub>2</sub> equivalent, but on the ETS it may sell for 70 times that amount, or as much as €12. In fact, HFC-23 CERs are expected to be worth €6 billion by 2012, whereas their real destruction cost is only €80 million.<sup>vii</sup> This distortion of the market through the destruction of HFC-23 “hot air” CERs does not represent real GHG reductions, and inhibits a fundamental low-carbon energy transformation.<sup>viii</sup>

At the heart of the CDM carbon market distortion issue are 19 chemical gas manufacturers, located mainly in China and India.<sup>ix</sup> Indeed, 10 of these companies were the source of 66% of all CERs sold into the ETS in 2009.<sup>x</sup> Recently, the CDM’s Executive Board requested a decades’ worth of data from five Chinese chemical manufacturers in order to determine if the carbon crediting system has been manipulated.<sup>xi</sup> To date, China has been the CDM’s key beneficiary acquiring more than a 40% share of CDM projects, and accounting for 53% of ETS CERs.<sup>xii</sup>

### **HFC production and carbon crediting in North America**

The HFC carbon-crediting controversy presents a significant challenge to the legitimacy of present ETS carbon trading. Moreover the environmental integrity of the WCI may also be at stake if HFC destruction projects are recognized in North America, or in the future through the CDM. California’s cap-and-trade programme, legislated under AB 32, trades carbon credits or Certified Reduction Tonnes (CRTs) issued by the Climate Action Reserve (CAR), a North American carbon offset registry. When it opens in 2012, AB 32, as is the case in the CAR, is expected to credit ODS mitigation emitted in the US.<sup>xiii</sup> Already, certifying ODS as eligible for crediting under the CAR has led to ODS’ taking a disproportionate share of the CRTs market. To date, about 1/3 of issued CRTs come from destruction of ODS at just one facility in El Dorado, Arkansas.<sup>xiv</sup> With California’s likely recognition of ODS, the CARs crediting of ODS, and the possibility that the WCI will recognize HFC destruction in particular, BC and WCI decision-makers should be alert to the possibility of market distortions and perverse incentives, just as has been the case with China and the CDM.

### **Implications for BC**

HFC destruction and perverse CDM incentives have relevance for BC on two accounts because of Western Climate Initiative (WCI) emissions trading. First, the example of Chinese HFCs flooding the EU market provides an analogous example for WCI partner

jurisdictions as the WCI considers including North American HFC emissions as credit sources. Second, although current CERs do not meet the stringency of WCI rules, Section 9.8 in the WCI Design Recommendation's<sup>xv</sup> opens the possibility for CERs from the CDM to be incorporated in future (assuming stronger environmental benefits).

#### *Possibilities for HFC credits flooding the market in WCI*

In 2007, only 57% of HCFC-22 production was covered by existing CDM projects.<sup>xvi</sup> Pricing is key for crediting HFC projects in the CDM as well as under the Montreal Protocol's MLF. WCI partner jurisdictions should consider the possibility that if recognized as eligible for carbon crediting, ODS with high global warming potential, like HFC-23 could flood the WCI carbon market as it has done in the ETS<sup>xvii</sup>. The current practice of investing in HFC-23 destruction, as it exists mainly from Europe, constrains the prospects of transitioning towards a low carbon energy future, for both developed and developing countries. HFC destruction is evidenced as limiting project diversity and support for projects that will deliver long-term sustainable development while meeting additionality requirements. Of note, a mere 4% of ETS CERs are registered as coming from renewable energy production or biomass projects.<sup>xviii</sup>

#### *Linking the CDM to the WCI*

Offset protocols used by the WCI partner jurisdictions must meet rigorous criteria to preserve the environmental integrity of the overall cap-and-trade programme. At present, WCI carbon offsets are geographically limited to North America as external offsets may undermine the environmental goals of the WCI. After 2020, however, assuming the additionality litmus test for CDM CERs is raised and met; WCI partner jurisdictions may accept offset credits from developing countries through the CDM.<sup>xix</sup> Harmonizing additional offsetting programs to the WCI, such as the CDM, will grow the size of the carbon market though may pose a credit demand and supply challenge for WCI decision-makers, at least early on. In order to effectively link different carbon markets and offsetting, an offset gateway (proposed in a forthcoming Briefing Note), could involve a WCI-specific gap analysis. This type of analysis would seek to preserve WCI principles as well as provide for a stringent enforcement and guarantee mechanism, to ensure that external carbon offsets meet the WCI's environmental integrity guidelines.<sup>xx</sup>

### **Conclusion**

Despite the ETS market distortion described above, carbon crediting can offer value and flexibility in future. HFC credits, and potential inclusion of other offset standards like the CDM, could assist BC in reaching its emission reduction requirements. Key points to consider are:

- The WCI supports an enlarged carbon market to improve liquidity, and to reduce volatility and manipulation<sup>xxi</sup>
- Between 2012-2020, WCI partner jurisdictions may meet 49% of their required GHG reductions outside of their borders<sup>xxii</sup> (which at present time do not extend outside of North America)

- The WCI's cap and trade system, which is to be launched in 2012, does not currently recognize HFC destruction or CDM projects, although there are provisions for their possible entrance into the system. As a result, caution should be taken to maintain the integrity of BC's and the WCI's GHG reductions if North American HFC projects are credited
- BC and its WCI partner jurisdictions should weigh the issues arising from HFC destruction. Options include urging an outright ban to crediting the destruction of the industrial gas, enabling a certain percentage of WCI credits to come from HFC destruction, or allowing the Montreal Protocol to fund its destruction through the MLF

In moving forward, BC and its WCI partner jurisdictions need to continue to support real, quantifiable and additional emissions reductions. In future and once properly revised, the CDM should make viable contributions toward meeting climate action commitments. The WCI carbon market may be an appropriate avenue for reducing North American HFCs, however it is important that BC and WCI decision-makers understand the problematic nature of incorporating HFCs as sources for emission reduction credits. With the kinds of carbon market distortions that have occurred on the ETS due to Chinese HFCs, decision-makers in BC and WCI partner jurisdictions should bear in mind that there is the potential for a similar market failure to occur and damage the environmental integrity of the WCI market. Accordingly, there are lessons to be learned from other jurisdictions, like that of China in the CDM, which must be heeded as BC and WCI partner jurisdictions seek to achieve real, verifiable and additional GHG reductions.

### **Further Reading**

CDM Watch, [CDM Watch submission to the European Commission on design aspects of quality restrictions on the use of credits from industrial gas projects](#), October 25, 2010.

Environmental Investigation Agency and CDM Watch, [HFC-23 Offsets in the Context of the EU Emissions Trading Scheme](#), Policy Briefing, July 14, 2010.

Government of British Columbia, Ministry of Small Business, Technology and Economic Development, [British Columbia's Trade and Investment Strategy for China – 2008-2011](#).

Government of British Columbia, [Climate Action Plan](#), June 2008.

United Nations Environment Programme, [Proposed draft decision submitted by Canada, Mexico and the United States of America on the phase-out of HFC-23 as a by-product emission of HCFC-22 with high global-warming potential](#), UNEP/OzL.Pro.WG.1/30/CRP.1, June 15, 2010.

United Nations Framework Convention on Climate Change, [Global Warming Potentials](#).

WCI, [Design Recommendations for the WCI Regional Cap-and-Trade Program](#), September 23, 2008

WCI, [Design for the WCI Regional Program](#), July 27, 2010.

## Sources

<sup>i</sup> HCFC-22 is widely used in hair sprays, air conditioners and some refrigerators and is considered less damaging to the seasonal ozone hole over Antarctica than other coolants.

<sup>ii</sup> The CDM is one of the market mechanisms designed to provide industrialized countries with flexibility in meeting their Kyoto Protocol and/or national-level GHG emission reduction obligations. Essentially, rather than cutting their GHGs directly, the CDM is designed to primarily so that industrialized countries and businesses may fund low-carbon technologies and emission reduction projects outside of their borders in developing countries. The parties then share the CERs which can be traded and sold on the carbon market, and used by industrialized countries to meet a part of their Kyoto emission reduction targets.<sup>ii</sup> Also, “additionality” is necessary for a project to be eligible to sell offsets as the aim is to subsidize projects which would otherwise not be built due to lack of funds.

<sup>iii</sup> Environmental Investigation Agency and CDM Watch, [HFC-23 Offsets in the Context of the EU Emissions Trading Scheme](#), Policy Briefing, July 14, 2010, p.3.

<sup>iv</sup> For more information on global warming potentials, See: United Nations Framework Convention on Climate Change, [Global Warming Potentials](#)[Accessed: December 10, 2010]

<sup>v</sup> Environmental Investigation Agency, [Companies Urged to Reject HFC-23 Credit Trade](#), June 16, 2010.

<sup>vi</sup> Environmental Investigation Agency and CDM Watch, [HFC-23 Offsets in the Context of the EU Emissions Trading Scheme](#), p.2.

<sup>vii</sup> The profits from HFC-23 destruction correlate with a 2009 study in *Geophysical Research Letters* which estimates that emissions for 2006-2008, equivalent to 200 million tonnes of CO<sub>2</sub> per year, are around 50% higher than levels derived for the 1990s, and unnecessarily continue to grow at a substantial rate. They are also expected to continue to rise.

See: Environmental Investigation Agency and CDM Watch, [HFC-23 Offsets in the Context of the EU Emissions Trading Scheme](#), p.3.

<sup>viii</sup> CDM Watch, [CDM Watch submission to the European Commission on design aspects of quality restrictions on the use of credits from industrial gas projects](#), October 25, 2010.

<sup>ix</sup> To a lesser extent, some of these companies are also located in South Korea, Argentina and Mexico.

<sup>x</sup> Nathaniel Gronewold, [U.N. Body Probes Cases of Paying Greenhouse Gas Emitters, Which Then Produce More](#), New York Times, 26 July 2010

<sup>xi</sup> John Heilpring, [UN Carbon Trading Scheme: \\$2.7 Billion Market Could Be 'Biggest Environmental Scandal In History'](#), *Huffington Post*, 21 August 2010.

<sup>xii</sup> Of note, the Chinese state does not support carbon crediting reform given the present and future profit margins, and also due to a 65% government surcharge it applies to HFC destruction, See: Rob Elsworth and Bryony Worthington, [International Offsets and the EU 2009](#), *Sanbag*, July 2010, p.5.

<sup>xiii</sup> Point Carbon, [Carbon Market North America](#), 5, no.48, December 10, 2010.

<sup>xiv</sup> See: Michael Wara, [Can CAR Transform the Politics of Cap-And-Trade?](#), Stanford Law School, Environmental and Energy Insights Blog, November 13, 2010, and Michael Wara, [Ozone Depleting Substances and the Climate Action Reserve: Perverse Incentives](#), Stanford Law School, Environmental and Energy Insights Blog,

<sup>xv</sup> WCI, [Design Recommendations for the WCI Regional Cap-and-Trade Program](#), September 23, 2008, p.11

<sup>xvi</sup> Environmental Investigation Agency and CDM Watch, [HFC-23 Offsets in the Context of the EU Emissions Trading Scheme](#), p.2.

<sup>xvii</sup> Elsworth and Worthington, [International Offsets and the EU 2009](#), p.16.

<sup>xviii</sup> Elsworth and Worthington, [International Offsets and the EU 2009](#), p.10.

<sup>xix</sup> WCI, [Design Recommendations for the WCI Regional Cap-and-Trade Program](#), p.11.

<sup>xx</sup> Adam Bumpus, Possibilities for a WCI Offset Gateway, Pacific Institute for Climate Solutions, Briefing Note (Forthcoming).

<sup>xxi</sup> Western Climate Initiative (WCI), [Design for the WCI Regional Program](#), July 27, 2010, p.23.

<sup>xxii</sup> WCI, [Design for the WCI Regional Program](#), p.10.