

June 18, 2010 - Analysis of HCFC-22 Production and Ratio of HFC-23 to HCFC-22 for CDM Projects 0011 and 0306

Introduction

On June 12, CDM Watch issued a press release indicating it has confronted the United Nations with new evidence that alleges emissions reductions from HFC-23 destruction projects under the CDM are actually increasing global greenhouse gas emissions. The evidence was put forward in an official submission to the CDM Executive requesting the revision of the approved CDM methodology AM0001 and calls for a benchmark that could cut the carbon credits by more than 90%.

CDM Watch claims that analysis of monitoring data from all registered HFC-23 destruction projects shows that CDM HCFC-22 plants are intentionally operated in a manner to maximize the production of offset credits. The analysis claims that because of the extra CDM revenue, more HCFC-22 is produced and far more HFC-23 generated than would occur without the CDM.

The request for revision of the approved CDM methodology AM0001 for incineration of HFC-23 was submitted through a DOE to the CDM Executive Board on March 10, 2010 to revise the HFC methodology AM0001; this request will be dealt with next week by the CDM Methodology Panel on June 21, 2010.

The request argues that the current methodology of AM0001 can create perverse incentives which can risk the objective of the CDM to achieve real and additional emission reductions. Specifically, the authors allege that CDM incentives are driving the production of HCFC-22 and that operators are keeping the ratio of HFC-23 to HCFC-22 production (w ratio) artificially higher than normal. The authors cite one project which reported a drop in w ratio during a period in which it could not claim credits as evidence of the gaming of the CDM. Finally the authors suggest the adoption of a benchmark on the w ratio of 0.2%.

Background

The World Bank as Trustee of the Umbrella Carbon Facility entered into emission reduction purchase agreements with operators of two Chinese HCFC-22 plants in December 2005 and registered with the CDM in 2006. One project is "Project for HFC23 Decomposition at Changshu 3F Zhonghao New Chemical Materials Co. Ltd, Changshu, Jiangsu Province, China" (**CDM Project 0306**). The other project is "Project for GHG Emission Reduction by Thermal Oxidation of HFC23 in Jiangsu Meilan Chemical CO. Ltd., Jiangsu Province, China" (**CDM Project 0011**).

Both projects were registered under version 5.2 of AM0001. The methodology requires that a plant be in operation for at least three years from 2000 to 2004. Importantly, the methodology caps annual production of HCFC-22 eligible for crediting to the maximum historical annual HCFC-22 equivalent production level at the plant during any of the last three (3) years between the beginning of the year 2000 and the end of the year 2004. This value includes the actual HCFC-22 production plus an HCFC-22 production equivalent to the CFC production at swing plants appropriately adjusted to account for the different production rates of HCFC22 and CFCs.

Jiangsu Meilan Chemical Company's HCFC 22 production unit A and unit B were both installed and put in operation in 2001. As recorded in the PDD for CDM project 0011, annual production of HCFC22 production output was 12,371 ton in 2002, 17,806 ton in 2003 and 25,149 ton in 2004. Based on the methodology, the maximum annual value for HCFC22 production was set to 25,149 tons (Q_HCFCeHist).

For CDM project 0306, the annual production is based on two production lines (excluding a third line that started its operation in December 2004). Annual HCFC22 production at 3F Zhonghao in 2002, 2003 and 2004 was measured to be 14,375.963 tons, 19,974.024 tons and 30,979 tons respectively. Based on the methodology, the maximum annual value for HCFC22 production was set to 30,979 tons (Q_HCFCeHist)..

HCFC-22 Production in CDM Projects 0011 and 0306

The Trustee reviewed the annual production values of HCFC-22 in CDM Projects 0011 and 0306 based on publicly available documents including the PDDs and monitoring reports. In addition, the Trustee was able to discuss production figures with the operators of CDM Project 0306 in order to fill gaps in the time series (2005 and 2006). Annual production of HCFC-22 for CDM project 306 is shown in Figure 1. The graph compares annual production levels (Q_HCFCy) to the maximum annual level for claiming credits (Q_HCFCeHist). A similar graph for CDM project 0011 is shown in Figure 2 (but missing figures for 2005-2006).

Figure 1: Annual production of HCFC-22, CDM project 0306

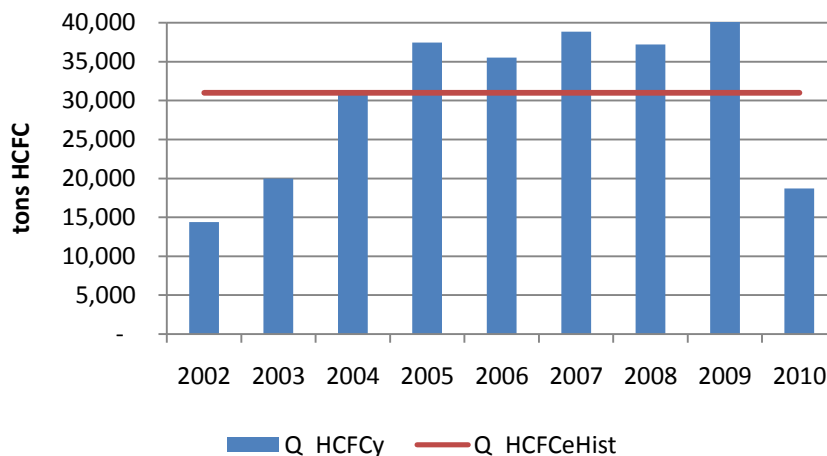
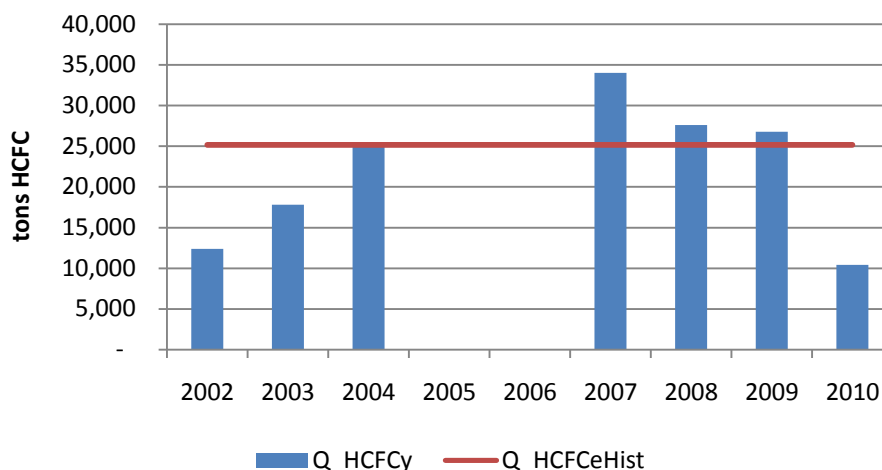


Figure 2: Annual production of HCFC-22, CDM project 0011



Based on the information, the Trustee concludes,

1. The overall HCFC-22 production has increased over time in both projects.
2. HCFC-22 production has **not** been limited to the maximum amount eligible for credits. (Indeed, for CDM Project 0306 a third production line added in 2005 due to the increasing demand for HCFC-22 is not even covered by the CDM project.)

The PDD also provides the reported *technical capacity* of each project to produce HCFC-22. The PDD for project 0306 reports a total annual production capacity of 40,000 tons (production line A and line B each have an individual capacity of 20,000 tons). The PDD for project 0011 reports an annual capacity of 30,000 tons (10,000 tons from unit A and 20,000 from unit B). Table-1 provides a comparison of the ratio of annual HCFC-22 production (Q_HCFCy) to maximum annual production (Q_HCFCeHist) against the ratio of Q_HCFCy to the technical capacity.

Table 1: HCFC-22 Production in relation with the maximum eligible amount of HCFC-22 production and the HCFC-22 production capacity.

Actual HCFC-22 production in relation with the HCFC 22 max. eligible production			Actual HCFC-22 production in relation with the HCFC-22 production capacity		
Years	Project 306 (%)	Project 11 (%)	years	Project 306 (%)	Project 011 (%)
2002	46	49	2002	36	41
2003	65	71	2003	50	59
2004	100	100	2004	77	84
2005	121	*	2005	93	*
2006	115	*	2006	88	*
2007	125	135	2007	97	113
2008	120	110	2008	93	92
2009	130	106	2009	100	89

* Values not available at the time this analysis was prepared

Based on the information, the Trustee concludes,

1. After registration of both projects in 2006, HCFC-22 production has been maintained around the annual technical capacity.
2. Maximum eligible production for the CDM projects does not appear to be a controlling factor in production since both projects are regularly exceeding this annual mark.

HFC-23 emissions to HCFC-22 production ratio (w-value)

The Trustee reviewed the production ratios of HFC-23 emissions to HCFC-22 (w) in CDM Projects 0011 and 0306 based on publicly available documents including the PDDs and monitoring reports. The methodology requires that the value of w is set at the lowest of the three historical annual values estimated and is not to exceed 3% (0.03 tons of HFC 23 produced per ton of HCFC 22 manufactured). To be additionally conservative project 0306 used the lowest - not the average - value from the two production lines (2.88%), which took place in 2004. Project 0011 used the w-value from 2003, its lowest annual value from 2002 through 2004 (2.86%). Figure 3 and Figure 4 compare the w-value of the PDD against the annually calculated w value for each project.

Figure 3: Actual w-values, CDM project 0306

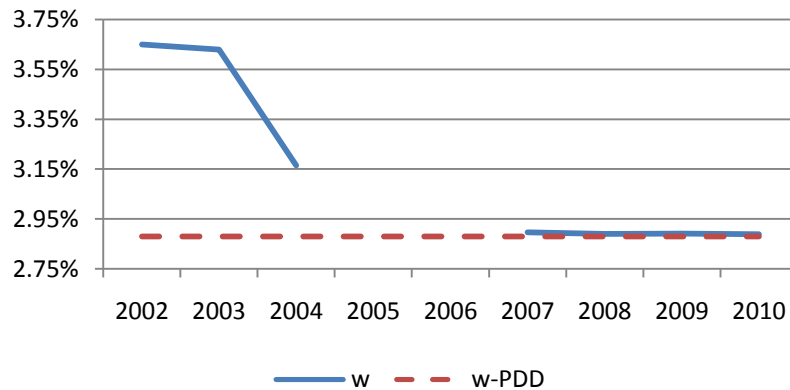
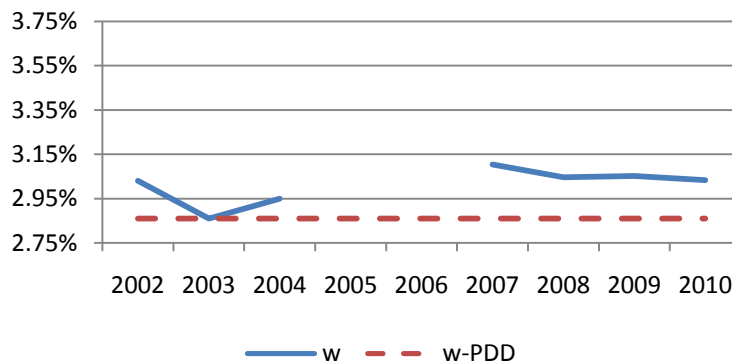


Figure 4: Actual w-values, CDM project 0011



Based on the information, the Trustee concludes,

1. W-values before registration are close or higher to the w-values found in the PDDs for both projects. In the case of project 0306, the w-values before registration are higher than the w-value employed selected in the PDD.
2. W-values are consistent after registration of the PDDs from monitoring period to monitoring period.
3. A closer examination of monitoring periods in which no credits were claimed found no significant change in the w-value from periods in which credits were claimed. This was the case for project 0306 for which a w-value of 2.89 and 2.90 were reported for monitoring periods 9/26/2007-12/21/2007 and 9/26/2009-12/21/2009, respectively.

Global Trends on HCFC-22 production and HCF-23/HCFC22 ratios

To provide more perspective on HCFC-22 production and HCF-23/HCFC22 ratios, the Trustee suggests reading “Recent increases in global HFC-23 emissions”, an article published in *Geophysical Research Letters* (2010) by¹ Stephen A. Montzka, Lambert Kuijpers, Mark O. Battle, Murat Aydin, Kristal Verhulst, Eric S. Saltzman, and David W. Fahey. The article makes the following points regarding HFCF-22 production.

1. A large fraction (57% in 2007²) of the developing countries production is not covered by CDM projects. Total annual production of HCFC-22 in developing countries has significantly increased over the past decade³ mainly due to the increasing demand for feedstock production (e.g., use as a co-product of Teflon). Production for feedstock production is not covered under the Montreal Protocol and thus not covered under the scheduled phase-out for HCFCs.
2. As illustrated in Figure 5, $w (E_{23}/P_{22})$ values have decreased in developing countries since the early 2000's to reach $2.4 \pm 0.3\%$ for 2006-2008. The E_{23}/P_{22} values for HCFC-22 production plants not associated with CDM projects are high ($3.7 \pm 0.3\%$) compared to values in the past obtained in either developing or developed countries. E_{23}/P_{22} values have steadily decreased in developed countries from approximately 2% in the 1990s to 0.9% during 2003-2007.

Figure 5: HFC-23 emissions to HCFC-22 production ratio (Source: Montzka et al. 2010).

¹ Authors include member of the Technology and Economic Assessment Panel (TEAP), a panel providing technical information to the Montreal Protocol Parties and member of the Steering Committee to the “IPCC/TEAP Special Report : Safeguarding the ozone layer and the global climate system: issues related to Hydrofluorocarbons and Perfluorocarbons”.

² Since 2007, three new HFCs projects have been registered (ref: 1947; 1867; 1105).

³ Total production includes feedstock (e.g. Teflon) and non-feedstock uses.

