Expert Consultation Report

Proposed VCS Methodology:
DESTRUCTION OF FLUOROFORM (HFC-23) WASTE GAS STREAMS
(SHORT VERSION)

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Executive summary

Perspectives GmbH [in the following: *Perspectives*], on behalf of Quimobásicos, S.A. de C.V., has developed a new methodology element for the DESTRUCTION OF FLUOROFORM (HFC-23) WASTE GAS STREAMS following the Verified Carbon Standard [in the following: *VCS*].

Trifluoromethane or fluoroform (HFC-23, CHF_3) is an unavoidable by-product of the production of HCFC-22 (chlorodifluoromethane, $CHClF_2$). HFC-23 is a powerful greenhouse gas with a global warming potential (GWP) of 14,800 for a 100 year period as per the 4th Assessment Report of the IPCC, and is formed at the reactor process of the manufacture of HCFC-22. This methodology element relates to the destruction of HFC 23.

Under this methodology element, the baseline scenario is defined by the global average emission factor of HFC-23 from HCFC-22 production consisting of all HCFC-22 production plants in the world. The project's baseline emissions are calculated using a standardized approach, which uses the global average emission factor as a performance benchmark for the crediting baseline.

The methodology element also uses a performance method to determine additionality by introducing an additionality performance benchmark that establishes a stringent performance level in order to ensure the use of state-of-the-art-destruction technology and achieve almost 100% destruction of HFC-23. Project emissions include HFC-23-emissions, CO_2 emissions from fossil fuel or electricity consumption for the operation of the HFC-23 decomposition facility and CO_2 emissions from the decomposition of HFC-23 to CO_2. Emission reductions are calculated following the standard procedure as the difference of baseline and project emissions.

Following the requirements of the VCS rules, standardized approaches require conduction of an expert consultation. Thus, Perspectives has facilitated the same by selecting a group of experts, providing the methodology element to the experts, conducting two webinars for discussion of standardized approaches and collecting feedback from the involved experts. This report was developed to describe the process and the outcome of the expert consultation.

1 Introduction

The methodology element is based on a standardized approach in order to determine the baseline crediting and the additionality performance benchmark. A standardized approach requires conduction of an expert consultation process in order to discuss appropriateness of the selected methods and the level of the applied performance benchmarks.

This report is available as short and as long version. While the short version is published along with the methodology element in order to provide all required information to the public, the long version will be made available to the VVBs to allow assessment of the consultation process with all its individual steps.

1.1 Background and objectives of this report

The expert consultation was conducted in order to fulfill the VCS requirements as outlined in the following VCS program documents (available at: http://www.v-c-s.org/program-documents/info):

- VCS Standard, v3.3
- Methodology Approval Process. v3.4
- VCS Guidance: Standardized Methods, v3.2

“Objective of the expert consultation is to ensure that the level of the performance benchmark metric provides both environmental integrity and sufficient financial incentive to potential projects” (VCS Guidance: Standardized Methods, v3.2, 2012). This report shall provide all information required to demonstrate fulfillment of the VCS requirements regarding the process itself and the outcome of the expert consultation.

1.2 Brief description of the standardized approaches

The methodology element introduces performance benchmarks for determining (1) additionality and (2) the crediting baseline. The level of each performance benchmark is different, and the level for determining additionality is more stringent than the level of the crediting baseline. The following provides (1) a description and analysis of the current distribution of performance within the HCFC-22 production sector with respect to each performance benchmark, (2) an overview of the technologies and/or measures available for improving performance within the sector, and (3) an evaluation of the tradeoff between false negatives and false positives.

In the absence of any regulation, HFC-23 produced as a by-product of HCFC-22 production has traditionally been vented to the atmosphere. While HFC-23 can be abated by reducing the waste rate[1] through process optimization, there are technological limits to reducing the waste rate and the generation of some HFC-23 cannot be prevented.

[1] Tonnes of HFC-23 generated as by-product per tonne of HCFC-22 produced

The waste rate typically ranges between 1.4% and 4%, depending on the technology used to produce HCFC-22 (IPCC/TEAP, 2007). Each type of technology achieves a different waste rate and not all of the technologies can achieve the lowest reported waste rate of approximately 1.4% (McCulloch, 2005). Accordingly, a significant amount of HFC-23 is vented to the atmosphere. In the absence of any revenue from credits generated from GHG abatement projects, there is no incentive for HCFC-22 producers to install and/or operate a destruction facility to destroy the inevitable HFC-23 by-product.

Performance benchmark for determining crediting baseline

As described above, the waste rate is a crucial factor in determining HFC-23 generation. By relying on the waste rate to calculate baseline emissions, CDM Methodology AM0001 inadvertently creates a perverse incentive for the plant operator to operate the HCFC-22 plant at a less than optimal waste rate in order to generate more HFC-23 available for destruction. To eliminate this perverse incentive, the proposed methodology introduces a different parameter as a basis for crediting: A global average emission factor (in the following EF_{HFC23}). The EF_{HFC23} parameter reflects the average emissions of HFC-23 from the global production of HCFC-22 from all HCFC-22 production plants (emitted HFC-23 per tonne of produced HCFC-22). Accordingly, the EF_{HFC23} includes all HCFC-22 production plants regardless of how the plant manages its HFC-23 emissions. The HFC-23 may be (partially) disposed of into an incineration or destruction facility and thereby destroyed (due to a regulation, voluntary action or due to a project activity aiming to achieve emission reductions, etc.) or (partially) vented to the atmosphere or (partially) captured and reused in products.

Thus, voluntary destruction and registered CDM projects are reflected in the baseline, which results in a more conservative baseline approach than that relied upon under the CDM and comparable schemes.

Level of performance benchmark for the crediting baseline

The level of the performance benchmark for the calculation of baseline emissions has been determined as the lowest observed annual global emission factor from 2004 to 2008, which is 0.0119 t HFC-23 / t HCFC-22 based on HCFC-22 production and HFC-23 emission data from Miller et al. (2010) as follows:

Table 1: Determination of the level of performance (Determination of the parameter $EF_{default.}$)

Year:	2004	2005	2006	2007	2008
Global HCFC-22 production[a] (Gg HCFC-22)	636	697	698	812	793
Global HFC-23 emissions[a] (GgHFC-23)	11.9	12.1	13.3	10.3	10.1
Global emission factor[b] (tonnes of HFC-23 per tonne HCFC-22)	1.8711%	1.7360%	1.9054%	1.2685%	1.2736%
Minimum[b] (tonnes of HFC-23 per tonne HCFC-22)	1.2685%				
Uncertainty factor[c]	0.943				
EF default[b] (tonnes of HFC-23 per tonne HCFC-22)	0.0119				

[a] Data adapted from Miller et al. (2010)

[b] Calculated value(s)

[c] Based on UNFCCC CDM Methodologies Panel (2008)

As this emission factor includes all HCFC-22 production plants and therefore also plants that operate destruction facilities (e.g. voluntary or registered CDM projects) the selected performance benchmark can be deemed highly conservative. In addition, as an outcome of the expert consultation, the performance benchmark has been even lowered to 0.01 t HFC-23 / t HCFC-22.

Performance benchmark for determining additionality

The destruction of HFC-23 waste streams that goes beyond any applicable legal requirements can be deemed a priori additional as the projects do not have any revenues other than the income from credits generated from GHG abatement projects. The proposed new methodology introduces a stringent a performance benchmark for additionality based on the best available destruction technology.

Level of performance benchmark for additionality

A project will be deemed additional under this proposed methodology if the Project Proponent can demonstrate that the HFC-23 destruction facility will result in average emissions of less than 0.0001 tonnes of HFC-23 per tonne of produced HCFC-22. This equals an overall destruction efficiency of more than 99.99% on a yearly basis. This performance benchmark is designed to limit the distribution of credits to only those projects that install the best available technology and operate under optimized conditions ensuring almost 100% destruction of HFC-23.

Analysis of current distribution of performance within the sector

As described above, the EF_{HFC23} applied as a performance benchmark is derived from HCFC-22 production plants with HFC-23 decomposition facilities and from HCFC-22 production plants without HFC-23 decomposition facilities. Plants without HFC-23 decomposition facilities can be assumed to emit HFC-23 based on the waste generation rate achieved in the HCFC-22 production plant. As stated, the waste rate ranges between 1.4% and 4%, depending on the technology used to produce HCFC-22.

Assuming (1) the total HCFC-22 production of the years 2004 to 2008 as shown in Table 1, (2) that HCFC-22 production plants have either no HFC-23 decomposition facilities or a HFC-23 decomposition facility operated during the years 2004 to 2008 and (3) that the average waste rate is 2.7%, in theory approximately 44% of the HCFC-22 production would have been produced by plants without HFC-23 decomposition facility and 56% by plants with HFC-23 decomposition facility.

Overview of technologies and/or measures available for improving performance within sector

HFC-23 can be abated by reducing the waste rate through process optimization. However, there are technological limits to reducing the waste rate and the generation of some HFC-23 cannot be prevented. As described above, the waste rate typically ranges between 1.4% and 4%, depending on the technology used to produce HCFC-22 and each type of technology achieves a different waste rate. Thus, in order to reduce HFC-23 emission below the level that can be achieved by process optimization, the installation of a HFC-23 decomposition facility is required.

In regard to HCFC-22 production plants that are operating a HFC-23 decomposition facility the following technologies are commonly used[2]:

- Thermal oxidizer
- Incineration furnace (electric)
- Superheated steam decomposition
- Plasma technology

These technologies are expected to achieve a destruction efficiency in the range of 99.9 % to 99.99999 %[3]. Thus, currently available technology operated under optimal conditions will qualify to apply the proposed new methodology.

Evaluation of tradeoff between false negatives and false positives

As the projects under the methodology can be generally deemed as being additional, “false positives[4]” can be excluded. At the same time “false negatives[5]” are also unlikely as the required

[2] The technologies have been identified based on a review of Project Design Documents of CDM projects applying CDM methodology AM0001 available at http://cdm.unfccc.int/Projects/projsearch.html

[3] The destruction efficiencies have been identified based on a review of Project Design Documents of CDM projects applying CDM methodology AM0001 available at http://cdm.unfccc.int/Projects/projsearch.html

[4] Projects that are deemed additional due to the level of performance selected in the methodology but would have been implemented even in the absence of the VCU revenue.

[5] Projects that are deemed to be not additional due to the level of performance selected in the methodology but are only mobilized through the VCU revenue.

technology to achieve the specified level of performance has been achieved in several registered CDM projects.

2 Description of the expert consultation process

As per VCS requirements, an expert consultation process has been facilitated in order to discuss the applied standardized approaches of the methodology element.

2.1 Involved experts

“The purpose of the expert consultation is to provide input on the appropriateness of the level of the performance benchmark metric. As such, the expert group is likely to be different from that of a typical project-level consultation where, for example, local communities may be a primary stakeholder. Such communities may not necessarily have a stake in the level of the performance benchmark metric, since the level at which the performance benchmark metric is set has no direct impact on the local environment or community. Hence, the primary experts of importance are likely to be groups such as industry (who have an interest in which activities will be eligible for crediting and the amount of credit that will be granted to these activities), environmental NGOs (who have an interest in the overall environmental integrity of the methodology and therefore the chosen level of the performance benchmark metric) and government and other regulatory bodies (who may be looking to regulate the sector at some future date or may be developing standardized baselines under programs such as the CDM, and are therefore interested in sector benchmarks)” (VCS Guidance: Standardized Methods, v3.2, 2012). Accordingly, Perspectives has selected the following experts. The VCS Association [in the following: *VCSA*] has been informed before the start of the consultation process about the list of selected experts.

Ben Miller	National Oceanic and Atmospheric Administration (Author of the main literature source)
Derik Broekhoff	Climate Action Reserve
Einar Telnes	Independent expert
Jaime Rodriguez Segovia	Chemical industry
Lambert Schneider	Independent expert
Michael Lazarus	Stockholm Environment Institute
Sandra Greiner	Climatefocus

Further experts have been invited, however, due to time constraints have not been able to participate.

2.1 Process of the expert consultation

The following steps have been conducted to set-up and conduct the expert consultation:

Selection and invitation of experts	The experts have been contacted by email. The process of contacting the experts started in April 2013.
Providing information to participating experts (methodology element, supporting document providing explanation of standardized approaches, article by Miller et al. (2010))	All information has been provided by email on the 17th of May 2013.
Invitation to the 1st Webinar	The invitation was sent by email on the 22nd of May 2013
1st Webinar	23rd of May 2013, 17:00 CEST
Summary of the 1st Webinar	The summary was sent by email on the 31st of May 2013
Invitation to the 2nd Webinar	The invitation was sent by email on the 07th of June 2013
2nd Webinar	11th of June 2013, 17:00 CEST
Summary of the 2nd Webinar	The summary was sent by email on the 26th of June 2013
Collecting and compiling feedback from experts	May to July 2013
Revision of the methodology based on the outcome of the expert consultation	August to September 2013

3 Summary of the received feedback

The feedback to the standardized approaches have been collected during the webinars and as well by email submitted by the experts. Please find below information regarding the received feedback during the webinars. Feedback received by email can be also find in the attachments to this report.

3.1 First Webinar

The 1st webinar took place on 23rd of May 2013, 17:00 CEST and was hosted by VCS. The following are the participants:

Experts:
Benjamin Miller
Derik Broekhoff
Einar Telnes
Lambert Schneider

Moderators:
Sven Feige (Perspectives GmbH)
Matt Ramlow (VCS)

The summary of the 1st webinar is attached as Annex 9 to this report.

3.2 Second Webinar

The 2st webinar took place on 11th of June 2013, 17:00 CEST and was hosted by VCS. The following are the participants:

Experts:
Benjamin Miller
Derik Broekhoff
Jaime Rodriguez Segovia
Sandra Greiner

Moderators:
Sven Feige (Perspectives GmbH)
Aditi Sen and Matt Ramlow (VCS)

The summary of the 2nd webinar is attached as Annex 12 to this report.

3.3 Feedback to specific questions No 16 to 18

During the expert consultation specific attention has been broad to the following questions as these are deemed most essential in relation to the expert consultation. Please find these questions and the received feedback below.

16	*Based on your current knowledge of the new methodology and your understanding of the project type, which option would you deem most appropriately:* *A) The proposed new methodology should be approved as a new VCS methodology* *B) The proposed new methodology should be a revision of the existing CDM methodology under the VCS scheme* *C) Both Options (A and B) would be possible* *D) I cannot judge based on the current available information*
	Sandra Greiner: Option A) seems preferable since both the scope of the methodology (new vs. existing facilities) as well as the approach for determining key issues such as additionality and relevant parameters differ.
	Jaime Rodriguez Segovia: Option A
	Derik Broekhoff: I don't have a strong impression here; however, given the political context surrounding this project type, it may be desirable to present this as a new VCS methodology (option A).
	Einar Telnes: Both options should be possible (C)
	Lambert Schneider and Michael Lazarus: We welcome the development of a methodology for HFC-23 abatement from HCFC-22 production under the VCS. The methodology could complement the CDM, as only plants with an operating history starting in 2002 are eligible under the CDM. (*extract from general feedback*)

17	*Based on your current knowledge of the new methodology and your understanding of the project type, which level of benchmark do you suggest for crediting (the methodology currently suggests 0.0119 tonnes of HFC-23 per tonne HCFC-22 (i.e. 1.19%)):*
	Sandra Greiner: Two options have emerged in the discussions: 1) adopting the lower level from the approved CDM methodology 2) the benchmark proposed in the methodology based on scientific observations of global emissions. There are good arguments to support either one of these choices: The first one seems preferable in terms of not undercutting the CDM. The second seems better supported by evidence. The authors of the methodology have convincingly stated that the benchmark used in the CDM methodology is not a level that can be sustained over time. I would opt for accuracy of the approach over setting the CDM as a conservativeness benchmark. Note that the Gold Standard cook stoves methodologies also allow for significantly more emission reductions than comparable CDM methodologies.
	Derik Broekhoff: I would support an emission benchmark of 1.0%
	Einar Telnes: 1,00%, based on the argumentation provided by Michael and Lambert.
	Lambert Schneider and Michael Lazarus: We strongly recommend that the baseline emission factor be set at a maximum value of 1.0%, consistent with version 6.0.0 of the CDM methodology, or at a lower value. (extract from general feedback)

18	*Based on your current knowledge of the new methodology and your understanding of the project type, which level of benchmark do you suggest for additionality (0.000001 tonnes of HFC-23 per tonne of produced HCFC-22. This equals an overall destruction efficiency of 99.9999%):*
	Jaime Rodriguez Segovia: 99.9999 standard
	Derik Broekhoff: As explained above, I think an additionality benchmark is unnecessary – projects could be considered additional as long as they are not required by law. However, a benchmark could be adopted on environmental best practice grounds.
	Einar Telnes: 99,9% should be sufficient as the incentive lies in the destruction itself, and paired with the benchmark above, this should be sufficiently conservative. As long as non-destructed HFC is counted as project emissions and thus reduce revenue, there is no need to make this overly stringent.
	Lambert Schneider and Michael Lazarus: The additionality benchmark is currently set at a relatively stringent level. We believe that such a stringent additionality benchmark does not provide additional value. It could reduce the potential to use the methodology if plant operators have a risk not to achieve the additionality benchmark. (extract from general feedback)

Please find the description of the changes that have been applied to the methodology element as a result of the received feedback in the following chapter.

4 Revision of the proposed VCS methodology based on the results of the expert consultation

The information below is shown as follows: *Content of the first webinar* *Content of the second webinar* Description of the revision of the methodology element

1	*For this methodology, not only the level of benchmark (emission level) is relevant, but also the related concept of commercially viable amount of produced HCFC-22.*
	It has been mentioned that the production of HCFC-22 can be differentiated into emissive applications (mainly refrigerants) and non-emissive use. According to he Montreal Protocol there is a phase out for production of emissive applications. The methodology should take the different situation into account. *It has been reported that for non-emissive applications the market is growing today.* *Furthermore, it has been stated that current/future developments of the Montreal Protocol should be acknowledged under the new methodology.* *Determination of the commercially viable amount of HCFC-22 production might be very subjective while on the other hand, standardized approach under VCS would look for an approach that is not project-specific.*
	The approach to determine the commercially viable amount of produced HCFC-22 has been revised based on the feedback received by the experts. According to this approach, only historical production levels are eligible plus any market growth observed before the implementation of the project activity. In addition, any additional production amount that has already been contracted before the start of the project activity are eligible for crediting. Please

	refer to the methodology element for further details on the approach.
2	*Although "over-crediting" is part of the Performance method, it has been stated that "over-crediting" should not occur for this specific project type, especially as due to the limited number of plants less balancing will be possible or occur and for reasons of environmental integrity.*
	Based on the information that has been provided by chemical industry (see #3 below), over-crediting would be avoided as a waste rate of 1% cannot be achieved during a full year of operation. Thus, the applied benchmark is lower than what would could be achieved without implementation of a destruction facility.
	Under the new crediting benchmark, "over-crediting" is avoided as the new crediting benchmark is already at the lower end of what can be achieved during a short period of operation and significant lower than what can be achieved under regular continuous operation.
3	*Lowest w-rate[6] that has been reported to UNFCCC is approx. 1% which was at least achieved for a period of 1 month for a specific plant.*
	It has been reported by chemical industry that a waste rate of close to 1% is not possible to achieve during a longer period of operation as this would cause damage to the catalyst. See also separate document.
	No revision required as only clarification.
4	*A requirement in the methodology to use either plant w-rate or default emission factor, whichever is lower would create a "perverse incentive" to operate the plant at a w-rate slightly higher than the default value and not at best operating conditions. However, the current approach of the methodology would avoid such a "perverse incentive" as the plant specific w-rate is not taken into account for crediting and thus there is an interest to operate the plant at lowest possible w-rate to maximize output of product and minimize required feedstock input.*
	No revision required as the methodology element already avoids any "perverse incentive".
5	*It has been questioned if there are explicit conditions in the methodology that would avoid crediting for plant No 4 (see presentation by Perspectives page 5).*
	A plant without destruction facility will not achieve continuously a baseline emission level lower than the benchmark for crediting and additionality. Thus, a production facility matching the situation as plant No.4 would need to operate a destruction facility already in the baseline situation. Applicability of such plants is described in the applicability condition as shown for question 6 below.
6	*It has been questioned if there are explicit conditions in the methodology that would avoid crediting for plants that have already installed a destruction unit in the past, either as a voluntary action or under a different mechanism. Especially, there should be no incentive to stop voluntary destruction and start destruction under the new methodology (e.g. by adding an applicability condition related to this situation).*
	Following the recommendation, the methodology element now includes the following applicability condition: • *No destruction of HFC-23 was conducted before the start of the project activity, except if such destruction of HFC-23 was carried out as a registered project under the Clean Development Mechanism (CDM) or the Joint Implementation (JI).* Moving from one mechanism (e.g. the CDM) to the VCS should be allowed under this methodology as the crediting benchmarks of the mechanisms are aligned and thus an increase in effective emissions is ruled out and at the same time the stringent additionaltiy benchmark may even enhance the total destruction of HFC-23 within a project.
7	*It has been stated that it should be avoided that projects switch (continuously) from one mechanism to another just for reasons of maximizing credits due to different levels of benchmarks.*
	It has been stated that a net increase in GHG emissions as a result of switching from one scheme to another scheme should be avoided. The methodology should take this into consideration and avoid any incentive to switch from one scheme to another.
	The methodology element has been revised as described under Question 17 below. As the crediting level is now aligned to the existing CDM methodology AM0001, such situations will not occur.

[6] Waste generation rate: The ratio of mass of HFC-23 formed per unit mass of HCFC-22 produced in a HCFC-22 production line or plant.

8	*It has been proposed to apply a less stringent additionality benchmark to allow more projects to apply the new methodology. Benefit of allowing more projects application of the methodology is deemed to be higher than the increase of project emissions due to the use of less efficient technologies. Anyway there is an incentive to operate at highest possible destruction efficiency in order to reduce project emissions an thereby maximize generation of credits.*
	The methodology element has been revised as described under Question 18 below.
9	*It has been questioned if sufficient accurate technical monitoring procedures/equipment exists to demonstrate the stringent proposed additionality benchmark.*
	As per the information by the expert from chemical industry sufficient accurate technical monitoring procedures/equipment exists. In addition, the additionality benchmark has been lowered to 0.0001 tonnes of HFC-23 per tonne HCFC-22 reducing the related requirements for measuring procedures.
10	*It has been proposed that the data basis and approach of taking data into account should be specified in more detail in the methodology. It has been reported that there are basically two approaches possible.(i) Bottom-up approach based on gathering and combining reported information (e.g. GHG inventories, Monitoring reports of CDM projects) and (ii) top-down approach based on measurements of atmospheric concentrations. In the past, the atmospheric measurements tends to provide a higher emission level than bottom-up approach.*
	Following the VCS requirements for standardized approaches, the requirement to calculate the crediting benchmark at the start of the project implementation has been removed from the methodology element. The update of the crediting benchmark is now required at the methodology level after 5 years (see VCS Methodology Approval Process Procedural Document v3.4 (2012) paragraph 10.1.1)
11	*The approach related to the demonstration of commercially viable amount of produced HCFC-22 was deemed as being not sufficient to avoid any "perverse incentive" leading to a shift of productions from non-credited plants to credited plants (Carbon leakage). The new methodology should provide more details on how to demonstrate the same but may also consider additional approaches such as a plant load factor/utilization factor or share of global production that would limit the amount of HCFC-22 production eligible for crediting for a specific plant.*
	See question 1 above.
12	*It has been proposed that it should be checked if data from commercial reports (with costs) and the Ozone Secretariat would allow establishment of such a plant load factor/utilization factor or share of global production that can be then used for determination of the produced amount eligible for crediting.*
	See question 1 above.
13	*It has been clarified that all HFC-23 emitted from a plant and not destroyed will be monitored and taken into consideration as project emissions.*
	No revision required as already included in the methodology element.
14	*Suggested to check one additional applicability condition: "Country where project is located should have ratified and comply with the Montreal Protocol and all its amendments."*
	Following the recommendation, the methodology element now includes the following applicability condition: *• The host country where the project is located, has ratified the Montreal Protocol and complies with the phase-out of HCFC-22 production for emissive uses as agreed under the latest amendments and adjustments of the Montreal Protocol.*
15	*Any other comments:*
	See feedback of experts as attached to this report.
16	*Based on your current knowledge of the new methodology and your understanding of the project type, which option would you deem most appropriately:* *A) The proposed new methodology should be approved as a new VCS methodology* *B) The proposed new methodology should be a revision of the existing CDM methodology under the VCS scheme* *C) Both Options (A and B) would be possible* *D) I cannot judge based on the current available information*
	As per the VCS Methodology Approval Process Procedural Document v3.4 (2012) paragraph 5.2.1, methodology developers shall justify submission of a new methodology while there are

	existing approved methodology of similar topics. Please refer to the methodology element for a description of existing methodologies and the difference to the methodology element. The methodology element uses an approach to setting the baseline and assessing additionality that is different to the existing CDM methodology AM0001. CDM methodology AM0001 is mainly based on a project method while the methodology element applies a performance method. Thus, the submission of a new methodology is sufficiently justified (see VCS Methodology Approval Process Procedural Document v3.4 (2012) paragraph 5.2.1/2)a)). The submission of a new methodology is also supported by the feedback by the experts as shown in chapter 3.3.
17	*Based on your current knowledge of the new methodology and your understanding of the project type, which level of benchmark do you suggest for crediting (the methodology currently suggests 0.0119 tonnes of HFC-23 per tonne HCFC-22 (i.e. 1.19%)):*
	Following the majority of recommendations by the experts, the level of the crediting benchmark has been lowered to 0.01 tonnes of HFC-23 per tonne HCFC-22 (i.e. 1.0%).
18	*Based on your current knowledge of the new methodology and your understanding of the project type, which level of benchmark do you suggest for additionality (0.000001 tonnes of HFC-23 per tonne of produced HCFC-22. This equals an overall destruction efficiency of 99.9999%):*
	Following the majority of recommendations by the experts but maintaining requirement of implementing state-of-the-art technology, the level of the additionality benchmark has been lowered to 0.0001 tonnes of HFC-23 per tonne HCFC-22. This equals an overall destruction efficiency of 99.99%).

In addition to the changes described above, it has been decided to apply a Global Warming Potential of HFC-23 of 14,800 as per the 4th Assessment Report of the IPCC.

The revised methodology submitted for approval will be available along with this report on the VCS website available at: http://www.v-c-s.org/methodologies/in-development.

5 References

IPCC/TEAP (2007): Special report: Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons; available at: http://www.ipcc.ch/pdf/special-reports/sroc/sroc_full.pdf

McCulloch, A. (2005): Incineration of HFC-23 Waste Streams for Abatement of Emissions from HCFC-22 Production: A Review of Scientific, Technical and Economic Aspects; available at: http://cdm.unfccc.int/methodologies/Background_240305.pdf

Miller, B. R., Rigby, M., Kuijpers, L. J. M., Krummel, P. B., Steele, L. P., Leist, M., Fraser, P. J., McCulloch, A., Harth, C., Salameh, P., Mühle, J., Weiss, R. F., Prinn, R. G., Wang, R. H. J., O'Doherty, S., Greally, B. R., and Simmonds, P. G (2010): HFC-23 (CHF3) emission trend response to HCFC-22 (CHClF2) production and recent HFC-23 emission abatement measures, Atmos. Chem. Phys., 10, p. 7875-7890

UNFCCC (2012): Approved CDM baseline and monitoring methodology AM0001 - "Decomposition of fluoroform (HFC-23) waste streams", version 6.0.0

6 Annexes

Annex	Description	Version
A1	VCS HFC-23 Methodology final_v3_000_expert_consultation	long
A2	Discussion of the performance benchmarks v3_000_expert_consultation_confidential	long
A3	HFC-23_emission trend_article_expert_consultation	long
A4	Expert invitation email dated 17th of May 2013	long
A5	1st webinar invitation email dated 22nd of May 2013	long
A6	VCS' presentation for the webinar	long
A7	Perspectives' presentation for the webinar	long
A8	1st webinar summary email dated 31st of May 2013	long
A9	Summary of the 1st webinar	short/long
A10	2nd webinar invitation email dated 7th of June 2013	long
A11	2nd webinar summary email dated 26th of June 2013	long
A12	Summary of the 2nd webinar	short/long
A13	Comments by Sandra Greiner	long
A14	Background information regarding Catalyst procedure and HFC-23 waste rate	long
A15	2012-05-22 Review input VCS HFC-23 methodology by SEI	long
A16	Comments by Einar Telnes	long
A17	2012-06-12 Review input VCS HFC-23 methodology by SEI updated	long
A18	Comments by Derik Broekhoff	long

Proposed VCS Methodology

Summary of the first webinar

Document Prepared by Perspectives GmbH

First Webinar

23rd of May 2013, 17:00 CEST, hosted by VCS

1 Participants

Matt Ramlow (VCS)

Sven Feige (Perspectives GmbH)

Experts:

Benjamin Miller

Derik Broekhoff

Einar Telnes

Lambert Schneider

2 Agenda

- Welcome
- Round of personal introduction
- Presentation: VCS requirements by Matt Ramlow
- Presentation: Proposed HFC methodology: Level of applied benchmarks by Sven Feige
- Discussion

3 Related documents

- Presentation by VCS
- Presentation by Perspectives GmbH
- Review of a proposed VCS methodology for abatement of HFC-23 by Lambert Schneider and Michael Lazarus
- Comments by Einar Telnes

4 Summary of discussion

The table below provides a summary of the topics/concerns/statements that have been raised and discussed by the experts during the webinar. You are invited to provide additional comments / your point of view in the table. Also you are invited to provide comments to the document prepared by Lambert and Michael or to the comments by Einar if you want or to provide your own evaluation/feedback document/text.

1	*For this methodology, not only the level of benchmark (emission level) is relevant, but also the related concept of commercially viable amount of produced HCFC-22.*
2	*Although "over-crediting" is part of the Performance method, it has been stated that "over-crediting" should not occur for this specific project type, especially as due to the limited number of plants less balancing will be possible or occur and for reasons of environmental integrity.*
3	*Lowest w-rate[7] that has been reported to UNFCCC is approx. 1% which was at least achieved for a period of 1 month for a specific plant.*
4	*A requirement in the methodology to use either plant w-rate or default emission factor, whichever is lower would create a "perverse incentive" to operate the plant at a w-rate slightly higher than the default value and not at best operating conditions. However, the current approach of the methodology would avoid such a "perverse incentive" as the plant specific w-rate is not taken into account for crediting and thus there is an interest to operate the plant at lowest possible w-rate to maximize output of product and minimize required feedstock input.*
5	*It has been questioned if there are explicit conditions in the methodology that would avoid crediting for plant No 4 (see presentation by Perspectives page 5).*
6	*It has been questioned if there are explicit conditions in the methodology that would avoid crediting for plants that have already installed a destruction unit in the past, either as a voluntary action or under a different mechanism. Especially, there should be no incentive to stop voluntary destruction and start destruction under the new methodology (e.g. by adding an applicability condition related to this situation).*
7	*It has been stated that it should be avoided that projects switch (continuously) from one mechanism to another just for reasons of maximizing credits due to different levels of benchmarks.*
8	*It has been proposed to apply a less stringent additionality benchmark to allow more projects to apply the new methodology. Benefit of allowing more projects application of the methodology is deemed to be higher than the increase of project emissions due to the use of less efficient technologies. Anyway there is an incentive to operate at highest possible destruction efficiency in order to reduce project emissions an thereby maximize generation of credits.*
9	*It has been questioned if sufficient accurate technical monitoring procedures/equipment exists to demonstrate the stringent proposed additionality benchmark.*
10	*It has been proposed that the data basis and approach of taking data into account should be specified in more detail in the methodology. It has been reported that there are basically two approaches possible.(i) Bottom-up approach based on gathering and combining reported information (e.g. GHG inventories, Monitoring reports of CDM projects) and (ii) top-down approach based on measurements of atmospheric concentrations. In the past, the atmospheric measurements tends to provide a higher emission level than bottom-up approach.*
11	*The approach related to the demonstration of commercially viable amount of produced HCFC-22 was deemed as being not sufficient to avoid any "perverse incentive" leading to a shift of productions from non-credited plants to credited plants (Carbon leakage). The new methodology should provide more details on how to demonstrate the same but may also consider additional approaches such as a plant load factor/utilization factor or share of global production that would limit the amount of HCFC-22 production eligible for crediting for a specific plant.*

[7] Waste generation rate: The ratio of mass of HFC-23 formed per unit mass of HCFC-22 produced in a HCFC-22 production line or plant.

12	*It has been proposed that it should be checked if data from commercial reports (with costs) and the Ozone Secretariat would allow establishment of such a plant load factor/utilization factor or share of global production that can be then used for determination of the produced amount eligible for crediting.*
13	*It has been clarified that all HFC-23 emitted from a plant and not destroyed will be monitored and taken into consideration as project emissions.*
14	*Suggested to check one additional applicability condition: "Country where project is located should have ratified and comply with the Montreal Protocol and all its amendments."*
15	*Any other comments:*

Proposed VCS Methodology

Summary of the second webinar

Document Prepared by Perspectives GmbH

Second Webinar

11th of June 2013, 17:00 CEST, hosted by VCS

1 Participants

Aditi Sen, Matt Ramlow (VCS)

Sven Feige (Perspectives GmbH)

Experts:

Benjamin Miller

Derik Broekhoff

Jaime Rodriguez Segovia

Sandra Greiner

2 Agenda

- Welcome
- Question & Answers regarding first webinar presentations
- Discussion of the summary of the first webinar

3 Related documents

- Summary of the first webinar

4 Summary of discussion

The table below provides a summary of the topics/concerns/statements that have been raised and discussed by the experts during the webinar. You are invited to provide additional comments / your point of view in the table.

The information below is shown as follows:

Content of the first webinar

Content of the second webinar

1	*For this methodology, not only the level of benchmark (emission level) is relevant, but also the related concept of commercially viable amount of produced HCFC-22.*
	It has been mentioned that the production of HCFC-22 can be differentiated into emissive applications (mainly refrigerants) and non-emissive use. According to he Montreal Protocol there is a phase out for production of emissive applications. The methodology should take the different situation into account. *It has been reported that for non-emissive applications the market is growing today.* *Furthermore, it has been stated that current/future developments of the Montreal Protocol should be acknowledged under the new methodology.* *Determination of the commercially viable amount ofHCFC-22 production might be very subjective while on the other hand, standardized approach under VCS would look for an approach that is not project-specific.*
2	*Although "over-crediting" is part of the Performance method, it has been stated that "over-crediting" should not occur for this specific project type, especially as due to the limited number of plants less balancing will be possible or occur and for reasons of environmental integrity.*
	Based on the information that has been provided by chemical industry (see #3 below), over-crediting would be avoided as a waste rate of 1% cannot be achieved during a full year of operation. Thus, the applied benchmark is lower than what would could be achieved without implementation of a destruction facility.
3	*Lowest w-rate[8] that has been reported to UNFCCC is approx. 1% which was at least achieved for a period of 1 month for a specific plant.*
	It has been reported by chemical industry that a waste rate of close to 1% is not possible to achieve during a longer period of operation as this would cause damage to the catalyst. See also separate document.
4	*A requirement in the methodology to use either plant w-rate or default emission factor, whichever is lower would create a "perverse incentive" to operate the plant at a w-rate slightly higher than the default value and not at best operating conditions. However, the current approach of the methodology would avoid such a "perverse incentive" as the plant specific w-rate is not taken into account for crediting and thus there is an interest to operate the plant at lowest possible w-rate to maximize output of product and minimize required feedstock input.*
5	*It has been questioned if there are explicit conditions in the methodology that would avoid crediting for plant No 4 (see presentation by Perspectives page 5).*
6	*It has been questioned if there are explicit conditions in the methodology that would avoid crediting for plants that have already installed a destruction unit in the past, either as a voluntary action or under a different mechanism. Especially, there should be no incentive to stop voluntary destruction and start destruction under the new methodology (e.g. by adding an applicability condition related to this situation).*
7	*It has been stated that it should be avoided that projects switch (continuously) from one mechanism to another just for reasons of maximizing credits due to different levels of benchmarks.*
	It has been stated that a net increase in GHG emissions as a result of switching from one scheme to another scheme should be avoided. The methodology should take this into consideration and avoid any incentive to switch from one scheme to another.

[8] Waste generation rate: The ratio of mass of HFC-23 formed per unit mass of HCFC-22 produced in a HCFC-22 production line or plant.

8	*It has been proposed to apply a less stringent additionality benchmark to allow more projects to apply the new methodology. Benefit of allowing more projects application of the methodology is deemed to be higher than the increase of project emissions due to the use of less efficient technologies. Anyway there is an incentive to operate at highest possible destruction efficiency in order to reduce project emissions an thereby maximize generation of credits.*
9	*It has been questioned if sufficient accurate technical monitoring procedures/equipment exists to demonstrate the stringent proposed additionality benchmark.*
10	*It has been proposed that the data basis and approach of taking data into account should be specified in more detail in the methodology. It has been reported that there are basically two approaches possible.(i) Bottom-up approach based on gathering and combining reported information (e.g. GHG inventories, Monitoring reports of CDM projects) and (ii) top-down approach based on measurements of atmospheric concentrations. In the past, the atmospheric measurements tends to provide a higher emission level than bottom-up approach.*
11	*The approach related to the demonstration of commercially viable amount of produced HCFC-22 was deemed as being not sufficient to avoid any "perverse incentive" leading to a shift of productions from non-credited plants to credited plants (Carbon leakage). The new methodology should provide more details on how to demonstrate the same but may also consider additional approaches such as a plant load factor/utilization factor or share of global production that would limit the amount of HCFC-22 production eligible for crediting for a specific plant.*
12	*It has been proposed that it should be checked if data from commercial reports (with costs) and the Ozone Secretariat would allow establishment of such a plant load factor/utilization factor or share of global production that can be then used for determination of the produced amount eligible for crediting.*
13	*It has been clarified that all HFC-23 emitted from a plant and not destroyed will be monitored and taken into consideration as project emissions.*
14	*Suggested to check one additional applicability condition: "Country where project is located should have ratified and comply with the Montreal Protocol and all its amendments."*
15	*Any other comments:*
16	*Based on your current knowledge of the new methodology and your understanding of the project type, which option would you deem most appropriately:* *A) The proposed new methodology should be approved as a new VCS methodology* *B) The proposed new methodology should be a revision of the existing CDM methodology under the VCS scheme* *C) Both Options (A and B) would be possible* *D) I cannot judge based on the current available information*
17	*Based on your current knowledge of the new methodology and your understanding of the project type, which level of benchmark do you suggest for crediting (the methodology currently suggests 0.0119 tonnes of HFC-23 per tonne HCFC-22 (i.e. 1.19%)):*
18	*Based on your current knowledge of the new methodology and your understanding of the project type, which level of benchmark do you suggest for additionality (0.000001 tonnes of HFC-23 per tonne of produced HCFC-22. This equals an overall destruction efficiency of 99.9999%):*