VCS Consultation Input

Inclusion of ODS under the VCS Program

GTZ-Proklima acts as an implementing agency under the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) since 1996, in over 150 projects in 40 countries with a budget volume of US$ 43 million. GTZ-Proklima is the largest bilateral implementing agency. The four major implementing agencies are multilateral bodies (WB, UNEP, UNDP, UNIDO). Based on this experience, Proklima submits the following for the consideration of the VCS Association so that the particular strength of the VCS Program can reflect the outcome of the 20 years of MLF implementation.

1. Eligibility of ODS

Due to the MLF outcomes, the existing ODSes can be divided into two classes

a. substances in wide circulations because they were either financed by MLF (double phaseout) or because they were excluded from it (end uses)
b. substances with smaller circulations that MLF funds could have dealt with

This distinction is pragmatic since these classes represent significantly different economic conditions. Wide circulation implies that complex and expensive infrastructure investments are required to abate them and this infrastructure is more important for the environmental integrity of emission reductions than the destruction itself. These ODSes are in use and their users' concerns and interests are relevant for any VCS Program activity. Small circulation in contrast is effectively addressed by specifying abatement conditions and their users' concerns and interests are either minor or beyond the reach of the VCS Program (as they were for MLF).

This distinction effectively acknowledges MLF outcomes and thereby builds on the MLF performance rather than just prolonging the MLF regime into the VCS Program.

This distinction is well evident in the assessment of remaining ODS banks:

Wide circulation: CFC-11, CFC-12, HCFC-22, HCFC-123, HCFC-141b, HCFC-142b

Small circulation: all other ODS in Annexes A, B, C and E of the Montreal Protocol

In aggregate terms of physical volumes or ozone-depleting potential (ODP tons), the six wide circulation ODSes are more significant by factors >100 than the small circulation ODSes. For example, A5 banks for CFC are estimated at 747,000 ODP t[1], where as total CTC banks are at 2,809 ODP t in 2005[2]. Besides the above-mentioned pragmatic reasons for the distinction, these six ODSes are far more important for the voluntary carbon market because the number of abatement projects is significantly higher. Suitable baseline calculations, project boundaries and additionality criteria might be defined differently for VCS projects that can appear in large numbers.

Another significant justification of this distinction according to circulation is the regional aspect. Small circulation ODSes are already eliminated in the majority of countries. For example 106 A5 countries have reported zero consumption of Methyl Bromide in 2006[3]. And two thirds of Halon worldwide was used in China[4] while South Korea was the only country to still produce it in 2003. Small circulation ODSes result in VCS projects in a small number of countries each one with a locally specific industrial or economic cause. Halon abatement technology for instance is not required in small economies and only few significant amounts exist and all companies involved are known. Whereas wide circulation ODSes are still present in almost all A5 countries. The VCS Program could acknowledge that smaller countries should not be disadvantaged in methodologies of these six wide circulation ODSes.

Final justification for the distinction, when abatement capacity exists for the six wide circulation ODSes, the small circulation ODSes can be treated in these facilities, and there is no particular aspect that would require a small circulation ODS destruction technology.

[1] UNEP 2009 Task Force Decision XX/7-Interim Report, "Environmentally Sound Management of Banks of Ozone-depleting Substances", page 18.
[2] With 96 % of the total in China and India. http://www.multilateralfund.org/files/51/5112.pdf
[3] http://www.multilateralfund.org/files/evaluation/4607.pdf
[4] http://www.multilateralfund.org/files/evaluation/4008.pdf

2. Eligibility Criteria proposed by VCS

The VCS Consultation Document proposes six eligibility criteria. Two of these Proklima wishes to comment on, the positive list for destruction technology (the fourth criterion in Table 2 of the VCS Consultation Document) and the eligible products (the fifth criterion in Table 2 of the VCS Consultation Document). For both of these criteria, Proklima believes that these are not adequate and instead criteria of another kind are more pertinent for the purposes intended.

2.1 Eligibility criterion destruction technology

The rationale stated in the VCS Consultation Document is that best practice in ODS destruction is used, according to the UNEP Technology and Economic Assessment Panel (TEAP) in 2002. Proklima queries the qualification 'best'.

The VCS Program does in general not suggest the use of positive lists for technologies. If this is a major characteristic of VCS[5], then it seems straightforward that ODS destruction technology would be a particularly inadequate case for positive listing.

The U.S.-EPA input[6] to the UNEP workshop on ODS banks July 2009, states that there are three ODS destruction facilities in operation with technologies not listed in TEAP 2002, Internally Circulated Fluidized Bed Incineration (ICFB), Fixed Hearth Incinerators and Air Plasma. Two of these three are in use in the US (ICFB and Fixed Hearth) and meet the U.S.EPA's Maximum Achievable Control Technology (MACT) standards that are more stringent than the TEAP criteria. Certainly when revising its destruction technology list, TEAP would include those found by U.S.EPA. However, Proklima sees little justification of a technology list per se.

Instead, a VCS ODS standard can impose the measurement parameters used by TEAP and their application in any ODS destruction project under VCS. TEAP (2002) states that the Destruction and Removal Efficiency (DRE) is the most commonly used parameter of ODS destruction facilities. Therefore, a VCS eligibility criterion could consist of a level of DRE together with a measurement standard to be applied. Any destruction facility for ODS would have to measure and prove that it meets them. This could be a performance level to be demonstrated over the course of the VCS project, setting an appropriate bar for environmental integrity while leaving the technology flexible.

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[5] As opposed to other voluntary standards such as the Climate Action Reserve that make extensive use of positive listing of technologies.

[6] U.S.EPA (2009) "ODS Destruction in the United States of America and Abroad", prepared by ICF International, Appendix A, page 40.
http://www.unep.ch/Ozone/Meeting_Documents/workshop_on_ODS_banks/WORKSHOP-3-INF1E.doc

Depending on the industrial and economic context in a country, the 'best' destruction technologies vary considerably. A more direct eligibility criterion is quantifiable environmental performance to be monitored. In many OECD countries no ODS regulations exist because general air pollution standards are sufficient (TEAP, 2002). In A5 countries where air pollution standards are perhaps not effective, VCS project monitoring can compensate directly for that.

2.2 Eligibility criterion origin of ODS in products

The rationale for the eligible products is that there is little regulation or incentive for ODS and that aerosols and pre-polymers have no significant ODS volumes (stated in Table 2 of the VCS Consultation Document). This rationale is justified[7], however, Proklima wants to question whether the VCS 2007.1 requirements are sufficiently reflected in it. This relates to the above-mentioned distinction of wide circulation ODSes. These six ODSes are contained in millions of appliances such as refrigerators, Air-conditioners and so on. What GHG sources, sinks and/or reservoirs are relevant to VCS projects dealing with appliances ?

Proklima asserts that the standard analytical approach widely used in MLF projects in the past must be used especially given the highly distributed dominant ODS remaining. The life-cycle approach has two mutually reinforcing parts,

a. relating ODS to the equipment that used it in whatever form and to the new equipment that provides the respective service
b. verifiable proof of the origin, i.e. all steps from ODS in use to this ODS' destruction must be assured

When an ODS containing appliance is removed, this affects the service the user obtained from the appliance. The proper analysis should therefore consider the life-cycle of the appliance and the new equipment replacing it. Instead of referring to Annex D of the Montreal Protocol that only classifies appliance types, this eligibility criterion can be extended to a boundary criterion for appliances, specifying that the boundary of a VCS project comprises the life-cycle of any appliance.

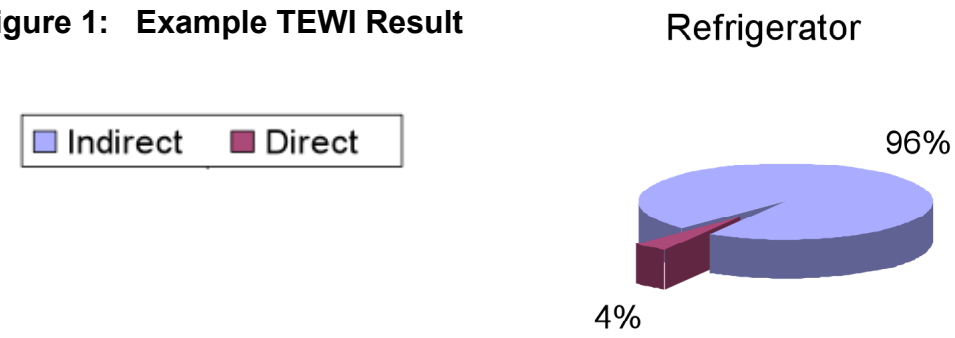
Extending the boundary can increase the eligible GHG emission reduction by accounting for energy savings of new equipment or it can reduce the eligible emissions when the new equipment leads to higher energy consumption or a reduction of the service the equipment renders.

Since the beginning of the Montreal Protocol, the interplay between direct emissions of ODS and indirect emissions from electricity consumption is being captured in combined measures such as Total Equivalent Warming Impact (TEWI) or Life-Cycle

[7] Although Annex D of the Montreal Protocol was intended to deal with countries not joining the Montreal Protocol, quite different from the needs of a voluntary carbon scheme.

Climate Performance (LCCP). TEWI and LCCP have been used in assessments by the TEAP and TOC committees whenever technologically (esp. the thermodynamics) different appliances were compared[8]. The rationale for using TEWI and LCCP applies equally to meeting VCS 2007.1 requirements.

Figure 1: Example TEWI Result



Over its lifetime, a typical domestic refrigerator emits 4 units CO_2e in the form of leaking refrigerant and 96 units CO_2e in the form of electricity consumed (in other appliances direct emissions can be a much larger share). A VCS project destroying refrigerator ODS results in other refrigerators without ODS being used. When these new refrigerators are less energy efficient than the ODS containing ones, the overall GHG impact can be negative, i.e. more GHG are emitted producing the additional electricity consumed that the GHG impact of the ODS destruction. An ODS refrigerant, an ODS in the insulation foam and the other appliance parts are the unit of analysis, cutting ODS from these parts analytically would not follow the principle of completeness in VCS 2007.1.

To quantify a baseline and a project scenario, the old and the new appliances should to be considered inside the project boundary. Appliances represent GHG sources and reservoirs according to VCS 2007.1. The distributed character of the six wide circulation ODSes should be considered here also because when dealing with large numbers of appliances, VCS methodologies can use sampling and benchmarks, as is the case in standard CDM methodologies. For instance for 2002, 94% of all CFC-12 worldwide was in refrigerators and Air-conditioners, 97% of HCFC-22 and 100% of all HCFC-123[9] and the ODS volumes per appliance are usually less than one kg. Thus almost all ODS projects will treat ODS from thousands of appliances in few days. To assure accuracy and conservativeness of the emission reduction estimation, baseline and project scenarios can use averages across large numbers of appliances and it is not necessary to account for each and every appliance.

This principle of life-cycle analysis for completeness of the emissions impact and the statistical monitoring in the carbon accounting also underlies the CDM methodology

[8] Applying TEWI and LCCP was never uncontested because details of leakage assumptions remain contentious, as in many environmental impact assessment applications, however the environmental principle behind various versions of TEWI and LCCP was never in doubt.

[9] Calculated from Schwarz W.(2004) "Der hohe und wachsende Anteil fluorierter Treibhausgase (F-Gase) an den globalen treibhauswirksamen Gesamtemissionen", Greenpeace Deutschland, page 9. Equivalent shares appear in the TEAP Bank inventories.

AMS III.X, a methodology for household refrigerators. Old and new appliances are monitored in operation and the recycling, reclaiming or destruction of HFC-134a is added to the electricity consumption impact. Another relevant CDM methodology is AM0060, for large chillers, with defined protocols for energy consumption of old and new chillers and where any change in ODS emissions must be accounted for as leakage. Irrespectively, the new chillers must have lower GWP refrigerants than the old ones.

Besides life-cycle analysis and statistical monitoring, there is a third rationale for the boundary, the ownership of the emission credits. The logistics of collecting large numbers of appliances is a major part of the ODS abatement cost. With a boundary including the life-cycle, the project owner is enabled to assemble different operational tasks and different companies. For this reason, the Climate Action Reserve also considers in its project protocol scoping whether the project proponent can be the company doing the recovery, the aggregator of appliances of ODS or the destruction facility. The three can be combined or separated.

For cost effective solutions and adaptations to the context, rural or urban, industrialization, income levels and so on, variable organizational form allows project proponents to innovate. CFC-12 or HCFC-22 can be collected decentrally or in a landfill where appliances end up. Appliances can be de-manufactured in automatized large scale plants, or manually on different sites, sometimes for better integration in other recycling processes for metal or plastics. Insulation foam can be separated mechanically from the appliance and the ODS extracted at another site, and so on. A life-cycle boundary in VCS methodologies enable project proponents to include all related steps in a chain of events, taking out the appliance of its usage site, …… until the final fate of the materials in the appliance and account for the impact. The full GHG outcome is credited and the project proponent can define the operational steps probably to minimize costs[10], but not to limit the project activity to only a part of the chain.

Fourthly, and probably the most important factor for VCS and appliances is that setting the boundary of the VCS projects appropriately reduces the risk of “low-hanging” fruit in ODS gathering and opportunistic profit taking. The prime example is the destruction of CFC-12 (cheap) while releasing the CFC-11 (expensive) from the same appliances. Preventing this with a life-cycle boundary seems imperative to protect the environmental integrity of VCS.

Summing up, the dominant form of ODS is widely distributed in appliances with 0.1 – 0.3 kg ODS per appliance. Baseline and project scenarios should include the appliance in typical usage. ODS destruction involves large numbers of appliances, suitable for statistical monitoring as used in CDM projects. Besides the principles of VCS 2007.1, the life-cycle boundary also increases project proponents’ incentive to assemble different project activities in the most effective manner and prevents low-hanging fruits.

[10] Limiting the recycling cost was a concern for the regulation of appliance recycling in the EU’s WEEE, Directive EC 2002/96.

3. Project Boundary

The life-cycle boundary can be established better for large numbers of appliances than for small amounts since the latter can be difficult to relate to average usage. Thus there are analytical and pragmatic reasons to apply the life-cycle boundary only to wide circulation ODSes (11, 12, 123, 141b and 142b).

In chapter 1, a number of reasons for the distinction of wide or small circulation are given – reflecting MLF outcomes, volumes remaining, regional occurrence and need for destruction technology. The life-cycle boundary requirement would add another one to these reasons.

A compromise between accuracy and generalizability can be defined and such a definition of a life-cycle boundary is applicable across all possible VCS projects. Proklima proposes one definition here as an illustration:

Wide circulation ODSes:

a. all ODSes in old and new appliances must be accounted for
b. energy consumption in normal usage of old and new appliances is included with statistical monitoring of usage parameters
c. ODSes emitted during maintenance of old and new appliances can be accounted for only with values from the IPCC Guidelines for National GHG Inventories
d. last users (households, workshop or commercial units) of the appliances are identified and a paper trail linking transports from last site of usage to the site where material fractions are separated is possible
e. the GHG emissions on the site of material fraction separation of the appliances are excluded from the boundary (significantly inferior to the GHG emission reductions from the re-use of material fractions)
f. the material fractions of the appliances leave the boundary with the exception of ODS
g. GHG emissions of the destruction of ODS are accounted for, substances recovered from the destruction are excluded (for example HF and HCl acids recovered in reactor cracking), and landfills for the destruction outputs are excluded

Small circulation ODSes:

Boundary requirements as above, but excluding b and c.

Without b and c, while the new and old appliance or equipment most be known, the operation of that appliance does not have to be quantified for small circulation ODSes.

4. Eligibility criteria in conjunction with life-cycle boundaries

Eligibility Criteria	Description	Rationale
Any destruction project of ODS needs to establish the equipment in use where the ODS was last used.	For equipment from which any ODS is destroyed, a paper trail allows to establish where the equipment was in use. The paper trail is based on delivery documents, container identification and related commercial documentation. Addresses of households, workshops or commercial locations and the transport to recover or recycling sites can be checked.	The destruction of ODS creates demand for other equipment for the services. In order to assure that all GHG are reflected, the usage must be documented. Perverse incentives are also prevented.
The boundary of an ODS methodology involving one of the six major ODS must combine old appliances usage and corresponding new appliance usage	Usage for all ODS containing equipment consists of electricity consumption. Statistical methods are used to establish average energy consumptions of the type of appliances containing the ODS destroyed and those appliances used in place. Emission factors from CDM are used.	The destruction of ODS creates demand of other equipment for the services. In order to assure that all GHG are reflected, normal usage of the appliances should be quantified and be part of project scenario and baseline. The complete life-cycle is thereby included.
All ODS used in old and new appliances are included in the baseline and project scenario		The destruction of ODS creates demand for other equipment for the services. In order to assure that all GHG are reflected, the usage must be documented. Perverse incentives are also prevented.
Where CDM methodologies request recovery standards for specific appliance types, these standards must be used in the VCS		Steel, copper and aluminum are often 75% of appliances' materials and re-cycling these adds to the GHG impact, although it can only raise the conservativeness

projects with these appliances.

Further eligibility criteria effectively raising the quality of emission reductions can concern the new appliances: energy efficiency standards required for new appliances, no ODS in new appliances or low-GWP in appliances. Other relevant quality criteria for wide circulation ODS can be derived from the precise mass ratios between refrigerants and refrigerant lubricants or between foam blowing agents and PUR foam. The lubricant oil and the foam fractions can be weighted with accuracy. Methodologies can apply these ratios in order to control the origin of ODS.

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The philosophy of the VCS Program includes reaching a large variety of GHG emissions while supporting innovation in emission reduction activities and using effective accounting procedures. Innovation in dealing with appliances and ODS consists far more of dealing with the appliances than with the ODS destruction process in isolation. Furthermore the appliances containing the dominant ODS are often in the oldest equipment still in use and therefore innovation in emission reduction can effectively focus the up-stream preparations for ODS destruction.

The principle for VCS ODS guidance should be the quality of the majority of ODS destruction projects that will appear. Acknowledging the distributed volumes of the dominant ODS, the VCS ODS guidance should demand life-cycle boundaries for the six wide circulation ODSes. Guidance around the physical properties of destruction is misleading for these six ODSes. Whereas the destruction focus is more adequate for the large variety of small circulation ODSes that still appear in selected industries in selected countries.