MONTREAL PROTOCOL

ON SUBSTANCES THAT DEPLETE

THE OZONE LAYER

UNEP

Technology and Economic Assessment Panel

SUPPLEMENT TO THE MAY 2008 TEAP REPLENISHMENT REPORT

"ASSESSMENT OF THE FUNDING REQUIREMENT FOR THE REPLENISHMENT OF THE MULTILATERAL FUND FOR THE PERIOD 2009-2011"

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The opinions expressed are those of the Panel and its Task Force and do not necessarily reflect the reviews of any sponsoring or supporting organisation.

Table of Contents

1 Introduction

1.1 The Process

Decision XIX/10 of the Nineteenth Meeting of the Parties requested the Technology and Economic Assessment Panel (TEAP) to prepare a report for submission to the 20th Meeting of the Parties (Doha, November 2008) and to present it through the Open-ended Working Group at its 28th meeting (Bangkok, July 2008), to enable the 20th Meeting of the Parties to take a decision on the appropriate level of the 2009-2011 Replenishment of the Multilateral Fund. Decision XIX/10 specified the issues the Panel should take into account and directed the TEAP, in undertaking this task, to consult widely with relevant persons and institutions and other relevant sources of information deemed useful. The TEAP established the 2008 Replenishment Task Force (RTF) to prepare the report on the 2009-2011 replenishment of the Multilateral Fund, in consultation with the full TEAP membership.

The final TEAP replenishment report was published by UNEP in May 2008 as part of the TEAP Progress Report (Volume 2).

1.2 The Contact Group on Replenishment

During the 28th meeting of the Open Ended Working Group, the TEAP RTF presented its report on the Funding Requirement for the Replenishment of the Multilateral Fund for the triennium 2009-2011. After consideration of the report by the plenary, the co-chairs of the OEWG decided to set up a Contact Group to consider the report, and to possibly formulate additional requests for a supplementary study.

The Contact Group included representatives of many non-Article 5 and Article 5 Parties and was co-chaired by Mr. Sateeaved Seebaluck (Mauritius) and Mr. Jos Buys (Belgium). The Contact Group had a number of closed sessions, which were attended by members of the TEAP RTF and by representatives of the Multilateral Fund Secretariat, as resource persons.

All members of the Contact Group expressed their satisfaction at the clarity and transparency of the TEAP Report and the presentations thereon. During the discussions, the members of the Contact Group received clarification and additional information from TEAP RTF members and from representatives from the Multilateral Fund Secretariat. The Contact Group then discussed a number of topics and agreed on a number of issues that they believed should be clarified and elaborated in a supplementary report.

On the basis of the discussions in the Contact Group, the Open-ended Working Group agreed to ask the TEAP to elaborate a specific group of issues in the form of a report supplementing its May 2008 Replenishment Report. The specific elements for which elaboration were requested were given in the

report of the 28th Meeting of the Open-ended Working Group; they are attached to this document as Annex 1.

1.3 Procedure for the completion of the Supplement Report

The TEAP Replenishment Task Force has prepared this supplementary report to address the issues agreed by the 28th Meeting of the Open-ended Working Group. This report has been structured so that each of the issues requested for further study could be dealt with in a separate chapter.

In order to gain more information to support the Panels work on issues related to Institutional Strengthening, exports of products and equipment, and the issue on multinational shares in companies dealing with HCFCs, the Replenishment Task Force contacted 25 Article 5 Parties with requests for further information on these issues. The Task Force did not receive any relevant responses to its request for information.

As it relates to the working groups request on the issue of destruction, the report of the 28th Meeting of the Open Ended Working Group included a request for Article 5 Parties to submit information by 15 August 2008 on contaminated or confiscated amounts of ODS available for destruction. Responses from 28 Article 5 Parties were received by the end of September 2008. In addition, the TEAP also requested more information on amounts available for destruction in the correspondence to 25 additional Parties as mentioned above. One further specific brief response on available amounts was received. As a consequence, the TEAP analysis of likely tonnes to be destroyed and related costs is based on an extrapolation of the data that have been submitted on this issue.

The requests to study the impacts of different cut-off dates and the impact of the type of funding for second conversions have been the most time consuming ones. For these requests, the Replenishment Task Force has once more studied the views expressed by Parties at the beginning of 2008, pursuant to Executive Committee Decision 53/37. Results for different cut-off dates and amounts of funding that may be needed for second conversions are presented in this Supplement Report. The impact on the funding requirement associated with this analysis is not as straightforward as many may have thought, and early cut-off dates may have consequences for Article 5 countries when they have to deal with reductions larger than 10-15% of the baseline.

A separate chapter in this report describes the impact of the lowest cost (baseline) scenario, and a scenario that was designed to ensure that climate benefits are maximised by allowing additional funding according to a limit based on the magnitude of the climate benefit arising and its cost effectiveness in climate terms. In the absence of a proven mechanism for determining

project-by-project climate benefits for a number of technology options and project types, the RTF did not consider it appropriate to try to quantify the climate benefit of the current RTF funding proposals. The report has therefore focused on the differences between a number of scenarios, which could be used to define climate impact.

This report was reviewed by the RTF and the TEAP in the period 15-26 September 2008; all comments received were discussed before they were inserted. The report was subsequently submitted to the UNEP's Ozone Secretariat during the last week of September 2008 for dispatch to the Parties.

2 Executive Summary

After considering the report of the Technology and Economic Assessment Panel on replenishment, the Open-ended Working Group at its twenty eighth meeting requested the Panel to investigate a number of specific issues, and to present its findings in the form of a Supplementary Report. The final version of the Replenishment Task Force's Supplemental Replenishment Report was placed on the Ozone Secretariat's website on 7 October 2008 and sent to Parties soon thereafter. The report of the RTF includes a separate chapter on each of the issues that the Open-ended Working Group asked it to investigate. This chapter is a summary of the discussions and findings in chapters three to twelve of this Supplementary Report.

As a first request, the Working Group asked the Panel to study the impact that varying inflation on all activities would have on the replenishment. In that regard, the Parties asked the Panel to assume several different inflation rates, and to explain the rationale for using the rates that were selected. After considering various source materials on inflation, the Panel decided to calculate the impact of applying both a 3 and 5.5% inflation rate to funding components that it believed could be adjusted for inflation. The Panel then considered the application of these rates to both the baseline and 2012 scenarios that it had developed for the original May 2008 replenishment report. In the case of the baseline scenario, the Panel found that the application of the 3% and 5.5% inflation rates resulted in an increase in the funding requirement of about US $4.5 million for each percent inflation. In the case of the 2012 funding scenario, that Panel found that applying those rates resulted in an increase of funding of about US $9 million for each percent inflation.

The Panel also studied the Parties' request that it look at Institutional Strengthening (IS) funding scenarios that considered the needs likely to be encountered in the next triennium in implementing all aspects of the work programme, giving adequate attention to Group 4 countries. After reviewing the body of Executive Committee work on this issue, and considering the case that has been made by various Parties, the Panel concluded that it was difficult to find good arguments to justify either a specific level of decrease or a specific level of increase in IS funding. It also noted, however, that the funding already suggested by the Panel for HCFC servicing included several elements that could be considered as Institutional Strengthening activities. As a result, the Panel suggested that the funding scenarios published in the May 2008 Replenishment Report could be considered to contain an implicit increase of IS funding, even if the direct IS component was kept constant.

The Parties also requested the Panel to perform an analysis of the costs that might arise in the collection, transport and destruction (or re-deployment) of existing stocks of contaminated or confiscated CFCs and halons. To support

this effort, the Open-ended Working Group had requested Article 5 Parties to submit information on their available stocks of contaminated or confiscated CFCs and halons to the Ozone Secretariat by 15 August 2008. Data from the 28 responses received to this request were extrapolated by the Panel, which reached a conclusion that an upper bound of contaminated or confiscated CFCs and halons that might be available for destruction would be about 1500 tonnes of CFCs and halons. Because the original RTF report assumed that three times this level (4500 tonnes) could be destroyed with the US $27 million allocated in the report to destruction activities, the Task Force's Supplementary Report concluded that the US $27 million that was included in the original RTF report would be sufficient to cover all possible costs related to the transport and destruction of assembled contaminated or confiscated stocks of CFC and halon in the next triennium.

The Panel also studied the Parties' request for an estimate of the impact that alternative cut-off dates (30 September 2007, 1 January 2004, as well as 1 January 2000 and 1 January 2010) would have on this replenishment and the next two replenishments. As a reminder, the notion of cut-off dates refers to a date after which capacities for manufacturing chemicals, products and equipment would not be eligible for funding. The Multilateral Fund has had a cut off date of 25 July 1995 for all sectors and chemicals, but has not taken a decision on what cut-off date might apply to HCFC projects in the aftermath of the Parties decision to accelerate the HCFC phase-out. While the historic application of the cut-off date guideline by the Multilateral Fund relied primarily on a project by project evaluation of the Implementing Agencies to determine when new capacity was installed in related firms, it was not possible for the Task Force to undertake anything approaching such a detailed review. Instead, the Task Force used consumption as a surrogate for added capacity and made the assumption that all consumption beyond the level that was reported for the cut-off year would be ineligible for funding. Because some portion of the consumption increases that occur after the cut-off date (year) is likely to be associated with greater utilisation of existing capacity (rather then the addition of new capacity) the impact estimated by the Task Force should be considered as an upper bound estimate of the actual impact that would result from the cut off dates noted.

The Panel's complex analysis of these items showed that, as could be expected, the selection of earlier cut-off dates (e.g., 2000 or 2004) resulted in lower levels of consumption being eligible for funding. However, due to the fact that many Parties did not increase their HCFC-141b foams consumption until after 2000, the Panel found that earlier cut-off dates would require Parties to bring forward higher cost refrigeration and air-conditioning projects to meet the initial freeze and the subsequent 10% reduction obligations. As a result, the Panel concluded that an early cut-off date would actually lead to an increased funding requirement in the next triennium 2009-2011 (or in the next two trienniums), although it would be lower thereafter. For example, the

Panel found that with a cut-off date of 2000, the baseline scenario would yield a funding requirement for HCFC capital costs that would be about US $16 million higher than for a cut-off date of 2007, while an assumption of HCFC capital costs plus 2 years operating costs would necessitate an increase in funding of about US $105 million for the same cut-off date of 2000. Also of note is the Panel's finding that, even though the funding needed to ensure compliance would increase if an earlier cut-off date would be used, the higher level of funding actually supports fewer Parties. This is because many Parties undertook most of their shift to HCFC-141b in foams after 2000, and Parties in this position would have a relatively small HCFC-141b consumption. For example, in the case of a 2000 cut-off date, several Parties would not have any eligible reduction activities beyond the first 10% reduction step that will occur in 2015.

In addition to the issue of cut-off dates, the Panel was also asked to consider scenarios for funding different components of second stage conversions (that is, conversions of plants that were previously converted by the Multilateral Fund from CFC-11 to HCFC-141b). Specifically, the Panel was requested to consider funding only incremental capital costs, incremental operating costs and technical assistance for such projects, taking into consideration Decision XIX/6. Also in this case the Panel used available HCFC consumption reports; specifically, in undertaking this analysis, the Panel was able to use available MLF project completion data to calculate the percentage of second conversions in the total HCFC-141b foam consumption for different cut-off dates.

The consideration of cut-off dates is made more complex by the fact that there are two ways of considering second conversions of foam operations: (1) assuming that these conversions take place in a gradual manner over time, as a percentage of the total conversions, and (2) assuming that they take place as soon as possible, and before any conversions from new HCFC equipment are considered. The analysis of these different assumptions was largely undertaken in an aggregate (country group) manner, and leads to substantial differences in funding requirements in different trienniums. Because this analysis cannot be really done on a country specific basis, the resulting funding impact findings should be considered to indicate reductions in funding relative to an assumption that all second conversions would be eligible. Compared to a scenario that assumes full funding of second conversions, a decrease in the funding requirement in the range of US $0-50 million was calculated for the next triennium for the various scenarios and for the cut-off dates of 2007 and 2004. A decrease in the range of US $0-80 million was determined for the triennium thereafter. While values for the third triennium are somewhat more difficult to summarise, it is clear that a 2000 cut-off date would lead to lower values because there is no consumption that is left as eligible for funding. As it relates to all of these scenarios and the funding estimates suggested, it needs to be emphasised that the actual funding

differences that would take place would be highly dependent on when a specific Party will undertake second conversions, and on the actual consumption levels faced by related firms (as opposed to the aggregate estimates by the Task Force). It is also important to note that while the area of second conversions may be important in some Parties, in others it may not be an issue. Estimates of the impact of the way of funding second conversions have also been given for the 2012 funding scenario, in order to make a comparison with the baseline funding scenario.

As requested by the Parties, this Supplementary Report also provides a more complete explanation of how cost-effectiveness factors have been constructed in different sectors, and which effects were taken into account. It also attempted to address the Parties' request for a review of the effect that the conversion of equipment at the end of its useful life would have on the cost-effectiveness figures for the consumption sector and the overall funding requirement. As regards this latter issue, the Panel concluded that it was difficult to determine precise quantitative impacts, and that the funding impact of conversions of equipment would be sensitive to the cut-off dates agreed by the Parties and the assumptions on the lifetime of related equipment.

Chapter 8 of this report deals with climate effects. In this chapter, the Panel gives qualitative considerations for a replenishment scenario (the May 2008 funding requirement scenarios), a baseline, a functional unit and a technical potential scenario. It also describes the way a functional unit approach/ scenario would look at the issues of GWP, energy efficiency and costs. However, since there are uncertainties related to energy efficiency for the different replacement options available, since the technology options are not clear and since capital and operating costs will evolve in currently unpredictable directions over the next years that the Fund will be operated, the chapter concludes that it is too early to come up with quantitative estimates for each of the scenarios.

Chapter 9 of this report deals with the issue of additional reference data (i.e., HCFC consumption data for the year 2007). Since only a third of the Group 1 and 2 countries had submitted HCFC consumption data for 2007 by the time this report was completed, it was not possible for the Task Force to calculate the precise impact on the funding requirement scenarios as published in the May 2008 report. However, of the six Group 2 Parties that so far did report 2007 HCFC consumption data, three Parties reported an aggregated HCFC consumption that was 8-15% higher than in 2006, and three reported a 40-80% higher consumption level. If this trend were to continue after 2007 (which the Panel thought likely) the Panel believed that the funding requirement for the next triennium 2009-2011 could well increase.

Chapter 9 also deals with the resubmission of Chinese data for the years 2005 and 2006. The originally submitted Chinese export data were not correctly

registered, which led to wrong consumption levels being published for the different HCFCs for China for the year 2005, as well as for 2006. The Task Force has studied the resubmitted data and, as requested, has made new funding requirement calculations for the three trienniums. The corrected (new 2005-2006) Chinese data result in a slight reduction of the funding requirement, i.e., the baseline funding for the next triennium will be reduced by US $1.5-2.5 million, and the 2012 funding requirement will be reduced by US $5-7 million. Similar reductions would apply to the trienniums thereafter.

The Panel's Supplementary Report also includes a chapter dealing with the Parties' request that the Panel reconsider its figures for demonstration projects taking into account the different applicability of technologies due to climate diversity among countries. In its analysis, the Panel was asked to make the corresponding cost adjustments to the remaining HCFC compliance activities on the assumption that the demonstration activities would in fact produce HCFC reductions. In this regard, the Panel suggested establishing 10 demonstration projects, two in each of five different temperate regions. It also assumed that the cost of these demonstration projects would be twice as high as normal phase-out projects due to the inclusion of more specific construction elements and the addition of temperature and power monitoring stations. Taking into account this array of demonstration projects, and factoring in the reductions that they would be expected to achieve, the panel calculated that related costs would be about US $2.7 million, which would imply a corresponding reduction of about US $2.7 million from what the Panel had originally proposed for demonstration projects.

Chapter 11 considers the impact of export percentages and the share of multinational ownership that would be ineligible for funding in Article 5 companies. In accordance with Multilateral Fund rules, project funding is reduced by the percentage that a firm exports to non-Article 5 Parties and by the percentage multinational ownership share of a firm. In addressing this issue, the May 2008 report had assumed a 20% reduction in the funding due to exports and multinational ownership in the refrigeration and air conditioning sectors. As no further reliable data on the export and multinational factors have been obtained since the May 2008 report, this assumption has been retained in the Supplementary Report. However, to correct the fact that the May 2008 report had not considered the application of the export and multinational ownership factors to the foams sector, the Supplementary Report investigates the impact of a 20% export and multinational ownership assumption for the foam sector. The inclusion of this assumption results in a reduction of US $10-15 million dollars in the total funding requirement for the next triennium. The impact of even higher percentages of exports and multinational ownership were also calculated and are included in the report.

In conclusion, as of September 2008, the Replenishment Task Force estimated the total funding for the 2009-2011 replenishment to enable the Article 5

Parties to comply with all relevant control schedules under the Montreal Protocol to be in the range of *US $338.7-629.8 million*. Specifically, the baseline funding scenario considers estimated required funding to be in the range of *US $338.7-387.2 million*, while the 2012 funding scenario estimates required funding to be in the range of *US $510.6-629.8 million*. These numbers showed only small changes compared to numbers in the May 2008 Replenishment Task Force report (about US $5 million in case of the baseline scenario and about US $10 million in case of the 2012 funding scenario). Specifically, the changes were related to the re-calculation of the funding requirement after the re-submission of Chinese data (which were not dealt with properly in the May 2008 report), and the re-calculation of the demonstration projects impact on the total funding requirement. All other factors that may have an impact on the funding requirement and which have been analysed in the Supplementary Report are presented solely for the Parties' consideration. .

Chapter 12 gives concluding remarks and summarises the impact of different factors on the total funding requirement, in particular for the next triennium.

Annex 1 gives the list of issues requested for further investigation. Annex 2 presents again the funding requirement tables from the May 2008 Replenishment Report. As requested by the Open-ended Working Group, Annex 3 gives a risk analysis related to non-compliance if a Party has to deal with a large (9%) growth in HCFC consumption in the period 2010-2012, which would have to be reduced again to the baseline level by the year 2013.

3 Inflation

The Contact Group requested the TEAP Replenishment Task Force to present a study in which the rate of inflation would be varied for all activities, assuming several different percentages. It also requested the Panel to explain the rationale for using the percentages selected.

The TEAP Replenishment Task Force decided to study the impact of inflation on the funding requirement for the period 2009-2011 only, for both the baseline funding scenario and the 2012 funding cases (see Annex 2).

The funding was estimated at the 2008 price level (see Annex 2). Inflation was applied for the year 2009, 2010 and 2011.

With regard to the request the Task Force to study the impact of varying inflation for all activities, the Task Force first considered all types of activities, in order to judge whether inflation could be applied to all of the separate elements. In that regard, the Task Force concluded that:

- Existing approved projects (whether NPPs, TPMPs, production closure projects etc.) cannot be increased for inflation since these projects were agreed by the Executive Committee at a specific funding level – which can not now be adjusted.
- New ODS projects that are supposed to be approved and (1) to be funded in one tranche) and/or (2) to be finished or completed by the end of the year 2009, can be increased by one time the annual inflation.
- New ODS projects concerning substances that will not be phased out until 2015, or technical assistance and similar activities can be considered for inflation during the entire period 2009-2011.
- New activities, such as "remaining HPMP preparation" or HCFC demonstration projects can only be considered for the year 2009, and that would imply that one time the annual inflation percentage would apply.
- HCFC activities, both servicing and non-servicing investment projects, could be considered for inflation during the entire 2009-2011 period.

The level of all non-investment activities, such as Institutional Strengthening, Multilateral Fund Secretariat and Executive Committee activities, Agency Core Unit funding and Treasurer costs have been agreed upon by the Executive Committee and cannot be adjusted for inflation. In accordance with Executive Committee decisions, the CAP Programme and the Agency Core Unit costs are already subject to annual increases of up to 3%, which can be considered a global inflation correction.

In order to determine which inflation percentages to include in this study, the TEAP RTF has considered various literature sources, from the International Monetary Fund, the World Bank, the International Finance Co-operation and several other institutions. In none of the reports global inflation rates are

considered. Most of the reports include separate inflation rates for industrialised and less industrialised countries or for developed countries and the so-called emerging economies. Inflation estimates for 2005-2006 were estimated in several reports for the developed world and, in the case of World Bank reports, for the developing countries separately. It is therefore difficult to derive exact global average percentages. The task given to the Task Force is made even more difficult due to the fact that the funding requirement calculations for the Multilateral Fund concerns a mix of activities for each element, which could involve the purchase of equipment in the developed world, and the purchase of both goods and services (non-investment components) in both the Article 5 and non-Article 5 countries. As a consequence, it is extremely difficult to apply a single percentage.

On the basis of estimates for the inflation in non-Article 5 Parties (advanced economies) in 2004-2006, and on the basis that inflation in these economies will decrease again after 2008, an inflation rate of 2% was chosen. Inflation rates in the emerging or developing economies were estimated to be higher and varied from more or less 0% to about 10%, with higher percentages for a few countries (source: World Bank publications). On this basis, a global average inflation rate of 3% was chosen, which would also be consistent with the annual adjustments allowed by the Executive Committee for CAP, Agency Core Unit funding etc. Inflation percentages went up in non-Article 5 Parties in 2007-2008 to 2.5-4%, whereas several larger Article 5 countries had inflation rates exceeding 7 % (with several Article 5 countries having percentages between 10-and 20%).

Baseline Funding 2009-2011	**Inflation (0%)** (baseline Annex 2)	**3%**	**5.5%**
ODS (appr., new)	64.58	66.008	67.209
Production	19.108	19.108	
HPMP	3.86	3.976	4.095
Demonstration	5.40	5.562	5.728
HCFC, non serv.	67.88-364.88	72.01-387.07	75.55-406.11
HCFC, servicing	63	66.83	70.119
Destruction	27	28.642	30.051
Supporting activ.	90	90	90
Assistance	2	2.122	2.226
Totals	342.82-392.32	354.25-406.75	364.09-419.17

Table 3-1 The funding for the various elements for different inflation percentages, viz. 3% and 5.5% globally, baseline funding scenario (in US $ million)

On the basis of a literature source by the International Monetary Fund /IMF08/, where percentages of 3.5% and 8.6% were given for May 2008 (for advanced and for emerging or developing countries, respectively), and by using an estimate of the global distribution of activities, a second "overall" inflation rate of 5.5% was determined.

The results of the inflation corrections can be seen in Tables 3-1 and 3-2. In these tables the costs that are not subject to inflation have been added and the elements subject to inflation have been given separately. This has been done for the baseline funding and the 2012 funding cases.

2012 Funding 2009-2011	**Inflation (0%)** (baseline Annex 2)	**3%**	**5.5%**
ODS (appr., new)	64.58	66.008	67.209
Production	19.108	19.108	
HPMP	3.86	3.976	4.095
Demonstration	5.40	5.562	5.728
HCFC, non serv.	243.34-364.88	258.14-387.07	270.84-406.11
HCFC, servicing	63	66.83	70.119
Destruction	27	28.642	30.051
Supporting activ.	90	90	90
Assistance	2	2.122	2.226
Totals	518.29-639.83	540.38-669.31	559.37-694.95

Table 3-2 The funding for the various elements for different inflation percentages, viz. 3% and 5.5% globally, 2012 funding scenario (US $ million)

In the case of baseline funding, the total level of funding needed for the 2009-2011 triennium increases by US $12-14 million for an annual inflation of 3%, and by US $21-27 million for an annual inflation of 5.5%.

In the case of 2012 funding scenario, the total level of funding needed for the 2009-2011 triennium increases by US $22-30 million for an annual inflation of 3%, and by US $41-55 million for an annual inflation of 5.5%.

The increase in the funding requirement is about US $4.5 million per percent inflation for the baseline funding scenario, about US $9 million per percent inflation for the 2012 funding scenario.

4 Institutional Strengthening

TEAP was requested to produce institutional funding scenarios that considered the needs likely to be encountered in the next triennium in implementing all aspects of the work programme, giving adequate attention to Group 4 countries. To help it assess this issue, the Task Force referred to Executive Committee documents and requested information from Parties.

4.1 Executive Committee report 53/61

In the Executive Committee report 53/61 the activities for non-HCFCs are defined as follows:
Following the final phase-out of CFCs, halons and CTC by 1 January 2010, as indicated in the paper presented to the 47th Meeting, Article 5 countries will need to take the necessary action to:

- *manage or co-ordinate management by implementing agencies of the completion (physical and/or financial) of ongoing national or sectoral phase-out projects and TPMPs, some of which may extend beyond 31 December 2009;*
- *phase out the final 30 per cent of consumption of methyl chloroform by 1 January 2015;*
- *phase out the final 80 per cent of consumption of MB by 1 January 2015;*
- *manage the storage and safe disposal (including possible destruction) of unusable CFCs and halons;*
- *meet continuing Montreal Protocol data reporting obligations and sustain the achieved phase-out of CFCs, halons and CTC; and*
- *manage the challenges of possible illegal traffic in any remaining new CFCs, halons or CTC (noting that CTC will continue to be generated as a by-product in the production of other, non-ODS chemicals).*

In the same Executive Committee report 53/61 an elaboration is given on the activities related to HCFCs:
At their 19th Meeting, the Parties to the Montreal Protocol, decision XIX/6, inter alia, endorsed an accelerated phase-out schedule for HCFCs (Annex V). Those parts of the relevant decision having an impact on the activities of National Ozone Units in the medium term (over the next 5 years) relate principally to:

(a) Preparing, collecting and providing sound and comprehensive Article 7 data as a basis for establishing their national HCFC consumption baselines as the average of consumption in 2009 and 2010;
(b) preparing to freeze HCFC consumption at the baseline level in 2013; and
(c) developing national phase out management strategies for HCFCs in line with guidelines on HCFC projects that may be agreed by the Executive Committee.

The activities that may need to be undertaken share a number of features common to the initial stages of national actions on CFC phase-out, for example:

(a) understanding and quantifying national consumption patterns;
(b) establishing linkages with industries and industry organisations associated with the import/export and use of HCFCs;
(c) extending regulatory measures to effectively control HCFC imports/exports;
(d) developing/establishing the types of interventions (projects and activities) that would provide the most cost-effective initial means of curtailing increases in national HCFC consumption to enable compliance with a 2013 freeze; and
(e) preparing national HCFC phase-out strategies that set a framework for consideration of the approval of funding for HCFC phase-out.

In a number of paragraphs the Executive Committee 53/61 report discusses the amount of funding needed for Institutional Strengthening.

- Previous changes to the level of support for institutional strengthening occurred in December 2001 and in July 2004. Decision 35/57 made provision for an across-the-board increase of 30 per cent in the level of funding for institutional strengthening projects. In agreeing to this increase, the Executive Committee also included a clear commitment that this level of funding should prevail for all Article 5 Parties until at least 2010, even if they agree to phase-out ODS earlier than the dates required. In recognising the special situation of LVCs and VLVCs, decision 43/37 increased the minimum funding level of institutional strengthening projects to US $30,000 per year provided the country concerned had legislation in place and had appointed a full time national ozone officer.

- Through decision 47/49 the Executive Committee agreed that measures already taken for the current range of tasks and the existing workloads of National Ozone Units are sufficient to enable compliance with the controls ending up to 2010. Noting the importance of the remaining activities needed to support phase-out objectives after 2010, the Committee agreed that this was an indication for the need to continue the work of National Ozone Units beyond 2010 to sustain the CFC phase out achieved, if it can be demonstrated that the likely future tasks and workload of National Ozone Units will be of a similar order as at present. On this basis it could be considered that the financial support from the Multilateral Fund for institutional strengthening projects should be maintained post-2010, at the same funding levels for the time being.

- As referred to in paragraphs 18-21 above, activities related to accelerated HCFC phase-out will, at the broadest level, and subject to priorities to be

decided by the Executive Committee, be similar to those required in meeting CFC phase-out.

- Therefore, while it is clear that the accelerated HCFC phase-out schedule could affect the level of NOU activity, any change will be determined only when institutional structures and new activities are developed and implemented. It may be seen at this stage as a general indication of an incremental change to the business as usual scenario prior to the 19th Meeting of the Parties. Taking into account the other NOU activities over the same period, it may be reasonable to conclude that the overall level of activities requiring institutional support will not undergo a radical change in the medium term and thus that financial support from the Fund could be continued at existing levels.

4.2 Reactions received

Some reactions were received related to future Institutional Strengthening needs, which emphasise either lower or higher IS funding, based upon certain arguments. Two of them are given below:

(a) *"Over the past 15 year period, Article 5 Parties have developed significant experience and expertise in implementing and monitoring projects and programs to phase out ozone-depleting substances. Because this capability within Article 5 countries has been developed over many years, and because future activities to ensure Montreal Protocol compliance are similar to and well understood by national ozone units, there may be less need for support when compared with the years when the Executive Committee initially decided to assist in establishing national institutional structures, procedures and management capabilities. With shrinking responsibilities for managing and implementing projects to achieve the 2010 phase-out for many ozone-depleting substance and many countries, and the ability to utilise the many skills and broad expertise obtained over the years, Article 5 Parties may need less external support to implement future programs and projects which will benefit from lessons learned in the past. For instance, for the majority of Article 5 Parties (more than 110) with only HCFC servicing needs the expertise and capabilities that have been gained by the National Ozone Unit in implementing an RMP, an RMP update, and the current TPMP projects could be immediately adapted to managing the phase-out of HCFCs."*

(b) *"The NOUs face immediate main challenges that run parallel on three tracks: (a) achieving the 2010 compliance targets addressing last issues relating to ODS phase-out (e.g., remaining consumption in CFC RAC equipment, CFC MDIs, military ODS use etc.), (b) preparing for the implementation of institutional & other measures for sustaining the ODS phase-out beyond 2010. One of the main activities under this track would be addressing the availability of recycled/stockpiled CFCs, which will be*

needed to service the existing CFC based equipment (to avoid premature retirement) (c) addressing HCFC phase-out issues, which primarily include the HPMP preparation and baseline assessment, reporting and a quick start of HCFC phase-out projects. In the light of this, it could be expected that NOUs would encounter higher work loads and activity levels during the 2009-2011 period. During the last 3-5 years, countries in different regions (e.g., Latin American & Carribean region, Asia & Pacific) have seen high inflation figures. Given the higher levels of activities anticipated at the NOU office coupled with lower net available funding under the IS component, compared to local costs at the country, it is desirable to increase the funding for Institutional Strengthening (an increase of about 30-50% compared to current levels for the next two biannual renewals and review the situation thereafter. It must also be noted that after the initial 3-5 years, the levels of IS activities would decrease. Consequently, these costs could be re-examined at that stage."

4.3 Further considerations

On the basis of the above one could consider funding scenarios for Institutional Strengthening for dealing with all ODS except HCFCs, which could be 10-20% lower than the funding agreed for the past triennium. Having achieved the phase-out by 2010 for the larger amount of ODS (except mainly methyl bromide), and knowing that production will be zero, with virtually no new projects, completion of projects in the course of 2009 (and for some in 2010) will be a main task. Additional work will have to be done in the areas of managing stockpiles of CFCs, and addressing illegal trade; with zero consumption for most ODS, data reporting is assumed to be an easier task.

It is difficult to estimate what the extra workload there would be in the triennium 2009-2011 related to HCFCs. A large part of it is assumed to relate to understanding and quantifying national consumption patterns (a task that is already covered in the HCFC Phase-out Management Plans), establishing linkages with industries (much of which should have occurred already for other ODS), extending regulatory measures, and enhancing monitoring to include HCFCs.

The extra workload for HCFCs could imply that the total amount for Institutional Strengthening activities in the 2009-2011 triennium could remain the same as the amount agreed by the Executive Committee (the amount of US $22 million applied in the funding requirement tables of the May 2008 report).

In considering the issue of Institutional Strengthening, the Task Force wishes to note that it has proposed US $63 million for HCFC servicing related activities. US $28 million of this sum has been included for establishing regulatory measures and providing technical assistance. Specifically, the US

$28 million includes US $2.8 million for monitoring and US $10.5 million for introducing extended regulatory measures (legislation). Because activities such as these have often been funded under the umbrella of Institutional Strengthening, this US $13.3 million could be considered as adding US $13.3 million to the existing US $22 million used for Institutional Strengthening in the funding requirement as determined for the triennium 2009-2011. Seen in this way, the funding included in the original proposal could imply a 60% increase in the current levels of funding for Institutional Strengthening. This would apply to all country groups, including Group 4 countries, which were specifically mentioned in the Parties' request. This is comparable to the funds made available in the past under NPPs and TPMPs, which could also be considered as adding a certain amount of funding to Institutional Strengthening activities.

As it relates to inflation, Decision 53/61 of the Executive Committee mentions (in its paragraph 28):

- Another factor that could also have an impact on the current level of funding is inflation. However, inflation should be examined and evaluated in the context of the overall responsibilities associated with the IS project and other funding received for capacity building to determine whether a change to the current levels of compensation is warranted. Moreover, the varied modalities of implementing capacity building in the different Article 5 countries should also be taken into account. Therefore, the Executive Committee may consider this review and evaluation as part of the 2009 work programme for evaluation and monitoring to provide a comprehensive assessment of the need for changes to the current levels of compensation for capacity building under the Multilateral Fund.

In light of the Executive Committee decision noted above, a possible inflation correction could be the result of the review planned by the Executive Committee for its 2009 Work Programme. If it would be considered by the Executive Committee in 2009, the amount related to an inflation correction for Institutional Activities could then probably be found in the total amount for Institutional Strengthening as presented by the Task Force (which would consist of the pure IS component and part of the US $63 million for the servicing sector, where the latter has been considered subject to inflation in chapter 3 of this report).

5 Destruction

TEAP was requested to perform an analysis of the costs that might arise in the collection of existing stocks of contaminated or confiscated CFCs and halons and their transport to destruction facilities or redeployment as the case may be, and their destruction.

Article 5 Parties were requested to provide information to the Panel by 15 August 2008 on the amounts of stocks of contaminated or confiscated ozone depleting substances that they have ready and waiting for destruction.

In its May 2008 report TEAP suggested a funding requirement of US $27 million for the destruction of a certain amount of CFCs and halons in the triennium 2009-2011 (i.e., 1,500 tonnes per year, or 4,500 tonnes during the triennium). This is based on the estimates made in the May 2008 report (which estimates have been given in other reports) that destruction would cost between US $2.5 and 4.5 per kg, and that the total cost would be US $6 for collection, transport and destruction.

In accordance with the work of the Open-ended Working Group, Article 5 Parties were requested to submit data to the Panel on the level of existing stocks of contaminated or confiscated CFCs and halons they have that are ready for destruction. By end September 2008, the Panel had received submissions from 28 Article 5 Parties.

In a number of cases Parties reported that they had zero amounts. In other cases they reported on the amounts of contaminated or confiscated CFCs and halons, but also on the amounts that could become available for destruction but were still stored (in operation) in refrigeration equipment (and maybe also in foams). Several Parties also reported on amounts of non-reusable HCFCs (mainly HCFC-22), either as HCFC or in a mixture with CFCs. In one case a Party reported on the amount of foam available for destruction.

15 small consuming (mostly LVC) Parties reported a total amount of about 7 tonnes of contaminated or confiscated CFCs, with one country also reporting 19.5 tonnes in halon banks. One small consuming Party reported 200 tonnes of confiscated and contaminated CFCs available for destruction.

It is difficult to extrapolate the data received since the differences reported by the separate Parties are huge. Given the large amount of small consuming countries, the Panel assumed as an upper estimate that 600 tonnes of CFCs and 150 tonnes of halons might be available for destruction in the small consuming Parties.

Five reports were received from large consuming Parties (Argentina, Colombia, Egypt, Malaysia and Thailand). Some of these submissions also mentioned the amounts of CFCs contained in equipment, which would be recovered in future and would be available for destruction at a future time. One Party also mentioned the collection, recovery and destruction of refrigerator equipment. The reports on confiscated and contaminated CFCs mentioned quantities that varied from very detailed numbers to "not known", "up to 2 tonnes", 15 tonnes, to "100s of tonnes of various ODS-estimate which needs verification". One report mentioned 25.85 tonnes of halon 1301, available for destruction.

Taking into account the submissions, and the relatively small number of large consuming Parties (where the largest ones did not report, even in September 2008), the Task Force estimated that 500 tonnes of confiscated or contaminated CFCs and 250 tonnes of such halons might be available for destruction in the large consuming Parties. This would yield a total, extrapolated amount of 1500 tonnes of CFCs and halons for all Article 5 countries, where the uncertainty in the number is significant. The amount could even be adjusted upward if the largest consuming Article 5 Parties would submit information that substantial amounts of material would be available for destruction.

As these amounts are confiscated or contaminated it must be assumed that the amount has been gathered over a certain period of time, which might be several years. It is not clear whether this amount would become available every year. This is the reason that it is actually impossible for the Task Force to give a good estimate for the next triennium. Assuming that all efforts to collect material for destruction will increase substantially in the coming years, one could say that, in the next triennium, there would be a total amount available for destruction of three times the amount of 1,500 tonnes.

With the estimate of 4,500 tonnes as reported in the May 2008 Replenishment Report, the Task Force believes that the amount of US $27 million earmarked for destruction during the triennium 2009-2011 would be sufficient.

6 Multilateral Fund issues

TEAP was requested to consider the impact on the funding needed for the replenishment of varying several Multilateral Fund parameters. In that regard, the Task Force first estimated the impact on the coming replenishments of applying cut-off dates of 30 September 2007, 1 January 2004 as well as 1 January 2000 and 1 January 2010. The Task Force then studied the impact that funding different components of second stage conversions (namely, incremental capital costs, incremental operating costs and technical assistance, taking into account Decision XIX/6) would have on the replenishment. Each of these issues will be considered below.

Cut off dates: The cut-off dates refer to a date after which capacities for manufacturing chemicals, products and equipment are not eligible for funding. The Multilateral Fund has had a cut-off date of 25 July 1995 for all ODS sectors and chemicals, but has not taken a decision on which cut-off date might apply to HCFC projects in the aftermath of the Parties decision to accelerate the HCFC phase-out. While the historic application of the cut-off date guideline by the Multilateral Fund relied primarily on a project by project evaluation of when new capacity was installed in related companies, it was not possible for the Task Force to undertake anything approaching such a detailed review. Instead, the Task Force has used consumption as a surrogate for added capacity. Such an assumption means that all consumption increases after the cut-off date would be ineligible for funding. Because some portion of the consumption increases that occur after the cut off date are likely to be associated with greater utilisation of existing capacity (rather then the addition of new capacity) the impacts provided in this Supplementary Report should be considered as outer bound estimates of the actual impact that would result from cut-off dates based on the date of capacity enhancements. TEAP's analysis of this issue assumed that capacities that would have been installed on 1 January of a year would get on stream during that year, and TEAP therefore used the reported Article 7 consumption for the relevant year the cut-off was investigated as the cut-off consumption (e.g. a 30 September cut-off date assumed consumption increases assumed or extrapolated for the years after 2007 were ineligible).

The TEAP analysis of this issue studied the HCFC consumption patterns of the Parties in Groups 1, 2 and 3. The Parties in Group 4 were not included in this analysis, as they were assumed to have servicing consumption only, and as a consequence, the establishment of a cut off date would not be expected to have an impact on funding for these countries. TEAP's analysis considered consumption for the period 2000-2006, as well as the extrapolated consumption levels for the period 2007-2012.

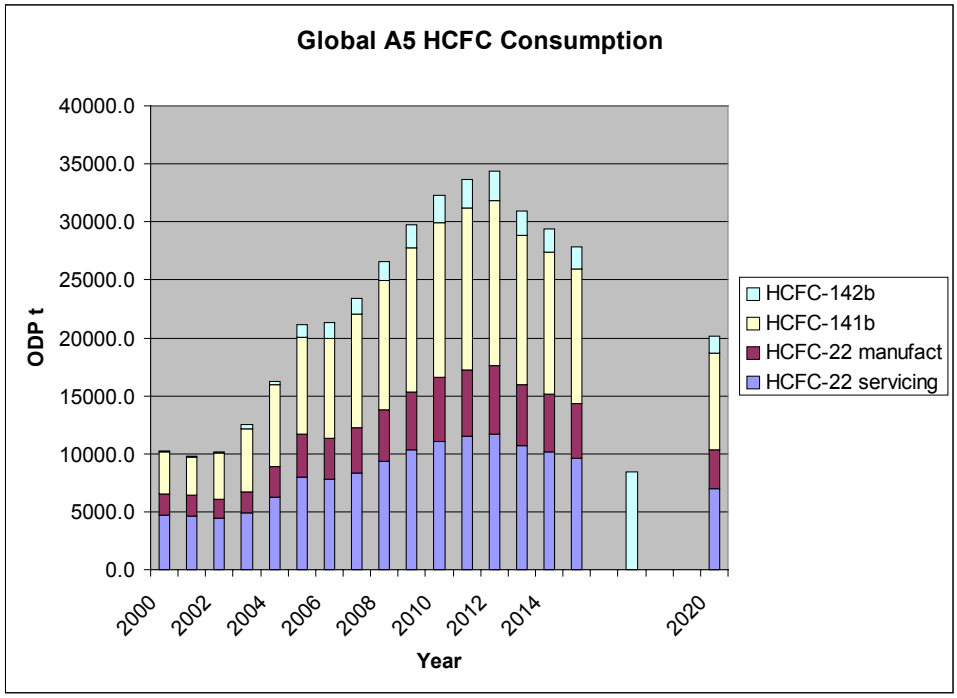


Fig 6-1 Global 2000-06 HCFC consumption and extrapolations after 2006. The bar shown after 2015 is the reduction to be achieved in HCFC non-servicing through 2020 (via approvals 2009-17); servicing reductions are already subtracted

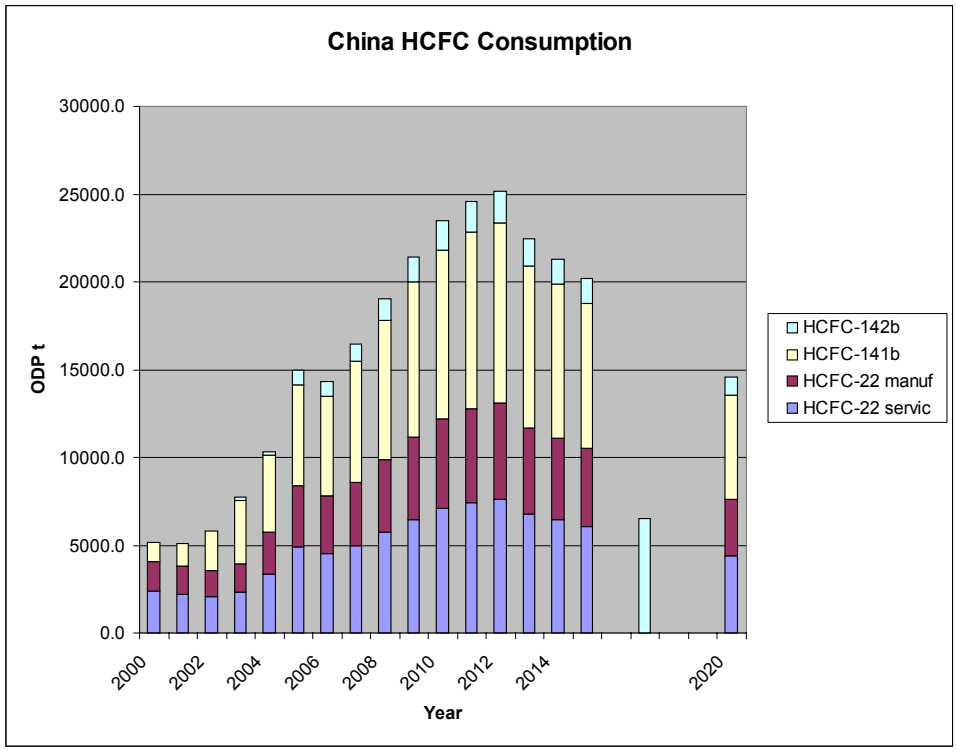


Fig 6-2 Group 1 2000-06 HCFC consumption and extrapolations after 2006. The bar shown after 2015 is the reduction to be achieved in HCFC non-servicing through 2020 (via approvals 2009-17); servicing reductions are already subtracted

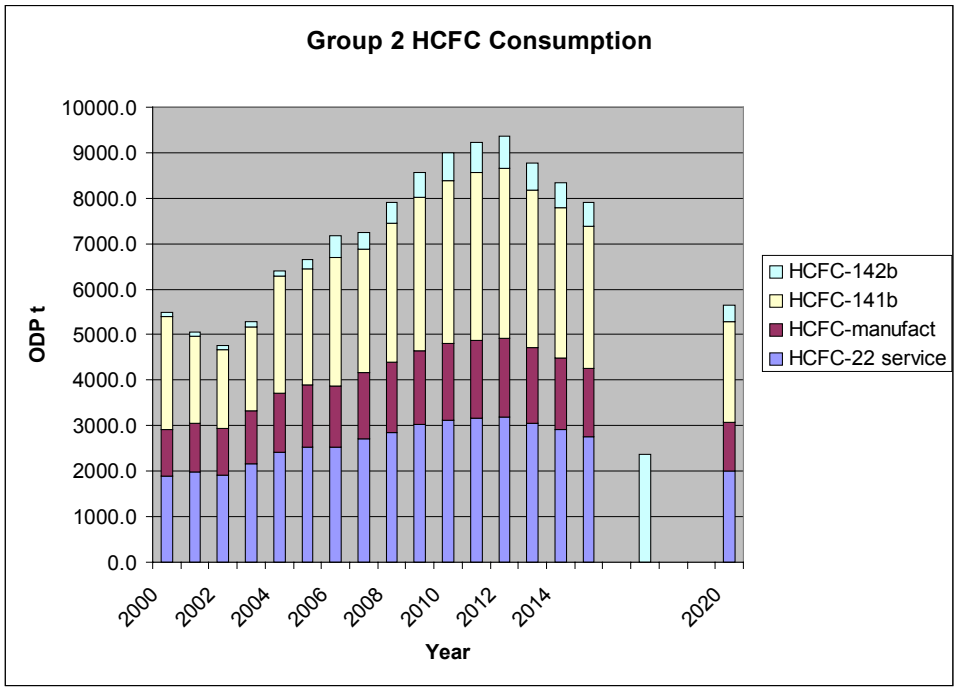


Fig 6-3 Group 2 2000-06 HCFC consumption and extrapolations after 2006. The bar shown after 2015 is the reduction to be achieved in HCFC non-servicing through 2020 (via approvals 2009-17); servicing reductions are already subtracted

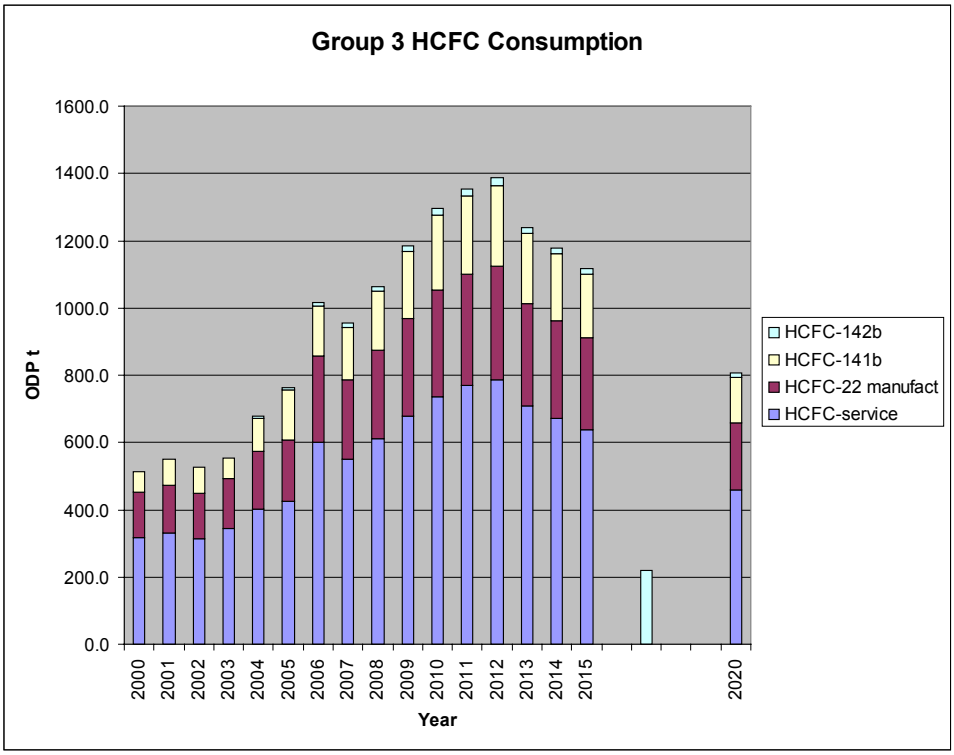


Fig 6-4 Group 3 2000-06 HCFC consumption and extrapolations after 2006. The bar shown after 2015 is the reduction to be achieved in HCFC non-servicing through 2020 (via approvals 2009-17); servicing reductions are already subtracted

This review enabled the Panel to compare the 10% reduction from the freeze year 2013 through 2015 --and subsequent reductions-- with the consumption level in the years 2000, 2004, 2007 or 2010. The assumption made in this analysis is that all necessary reductions for compliance that are eligible are funded by the Multilateral Fund.

6.1 Cut off date 2000

A 2000 cut-off date is assumed to mean that capacity installed after 1 January of that year would not be eligible for funding, and that HCFC capacity installed before 1 January 2000 would be utilised in that same year; it is therefore assumed that the 2000 HCFC consumption data would apply for the cut-off calculations. Under this scenario, the reduction to be achieved in the period 2013-2015 via eligible manufacturing conversions would equal the total reduction minus the reduction assumed in the servicing sector. This 10% reduction is part of the scheduled reduction through 2020, which is shown in the figures above as the bar after the year 2015. This bar has to be compared with the non-servicing consumption (upper two-three parts in the bars in the charts for the year 2000 in case of a cut-off date of 2000 in Figs. 6-1 through 6-4; the same would apply for other cut-off years). Except for China, these bars show the consumption of certain Groups of Article 5 countries, and it is therefore difficult to judge from these charts what the reduction for a specific country would mean (except in the case of Group 1, China, in Figure 6-2).

For the purposes of this analysis, the level of reductions necessary to achieve the upcoming requirements of the Protocol is always assumed to come first from eligible projects, and not from independent action taken by the Article 5 countries themselves. As a consequence --in the case of a 2000 cut-off date--, a significant portion of the manufacturing capacity available in the year 2000 (and therefore eligible) needs to be addressed for conversion in order to achieve compliance with the 10% reduction in the year 2015, especially in the case of the Group 1 and 3 countries. In contrast to what might be expected, the use of an early cut-off date does not lead to a big difference in the funding for capital costs. This is because investment projects are necessary to effectuate the needed reductions, and there is little difference in the capital costs associated with foams projects on the one hand, and refrigeration and AC projects on the other. The main difference in the case of a cut-off date of 2000 is due to the lower ODP of HCFC-22. As a consequence of that, in order to achieve equal ODP reductions, one would need more tonnes of HCFC-22 than tonnes of HCFC-141b, which results in an increase in capital costs in most cases; this even when capital costs for refrigeration and AC are somewhat smaller on a per kg basis.

However, if operating costs are included in the analysis, the amount of funding required for the first triennium with a cut-off date 2000 is much higher than for later cut-off dates. This is due to the fact that in most

countries, more refrigeration and AC conversions will have to be done, since not enough consumption is available from eligible foam sector projects to fully cover the first 10% reduction, or 10-20% reduction from the baseline. Again, it needs to be stated that while this applies to many Article 5 Parties, there are Parties that have a large consumption in the foam sector in the year 2000 already, where 10-30% reductions after the 2013 freeze (the baseline) can be achieved by converting foam operations that were already in existence in the year 2000. This is especially the case for a number of Group 2 countries.

Turning to the years between 2015 and 2020 when the reductions between 10 and 40% of the baseline have to be achieved, some Parties will face the situation of having virtually no eligible foams projects and only eligible refrigeration manufacturing conversions if they are to achieve compliance; in other Parties, no eligible projects would be left and those Parties would not be able to achieve compliance, unless they would fund their own conversions of manufacturing equipment installed after the year 2000.

It should be noted that the entire discussion on the phase-out of HCFC-22 consumption in the refrigeration and AC sector assumes that reliable, efficient and environmentally friendly alternatives for HCFC-22 are available for many refrigeration and AC sub-sectors at short notice, i.e., already at the beginning of the triennium 2009-2011, when decisions on conversions have to be made in the case of early cut-off dates.

As an overview, where it concerns the cut-off date 2000:

- Group 1, China, can achieve the 10% reduction from the baseline through the conversion of eligible projects, maybe slightly more, after which no eligible capacity is available. This is due to the fact that consumption has grown substantially after 2000, which impacts the baseline and the size of the necessary reductions; these relatively large reductions can only partly be covered from capacities in operation in the year 2000;
- In Group 2, 3 Parties can achieve only part of the required 10% reduction from the baseline through conversion of eligible projects during 2013-2015, 1 Party can achieve more or less the full 10% reduction from the baseline through conversion of eligible projects, 6 Parties can achieve a 15-20% reduction from the baseline through the conversion of eligible projects, and 7 Parties have such large consumption in 2000 already that they can achieve reductions larger than 30-40% from the baseline through the conversion of eligible (2000) projects;
- In Group 3, several Parties can achieve a 10% reduction from the baseline through the conversion of eligible projects, but many Parties have such a small consumption in the year 2000, that they cannot find enough eligible operations in that year to cover the first 10% reduction.

6.2 Cut off date 2004

A 2004 cut-off date is assumed to mean that capacity installed after 1 January of that year would not be eligible for funding, and that HCFC capacity installed before 1 January 2004 would be utilised in that same year. It is assumed that the 2004 HCFC consumption data would apply for the cut-off calculations. In the 2004 cut-off date scenario, there are more eligible foam sector foam projects that can be converted to realise the 10% reduction from the baseline. This will then reduce the number of more costly first triennium refrigeration and AC projects and result in decreased funding required in the triennium 2009-2011 compared to the cut off date of 2000; moreover, for many Parties, it also will reduce the amount of funding required in the 2012-2014 triennium. This does not imply that the funding requirement will be less than for a cut-off date later than 2004 (as e.g. the 2007 date which has been selected in the May 2008 Replenishment Report); in the 2004 cut-off date scenario it is still so that more refrigeration and AC manufacturing operations have to be converted during the initial years as compared to a 2007 cut-off date scenario.

As an overview - for the 2004 cut-off date scenario:

- Group 1, China, can achieve a 25-30% reduction from the baseline through conversion of eligible projects, maybe slightly more. In the case of China this is due to the fact that the HCFC consumption has grown substantially in the period 2000-2004 (factor of 4.3), which impacts the baseline and the necessary reductions; these relatively large reductions can be covered from capacities in operation in the year 2004 (addressed in this study via the 2004 consumption data);
- In Group 2, all Parties can achieve a 10-20% reduction from the baseline during 2015-2018 through conversion of eligible projects. In case of reductions after 2018, five Parties cannot find eligible manufacturing operations in 2004 for further reductions. Further reductions can then only be achieved if they themselves would fund conversions of manufacturing operations, which started after 2004.
- In Group 3, a large number of Parties (not all) can achieve the 10% reduction from the baseline through the conversion of eligible projects. However, many Parties in this group had such a relatively small consumption in the year 2004, that they cannot find enough eligible operations in that year to cover the reductions from the baseline necessary to meet reductions in the 10-20% range.

6.3 Cut off date 2007 and later

In the case of a cut-off date of 2007 (or 2010) one has to study the extrapolated 2007 or 2010 HCFC consumption data. If a cut-off date of 2007 is chosen, there would be enough eligible projects to enable reductions of 25-

40% from the baseline in all Article 5 Parties without them having to convert any of their projects on their own.

By a suitable choice of the conversion of foam and refrigeration/AC manufacturing operations, a 2007 cut-off date would yield funding requirements for the 2009 to 2011 that would be lower than for the-cut-off dates of 2000 and 2004. The reasons for this have been explained in the prior two cases.

This even more valid in the case of a cut-off date of 2010.

6.4 Overview of consequences for three trienniums funding

6.4.1 Implications of different cut-off dates on the Baseline Funding scenario

The table 6-1 below presents the funding amounts per triennium, for zero years and two years operating costs, and for the cut-off dates 2000, 2004 and 2007 (the last one is identical to the funding requirement calculated in the May 2008 report) for the baseline funding scenario. Table 6-2 presents the amounts for production. In the case of production, no funding would be required during the first triennium; funding during subsequent triennia would be equal to the amounts phased out in earlier trienniums times an amount of US $3 per kg HCFC.

BASELINE	**HCFC consumption funding (US $ million)**				
Cut-off/ 0 and 2 years oper. costs		**2009-2011**	**2012-2014**	**2015-2017**	**Total**
2007 / CE 0Y		67.88	201.24	216.10	485.22
2007 / CE 2Y		117.37	322.76	337.76	777.89
2004 / CE 0Y		71.34	201.67	203.14	476.15
2004 / CE 2Y		131.87	389.26	431.86	952.99
2000 / CE 0Y		83.21	189.85	38.98	312.04
2000 / CE 2Y		222.35	513.55	94.01	829.91

Table 6-1 Amounts (US $ million) for the funding requirement for three trienniums for HCFC consumption (non-servicing projects) for three different cut-off dates and 2 different costs scenarios (zero and 2 years operating costs)

From Table 6-1 it can be derived that in the case of a cut-off date of 2000:

- the triennium 2009-11 will have a US $16-105 million higher funding requirement;
- the triennium 2012-14 will have a US $12 million lower to a US $191 million higher funding requirement;
- the triennium 2015-17 will have a US $177 to 243 million lower funding requirement.

From Table 6-1 it can also be derived that in the case of a cut-off date of 2004:

- the triennium 2009-11 will have a US $4-14 million higher funding requirement;
- the triennium 2012-14 will have a US $0-77 million higher funding requirement;
- the triennium 2015-17 will have a US $13 million lower to a 94 million higher funding requirement.

BASELINE	**HCFC production funding (US $ million)**				
Cut-off year		**2009-2011**	**2012-2014**	**2015-2017**	**Total**
2007		0	54.12	156.92	211.04
2004		0	52.51	153.93	206.44
2000		0	27.15	107.92	135.07

Table 6-2 Amounts (US $ million) for the funding requirement for three trienniums for HCFC production phase-out for three different cut-off dates

The 2000 cut-off date generally requires a somewhat higher funding for the HCFC consumption phase-out for the zero years operating costs scenario in the first triennium (this is due to the fact that more tonnes of HCFC-22 need to be considered, leading to a relatively small increase in capital cost funding). As a result, for the three trienniums together the 2 years operating cost scenario results in about US $52 million higher funding for the 2000 cut-off date compared to the 2007 cut-off date; this relatively moderate increase is due to the fact that many necessary conversions cannot be funded by the Fund anymore in the third triennium. In case of the 2000 cut-off date, total production phase-out costs are US $76 million cheaper. This balances to some degree the higher funding in the case of non-servicing HCFC projects.

It should be noted that the cut-off date of 2000 would make it impossible for many Article 5 Parties to comply with reductions beyond the 10% level without providing funding of their own.

6.4.2 2012 funding

The 2012 funding scenario considers funding to also deal with possible reductions between 2011-2012 and the freeze at baseline level in 2013; it therefore results in much higher funding requirement values in the first triennium. Table 6-3 gives the amounts for the 2012 Funding scenario. For this scenario a cut-off date of 2000 cannot be applied (or rather, is not realistic) since the eligible consumption in the year 2000 will have to be mainly applied to the reductions from the year 2012 to 2013, which leaves no

consumption eligible for the funding of reductions after the year 2013 (for most Article 5 Parties).

2012	HCFC consumption funding (US $ million)				
Cut-off/ 0 and 2 years oper. costs		**2009-2011**	**2012-2014**	**2015-2017**	**Total**
2007 / CE 0Y		243.43	201.24	216.10	660.68
2007 / CE 2Y		364.88	322.76	337.76	1025.40
2004 / CE 0Y		298.72	201.67	203.14	703.53
2004 / CE 2Y		730.06	389.26	431.86	1551.18
2000 / CE 0Y		Not relevant for the three triennia since most eligible tonnes must be used to achieve the 2013 freeze and cannot be used for further reduction			
2000 / CE 2Y					

Table 6-3 Amounts (US $ million) for the funding requirement for three trienniums for HCFC consumption (non-servicing projects) for two different cut-off dates and 2 different costs scenarios (zero and 2 years operating costs)

The funding requirement is already high in the first triennium, since reductions are needed between 2012 and 2013, which have to be approved in the beginning of the 2009-2011 triennium. Amounts in Table 6-3 can be compared to the amounts for the Baseline Funding scenario in Table 6-1.

The data for the two trienniums 2012-2014 and 2015-2017 for the cut-off year 2007 are the same as in the case of the Baseline Funding scenario. Numbers are substantially different for the first triennium when the reductions from the year 2012 to 2013 (the freeze year) have to be found in the 2004 (2007) eligible manufacturing operations (a cut-off date of 2000 has not been further considered). It simply implies that especially in the case of 2 years operating costs, the funding requirement will be substantially higher due to the fact that more refrigeration/AC manufacturing operations have to be converted than in the case of a cut-off date of 2007.

2012 Funding	HCFC production funding (US $ million)				
Cut-off year		**2009-2011**	**2012-2014**	**2015-2017**	**Total**
2007		0	147.18	156.92	211.04
2004		0	96.86	153.93	206.44
2000		Not applicable			

Table 6-4 Amounts (US $ million) for the funding requirement for three trienniums for HCFC production phase-out for two different cut-off dates

The funding requirement for HCFC production phase-out is lower for the triennium 2012-2014 than for a 2007 cut-off date since a smaller number of tonnes in some Parties will be phased out to reach the freeze (not enough eligible consumption available), and there are differences in the amounts of HCFC-141b and HCFC-22 phased out in different Parties.

6.5 Second conversions

"Second conversions" refers to the notion of funding the conversion of firms that the Multilateral Fund had earlier converted from some ODS to HCFCs; in fact, in virtually all cases it concerns a first foam operation conversion from CFC-11 to HCFC-141b. The Open-ended Working Group requested an investigation of the costs associated with second conversions, including funding different components of such conversions (incremental capital, incremental operating and technical assistance costs).

To address this issue, the TEAP Replenishment Task Force studied the amount of tonnes involved in the conversions from CFC-11 to HCFC-141b for the different Parties for the period 1993-2004 (the Task Force did not look at second conversions from HCFC-22, since the amounts are relatively small; furthermore the Task Force was unable to study these conversions since the equipment converted had no link to consumption --being mostly compressor products--). The HCFC-141b consumption amounts involved in completed conversion projects were made available by the Multilateral Fund Secretariat. These amounts were compared with the 2000 and 2004 consumption data for HCFC-141b as reported to UNEP under Article 7. This analysis resulted in the following observations:

1. In some Article 5 Parties the HCFC-141b consumption reported to UNEP in either 2000 or 2004 is much smaller than the consumption involved in the conversion projects. This can only be explained by the fact that some amount of the HCFC-141b in the converted projects is used in the form of a pre-blended polyol, which is not reported as consumption. A corollary to that would suggest that the HCFC-141b consumption reported to UNEP only concerns new non-converted manufacturing operations using HCFC-141b directly. However, this is not certain and it could not be verified with the Parties concerned.
2. In case of a fast growing or very high consumption of HCFC-141b in a country, the amounts from converted operations will be smaller than average. China reports a 2000 consumption that is twice the consumption in converted projects; whether the consumption reported includes all the converted project consumption is not clear. E.g., Mexico had very high HCFC-141b consumption levels in the years 2000 and 2004 and the maximum consumption from (completed) foam conversion projects in the total consumption was less than 10-20% in both 2000 and 2004. This implies that the second conversion issue does not have that major impact in the funding considerations related to HCFC-141b for this Party.

3. In many Article 5 Parties the HCFC-141b consumption reported from conversion projects is in the range of 0.70-0.85, with some exceptions where Parties report 40% of the HCFC-141b consumption from converted projects.

In the case of funding only operating costs, the Task Force assumed that it would concern two years operating costs. Since operating costs only would be US $1.53 per kg for the average HCFC-141b conversion (compared to capital and 2 years operating costs of US $6.85 per kg), this would imply a substantial difference.

The number of CFC-11/HCFC-141b conversions that were reported as completed increased from 2000 to 2004. In the case of the cut-off years 2000 and 2004, it has been assumed that second conversions would constitute 50% of the total in China, and 65% of the total in the countries in Groups 2 and 3 together (this latter calculation was based on a weighting of the percentage, taking into account the consumption of the separate Parties that report Article 7 consumption and consumption from converted projects).

In the case of the cut-off year 2007 it has been assumed that the consumption involved in second conversions is the same as in the year 2004. This implies that the percentage in the total HCFC-141b consumption is decreasing (after 2004).

Two different cases have been studied for the second conversions, if only two years operating costs would be funded:
(1) second conversions are done in an even manner over the next trienniums (a fixed percentage of the total, independent of the triennium or the year considered);
(2) second conversions are done first, i.e., conversions of new facilities do not take place until all second conversions have been completed.

If, in future, Parties would wish to consider different funding concepts for second conversions (i.e., capital or 2 years operating costs only), the following has to be taken into account:
- Parties will determine in their HPMPs the strategy for second conversions. This will then result in a funding requirement that will be in a range determined by different scenarios that would apply;
- The calculations of the different funding requirements have uncertainties attached to them which are related to the percentage consumption in second conversions in the total Article 7 reported consumption;
- The calculations as performed are done to some degree for separate Article 5 Parties and for aggregated consumption in country groups. It implies that in many cases certain Parties will not be able to implement second conversions as others can do. It implies that maximum reductions in funding requirements determined for certain scenarios cannot be

achieved in practice. Only if studies would be done at country and company level it might be possible to calculate more precise funding requirement numbers.

BASELINE	HCFC consumption funding (US $ million)			
Cut-off/ 0 and 2 years oper. costs	**2009-2011**	**2012-2014**	**2015-2017**	**Total**
2007 / CE 0Y	67.88	201.24	216.10	485.22
2007 / CE 2Y	117.37	322.76	337.76	777.89
2007 / CE 2Y capital costs for sec. conv. only	116.24	318.72	332.32	767.28
2007 / CE 2Y oper. costs for sec. conv. only	112.90	311.82	327.98	752.70
2007 / CE 2Y same as above, sec. conv. "first"	65.49	259.31	309.94	634.74
2004 / CE 0Y	71.34	201.67	203.14	476.15
2004 / CE 2Y	131.87	389.26	431.86	952.99
2004 / CE 2Y capital costs for sec. conv. only	130.20	385.52	428.79	944.51
2004 / CE 2Y oper. costs for sec. conv. only	126.06	376.26	421.21	923.53
2004 / CE 2Y same as above, sec. conv. "first"	82.70	308.59	413.09	804.38
2000 / CE 0Y	83.21	189.85	38.98	312.04
2000 / CE 2Y	222.35	513.55	94.01	829.91
2000 / CE 2Y capital costs for sec. conv. only	219.12	507.25	92.36	818.73
2000 / CE 2Y oper. costs for sec. conv. only	207.99	484.28	84.05	776.32
2000 / CE 2Y same as above, sec. conv. "first"	197.23	483.37	82.02	762.64

Table 6-5 Baseline funding amounts (US $ million) for the funding requirements for three trienniums for HCFC consumption (non-servicing projects) for three different cut-off dates and 5 different costs scenarios (zero and 2 years operating costs), focused on the impact of second conversion funding scenarios. The first two rows for each cut-off date are similar to the ones as given in Table 6-1.

The results for the funding requirements for the different cases are given in Table 6-5 above, for the cut-off dates 2007, 2004 and 2000. Results for a cut-off year of 2010 are assumed to not be different from the cut-off year 2007. It concerns:

(a) capital costs for all conversions;
(b) capital plus 2 years operating costs for all conversions;
(c) capital costs for second conversions only;
(d) 2 years operating costs for second conversions only (evenly distributed over time);
(e) 2 years operating costs for second conversions only (second conversions "first").

Table 6-5 gives funding requirement results for the baseline funding scenario.

It would go too far to analyse all date presented in Table 6-5 in a very detailed manner, also taking into account the uncertainties, which would be introduced by activities at the country and company level as well as the uncertainty in Article 7 consumption data versus completed project data consumption data.

- Funding capital costs only for second conversions (which has been considered only for an even distribution in time), leads to relatively small changes in the funding requirement (US $0-5 million dependent on cut-off date and triennium concerned);
- Funding of second conversion costs, if conversions are distributed evenly over time, would cause a reduction of the funding requirement compared to full capital and operating cost funding, of at maximum US $5-15 million;
- Funding second conversion costs "first" would lead to a lower funding requirement compared to full capital and operating cost funding, of about US $50 million at maximum for the first triennium 2009-2011 (with a lower maximum of US $25 million for the cut-off year 2000);
- Funding second conversion costs "first" would lead to a lower funding requirement compared to full capital and operating cost funding, of about US $80 million at maximum for the second triennium 2012-2014 (with a lower maximum of US $50 million for the cut-off year 2000);
- Funding second conversion costs "first" would lead to a lower funding requirement compared to full capital and operating cost funding, of about US $18-30 million at maximum for the third triennium 2015-2017 (with lower values for the cut-off year 2000);
- Total, maximum decreases in funding requirement in case of funding second conversions "first" over the three trienniums, would be US $15-160 million at maximum.

It should be noted here that, if a Party would choose to do so, second conversions would not have to be addressed in the case of a cut-off date of 2007 (or later). Mandated reductions in consumption from the baseline could all be done using new foam operations during the three trienniums considered.

This has been the way the Task Force has considered the funding requirement for foam conversions in the May 2008 report.

It should be mentioned that the more one goes out into the future, the less likely it is that maximum savings will actually be as calculated above. Therefore, while it appears clear that maximum savings of US $50 million for the first triennium for a certain scenario may be realistic, it is less likely that the savings calculated for the following trienniums will be as calculated, since equipment refurbished in or before 2000-2004, may reach its end of life and different funding scenarios, if at all, need to be considered.

It would also be possible to consider only technical assistance for the second conversions. However, the Task Force has discussed the costs for technical assistance with the Multilateral Fund Secretariat on the basis of a number of foam projects of different sizes.

Costs for technical assistance appear to be in the range of US $0.5-4 per kg and are dependent on the size of the operations. This value is comparable to the value of the 2 years operating costs (US $1.85) and since precise information on the level of companies is lacking, the Task Force has not further considered this issue.

In order to give a complete picture, the impact of the second conversion funding for the 2012 funding scenario has been determined as well, for the cases mentioned above.

The 2012 funding scenario is not applicable in the case of the 2000 cut-off date, and this 2012 scenario has not been further considered for this cut-off date in Table 6-6.

Compared to the full funding of capital and operating costs, consideration of second conversions "first" on the basis of 2 years operating costs only would result in a lower funding requirement in the range of US $120-140 million for the first triennium 2009-2011, at maximum. This would then apply to both cut-off dates considered.

For the 2012 funding scenario, the maximum decrease in the funding requirement for the same case would be much lower for the second triennium (US $30-40 million), and also lower than for the baseline funding case. This is due to the fact that much more funding (and the use of second conversions) would be required in the first triennium in the 2012 funding scenario.

2012 FUNDING	HCFC consumption funding (US $ million)			
Cut-off/ 0 and 2 years oper. costs	2009-2011	2012-2014	2015-2017	Total
2007 / CE 0Y	243.43	201.24	216.10	660.68
2007 / CE 2Y	364.88	322.76	337.76	1025.40
2007 / CE 2Y capital costs for sec. conv. only	358.64	318.01	332.94	1009.59
2007 / CE 2Y oper. costs for sec. conv. only	310.22	316.61	333.11	959.94
2007 / CE 2Y same as above, sec. conv. "first"	220.74	290.02	328.42	839.18
2004 / CE 0Y	298.72	201.67	203.14	703.53
2004 / CE 2Y	730.06	389.26	431.86	1551.18
2004 / CE 2Y capital costs for sec. conv. only	723.55	385.01	425.78	1534.34
2004 / CE 2Y oper. costs for sec. conv. only	691.55	371.23	410.60	1473.38
2004 / CE 2Y same as above, sec. conv. "first"	614.71	343.81	229.12	1187.64

Table 6-6 2012 Funding amounts (US $ million) for the funding requirements for three trienniums for HCFC consumption (non-servicing projects) for three different cut-off dates and 5 different costs scenarios (zero and 2 years operating costs), focused on the impact of second conversion funding scenarios. The first two rows for each cut-off date are similar to the ones as given in Table 6-3.

Note:

It has been mentioned above that the use of pre-blended polyol containing HCFC-141b is occurring in several countries, especially those with small foam operations. The number of these operations may currently be substantial, and may well have been increasing in total numbers (and in percentage of the operations) during the period 2000-2008. Since Article 7 data are used to derive the baseline and the reduction levels for HCFC consumption, conversion of these polyol blended operations would fall outside the reductions mandated in the Decision XIX/6 schedule if they were not reported under Article 7 of the Protocol (i.e., consumption).

7 Servicing sectors and cost effectiveness

This chapter responds to the request for TEAP to explain how cost effectiveness factors have been constructed.

7.1 Foams

In the case of foams, the 2006 consumption of HCFC-141b (or HCFC-142b) was taken as a starting point, separately for all Article 5 Parties. Because plants of different sizes are likely to decide on different alternatives, and face different costs for conversion capital and operational cost, the Panel considered the experience of the Fund to date, and assumed that Parties would be likely to have plants with capacities of 5, 25 and 75 tonnes of HCFCs, based upon experience data.

Estimates of the number of plants of each capacity were then made for the total of all Article 5 Parties.

For each of the capacities, an estimate was made of the percentage and the costs of retrofits, or replacements to hydrocarbons, HFC mixes and methyl formate, and retrofits for integral skin foam. With average capital costs for conversion of each capacity, the total amount for all plants was then calculated.

Assuming certain percentages and operating costs in the conversion for HFC-245fa (15% share, US $4.50), methyl formate (15% share, -US $1.10), water based systems (10% share, US $1.30), hydrocarbons (40% share, -US $1.40) and integral skin (20% share, US $4.00), operating costs were determined.

Using the total HCFC consumption in all plants, the capital costs per kg of HCFC-141b can be calculated, as well as the costs for one and two years operating costs.

For HCFC-141b the analysis described above resulted in a calculation of capital costs of US $5.32 per kg. This cost was assumed to rise to US $6.20 per kg for adding one year of operating costs, and to US $6.85 for adding two years of operating costs. As can be seen above, the conversion to HFC substitutes will result in low capital investment and high operating cost and conversion to hydrocarbons will result in high capital cost and operating savings.

In the case of HCFC-142b, the analysis yielded the conclusions that capital costs associated with conversions would be US $5.69 per kg, and that total costs would decline to US $5.58 and US $5.50 if a decision were made to

compensate for one or two years operating costs, respectively. This implies that there is a small operating cost saving for HCFC-142b.

The above figures are best estimates resulting from a combination of all technical possibilities for different sizes of operations, resulting in cost-effective conversions; a real minimum in costs has not been used as a criterion.

7.2 Refrigeration and air conditioning

The cost effectiveness calculation for refrigeration and AC assumed a combination of different types of equipment and different types of conversions. The numbers for the different capital and operating costs can be found in Executive Committee paper 54/54.

The analysis looked at both room split air conditioning and commercial ducted air conditioning systems. For room split units, alternatives to HCFC-22 considered were R-410A, R-407C and R-290 (propane). For commercial ducted air conditioning systems, alternatives considered were R-410A and R-407C. Each of the alternatives has a range for incremental capital costs, and certain operating costs per year. The cost effectiveness factors for split units and for ducted systems are calculated on the basis of a certain amount of kg of HCFC-22 per unit and a production amount for which the capital costs would apply.

The cost effectiveness factors (capital costs and capital and 2 years operating costs) are calculated for each combination noted above, and the final estimates are based on an assumption that the selection of refrigerants will be distributed on an equal basis among the options. It was also assumed that, in air conditioning, 80% of the amount is in split units and 20% is in ducted systems.

With an average capital cost of US $0.73 per kg in room split units, capital plus 2 years operating costs are calculated as US $17.18. Capital costs are much higher for ducted systems, whereas the operating costs part is lower, resulting in a cost effectiveness of US $17.76 per kg for capital cost and 2 years operating costs. On the basis of 80% room split units this results in a capital cost of US $2.5 per kg and 2 years operating costs of US $17.5 per kg.

The above results in an estimate of the cost effectiveness of combinations of air conditioning conversions representing what the Task Force considered to be a realistic conversion scenario based on current practices. The result could also be considered a best and cost effective compromise. If a specific conversion of a specific subsector would be chosen, either the cost effectiveness for capital costs only or the cost effectiveness for capital and

operating costs could be slightly lower, but the differences are believed to be small.

Calculations for capital and operating costs were also made for commercial refrigeration assuming as alternatives R-404A and R-134a, both HFC refrigerants.

The resulting analysis resulted in capital costs of US $10.5 per kg for both alternatives, and capital costs plus two years operating costs in the range of US $ 17.1-19.5 (the first value for R-134a). These values were then used in the calculation of an overall cost effectiveness for commercial refrigeration. In this case the majority of the conversions was supposed to be to HFC-134a, having a lower GWP (the conversions of vending machines to low GWP refrigerants was not considered, since precise information on the ratio of the amounts used in commercial freezers and in vending machines was lacking).

The assumption that 2/3 of the total (assuming operations in all Article 5 Parties) would go to air conditioning and 1/3 would go to commercial refrigeration, enabled cost effectiveness to be calculated. The resulting cost effectiveness was US $ 5.17 for zero years operating costs, and US $ 17.37 for two years operating costs. In order to net out an assumed export percentage of 20%, these figures were multiplied by 0.8.

7.3 Converting equipment at the end of its useful life

The Task Force was asked to investigate the extent to which the possibility of converting equipment at the end of its useful life will have an effect on the cost-effectiveness figures for the consumption sector and to investigate the resulting impact on the funding requirement and the compliance risks and feasibility of the application of this method in project management.

The Panel's use of cost effectiveness figures did not consider the lifetime of the equipment to be converted. Accordingly, consideration of the lifetime of equipment and its impact on the overall funding requirement could only be done by assuming changes to the funding itself. Determining a level of funding change was very difficult and imprecise. This is because the Task Force report has been considering the funding of conversions on a global level, with different consumption patterns over the year, and in Parties with a different range of activities. Further, as will be seen in reading the following paragraphs, the consideration of lifetimes effects the different scenarios in different ways, and adds a high degree of complexity to the analysis.

In the case of a cut-off date of 2000 (see the previous chapter), it will be clear that the calculations assume a constant, or rather, lifetime independent cost effectiveness. Costs decrease sharply for the third triennium due to the fact that no eligible conversions can be found. In the case of a cut-off date of

2004, this decrease for the third triennium is less pronounced, due to the fact that more eligible conversions can be found.

However, if one would take an overall 15-20 year lifetime for equipment, it implies that (with a cut-off date of 2000) funding costs (approvals) for the conversion of HCFC based equipment could substantially be decreased in the 2012-2014 triennium, and would be minimal for the 2015-2017 triennium. This would be slightly dependent on whether or not it would apply a second conversion, but this is not believed to be a major factor.

With the same lifetime of 15-20 years, it can be estimated that the calculations for the first two trienniums would not change in the case of a cut-off date of 2004. It would then depend in which sequence and for which specific type of equipment the first conversions are done, which would then have an impact on the funding of conversions in the third triennium. It may well be that the impact is small here compared to the conversions under a cut-off date of 2000.

With cut-off dates of 2007 and 2010, conversions of equipment can be done when the issue of the lifetime of the equipment is not important, and the lifetime issue would therefore have no impacts on the funding requirement calculated for the three trienniums.

8 Climate benefits

TEAP was requested to the extent possible to

- Provide a business-as-usual scenario based on cost-effectiveness considerations;
- Provide an overview of specific alternative substances by sectors and where possible by sub-sectors;
- Where applicable, give cost and cost-benefits of more climate-friendly technologies stating the underlying assumptions. Environmental benefit could be indicated using indicators, including global warming potential reductions and energy use of alternative substance ($/tonnes CO_2 equivalent);
- Based on the work being carried out by the Executive Committee, provide information on national and international schemes (flexible and/or market mechanisms) for funding emission reductions of HCFC replacements.

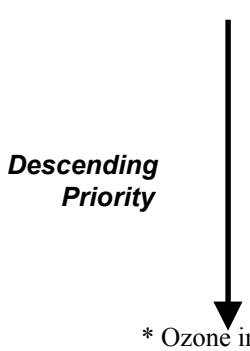
8.1 An overview of climate aspects on triennium funding scenarios

Both the IPCC/TEAP Special Report on Ozone and Climate (SROC, 2005) and the TEAP Task Force Response to Decision XVIII/12 (2007) provided important information about the on-going emissions of ozone depleting substances and their substitutes. One fundamental difference between the two reports was that the SROC only dealt with two reference years (2002 and 2015) while the Decision XVIII/12 Response provided time-related emission profiles through to 2050. In that sense, the Decision XVIII/12 Response is perhaps more relevant to the assessment of likely measures being assessed under the 2008 TEAP Replenishment Report.

Decision XIX/6 is an extension of the existing production/consumption approach adopted under the Montreal Protocol and, as such, its success is measured by concrete progress made in reducing global production and consumption of HCFCs. However, since the climate benefits or dis-benefits arising from these measures will ultimately be assessed in terms of avoided emissions throughout the lifecycle, the metrics for measuring that success in climate terms are less obvious. If climate benefits were assessed for just the period from 2009-2017 (i.e. the three triennium periods for which funding is being discussed) the assessment of 'best climate option' might be different than if the whole life cycle were taken into account. For the relevant HCFC sectors in particular, most commentators agree that a lifecycle approach is essential to ensuring that appropriate decisions are made – particularly where lifecycles are long and energy use considerations are significant. Indeed, there is some discussion within methodology circles that a *deemed to emit* approach might be adopted in future for applications of this type, which will allow the climate benefits of a particular measure to be aggregated up-front (i.e. in the first year) based on a relatively secure knowledge of the lifecycle.

Since the emissions lifecycles of ODS-containing & ODS Substitute-containing applications has been studied more than most, there is a strong argument for considering lifecycle climate benefits or dis-benefits in the initial decision-making process. This approach is currently being considered by the Executive Committee of the Multilateral Fund.

A further point to consider is that the priorities set by the ODS phase-out schedule might be different than the priorities that would be adopted if only climate considerations were taken into account. Since Decision XIX/6 is explicit about the need to give priority to HCFCs with the highest ODP, there appears to be less room for manoeuvre when it comes to prioritising climate. The following diagram gives a simplified, but still relevant, illustration of the point:



	Priority driven by potential ozone compliance	*Priority driven by potential annualised climate benefits*
	• *HCFC-141b (foam)*	• *HCFC-22 (servicing)*
	• *HCFC-141b (solvent)*	• *HCFC-22 (manufacture)*
	• *HCFC-22 (manufacture)*	• *HCFC-141b (solvent)*
	• *HCFC-22 (servicing)**	• *HCFC-142b (foam)*
	• *HCFC-142b (foam)*	• *HCFC-141b (foam)*

* Ozone interest in HCFC-22 servicing being mostly driven by the compliance needs of Group 4 Parties

Table 8-1 Priorities of phasing out substances in descending mode, driven by ozone protection and by climate benefits

It should be noted that the climate priorities in the right hand column are set by overall importance in annual emission terms rather than by suitability for immediate transition, often highlighting the need for further development. Although these priorities might seem at first to be conflicting with the ozone compliance objectives, there is a likelihood that focusing, for example, on HCFC-141b phase-out in the foam sector as a first priority under Decision XIX/6 may be able to buy the time necessary to seek further developments in those areas. This, of course, assumes that climate beneficial (or at least climate neutral) technologies are available in the HCFC-141b using foam sector.

Since the funding priorities of each triennium are set by the ozone protection priorities enshrined in Decision XIX6, the climate priorities will need to remain visible. It is important that obvious synergies are prioritised, and that any investment decision made during the three triennium periods takes full account of the additional climate impacts created by the technology choices made. This raises important challenges concerning the future treatment of cost-effectiveness criteria in an effort to avoid poor climate choices being

made for reasons of short-term expediency. These matters are discussed further in the following sections.

8.2 The Inter-relationship of scenarios

There are potentially four scenarios that can be envisaged when considering the impact of triennium funding on climate impacts. These are:

1. The scenario followed in the 2008 TEAP Replenishment Report which adopted a pragmatic approach to technology selection based primarily on cost but with some consideration of climate impact minimisation where cost-effective ***in ozone terms*** *(the Replenishment Scenario);*

2. A scenario, which pays no attention to climate impacts at all and which focuses only on least cost solutions *(the Baseline Scenario);*

3. A scenario which ensures that climate benefits are maximised by allowing additional funding according to a limit based on the magnitude of the climate benefit arising and its cost effectiveness ***in climate terms*** *(the Functional Unit Scenario);*

4. A scenario which seeks to maximise climate benefit on the basis of technically feasible options irrespective of the costs associated with those options *(the Technical Potential Scenario).*

- *The Replenishment Scenario*

The outputs from the *Replenishment Scenario* have already been well documented in the original 2008 TEAP Replenishment Task Force Report. The purpose of this section is therefore to say a little more about the basis for that scenario.

$/ODS-kg	**HCFC-141b (all)**	**HCFC-142b (foams)**	**HCFC-22 (commercial)**	**HCFC-22 (air conditioning)**
ICC only	5.32	5.70	10.50	2.50
ICC + 2yr IOC	6.85	5.50	17.10	17.50

Table 8-2 Cost effectiveness for capital and capital plus 2 years operating costs for foams, commercial refrigeration and air conditioning

At the time of its development, the major source of data available to the Task Force was the Cost Paper prepared for the 54th Executive Committee Meeting (Executive Committee Document 54/54). This evaluated the costs of various alternative technologies available and provided the basis for the cost

effectiveness factors included within the original Task Force Report. These are summarised for completeness in Table 8-2.

This assessment of costs and cost effectiveness factors took into consideration current best practice and represents an effective extrapolation of that practice. In adopting this approach there was an implicit consideration of climate factors. Therefore, due regard was given to the existing market penetration of hydrocarbons and its potential to increase. However, equal consideration was given to the fact that many of the smaller enterprises continuing to use HCFCs did so because the further transition to hydrocarbons was not a practical proposition, either economically or from a safety perspective.

It is believed that the *Replenishment Scenario* carries with it some implicit climate action but, as the next section will demonstrate, does not inflict a substantial cost burden to the Multilateral Fund in doing so. Both the *Baseline* and *Replenishment Scenarios,* and the related costs that are currently predicted, are likely to be highly influenced by the maturing of some technology options and the development of others.

- *The Baseline Scenario*

At first sight, it might seem relatively simple to define this scenario, but one of the problems is that the rules for defining least cost options have not yet been established for funding the HCFC phase-out. The May 2008 Replenishment Study took two parallel approaches – one assuming that only incremental capital costs (ICCs) would be eligible, the other assuming that two years worth of incremental operating costs (IOCs) would also be eligible. Adopting the same approach here can lead to two *Baseline Scenarios* from a climate perspective. However, this is still viewed as manageable and reveals some important trends about the inter-relationship of ICCs and IOCs.

It should be noted that sometimes climate and financial considerations work together. An example is the use of HFC-245fa as a replacement blowing agent for HCFC-141b. Although this represents one of the lower cost technologies from a capital cost perspective, the incremental operating costs are badly affected by the high 'per kg' cost of the alternative. However, co-blowing of HFC-245fa with CO_2 (water) can both reduce these incremental operating costs and reduce the climate impact of future emissions at the same time. Therefore, the lowest cost solutions are not always the worst from a climate perspective.

It is a complex set of assessments (and beyond the scope of this report) to establish the lowest cost options for all potential project types. However, using the approach already taken by the TEAP Replenishment Task Force, it is possible to recalculate the cost effectiveness factors that would apply in such *Baseline Scenarios*. The calculations are made more complicated by the

fact that there is a need to connect the choice of technology, capital cost and plant size together in one algorithm. This inter-connection is one that has been discussed at some length in both Cost Papers developed for the Executive Committee of the Multilateral Fund (54/54 and 55/47) but without deriving a formal linkage. The risk of trying to do so, is that incorrect assumptions are made about the ability of a given technology choice to reach across all process or equipment types. This is particularly the case where technologies are still immature (e.g. methyl formate in foams). The following table illustrates the impact of maximum market penetration potentials for methyl formate in HCFC-141b replacement, assuming the capital costs associated with hydrocarbon are considered too great in all lowest-cost assessments.

$/ODS-kg	**Replenishment**	**Baseline (30% MF)**	**Baseline (50% MF)**	**Baseline (70% MF)**
ICC only	5.32	2.31	2.31	2.31
ICC + 2yr IOC	6.85	6.48	4.54	2.59

Table 8-3 Cost effectiveness for capital and capital plus 2 years operating costs for foams, depending on the percentage methyl formate

The trend in the ICC plus 2 year IOC figures is created by the potential avoidance of HFC-245fa use by a wider use of methyl formate, once again reinforcing the value of early pilot/demonstration projects for this technology.

Similar scenarios could be envisaged for technology choices adopted for the replacement of HCFC-142b in extruded polystyrene foams, but insufficient cost data yet exists to make reliable assessments.

For the commercial refrigeration and air conditioning sectors, the ICC and IOC influences tend to vary by application rather than technology choice within an application. For example, commercial ducted air conditioning carries much higher ICC elements than room split A/C whatever the choice of refrigerant technology. Accordingly, any parallel assessment of the refrigeration and air conditioning sector would have to be carried out at the sub-sectoral level to be meaningful. However, it should be noted that, if there is little real difference between the ICCs and IOCs for hydrocarbons (e.g. R-290, propane), then cost would not be a limiting factor to wider use - and greater climate benefit.

Within the May 2008 Replenishment Report, the splits have been assumed between three refrigerants for the cost effectiveness determination as shown in Table 8-4.

Once again, it will be the effectiveness with which low climate impact refrigerants are able to demonstrate their capabilities across a wide range of

applications that will determine the climate impact of the sector rather than the differential between the *Baseline Scenario* and the *Replenishment Scenario.*

Application	***R-410A***	***R-407C***	***R-290***
Room Split A/C	*33.3%*	*33.3%*	*33.3%*
Commercial Ducted A/C	*50%*	*50%*	*0%*
Commercial Freezers	*50%*	*50%*	*0%*
Vending Machines	*0%*	*0%*	*100%*

Table 8-4 Split in the application of different refrigerants in different sub-sectors

In summary, the definition of the *Baseline Scenarios* will continue to be a subjective assessment for the foreseeable future as it will only fully emerge if the underlying funding strategy is adopted in practice. As with all the scenarios considered in this chapter, the real costs will only emerge as replacement technologies mature and the real costs are better understood.

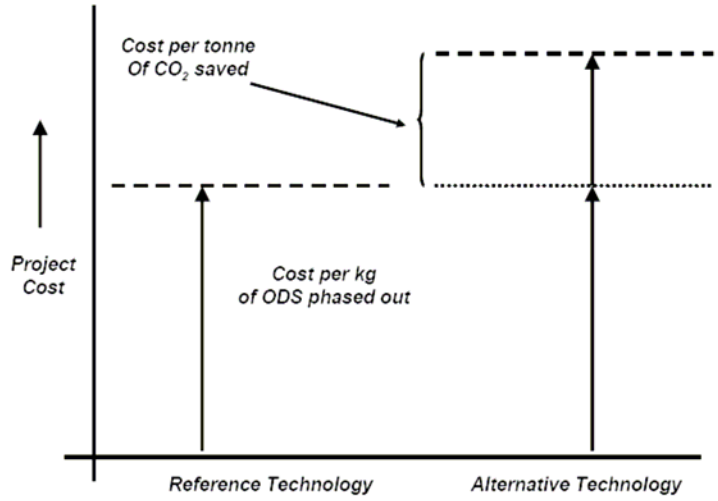
- *The Functional Unit Scenario*

The title for this scenario was chosen in order to reflect the fact that it parallels the work being carried out for the Executive Committee of the Multilateral Fund in developing a functional unit approach to climate impact assessment. Annex V of Document 55/47, as presented to the 55th Executive Committee meeting in Bangkok in July 2008 sets out the potential methodology in some detail and therefore it is not intended to repeat that explanation in full here.

However, the main elements of the approach will be provided below.

The Functional Unit analysis commences with an assessment of a least-cost, climate neutral replacement for an existing use of HCFCs (referred to as the Reference Technology). Any additional cost associated with making the transition in a more climate beneficial way can then be assessed against the Reference Technology in order to determine a cost per tonne of CO_2 saved. This could be negative, where a more climate beneficial technology is actually less expensive than the Reference Technology. The graph below illustrates the simple comparison.

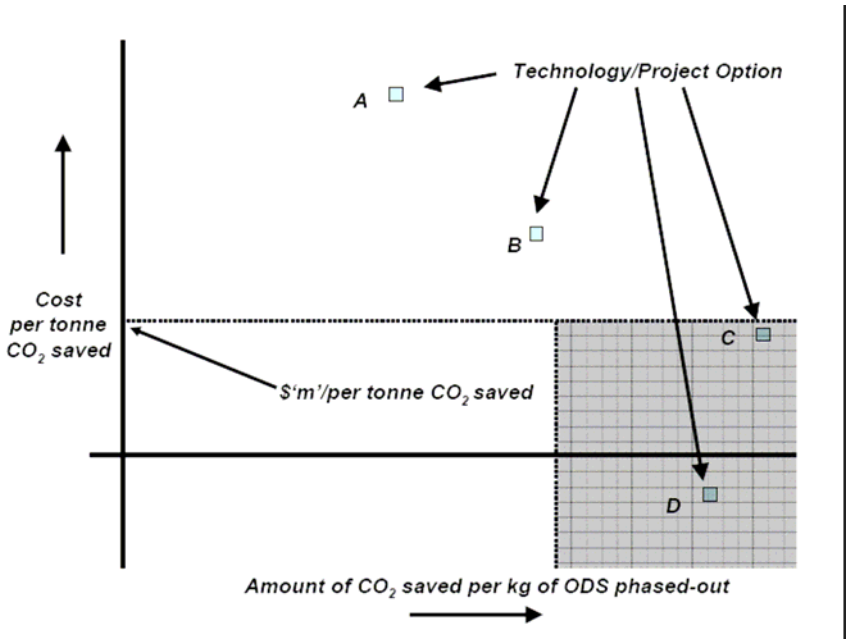
The determination of climate impact itself can be complex, but is simplified sufficiently for funding purposes by using a 'functional unit' approach rather than a full lifecycle assessment.



The fundamental difference that this approach introduces to the funding assessment is that it allows for a direct comparison between Fund sponsored interventions, and climate actions that are being carried out elsewhere in governmental and inter-governmental programmes. In other words, it becomes possible to make judgements about whether it is at least as effective, if not more effective, to make climate savings within the context of Decision XIX/6 of the Montreal Protocol than it is elsewhere. This would be an important element of any explanation required to justify a possible increase in the Multilateral Fund provisions to address climate, should Parties wish to do so. For example, if the Executive Committee could agree on appropriate parameters, it could, for any sector or sub-sector, set limits on such things as the maximum amount it would be prepared to spend on climate benefits and the minimum amount of climate benefit it would wish to gain. For example, in the diagram below, Technologies C and D could both be seen as qualifying technologies, leaving the decision on which one to choose between incremental climate benefit and incremental cost.

Another powerful aspect of this approach is that it can account for the size of an enterprise (in ODS consumption terms) so that technology selections that might be both climate beneficial and cost-effective for larger enterprises are not automatically adopted for smaller enterprises where the cost effectiveness might be untenable.

Since this approach is still in its early phases of development, it is not yet possible to determine what the likely cost of the climate neutral technology transition might be, and therefore, what the incremental cost of climate beneficial transitions might be.



Conversely, it is not yet clear whether the existing *Replenishment Scenario* would provide an outcome, which is climate neutral or better. Indeed, as with the *Replenishment* and *Baseline Scenarios* the ultimate costs will be highly dependent on emerging and maturing technologies. Nevertheless, bearing in mind that the transition priorities will be initially set by ozone compliance rather than climate considerations, it will be important to be making every technology selection decision in an informed manner.

- *The Technical Potential Scenario*

This scenario assumes that conversion decisions will be made on the basis of what is best for climate irrespective of cost. At its limit, the best climate selection could result in no climate impacts at all. However, where energy use is also involved this is not a practical outcome. The analysis contained in the TEAP Response to Decision XVIII/12 comes close to conveying the Technical Potential as it was understood at that time. It maybe recalled that an accelerated phase-out of HCFCs (of the type now envisaged within Decision XIX/6) would have the potential to save cumulative emissions of close to 18 billion tonnes CO_2-eq. in the period to 2050 assuming that associated HFC-23 emissions were also included.

Regrettably, this analysis has led to some claims that figures of this magnitude were within grasp. Of course, such claims have no basis in the financial realities of the triennium funding approach outlined in the 2008 TEAP Replenishment Task Force Report. Indeed, only if all sectors and sub-sectors had access to technology choices, which gave a minimal climatic footprint and fitted within the cost effectiveness factors identified, would such an objective be met.

As with the other scenarios considered in this section, the *Technical Potential Scenario* will be greatly effected by the on-going emergence and maturing of technology options with low climate impact. This will be impacted by the number of technology options available and their ultimate cost-effectiveness.

8.3 Specific alternatives by sector and sub-sector

Chapter 4 of the TEAP Response to Decision XVIII/12 provided a fairly comprehensive overview of the technology options available for the HCFC phase-out both by sector and sub-sector, together with an assessment of their likely climate performance. Rather than repeat this analysis again here, this section will focus on new developments and insights that have emerged since that analysis in 2007.

Probably the most significant development since 2007 has been the emergence of a number of low GWP HFCs for both refrigeration and foam blowing applications. At present the scope of their use is unclear both technically and economically. In addition, there may still be some toxicological assessments to be completed in some instances. . Nevertheless, this type of development reminds Parties that the technological landscape is continually changing and that these changes need to be factored into future transition strategies - particularly where compliance with Decision XIX/6 can be achieved by other means such as improving leakage performance from new and existing refrigeration equipment, for example, thereby allowing these newer technologies time to mature.

The basis of alternatives considered for the May 2008 Replenishment Report is much narrower than the list of options provided in the TEAP Decision XVIII/12-report and draws upon the Cost Paper (55/47) developed for the Executive Committee of the Multilateral Fund. This approach allowed for consistency between the two sources and also provided the necessary transparency in assumptions. Although the climate impacts of a much wider range of alternatives could have been evaluated as part of this Supplementary Report, it would not have been possible to keep consistency with these other sources, particularly if quantitative conclusions were to be drawn.

8.4 Approaches to assessing the cost/benefits and environmental benefits

One of the challenges of the Decision XIX/6 text is that it requires the Executive Committee to *"give priority to cost-effective projects and programmes which focus on"……"substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account global warming potential, energy use and other relevant factors"* and, in doing so, anchors the cost-effectiveness criterion fully within the ozone criteria, as established through the cost effectiveness factors of the May 2008 Replenishment Report.

However, as has already been shown, there are a number of potential projects that could well be highly cost effective in terms of climate (US $ per tonne of CO_2-eq saved) but would not be cost-effective in US $ per ODS-kg terms. The 'functional unit' approach provides one way of broadening the scope of consideration, but could require Parties to think more creatively about the way in which the Multilateral Fund is used in future. The ability to effectively split the 'ozone element of cost' from the 'climate element of cost' could be very helpful in providing a way forward and potentially opens the door to co-funding or other reimbursement options from climate funds.

8.5 National and international schemes for funding emission reductions of HCFC replacements

There are a number of emerging options for the funding of climate benefits that might otherwise be integrated within projects having a different primary focus. These can sensibly be split into two categories:

(a) Grant-based funding mechanisms (e.g. Multilateral Fund, GEF etc)

(b) Market-based, climate-specific co-funding approaches (e.g. Clean Development Mechanism, Voluntary Carbon Market etc.)

One of the fundamental differences between these two categories is that the grant-based mechanisms will tend to operate on a cost-coverage basis, while the climate-specific co-funding approaches will be benefit-driven mechanisms and remuneration will be dependent on market prices for carbon and the perceived acceptability of ozone-related projects as a vehicle for the generation of climate benefits. There is therefore more certainty about the Integrated Approach at the outset.

For this reason, many project proponents might be more comfortable with the certainties associated with cost coverage, while more adventurous proponents might be willing to risk the vagaries of the market.

There is also the potential for a hybrid of the two options where the funds are delivered to the project proponents by way of a cost recovery mechanism (e.g. via the Multilateral Fund) but that the parallel potential exists for the charging Fund itself to aggregate the climate benefits and negotiate reimbursement via an agreed market mechanism. The success of such an approach would depend on the willingness of the donors to that Fund to take on the vagaries of the market while at the same time relying on the competence of the aggregator to ensure that all climate benefits were accounted for.

A further model might be the use of a grant-funded initial investment for the creation of a revolving fund. This is similar to the way in which a bank might underwrite an initial investment against future carbon revenues.

There is yet a further dimension of potential support from bilateral arrangements of the type already allowed under the Multilateral Fund.

Whichever approach is taken, it will rely on a robust method of accounting for climate benefits. In this respect, the potential use of a *deemed to emit* methodology could be valuable.

This said, there are wider concerns about the extension of carbon credits to the ODS arena. There are fears that if Decision XIX/6 was particularly successful in climate terms, it could swamp the carbon market with credits and drive prices downwards. Although this is an important possibility to consider, it assumes that Decision XIX/6 would deliver the maximum potential savings in a concentrated period of time. This is unlikely to be the case in practice, particularly in a growing carbon market. However, it would be necessary to make an assessment of the likely savings, and their timing based, on the implementation of Decision XIX/6 to assuage those fears.

The subject of ODS-related carbon credits has been hotly debated since the early experiences with HFC-23 as a by-product of HCFC-22 production and there is definitely a credibility barrier to overcome if genuine climate benefits are to be recognised during HCFC-phase-out. The 'functional unit' approach (or something like it) would provide clear evidence of additionality, but there would still need to be a sound methodology behind the climate calculations and aggregation. Those typically evaluating and validating carbon project methodologies (e.g. Gold Standard) are nervous about this area and this nervousness has been accentuated by some of the early methodologies developed for ODS bank management which some believe did not address additionality in an appropriate way. With these aspects in mind, there may be a need to consider the development and endorsement of appropriate methodologies within the Montreal Protocol framework itself. These would need to be published and, where necessary, externally validated, but would carry with them the weight and reputation of the Montreal Protocol bodies. This could be important if a reasonable market price for the credits is to be achieved.

These are all factors for consideration on the assumption that a market mechanism might be appropriate for the co-funding or reimbursement of climate benefits. However, cost-coverage may be viewed by others as a more efficient use of resources, whether delivered from inside or outside of the existing funding regimes.

8.6 Summary

In summary, this climate chapter has been targeted more at evaluating the methods for determining and expressing costs of transition than at the cost of climate benefits themselves. This is a recognition of the fact that it is

probably still premature to make reliable assessments of costs in a rapidly changing technological landscape and in the absence of finalised guidelines for funding. Of critical importance to this review have been the following:

- That priorities for phase-out of HCFCs under Decision XIX/6 will be set first and foremost by ozone compliance considerations;

- That every transition (including servicing initiatives) should be fully evaluated for its climate impact using a consistent and representative methodology to inform decisions;

- That a means of expressing the overall transition in terms of ozone and climate components can be helpful in evaluating whether to proceed with a technological choice as well as providing the basis for potential co-funding whether up-front or retrospectively;

- That more innovative funding mechanisms are emerging but that these need to be governed by appropriately developed and managed methodologies;

- That the potential climate benefit arising from Decision XIX/6 will be totally dependent on choices made under the Multilateral Fund.

9 Baseline operating costs

TEAP was requested to conduct a risk analysis, relating to the extrapolations of future HCFC growth in Group 1 countries. This risk analysis is given in Annex 3.

9.1 Additional reference data

Under "baseline operating costs" it is also mentioned that additional reference data of 2007 (HCFCs) should be applied in the analysis.

The TEAP Replenishment Task Force did an analysis of HCFC consumption patterns during December-February 2007, when only 2006 HCFC consumption and production data were available. The 2000-2006 data formed the basis for an extrapolation of the data for the years 2007-2012, from which the baseline (freeze value) has been derived.

Up to September 2008 a large number of Parties have submitted 2007 HCFC consumption data, however, the majority of these Parties were low volume consuming ones. Some large volume consuming Parties (classified in Group 2) also submitted 2007 HCFC data. These data have been compared with the 2006 HCFC data. These data provide clear indications that there is a tendency toward growth in the consumption pattern for HCFCs that is higher than what was anticipated in the earlier study. Of the six Group 2 Parties that submitted data, three had a 8-15% higher consumption in 2007, and three had a 40-80% higher consumption in 2007, compared to 2006. The 2006 consumption reported by these Parties (3173 ODP tonnes) increased by 37% in this one year period (4351 ODP tonnes). Unless this type of growth would be seriously curbed in several Article 5 Parties in the years 2008-2009, it can be expected that the baseline consumption levels will be as much as 10-25% higher than the level extrapolated by the Task Force; which, depending on a cut-off date chosen, could translate into substantially higher funding requirements. Constant checks of 2007 data submitted to UNEP until the MOP-20 in Doha, mid-November 2008, would be desirable.

However, as long as no data have been submitted by China as the largest HCFC consumer, it will be impossible to derive a more accurate estimate or extrapolation for the global 2009-2010 consumption levels, which will determine the baseline. The Task Force has to stick to the extrapolations done from the 2000-2006 HCFC consumption data, as in its May 2008 report.

9.2 Chinese HCFC data submission for 2006

The data studies done by the TEAP Replenishment Task Force were based on HCFC data submitted to UNEP under Article 7 for each year and each

individually reported HCFC chemical in the period 2000-2006. The major part of the studies concerned HCFC consumption during this period.

As usual, these data were derived – that is, Parties submit to UNEP the data for total production, for feedstock uses, for import and for export, and UNEP's Ozone Secretariat derives the consumption data. That derivation is then sent back to the country for verification before it is posted on the UNEP website

Consumption data for each chemical are calculated by UNEP following

Consumption = Production – Feedstock – Export + Import

China reported for the year 2005 all numbers required for all HCFC substances, including import and export data. The same was supposed to be the case for the year 2006. However, in the case of 2006, the data submission registered by UNEP only contained exports for HCFC-22 and not for other HCFCs; furthermore, the export quantity of HCFC-22 was equal to the quantities exported for all HCFCs. This resulted in a relatively low consumption for HCFC-22 because all exports were subtracted from the net production data. Furthermore it resulted in high consumption data for HCFC-141b and -142b because exports were considered to be zero.

China noticed the differences in the May 2008 Replenishment Report and re-submitted all of its 2006 HCFC data to UNEP. The Secretariat and the Task Force then re-calculated consumption data for all chemicals including HCFC-22, -141b and -142b.

The table below shows the consumption levels for 2005-2006, and the differences for the different reporting in 2006, in metric tonnes.

Year/chemical	**2005**	**2006 (before correction)**	**2006 (corrected)**
HCFC-22	153035	141489	174510
HCFC-141b	28703	74806	46325
HCFC-142b	4922	21847	19341

Extrapolation for the years 2007-2012 results in substantial differences for the consumption levels for each HCFC chemical. However, the total in ODP tonnes appears to be not that much different. The baseline of 22,341 ODP tonnes is reduced to 21,758 ODP tonnes, a decrease of 3%. The 2012 extrapolated consumption decreases from 25,160 to 24,660 ODP tonnes.

Where it concerns the funding requirement, the table below gives the modified estimates for the three trienniums (compare Annex 2); the numbers in bold denote the adjusted funding requirement.

Triennium	Funding requirement (US $ million)
2009-2011 baseline (HCFC)	**66.48-115.00** (67.88-117.37)
Total funding	**341.4-389.9** (342.8-392.3)
2009-2011 2012 funding (HCFC)	**238.32-357.51** (243.34-364.88)
Total funding	**513.3-632.5** (518.3-639.8)
2012-2014 (HCFC)	**197.03-316.10** (201.24-322.76)
Total funding	**416.4-535.4** (420.6-542.1)
2015-2017 (HCFC)	**211.64-330.68** (216.10-337.66)
Total funding	**532.0-650.9** (536.4-657.9)

Table 9-1 Funding requirement values for HCFC, non-servicing, using the resubmitted Chinese data for 2006, as well as the values for total funding requirement, for the three triennium and the funding scenarios (bold for the adjusted values). Values can be compared to the original values (in brackets), given in Annex 2

10 Demonstration Projects

TEAP was requested to reconsider its figures on demonstration projects taking into account the different applicability of technologies due to climate diversity among countries and to make the corresponding cost adjustments to the remaining HCFC compliance activities.

The latter part of this request by the Parties is related to the fact that any phase-out from projects, even demonstration projects, should be taken into account in project funding.

In the original May 2008 report TEAP included a contingency of US $5.4 million (which included agency support costs at 8% or US $400,000) for demonstration projects.

In that regard, the Replenishment Task Force believes it will be necessary to investigate the behaviour of the different HCFC substitutes in refrigeration and air conditioning in different regions of the world with different climatic (temperature, humidity) conditions. This is due to the fact that the impact on capacity and energy efficiency of several HCFC substitutes has never been well investigated (see also Decision XIX/8).

The need outlined above would imply the implementation of approximately ten demonstration and testing projects (two each, in five different temperature regions). These projects are estimated to be twice as expensive as the usual conversion or replacement projects (due to more specific construction elements and the addition of temperature and power monitoring stations).

However, there will be a certain phase-out related to these projects. This has already been considered in the funding requirement line "HCFC consumption, non-servicing". Analysing the need in this manner enables a specific estimate of cost to be made. In that regard, implementation of these projects is assumed to require about $2.7m, or about half the amount in the original funding requirement. In that regard, for accounting purposes, an equal amount would also have to be subtracted from the HCFC non-servicing funding requirement.

This would then result in a total funding requirement range for the 2009-2011 triennium of US $ 340.1-US $389.6 million (compared to the original US $342.8-US $392.3 million) for the baseline funding scenario. For the 2012 funding scenario, the related range would be US $515.6-US $637.1 million (instead of US $518.3-US $639.8 million).

11 Other issues

TEAP was requested to consider the export rule and the multinational rule of the Multilateral Fund as these may have an effect on the level of funding.

The original May 2008 TEAP Replenishment Report included a paragraph dealing with the impact of the exports (and multinational owner-ships).

Specifically, on the basis of some information received by the TEAP, TEAP applied a 20% reduction to the refrigeration and air conditioning sector to cover both export and multinational ownership. This was based upon export estimates for China (with small multinational owner-ship in the refrigeration and AC sector) and some higher estimates for other countries. However, it has to be stated that these estimates were based on scarce information.

In the period July-September 2008 the TEAP Replenishment Task Force has tried to get some more information on the export quantities and the multinational ownership.

Based upon an estimate of 10% exports (export data estimates confirmed by Chinese delegation members in July 2008 at the OEWG Bangkok, in personal communications) and a TEAP first estimate of 10% multinational ownership in China, the 20% reduction in funding requirement for refrigeration and AC would appear realistic for China.

Based upon statements from other Parties, which could not be verified by the Task Force, the exports and multinational ownership components in the refrigeration and AC sector could well be higher in other Parties, which are mainly situated in South East Asia and Latin America. Knowledge regarding the export percentages and multinational ownership is often confidential or proprietary information. Although the Task Force has contacted 25 of the major HCFC consuming Parties regarding this issue, it cannot be expected that much reliable information will become available at short notice and before the Meeting of the Parties. Producing more precise estimates is therefore not seen as possible at this time.

Taking into account the importance of the Chinese numbers (due to the major share of China in the total HCFC consumption pattern), high exports and high multinational ownership components in refrigeration and AC may well lead to a more substantial reduction of the funding requirement. Table 11-1 gives an estimate of what a 0%, 20% (as used in the May 2008 report) and 30% reduction (for export and multinational shares) in the refrigeration and AC sector would imply for the 2009-2011 funding requirement (baseline funding case).

With the number of conversion operations in the refrigeration and AC sector being relatively small in the first triennium (May 2008 report), the impact of a variation on the funding requirement range for the baseline funding scenario for the next triennium is not very large.

The May 2008 Task Force report did not adequately consider the impact of a multinational component in foam blowing operations. Certainly in the case of the manufacturing of refrigerators this multinational component may be substantial. Because more foam projects are expected to be implemented during the next triennium, it is clear that any multinational and export percentage in the foams sector will have a larger impact during that time period than the same percentage in refrigeration and air conditioning, due to the fact that priority has been given to foam conversions.

Table 11-1 also gives the estimates for the funding requirement for the above percentages (0, 20 and 30% for refrigeration and AC), under the assumption of a 20% multinational (global) share in all foam operations. Roughly speaking, a 20% multinational share in the foam operations would reduce the funding requirement by about US $10 million. However, it should be stated that these estimates are indicative, as reliable information on the actual percentage of exports and multinational share is lacking.

Percentage reduction refrigeration and AC (no multinational owner-ship for foams)	**HCFC non servicing funding**	**Total funding requirement 2009-11**
0%	71.53-129.68	346.5-404.6
20%	67.88-117.37	342.8-392.3
30%	66.04-111.20	341.0-386.1
Under the assumption of an additional 20% reduction for foams (due to multinational owner-ship)		
0%	60.93-116.07	335.9-391.0
20%	57.28-103.76	332.3-378.7
30%	55.44-97.59	330.4-372.5

Table 11-1 Funding for HCFC non-servicing activities for different percentages export (and multinational ownership) in refrigeration and AC, as well as the total funding requirement, for the triennium 2009-2011, for the baseline funding case (in US $ million). Different percentages for refrigeration and AC manufacturing are considered for 0% and 20% multinational ownership of foam operations

12 Conclusions

As of September 2008, the Replenishment Task Force estimates the total funding for the 2009-2011 replenishment to enable the Article 5 Parties to comply with all relevant control schedules under the Montreal Protocol to be in the range of ***US $338.7-629.8 million***. Specifically, the baseline funding scenario considers estimated required funding to be in the range of ***US $338.7-387.2 million***, while the 2012 funding scenario estimates required funding to be in the range of ***US $510.6-629.8 million***.

This change compared to numbers in the May 2008 Replenishment Task Force report is relatively small (about US $5 million in case of the baseline scenario and about US $10 million in case of the 2012 funding scenario). Namely, this change is only due to

1. Re-calculation of the funding requirement after the re-submission of Chinese data (which were not dealt with properly in the May 2008 report);
2. Re-calculation of the demonstration projects impact on the total funding requirement.

All other factors that may have an impact on the funding requirement and which have been analysed in this Supplementary Report are presented for the Parties' consideration. They can only be listed and used wherever thought appropriate in further discussions by Parties.

The use of an inflation factor is estimated to increase the baseline funding requirement by US $4.5 million dollar per percent inflation assumed, and to increase the 2012 funding requirement by US $9 million per percent inflation assumed. The calculation of these numbers did not include inflation on elements that have otherwise been fixed via Executive Committee decisions. Inflation has not been considered in past replenishment reports and the numbers have been given in this report without recommending a change to the amounts contained in the May 2008 report

Similarly, this report presents considerations on Institutional Strengthening without recommending a change to the amounts contained in the funding requirement calculated in the May 2008 report.

Based on the submissions by Parties of the amounts available for destruction it can be concluded that there is huge divergence between the submissions by separate Parties and that extrapolation towards a global amount available in Article 5 Parties is difficult. The contingency of US $27 million made in the May 2008 report is considered sufficient to cover all costs related to the Parties specific request that would be expected to be incurred in the triennium 2009-2011.

A separate chapter in this report describes in a qualitative fashion the impact of a lowest cost (baseline) scenario, and a scenario which ensures that climate benefits are maximised by allowing additional funding according to a limit based on the magnitude of the climate benefit arising and its cost effectiveness in climate terms (the Functional Unit Scenario).

In the absence of a seriously proven mechanism for determining project-by-project climate benefits for a number of technology options and project types, it was not considered appropriate to attempt to quantify the climate benefit of the current Replenishment Task Force proposals. The report has therefore focused on the differences between a number of scenarios, which could be used to define such a climate impact. Since all of the scenarios will vary as the Executive Committee funding rules are finally agreed and the real technology options appear, this approach is expected to avoid the risk of premature calculations that yield cost benefits which are unrealistic.

The May 2008 Task Force report did not adequately consider the impact of a multinational and export components in the area of foam blowing operations. Certainly in the case of the manufacturing of refrigerators, the multinational component may be substantial. Roughly speaking, if one assumed a 20% multinational share ownership of foam operations, this would lead to a reduction in the 2009-2011 baseline funding requirement of about US $10 million. It is thought that 20% would be a reasonable estimate for all foam types, however, it should be noted that any reliable information from Parties on this percentage is lacking. The impact of the multinational component in foams is much larger than the impact from refrigeration and AC during the upcoming replenishment cycle, as long as the majority of the conversions considered for that time period are foam-related (as was assumed in the May 2008 Task Force report).

Assessing the impact of various cut-off dates and various factors surround second conversions is complicated. The funding requirement for the baseline funding could well increase to US $355-492 million in the case of a cut-off date of 2000 and to US $343-401 million in the case of a cut-off date of 2004. This is mainly due to the fact that more conversions of refrigeration and AC equipment have to be considered in the next triennium than in the case of a later cut-off date. For these refrigeration and AC conversions the same 20% export/ multinational owner-ship was applied as in all funding requirement calculations. Very large impacts on the funding requirement can be calculated for the triennium 2009-2011 in case of the 2012 funding scenario and a 2004 cut-off date.

Taking into account lower funding scenarios for second (foam) conversions, via either the funding of capital costs, operating costs only or via funding costs for technical assistance definitely has an impact on the funding requirement. The impact of funding capital costs only is not large, due to the

fact that capital costs are still a high percentage of the total costs. Where it concerns the funding of 2 years operating costs only, large differences in funding can be calculated compared to the full funding case.

Two ways have been considered for carrying out second conversions: (1) as a percentage of all operations, i.e., evenly distributed in time, and (2) as soon as possible, before considering new equipment conversions. The latter method has a big impact on the maximum funding requirement, not only for the first, but also for the second triennium, and could be in the range of US $0 to US $80 million at maximum. It is impossible to determine precise numbers since this study is done on the basis of reported consumption, and not on a country and company level, furthermore there may be inconsistencies between Article 7 consumption data and data from project completion reports. It may also be the case that, because in a number of cases aggregated data for groups of countries were considered, certain countries may have to deal in a different manner with second conversions than others. This puts a big uncertainty on the funding requirement decreases determined for second conversions in a number of scenarios.

Rather than summarising the precise funding consequences of early cut-off dates combined with funding aspects of second conversions, further discussion would first be needed whether early cut-off dates are considered to contribute positively to the phase-out process (an early cut-off date is then defined as a date before 2006-2007). Namely, in many cases the determination of early cut-off dates will limit the eligibility for funding of conversions in many Parties. This implies that several Parties would only be able to realise a relatively small portion of the reductions after 2013 with funding assistance of the Multilateral Fund, and should be considering other ways of financing conversions in the course of the 2015-2020 period.

13 Acronyms

CAP	Compliance Assistance Programme
CTC	Carbon Tetra Chloride
IS	Institutional Strengthening
LAC	Latin America and the Caribbean
LVC	Low Volume Consuming Country
MB	Methyl Bromide
MDI	Metered Dose Inhaler
MEA	Multilateral Environmental Agreement
NPP	National Phase-out Plan
ODS	Ozone Depleting Substance
RMP	Refrigerant Management Plan
RTF	Replenishment Task Force
TCA	1,1,1 Tri-Chloro Ethane (methyl chloroform)
TEAP	Technology and Economic Assessment Panel
TPMP	Terminal Phase-out Management Plan

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Annex 1 Specific elements for which elaboration was requested by the Open-ended Working Group

On the basis of the discussions in the Contact Group, the Open-ended Working Group agreed to ask the TEAP to elaborate a specific group of issues in the form of a report supplementing its May 2008 Replenishment Report. The specific elements for which elaboration was requested are given below.

1. General

A study on the variation of inflation on all activities, assuming several percentages. The Panel should explain the rationale for using those percentages;

2. Institutional strengthening

Institutional strengthening funding scenarios that consider needs likely to be encountered in the next triennium in implementing all aspects of the work programme, giving adequate attention to group 4 countries;

3. Destruction

An analysis of the costs that might arise in the collection of existing stocks of contaminated or confiscated CFCs and halons, their transport to destruction facilities or redeployment as the case may be, and their destruction. Parties operating under paragraph 1 of Article 5 are requested to provide information to the Panel by 15 August 2008 on the amount of stocks of contaminated or confiscated ozone-depleting substances that they have ready and waiting for destruction;

4. General issue of HCFCs

The Panel should take into account the conclusions of the Executive Committee on relevant issues, including production sector issues in order to achieve the freeze;

5. Multilateral Fund-related issues

Estimate of the impact of the cut-off dates of 30 September 2007, 1 January 2004, as well as 1 January 2000 and 1 January 2010 for this replenishment and the next two replenishments, including scenarios for funding different components of second stage conversions, namely, incremental capital costs, incremental operating costs and technical assistance, taking into consideration decision XIX/6;

6. Servicing sectors and cost-effectiveness

An explanation of how cost-effectiveness factors have been constructed and which effects are being taken into account.

The extent to which the possibility of converting equipment at the end of its useful life will have an effect on the cost-effectiveness figures for the

consumption sector and the resulting impact on the funding requirement and the compliance risks and feasibility of the application of this method in project management;

7. Climate benefits

To the extent possible:

- Provide a business-as-usual scenario based on cost-effectiveness considerations;
- Provide an overview of specific alternative substances by sectors and where possible by sub-sectors;
- Where applicable, give cost and cost-benefits of more climate-friendly technologies stating the underlying assumptions. Environmental benefit could be indicated using indicators, including global warming potential reductions and energy use of alternative substance ($/tonnes CO_2 equivalent);
- Based on the work being carried out by the Executive Committee, provide information on national and international schemes (flexible and/or market mechanisms) for funding emission reductions of HCFC replacements;

8. Baseline operating costs

A risk analysis, not including costs, relating to extrapolations of future HCFC growth in group 1 countries, based on an annual growth rate of 9 per cent for the years 2011 and 2012, as an annex to the supplemental report, to help the Parties to foresee the risks that may result from the growth rate used by the Panel in the assumption in its current report;

Additional reference date of 2007 in the analysis;

9. Demonstration projects

Reconsideration of its figures taking into account the different applicability of technologies due to climate diversity among countries and to make the corresponding cost adjustments to the remaining HCFC compliance activities;

10. Other issues

Consideration of the export rule and the multinational rule of the Multilateral Fund as these may have an effect on the level of funding.

Annex 2 Funding requirement for three trienniums (May 2008 report, chapter 11)

The estimates for the individual expenditure categories in the May 2008 report were combined into the total estimated funding requirement for the 2009-2011 replenishment for four funding scenarios:

- Two scenarios in which the HCFC consumption level to be funded is either baseline funding (2009/2010) or 2012 funding (2012 being the year before the freeze in 2013), and
- Two scenarios in which the cost effectiveness parameter is varied by assuming zero or two years operating costs in the calculation of this parameter (no thresholds are applied).

In Tables A1-1 and A1-2 below, the results of the calculations for the four scenarios are given. Tables A1-1 and A1-2 contain a number of elements related to (1) the ODS (non-HCFC) phase-out where funding has been agreed, (2) new (non-HCFC) elements where the funding is expected to be agreed as of mid-2008, (3) funding estimates for disposal and destruction, (4) funding estimates for the preparation of HPMPs and demonstration projects, (5) the particularly important funding estimates for addressing HCFC reductions, as well as (6) funding estimates for supporting activities.

In Table A1-1 the funding estimate for HCFC phase-out projects is given as a range for the baseline funding scenario, with variation of the cost effectiveness parameter, together with an estimate for the funding required for the servicing sector. Table A1-2 is identical to Table A1-1, with the one major exception that the funding estimates for HCFC phase-out projects are given for the "year 2012 funding" scenario. In Tables A1-1 and A1-2 no funding for production closure is assumed since closure funding is not expected to be submitted and approved before the 2012-2014 triennium.

Tables A1-3 and A1-4 are comparable to Tables A1-1 and A1-2, with baseline funding assumed in Table A1-3, and 2012 funding assumed in Table A1-4. A major difference between those two tables is the funding assumed for production closure during the period 2012-2014, according to the funding scenarios, where the 2012 funding scenario yields the largest funding requirement (Table A1-4).

Funding requirement estimates are based on the actual costs incurred and year 2008 prices.

Table A1-1 All elements that determine the 2009-2011 total funding requirement (US $ million) for the scenario "baseline funding" and two cost effectiveness factor combinations

Funding requirement ALL ODS RELATED ACTIVITIES	**2009-2011**	**2009-2011 agency support**
ODS (NON-HCFC) CONSUMPTION		
ODS Phase-out plans, approved	10.731	1.025
ODS Phase-out plans, new	1.750	0.131
TPMPs, new	4.896	0.595
MDI	23.950	1.796
MB, approved	5.926	0.500
MB, new	6.280	0.544
CTC, Halons		
CTC, approved	3.212	0.241
Process Agents, approved	2.500	0.182
CTC, TCA, assistance	0.220	0.020
Halons, assistance	0.075	0.006
ODS (NON-HCFC) PRODUCTION		
CFC production phase-out	15.800	1.158
MB production phase-out	2.000	0.150
HCFC RELATED ACTIVITIES		
HPMP preparation	3.500	0.360
HCFC Demo-projects	5.000	0.400
HCFC PHASE-OUT ACTIVITIES		
*HCFC phase-out, non-servicing**	67.88-117.37	(included)
*HCFC phase-out, servicing**	63.000	(included)
HCFC, production phase-out	0.000	(included)
DESTRUCTION, DISPOSAL	25.116	1.884
SUPPORTING ACTIVITIES		
Executive Committee, Secretariat	20.257	
Treasurer	1.500	
Core Unit costs	16.624	
CAP	29.192	
Institutional Strengthening	21.560	0.862
Technical Assistance	1.820	0.180
TOTAL	**332.79-382.28**	**10.03**

If agency support costs are included, the total funding requirement for the period 2009-2011, assuming the scenario **baseline funding,** is determined at **US $342.8-US $392.3 million.**

Table A1-2 All elements that determine the 2009-2011 total funding requirement (US $ million) for the 2012 funding scenario (allowing for funded consumption growth until 2012) and cost effectiveness factor combinations

Funding requirement ALL ODS RELATED ACTIVITIES	**2009-2011**	**2009-2011 agency support**
ODS (NON-HCFC) CONSUMPTION		
ODS Phase-out plans, approved	10.731	1.025
ODS Phase-out plans, new	1.750	0.131
TPMPs, new	4.896	0.595
MDI	23.950	1.796
MB, approved	5.926	0.500
MB, new	6.280	0.544
CTC, Halons		
CTC, approved	3.212	0.241
Process Agents, approved	2.500	0.182
CTC, TCA, assistance	0.220	0.020
Halons, assistance	0.075	0.006
ODS (NON-HCFC) PRODUCTION		
CFC production phase-out (incl. Accel.)	15.800	1.158
MB production phase-out	2.000	0.150
HCFC RELATED ACTIVITIES		
HPMP preparation	3.500	0.360
HCFC Demo-projects	5.000	0.400
HCFC PHASE-OUT ACTIVITIES		
HCFC phase-out, non-servicing	243.34-364.88	(included)
HCFC phase-out, servicing	63.000	(included)
HCFC, production phase-out	0.000	(included)
DESTRUCTION, DISPOSAL	25.116	1.884
SUPPORTING ACTIVITIES		
Executive Committee, Secretariat	20.257	
Treasurer	1.500	
Core Unit costs	16.624	
CAP	29.192	
Institutional Strengthening	21.560	0.862
Technical Assistance	1.820	0.180
TOTAL	**508.25-629.79**	**10.03**

If agency support costs are included, the total funding requirement for the period 2009-20A1, under the scenario **funding to address the 2012 consumption**, is determined at **US $518.3-US $639.8 million.** Averaged this is about US $210 million higher than the funding calculated for the baseline funding 2009/2010 with the same cost-effectiveness factor combinations.

It is likely that the funding requirement in future will neither be the baseline funding or the 2012 consumption funding. This will depend on the approaches how the HCFC phase-out will be dealt with in certain Parties,

according to HPMPs to be submitted, and how these plans are validated in future Executive Committee approaches and decisions.

For all Article 5 Parties together, it could be assumed that the total funding requirement would be the medium of the two values, i.e., would be the average of the baseline funding and the 2012 consumption funding for the two cost effectiveness factor combinations selected.

This would yield a (more narrow) range for the 2009-2011 funding requirement (based upon two cost effectiveness factor combinations) of **US $430.6-US $516.1 million.** However, it should be realised that this figure is based on very definite funding assumptions that could be different in practice.

Table A1-3 All elements that determine the 2012-2014 total indicative funding requirement (US $ million) for the scenario allowing for baseline consumption funding and two cost effectiveness factor combinations; in this triennium production closure is assumed to be funded

Funding requirement ALL ODS RELATED ACTIVITIES	**2012-2014**	**2012-2014 agency support**
ODS (NON-HCFC) CONSUMPTION		
ODS Phase-out plans, approved	0.113	0.008
MB Phase-out plans	4.223	0.368
ODS (NON-HCFC) PRODUCTION		
MB production phase-out	1.790	0.134
ALL HCFC RELATED ACTIVITIES		
HCFC phase-out, non-servicing	201.236-322.762	(included)
HCFC phase-out, servicing	31.500	(included)
HCFC, production phase-out	54.120	(included)
DESTRUCTION, DISPOSAL	25.116	1.884
SUPPORTING ACTIVITIES		
Executive Committee, Secretariat	22.135	
Treasurer	1.500	
Core Unit costs	18.165	
CAP	31.899	
Institutional Strengthening	23.477	0.939
Technical assistance	1.820	0.180
TOTAL	**417.09-538.62**	**3.51**

Tables A1-3 and A1-4 give the indicative values for the funding requirement 2012-2014. If agency support costs are included, the total funding requirement for the period 2012-2014 for the scenario **baseline funding** is determined at **US $420.6-US $542.1 million** (see Table A1-3).

Table A1-4 All elements that determine the 2012-2014 total indicative funding requirement (US $ million) for the scenario "2012 funding" (allowing for consumption growth that will be funded until 2012) and two cost effectiveness factor combinations; in this case the production closure funding will be maximal due to the funding of the production up to and including the year 2012

Funding requirement ALL ODS RELATED ACTIVITIES	**2012-2014**	**2012-2014 agency support**
ODS (NON-HCFC) CONSUMPTION		
ODS Phase-out plans, approved	0.113	0.008
MB Phase-out plans	4.223	0.368
ODS (NON-HCFC) PRODUCTION		
MB production phase-out	1.790	0.134
ALL HCFC RELATED ACTIVITIES		
HCFC phase-out, non-servicing	201.236-322.762	(included)
HCFC phase-out, servicing	31.500	(included)
HCFC, production phase-out	147.180	(included)
DESTRUCTION, DISPOSAL	25.116	1.884
SUPPORTING ACTIVITIES		
Executive Committee, Secretariat	22.135	
Treasurer	1.500	
Core Unit costs	18.165	
CAP	31.899	
Institutional Strengthening	23.477	0.939
Technical assistance	1.820	0.180
TOTAL	**510.15-631.68**	**3.51**

If agency support costs are included, the total funding requirement for the period 2012-2014 for the scenario **funding to address the 2012 consumption**, is determined at **US $513.7- US $635.2 million.**

As for the 2009-2011 funding requirement, it could be assumed that the total funding requirement would be in the middle of the two extremes, i.e., would be the average of the baseline and the 2012 consumption funding scenarios, for two cost effectiveness factor combinations.

This would yield a range for the 2012-2014 indicative funding requirement (based upon two cost effectiveness factor combinations) of between **US $467.2 and US $588.7 million.**

In Table A1-5 the indicative funding requirement for the period 2015-2017 is given, with a range for the HCFC funding requirement in the non-servicing sector, following the application of the two cost effectiveness scenarios. If agency support costs are included, the total indicative funding requirement for the period 2015-2017 is estimated at **US $536.4-US $657.9 million.** The

higher amount of funding compared to the earlier triennium is caused by the increase in the production phase-out funding.

Table A1-5 All elements that determine the total 2015-2017 funding requirement (US $ million) assuming two scenarios for cost effectiveness factor combinations

Funding requirement ALL ODS RELATED ACTIVITIES	**2015-2017**	**2015-2017 agency support**
ALL HCFC RELATED ACTIVITIES		
HCFC phase-out, non-servicing	216.098-337.657	(included)
HCFC phase-out, servicing	31.500	(included)
HCFC, production phase-out	156.930	(included)
DESTRUCTION, DISPOSAL	25.A16	1.884
SUPPORTING ACTIVITIES		
Executive Committee, Secretariat	24.188	
Treasurer	1.500	
Core Unit costs	19.850	
CAP	34.856	
Institutional Strengthening	21.560	0.862
Technical Assistance	1.820	0.180
TOTAL	**533.42-655.00**	**2.93**

In Table A1-6 an overview is given of the funding requirements (or indicative funding requirement for the different scenarios) for the trienniums 2009-2011 and 2012-2014. It is also given for two scenarios for cost effectiveness factor combinations for the period 2015-2017 (in this case the funding parameter, i.e., starting with the baseline or with the 2012 consumption level), does not play a role anymore. "Averaging" the two funding scenarios yields variations for the different trienniums as given for the two cost effectiveness factor scenarios.

The funding requirement per triennium based on different cost effectiveness factor assumptions (for zero year and two years operating costs) is US $50-90 million smaller for the first triennium 2009-20A1 than for the second, and US $120-160 million smaller for the first than for the third triennium 2015-2017. This is due to the increasing costs for production phase-out (closure).

The difference between the funding requirements based upon two years operating costs and zero years operating costs is larger the higher the percentage of refrigeration and AC activities is in the total. This is particularly due to the air conditioning sector where the capital costs are small compared to the operating costs (operating costs per year in this study estimated at three times the average capital costs).

Funding requirement Triennium/Assumptions	2009-2011 (US $ million)	2012-2014 (US $ million)	
Baseline funding, low cost	**342.8**	**420.6**	
Baseline funding, high cost	**392.3**	**542.1**	
2012 funding, low cost	**518.3**	**513.7**	
2012 funding, high cost	**639.8**	**635.2**	
Average of baseline and 212 HCFC consumption funding	2009-20A1 (US $ million)	2012-2014 (US $ million)	2015-2017 (US $ million)
Low cost	**430.6**	**467.2**	**536.4**
High cost	**516.1**	**588.7**	**657.9**

Table A1-6 Funding requirements for the Multilateral Fund for the trienniums 2009-2011, 2012-2014 (indicative) and 2015-2017 (indicative), which consist of all funding elements for ODS (non-HCFC) phase-out plans and HCFC phase-out plans (in US $ million), for two different HCFC cost effectiveness factor combinations, the first one based on zero years, the second one on two years funding of operating costs. The values for the trienniums 2009-2011 and 2012-2014 are also averaged from the two funding cases studied (the baseline and 2012 funding scenarios), so that two values (ranges) remain for the different trienniums that are related to the two cost effectiveness factor scenarios (lower two rows in the table).

Annex 3 Risk analysis relating to the extrapolations of future HCFC growth in group 1 countries

In the requests by the Contact Group a risk analysis is requested (not including costs) relating to extrapolations of future HCFC growth in Group 1 countries, based on an annual growth rate of 9% for the years 2011 and 2012, in an annex. This to help the Parties to foresee the risks that may result from the growth rate used by the TEAP in the assumption in its May 2008 report.

The TEAP Replenishment Task Force has extrapolated HCFC consumption patters for all Parties, including the one in Group 1; this was done on the basis of growth patters in the period 2000-2006. This results in certain annual growth percentages for the years in the period 2007-2010. The Task Force considered a further straightforward extrapolation of the HCFC consumption for the years 2011 and 2012 (as was done for the period 2007-2010) as non-realistic. A modified extrapolation procedure applied for the years 2011-2012 --in the May 2008 report-- was based on decreasing growth, which could lead to a more stable consumption pattern in a few years. This modified extrapolation of the consumption data also forms the basis for the funding requirement data derived for the 2012 funding scenario (see Annex 1).

However, when this "decreasing growth scenario" was discussed by the Contact Group at the OEWG in Bangkok, the delegation from the Group 1 Party mentioned that a 9% growth should be used for the years 2011 and 2012. They also mentioned that 4.5% and lower values, as used by the Task Force for 2011 and 2012 would really be too low. It is therefore on the 9% annual growth that this risk analysis is based, although the same arguments would apply for lower growth percentages.

The first reduction from the freeze level (in 2013), given in Decision XIX/6, is a 10% reduction in consumption by the year 2015. This implies a 5% decrease per year for the total consumption of a Party, which includes HCFC-22 consumption for both servicing and non-servicing applications. The funding for the reduction in the servicing sector is assumed to start in 2009 and is supposed to result in reductions after a period of about 3 years. The implementation delay is related to the entering into force of legislation, the results of training of technicians that can be applied in the field etc. It should be mentioned here that certain update activities in legislation etc. are already getting preparatory funding at this stage, which may yield faster implementation results in a best case scenario.

With the servicing sector decreasing its consumption, it implies that the reductions in the non-servicing HCFC sector will be less than 5% per year for a Party, i.e., in the order of 3 to 4% of the total annual HCFC consumption in the year 2013 (the baseline consumption) or 2014. The precise percentage

depends on the type of Party (in which Group, which determines the servicing to non-servicing HCFC consumption ratio).

The funding for a national project approach to deal with these 3-4% annual reductions is supposed to be approved 3 years before full implementation, which implies an approval in the years 2010 and 2011. This is in principle the basis for the calculation of the funding requirement for the first triennium 2009-2011.

If a Party would show 9% growth after the establishment of the baseline (the average of the years 2009 and 2010), it would imply that the consumption in the year 2012 would be about 25% higher than the baseline. This 25% of the total consumption would then have to be phased out in, so to say, less than a year.

It has to be phased out at a moment when the servicing sector reductions are just starting, and this 2012 phase-out would therefore apply to 25% of the HCFC total consumption. This is a factor of 7 higher than the reductions planned for the years 2013 (and 2014) in the non-servicing sector, which are expected to be in the order of 3 to 4% of the baseline (see above).

It should also be noted that, in the case of the Group 1 Party, 25% of the baseline consumption could well be in the order of 80,000 metric tonnes of HCFCs (assumed to be a mix of HCFC-22, HCFC-141b and -142b, with emphasis on the foam blowing agents). In a first instance, it is highly questionable whether a Party could co-ordinate domestically a (very) rapid phase-out of 80,000 metric tonnes; experiences from the CFC era, where this quantity of phase-out in a year has never occurred, makes the case at least an unprecedented one.

Taking into account that

- An implementation of the phase-out of HCFC quantities in 2012 has to be approved in 2009 (the usual three years implementation delay);
- The approvals of the HCFC quantities have to be done in 2009, the first year of the two years that will establish the baseline consumption level. This implies that at that stage, the baseline is not known, neither the amount of HCFC consumption that would be higher than the baseline in 2012;
- the HCFC consumption level of the year 2012 will not be known until the year 2013 (the usual reporting delay), so that a planning of the phase-out in 2012 can only be very preliminary addressed (in 2009).

The above three arguments actually present the reasons why, in practice, it would be enormously difficult how to address this “2012 growth” issue. It should be noted that there is some kind of a “feedback”; it is likely that the 25% higher than baseline consumption will not be achieved because of

legislative and conversion activities, so it could well remain a purely theoretical number.

The amount to be approved in the year 2009 (for reductions before January 2013) is therefore actually unknown, and in order to remain in compliance even more than an estimated 25% of an (unknown) baseline consumption has to be approved in 2009. It should also be taken into account that 2009 is the earliest year where the implementation of HCFC projects might start, following the approvals of HPMPs; first experiences in the year 2010 will show how these phase-out processes could be done in the period thereafter, which would apply to the activities in 2011 and 2012.

The approvals of a large amount of HCFCs for phase-out in the year 2009, a much larger amount than would have to be approved in the years 2010 or 2011 (for the years 2013 and 2014), is also highly unlikely. This because it would result in a completely uneven workload for all entities involved in the process (MLF Secretariat, Implementing Agencies, Ozone Units), so that it is really questionable whether the whole 2012 phase-out process (approvals and implementation) can be approached in this manner at all.

It should also be taken into account that there are severe signs that the ongoing phase-out of CFCs, CTC and MB is occupying a significant share of the capacities in the Implementing Agencies; thus for most Parties a rapid progress in HPMP preparation cannot be expected owing to lack of experienced personnel. Due to the short timelines and the limited current availability of experts, the Implementing Agencies have virtually no possibilities to avoid capacity issues.

It should also be noted that the funding for this 2012 reduction in consumption would require the approval at the MOP-20 of (at least) the funding requirement determined for the 2012 funding scenario, as determined by the Replenishment Task Force in its May 2008 report (with small modifications as outlined in this report). If that approval would not occur, the whole discussion on reducing a large amount of consumption in the year 2012 is purely hypothetical and one could expect non-compliance if the above mentioned growth percentage would pertain. This is a factor that should also be seriously noted.

In conclusion, if a Party would show a large increase in (the 2012) consumption compared to the baseline consumption it is highly unlikely that compliance with the freeze in the year 2013 will or even can be achieved on the basis of the arguments given above. Furthermore, there is a substantial risk that this non-compliance situation would continue for more than just one year, given the delay in the reporting, and the subsequent project approval and implementation process. This risk increases the higher the necessary reduction in the 2012 consumption has to be. It is considered as a very large

non-compliance risk if it would concern 80,000 metric tonnes that would have to be phased out in one year (as this is a first estimate for the HCFC consumption reduction of the Party in Group 1, between the years 2012 and 2013).

The above arguments underline the fact that, for a minimisation of non-compliance risks, Parties may strive to stabilise their HCFC consumption as soon as possible, at least as soon as possible after the period 2009/2010, when the baseline consumption level will have been established.