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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Seventy-eighth Meeting  
Montreal, 4–7 April 2017

**INFORMATION RELEVANT TO THE DEVELOPMENT OF THE COST GUIDELINES FOR  
THE PHASE-DOWN OF HFCs IN ARTICLE 5 COUNTRIES: DRAFT CRITERIA FOR  
FUNDING****Background**

1. At their Twenty-Eighth Meeting<sup>1</sup>, the Parties to the Montreal Protocol adopted the Kigali Amendment<sup>2</sup>, and decision XXVIII/2 related to the Amendment to phase down the production and consumption of hydrofluorocarbons (HFCs). In paragraph 10 of decision XXVIII/2 the Parties requested the Executive Committee to develop, within two years of the adoption of the Amendment, guidelines for financing the phase-down of HFC consumption and production, including cost-effectiveness thresholds. The decision requests the Executive Committee to present those guidelines to the Meeting of the Parties for the parties' views and inputs before their finalization by the Executive Committee.
2. In the context of agenda item 10 on Issues relevant to the Executive Committee arising from the Twenty-Eighth Meeting of the Parties to the Montreal Protocol at the 77<sup>th</sup> meeting (November-December 2016), the Executive Committee discussed a note from the Secretariat aimed at seeking guidance from the Executive Committee on the way forward to address decision XXVIII/2. Further to the discussion, the Executive Committee requested the Secretariat to prepare a document containing preliminary information in response to the elements in decision XXVIII/2 that requested the Executive Committee to take action, and addressing *inter alia* information relevant to the development of the cost guidelines requested from the Executive Committee (decision 77/59(b)(v)).
3. The Executive Committee further invited members at the 77<sup>th</sup> meeting to share relevant information with the Secretariat no later than 31 January 2017, owing to the limited time remaining before the end of 2016 (decision 77/59(c))<sup>3</sup>.
4. The Secretariat has developed the present document in response to decision 77/59.

<sup>1</sup> Kigali, Rwanda, 10–15 October 2016.

<sup>2</sup> Decision XXVIII/1, Annex I of document UNEP/OzL.Pro/28/12.

<sup>3</sup> Information was received from the Governments of Argentina, Germany, Japan and the United States of America.

Structure of the document

5. For the preparation of this document, the Secretariat reviewed the decisions by the Parties and the Executive Committee (and supporting documents as necessary) related to each of the relevant elements of decision XXVIII/2. Particular attention was given to the approved criteria for funding HCFC phase-out in response to decision XIX/6 (September 2007), namely, decision 60/44 on the criteria for funding stage I of HCFC phase-out management plans (HPMPs), and decision 74/50 on the criteria for funding HCFC phase-out in the consumption sector for stage II of the HPMPs.

6. Given the experience of the Executive Committee in developing and approving the funding criteria for HCFCs, this document presents the elements of decision XXVIII/2 which are relevant to the cost guidelines to be developed for the phase-down of HFCs by following the framework of the funding criteria for HCFCs. Table 1 lists the elements of the cost guidelines alongside the relevant paragraphs of decision XXVIII/2. The Secretariat believes that this way of organizing the document will facilitate the work by the Executive Committee; however, the Committee may wish to structure its discussion in any way it considers most appropriate.

**Table 1. Proposed structure for consideration of the funding criteria for the phase-down of HFCs**

Elements of the guidelines for phase-down of HFCs	Paragraphs in decision XXVIII/2
I. Overarching principles and timelines	9, 10, 11 and 12
II. Flexibility in implementation (*)	13 and 14
III. Cut-off date for eligible capacity (*)	17
IV. Second and third conversions (*)	18
V. Sustained aggregate reductions in HFC consumption and production	19
VI. Enabling activities [1]	3, 20, 23
VII. Eligible incremental costs	15
- Consumption manufacturing sector	3, 15(a), 23
- Production sector [2]	15(b)
- Refrigeration servicing sector	3, 15(c), 16 and 23
- Other costs (*)	25
VIII. Institutional strengthening [3]	21
IX. Energy efficiency	22
X. Capacity building to address safety	3, 23
XI. Disposal	24
XII. Eligibility of Annex F substances subject to high ambient temperature exemptions (*)	35

\* Principle already agreed by the Parties. Text has been included in the proposed template for a draft cost guidelines contained in Annex I to the present document.

[1] Document UNEP/OzL.Pro/ExCom/78/6.

[2] Issues related to HFC-23 by-product-control technologies included in document UNEP/OzL.Pro/ExCom/78/9.

[3] Document UNEP/OzL.Pro/ExCom/78/7.

7. Each section of the present document dealing with an element of the cost guidelines for the phase-down of HFCs contains the following information:

- (a) The actual text of the paragraph in decision XXVIII/2 (the text is presented in italic font with reference to the paragraph number of the decision);

- (b) Information provided by Executive Committee members in accordance with decision 77/59(c) in reference to the element (the Secretariat has summarized the information highlighting the key points to facilitate consideration of the document)<sup>4</sup>; and
- (c) Information on decisions, guidelines and/or processes of the Parties or the Executive Committee that is relevant to the element. In line with the Executive Committee's mandate the document does not include observations, comments or policy proposals by the Secretariat.

8. This document also includes the following five annexes:

- Annex I Proposed template for a draft cost guidelines for the phase-down of HFCs, including the following elements of decision XXVIII/2 that were agreed by the Parties at their Twenty-Eighth Meeting: paragraph 13 (flexibility in implementation); paragraph 17 (cut-off date); paragraph 18 (second and third conversions); paragraph 25 (other costs) and paragraph 35 (eligibility of Annex F substances subject to high ambient temperature exemptions)
- Annex II Decisions of the Executive Committee relevant to elements of decision XXVIII/2
- Annex III The rules of procedure of the Executive Committee
- Annex IV Information relating to the refrigeration servicing sector
- Annex V Information relating to maintaining/enhancing energy efficiency

9. Given the relevance of enabling activities (section VI in Table 1 above), HFC-23 by-product-control technologies (part of section VII) and institutional strengthening (section VIII), which are elements of decision XXVIII/2 and included in the structure of the present document, they are discussed in detail in separate documents (i.e., UNEP/OzL.Pro/ExCom/78/6, UNEP/OzL.Pro/ExCom/78/9, and UNEP/OzL.Pro/ExCom/78/7, respectively).

10. During the preparation of the document, the Secretariat gave due consideration to all paragraphs of decision XXVIII/2 and concluded that the following ones did not call for specific action by the Executive Committee and, therefore, have not been included in the document:

- (a) Paragraphs 1 and 2 refer to the application of specific paragraphs of the Amendment to different groups of countries and do not include a specific mandate for the Executive Committee;
- (b) Paragraphs 4 and 5 refer to specific requests to the Technology and Economic Assessment Panel (TEAP) to conduct technology reviews; and
- (c) Paragraphs 25 to 34 and 36 to 40 are on criteria, conditions and the process for exemptions for high-ambient-temperature parties and other exemptions for the Parties.

11. The Secretariat notes that paragraphs 6 to 8 on relationship with the HCFC phase-out did not call for specific action by the Executive Committee. However, the Secretariat considers that these paragraphs may be relevant to the HCFC phase-out and the HFC phase-down and, therefore, have been included in the document.

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<sup>4</sup> The complete text of the information provided by members of the Executive Committee is contained in Annex II of document UNEP/OzL.Pro/ExCom/78/1/Add.1 (Annotated provisional agenda).

## **Relationship with the HCFC phase-out**

Paragraph 6, decision XXVIII/2: “*To acknowledge the linkage between the HFC and HCFC reduction schedules relevant to sectors and the preference to avoid transitions from HCFC to high global-warming-potential (GWP) HFC and to provide flexibility if no other technically proven and economically viable alternatives are available*”.

Paragraph 7, decision XXVIII/2: “*To also acknowledge these linkages with respect to certain sectors, in particular industrial process refrigeration, and the preference to avoid transitions from HCFC to high-GWP HFCs and to be willing to provide flexibility, if no other alternatives are available, in cases where:*

- (a) *HCFC supply may be unavailable from existing allowable consumption, stocks as well as recovered/recycled material, and*
- (b) *It would allow for a direct transition at a later date from HCFC to low-GWP or zero-GWP alternatives*”.

Paragraph 8, decision XXVIII/2: “*To provide, prior to the commencement of the Article 5 HFC freeze and in the light of the acknowledgement in the paragraph above, flexibility measures in relation to the HCFC phase-out relevant to certain sectors, in particular the industrial process refrigeration subsector, in order to avoid double conversions*”.

### Information from Executive Committee members in accordance with decision 77/59(c)

12. The Government of Germany recommended that parties acknowledge the linkages between HFC and HCFC reduction schedules with respect to certain sub-sectors, in particular industrial process refrigeration, in order to avoid double conversions, and by acknowledging this linkage, the Parties signalled their alignment with the principle of using resources in the most cost-effective manner by seeking synergies between the HCFC phase-out and HFC phase-down regimes. With regard to such synergies in the consumption sector, Germany suggested the following questions for consideration:

- (a) How could leapfrogging of HFC transitions be further maximised;
- (b) Could this also apply to HPMP projects where high-GWP alternatives have been approved already, but have not yet been implemented;
- (c) How to account for additional funding resources in view of the starting point for HFC, when avoiding the phase-in of high-GWP HFCs; and
- (d) How to rationalise costs following the synergizing effects of implementing servicing simultaneously under the HCFC phase-out and HFC phase-down.

13. On the integration of the production sector the Government of Germany would like to know how the transition to high-GWP production will be avoided or minimized.

14. The Government of Japan indicated that the activities aimed at securing compliance of Article 5 countries with the HCFC phase-out schedule should not be delayed as HFC phase-down activities commence.

Previous Executive Committee decisions and practice

15. In accordance with decision 77/59(b)(iv), the Secretariat has compiled issues in relation to existing HCFC phase-out activities in a separate document (UNEP/OzL.Pro/ExCom/78/8) for the Executive Committee's consideration.

**I. Overarching principles and timelines**

Paragraph 9, decision XXVIII/2: *“To recognize that the Amendment maintains the Multilateral Fund for the Implementation of the Montreal Protocol as the financial mechanism and that sufficient additional financial resources will be provided by Parties not operating under paragraph 1 of Article 5 to offset costs arising out of HFC obligations for Parties operating under paragraph 1 of Article 5 under the Amendment”*.

Paragraph 10, decision XXVIII/2: *“To request the Executive Committee to develop, within two years of the adoption of the Amendment, guidelines for financing the phase-down of HFC consumption and production, including cost-effectiveness thresholds, and to present those guidelines to the Meeting of the Parties for the Parties' views and inputs before their finalization by the Executive Committee”*.

Information from Executive Committee members in accordance with decision 77/59(c)

16. The Government of Argentina suggested, in view of the limited time available, that the Executive Committee give first priority to the development and submission to the Parties of the financing guidelines for HFC phase-down including the cost-effectiveness thresholds.

17. The Government of Germany indicated that, as a principle the existing ODS guidelines should be maintained as much as possible as they are well understood by members and implementing agencies and are operating well. The Government also provided an overarching comment on funding issues, which indicated that the evaluation of requests for financing incremental costs of a given HFC-project should take into account a number of principles listed in detail in Annex II of the Annotated provisional agenda.<sup>5</sup> These principles include, among others, that the most cost-effective and efficient option should be chosen, taking into account the national industrial strategy of the recipient country; that the operational policies, guidelines and administrative arrangements, including the disbursement of resources, for the purpose of achieving the objectives of the Multilateral Fund (Article 10(5)) should strictly relate to compliance with the provisions of the Protocol, and meet agreed incremental costs (Article 10(6)); that all activities which require funding, including energy efficiency, should be strictly related to the phase-down of HFCs, and kept within agreed cost thresholds; that any saving or benefits during the transition process are considered when establishing the incremental costs in the various subsectors; that any request (HFC, energy use) shall be presented with a baseline and the respective reduction targets that are measurable, (independently) verifiable and reportable, matching the requirements of both the Montreal Protocol and the United Nations Framework Convention on Climate Change (UNFCCC); that methodologies and procedures for conservatively projecting and measuring greenhouse gas (GHG) reductions in the refrigeration and air-conditioning sector are developed together with renown institutions in the field of energy; and that in the evaluation of GHG reductions, the impact in tCO<sub>2</sub>eq is measured and illustrated on the basis of annual consumption, lifetime emissions and aggregated savings until 2050 versus a business-as-usual scenario.

Previous Executive Committee decisions and practice

18. National strategies have been the basis for providing assistance to Article 5 countries to phase out controlled substances. The document on information relevant to the development of the cost guidelines

<sup>5</sup> UNEP/OzL.Pro/ExCom/78/1/Add.1.

for the phase-down of HFCs in Article 5 countries: enabling activities<sup>6</sup> provides a comprehensive overview of the different national strategies used to provide assistance to Article 5 countries at different points in time, from country programmes to HPMPs.

19. In the case of the acceleration of the HCFC phase-out, subsequent to the decision XIX/6 (September 2007), the Executive Committee at its 53<sup>rd</sup> meeting (October 2007) started discussing several issues related to the funding of HCFC phase-out, including the most suitable type of national strategy to provide assistance for HCFC phase-out. Given that the baselines had not been established and there were still uncertainties with respect to future technologies, a staged approach was agreed. This approach made it possible to take on sectors where substitute technologies were more developed and new technologies had become available.

20. Other issues on which the Executive Committee reached agreement at the 53<sup>rd</sup> meeting before agreeing on cost guidelines included *inter alia* the legal prerequisites for accessing Multilateral Fund funding for HCFC phase-out (i.e., ratification of the Copenhagen Amendment for consumption and the Beijing Amendment for production); continued applicability of the existing policies and guidelines of the Multilateral Fund in funding phase-out of ODS other than HCFCs; continued use of the institutions and capacities in Article 5 countries developed through Multilateral Fund assistance; a request to the Secretariat and the implementing agencies to examine the existing guidelines for country programmes and sector plans (decision taken at the 3<sup>rd</sup> meeting (June 1991) and decision 38/65), and to propose draft guidelines for the preparation of HPMPs incorporating HCFC surveys and taking into consideration views expressed by the members; a request to the Secretariat to work in consultation with technical experts to prepare a preliminary discussion document providing analysis on all relevant cost considerations taking into consideration the views expressed by the members; and the approval of an expenditure of up to US \$150,000 to cover the cost of consultations with technical experts and other stakeholders for the preparation of the document referred to in the decision.<sup>7</sup>

Paragraph 11, decision XXVIII/2: “*To request the Chair of the Executive Committee to report back to the Meeting of the Parties on the progress made in accordance with this decision, including on cases where Executive Committee deliberations have resulted in a change in a national strategy or a national technology choice submitted to the Executive Committee*”.

#### Information from Executive Committee members in accordance with decision 77/59(c)

21. The Government of Argentina suggested that, in order to ensure transparency and equity across Executive Committee approvals, the Secretariat should prepare an overview table for the project review agenda item, summarizing for each country proposal (regardless of whether it is recommended for blanket approval or not), the proposed and agreed strategy, the technology choice and recommended level of funding, the sectors and selected technologies covered by each project, the total eligible costs and cost-effectiveness based on eligible consumption for each sector as well as overall coverage (percentage of the baseline level), and the reason why the Secretariat has suggested changing the proposed strategy chosen by the country, if this is the case.

#### Previous Executive Committee decisions and practice

22. With regard to the reporting practice, the Chair of the Executive Committee provides a report at each Meeting of the Parties high-level segment that describes the work of the Executive Committee since the previous Meeting of the Parties, including highlights of achievements, policies and projects approved, noting and acknowledging the work that is done by each bilateral and implementing agency. This report is

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<sup>6</sup> UNEP/OzL.Pro/ExCom/78/6.

<sup>7</sup> Decision 53/37 and subsequent decisions related to the HCFC phase-out are included for reference in Annex II to the present document.

prepared by the Secretariat and approved by the Executive Committee at the meeting preceding the Meeting of the Parties where this report is presented. The agenda of the Thirty-ninth meeting of the Open-Ended Working Group (OEWG) includes an item on the update on the Executive Committee's progress in relation to decision XXVIII/2. This update at the OEWG could be made through a note prepared by the Secretariat on behalf of the Executive Committee or by any other manner through which the Executive Committee decides to update the Parties.

23. The Secretariat seeks guidance from the Executive Committee on how it wishes to update the Parties on its progress in relation to decision XXVIII/2 to the OEWG and on changes to the format of the report to the Meeting of the Parties where required, following paragraph 11 of decision XXVIII/2.

Paragraph 12, decision XXVIII/2: *“To request the Executive Committee to revise the rules of procedure of the Executive Committee with a view to building in more flexibility for Parties operating under paragraph 1 of Article 5”*.

Information from Executive Committee members in accordance with decision 77/59(c)

24. The Government of Argentina indicated that decisions that are clearly directed at individual investment projects approved prior to the performance-based project modality should be retired to prevent misuse (i.e., to limit country flexibility or funding levels); and that the Executive Committee should commission a report, to be updated periodically, containing a rolling list of decisions that can no longer be applied to sector/national plans.

Previous Executive Committee decisions and practice

25. The rules of procedure of the Executive Committee indicated in the decision are presented for reference in Annex III to the present document.

**II. Flexibility in implementation that enables Parties to select their own strategies and priorities in sectors and technologies**

Paragraph 13, decision XXVIII/2: *“Parties operating under paragraph 1 of Article 5 will have flexibility to prioritize HFCs, define sectors, select technologies and alternatives and elaborate and implement their strategies to meet agreed HFC obligations, based on their specific needs and national circumstances, following a country-driven approach”*.

Paragraph 14, decision XXVIII/2: *“To request the Executive Committee of the Multilateral Fund to incorporate the principle referred to in the paragraph above into relevant funding guidelines for the phase down of HFCs and in its decision-making process”*.

26. Paragraph 13 of decision XXVIII/2 has been included in the proposed template for a draft cost guidelines contained in Annex I to the present document.

Information from Executive Committee members in accordance with decision 77/59(c)

27. The Government of Argentina suggested that this principle needs to be included in a decision.

Previous Executive Committee decisions and practice

28. The evaluation of requests for financing of incremental costs of projects submitted to the Multilateral Fund (individual and multiyear projects to phase out all ODS) has been based on the following general principles agreed by the Second MEETING OF THE PARTIES (June 1990).<sup>8</sup>

- (a) The most cost-effective and efficient option should be chosen, taking into account the national industrial strategy of the recipient Party. It should be considered carefully to what extent the infrastructure at presently used for production of the controlled substances could be put to alternative uses, thus resulting in decreased capital abandonment, and how to avoid deindustrialization and loss of export revenues;
- (b) Consideration of project proposals for funding should involve the careful scrutiny of cost items listed in an effort to ensure that there is no double-counting;
- (c) Savings or benefits that will be gained at both the strategic and project levels during the transition process should be taken into account on a case-by-case basis, according to criteria decided by the Parties and as elaborated in the guidelines of the Executive Committee; and
- (d) The funding of incremental costs is intended as an incentive for early adoption of ozone protecting technologies. In this respect the Executive Committee shall agree which time scales for payment of incremental costs are appropriate in each sector.<sup>9</sup>

29. Specific decisions of the Meeting of the Parties and the Executive Committee on prioritization during HCFC phase-out have been implemented respecting the main principles on incremental costs above:

- (a) Decision XIX/6 requested that the Executive Committee, when developing and applying funding criteria for projects and programmes, give priority to cost-effective projects and programmes which focus on, *inter alia* phasing out first those HCFCs with higher ODP, taking into account national circumstances; substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account global-warming potential (GWP), energy use and other relevant factors; and small and medium-size enterprises (SMEs);
- (b) Accordingly, decision 59/11 requested bilateral and implementing agencies to submit as a priority HCFC-141b phase-out projects. Decision 60/44 (stage I of HPMPs) established that non- low-volume-consuming (LVC) Article 5 countries should first address consumption in the manufacturing sector to meet the reduction steps in 2013 and 2015, and that funding for servicing would be provided if such countries clearly demonstrated that they required assistance in this sector to comply with these targets. Decision 62/12 requested additional justification for the submission of projects in sectors not considered as a priority, and decision 72/18 reminded bilateral and implementing agencies and Article 5 countries to prioritize the phase-out of HCFC-141b and compliance with the 2020 target when requesting and using project preparation funds for projects in non-LVC countries. Subsequently, decision 74/50 (stage II of HPMPs) established that non-LVC countries should prioritize consumption in the manufacturing sector to meet the reduction steps in 2020, where possible;

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<sup>8</sup> Appendix 1 of decision II/8 (Financial Mechanism).

<sup>9</sup> Annex I of document UNEP/OzL.Pro/ExCom/55/47.



- (c) In following the prioritization principles described above, flexibility has been applied when required whether to include sectors that were not considered priority (e.g., refrigeration servicing sector) or to continue using HCFCs in certain applications and submit stand-alone projects when a suitable technology was identified.<sup>10</sup> As a result, activities in the refrigeration servicing sector have been approved in virtually all countries that have requested funding for this sector in stage I and stage II of HPMPs. In a few countries (e.g., Chile and the Bolivarian Republic of Venezuela) stage I of the HPMP was approved exclusively for the refrigeration servicing sector instead of the manufacturing sector, upon clear demonstration by the countries that they required assistance in the refrigeration servicing sector to comply with the reduction targets; and
- (d) There have also been instances in which three or more sectors in a country have received the same priority resulting in a proposal to phase out more consumption of HCFCs than would be required to comply with the next reduction target (a common case when there are several implementing agencies), and in cases with funding values substantially above the submitted business plans. Each of these cases has been discussed at the Executive Committee in light of the specific circumstances of the country, resulting in the approval of the strategy as submitted in many cases, and in other cases additional HCFC reduction commitments, longer implementation periods and/or prioritization of some sectors over others.

### III. Cut-off date for eligible capacity

Paragraph 17, decision XXVIII/2: “*That the cut-off date for eligible capacity is 1 January 2020 for those Parties with baseline years from 2020 to 2022 and 1 January 2024 for those Parties with baseline years from 2024 to 2026*”.

30. Paragraph 17 of decision XXVIII/2 has been included in the proposed template for a draft cost guidelines contained in Annex I to the present document.

### IV. Second and third conversions

Paragraph 18, decision XXVIII/2: “*To request the Executive Committee to incorporate the following principles relating to second and third conversions into funding guidelines*:

- (a) *First conversions, in the context of a phase-down of HFCs, are defined as conversions to low-GWP or zero-GWP alternatives of enterprises that have never received any direct or indirect support, in part or in full, from the Multilateral Fund, including enterprises that converted to HFCs with their own resources;*
- (b) *Enterprises that have already converted to HFCs in phasing out CFCs and/or HCFCs will be eligible to receive funding from the Multilateral Fund to meet agreed incremental costs in the same manner as enterprises eligible for first conversions;*
- (c) *Enterprises that convert from HCFCs to high-GWP HFCs, after the date of adoption of the Amendment, under HCFC phase-out management plans already approved by the Executive Committee will be eligible to receive funding from the Multilateral Fund for a subsequent conversion to low-GWP or zero-GWP alternatives to meet agreed incremental costs in the same manner as enterprises eligible for first conversions;*
- (d) *Enterprises that convert from HCFCs to high-GWP HFCs with their own resources*

<sup>10</sup> Examples of this are described in document UNEP/OzL.Pro/ExCom/78/8.

*before 2025 under the Amendment will be eligible to receive funding from the Multilateral Fund to meet agreed incremental costs in the same manner as enterprises eligible for first conversions; and*

- (e) *Enterprises that convert from HFCs to lower-GWP HFCs with Multilateral Fund support when no other alternatives are available will be eligible to receive funding from the Multilateral Fund for a subsequent conversion to low-GWP or zero-GWP alternatives if necessary to meet the final HFC phase-down step”.*

31. Paragraph 18 of decision XXVIII/2 has been included in the proposed template for a draft cost guidelines contained in Annex I to the present document.

## **V. Sustained aggregate reductions in HFC consumption and production**

Paragraph 19, decision XXVIII/2: *“To request the Executive Committee to incorporate the following principle related to sustained aggregate reductions into Multilateral Fund policies: remaining eligible consumption for funding in tonnage will be determined on the basis of the starting point of national aggregate consumption less the amount funded by previously approved projects in future multi-year agreement templates for HFC phase-down plans, consistent with Executive Committee decision 35/57”.*

### Information from Executive Committee members in accordance with decision 77/59(c)

32. The Government of Germany expressed the following points:

- (a) The starting point for aggregate reduction in HFC consumption should be established at the time of submission of either the first HFC investment project or the HFC-management plan, whichever was submitted first to the Executive Committee. In cases where calculated HFC baselines, based on reported Article 7 data, were different from the calculated starting point before the baseline, the starting points could be adjusted;
- (b) Fixing a starting point for eligible funding, clearly divided into subsectors and respective eligible HFC consumption in kg substance will provide predictable clarity about financial needs for the Parties in each of the subsectors;
- (c) In accordance with the Multilateral Fund’s strategy of a compliance-driven business planning approach, the required reduction level for each country is calculated prior to allocating the resources that are needed to achieve that level of reduction. This calculation is made in the case of HFCs on the basis of an agreed baseline of eligible consumption figures in terms of environmental impact (tCO<sub>2</sub>eq). The energy consumption of HFC technologies should also be measured in tCO<sub>2</sub>. When energy consumption of alternatives is funded, a subsector baseline of energy consumption is necessary in order to ensure that the funding provided will result in sustained reductions;
- (d) A paradigm change is needed for assessing and reporting climate impact in comparison to the approach taken so far under ODS controls, when the impact of GHG reduction was a secondary benefit. Transparency and reliability of reporting climate impact should be improved and a clear distinction should be made between verified (hard) emission reductions (e.g. HFC) and not verifiable (soft) reductions that depend on unpredictable conditions (such as energy use, unless an agreed conservatively proven methodology is applied). The evaluation of the environmental impact should include in the case of HFCs lifetime emissions of the conversion of annual productions; the aggregated impact (tCO<sub>2</sub>) until 2050; and the separated indication of the impact (tCO<sub>2</sub>) of hard and soft reductions.

Each data set should include underlying assumption and a description of the means of verification;

- (e) Any funding should be used in light of the principle of sustained aggregate reductions; however, the Government of Germany would also like to know:
  - (i) On which principles/decisions could the incremental costs of energy efficiency be justified, and in case it is done, clarify whether energy efficiency will also fall under the agreed subsector cost thresholds;
  - (ii) How to maintain the principle of sustained aggregate GHG reductions of energy use in a refrigeration and air-conditioning subsector and avoid diluting/offsetting GHG reductions and the cost-effectiveness of the HFC phase down;
  - (iii) How would a possible starting point be assessed in such case (bottom up?); and
  - (iv) In such case, will the Executive Committee agreement complement for individual compliance to targets of the recipient country with regard to GHG reductions in the energy use subsector?

#### Previous Executive Committee decisions and practice

33. At the 35<sup>th</sup> meeting (December 2001), the Executive Committee agreed *inter alia* that further funding must be predicated on a commitment by the country to achieve sustainable permanent aggregate reductions in consumption and production, as relevant.

34. In implementing this provision, the Executive Committee believed that all Article 5 countries should be treated equally. In that regard, each Article 5 country should select one of two options for determining the starting point for implementation of its national aggregate consumption: Montreal Protocol baseline as reported at the 35<sup>th</sup> meeting less projects approved but not yet implemented when the baseline was established in 1997, and projects approved since (option 1); or, latest reported data (1999 or 2000) as reported at the 35<sup>th</sup> meeting less projects approved but not yet implemented (option 2).<sup>11</sup>

35. The Committee also acknowledged that some future years' reported consumption could go above or below the levels that resulted from the agreed calculation, but if consumption numbers went above the resulting levels, such increases in consumption would not be eligible for funding. In other words, the resulting numbers (i.e., the starting point) represented the maximum residual ODS that the Fund would pay to reduce, and existing Fund guidance related to eligibility of projects would be maintained in all respects.

36. Six months after the adoption of decision 35/57, at its 37<sup>th</sup> meeting (July 2002), for those countries that had not made or confirmed their final selection of an option, at its 37<sup>th</sup> meeting (July 2002), the Executive Committee *inter alia* decided to set the selection deadline at eight weeks prior to the meeting at which the country concerned intended to submit a project for consideration by the Executive Committee; to automatically apply Option 1 if such a country submitted a project without making a selection; and to request the Secretariat to assist those countries that were having technical difficulties in

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<sup>11</sup> The Executive Committee also noted that if an Article 5 country selected option 2, it should be with the understanding that the Executive Committee might agree in exceptional cases to adjust the resulting baseline at the first instance a project from a country was considered, to take into account the demonstrated non-representative nature of the last year's data for reasons such as clearly demonstrated stockpiling in the specific 12-month period, and/or national economic difficulties in the specific 12-month period (illegal imports were not taken into account as firms that import illegally or purchase illegal imports should not benefit from Fund assistance).

making their selection (decision 37/66(c)). The starting point for sustained aggregate reductions in eligible consumption of CFCs was agreed ten years after funding for the first projects was approved.<sup>12</sup>

37. For the phase-out of HCFCs, Article 5 Parties could choose between two options to establish their starting point for sustained aggregate reductions: the most recent reported HCFC consumption under Article 7 at the time of the submission of the HPMP and/or the investment project, or the country's forecast baseline HCFC consumption. If the latter was chosen, the starting point would be adjusted once the HCFC baseline was known. In particular, the calculation of the starting point for HCFC phase-out was decided at the 60<sup>th</sup> meeting (April 2010), where the Executive Committee decided:

- (a) To establish the starting points for aggregate reductions in HCFC consumption, for those Article 5 countries that submit projects in advance of their assessed baseline, at the time of submission of either the HCFC investment project or the HPMP, whichever was first submitted for the consideration of the Executive Committee;
- (b) To allow Article 5 countries to choose between the most recent reported HCFC consumption under Article 7 of the Montreal Protocol at the time of the submission of the HPMP and/or the investment project, and the average of consumption forecast for 2009 and 2010, in calculating starting points for aggregate reductions in HCFC consumption; and
- (c) To adjust the agreed starting points for aggregate reductions in HCFC consumption in cases where calculated HCFC baselines based on reported Article 7 data are different from the calculated starting point based on the average consumption forecast for 2009-2010 (decision 60/44(c), (d), and (e)).

38. For the majority of Article 5 countries, the starting points for aggregate reduction in consumption for CFCs (decision 35/57) and for HCFCs (decision 60/44) have been similar to their respective baselines for compliance (i.e., average 1995-1997 CFC consumption, and average 2009-2010 HCFC consumption, respectively).<sup>13</sup> The starting points for CFC and HCFC consumption have been based on the levels of consumption of the controlled substances that would be phased out and have been measured in ODP tonnes.

39. In considering how to determine the starting point for sustained aggregate reductions in HFCs, the Executive Committee may wish to note that Article 5 countries' baseline for compliance for CFCs and HCFCs was based on the level of consumption of the respective controlled substance, in ODP tonnes. In contrast, the baseline for compliance for HFCs is based on the average level of the controlled substance (i.e., HFCs) over a three-year period plus 65 per cent of the HCFC baseline (i.e., a different controlled substance) measured in CO<sub>2</sub> equivalent tonnes. In addition, the Executive Committee may wish to note that blends of HFCs may constitute a significant proportion of a country's HFC consumption.<sup>14</sup>

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<sup>12</sup> At the 4<sup>th</sup> meeting (June 1991), the Executive Committee approved 61 projects in 29 Article 5 countries and two regional projects, at a total value of US \$6,160,422. The starting point for sustained aggregate reductions was agreed at the 35<sup>th</sup> meeting (December 2001).

<sup>13</sup> For example, the starting point for aggregate reductions in HCFC consumption of 131 of the 143 Article 5 countries currently receiving assistance from the Multilateral Fund is similar to their baseline for compliance; seven countries selected the starting point as either the 2008 or the 2009 HCFC consumption reported under Article 7 of the Montreal Protocol; five countries calculated their starting point taking into account national circumstances such as HCFC stockpiles; and one country does not yet have an approved HPMP.

<sup>14</sup> UNEP/OzL.Pro/ExCom/78/4 (document on Available information on HFC consumption and production). Consumption of blends like R-410A, R-407C, R-404A can account for a significant portion of the total HFC consumption both in metric tonnes and CO<sub>2</sub> equivalent.

## VI. Enabling activities

Paragraph 20, decision XVIII/2: “*To request the Executive Committee to include the following enabling activities to be funded in relation to HFC phase-down under the Amendment:*

- (a) *Capacity-building and training for handling HFC alternatives in the servicing, manufacturing and production sectors;*
- (b) *Institutional strengthening;*
  - (a) *Article 4B licensing;*
  - (b) *Reporting;*
  - (c) *Development of national strategies; and*
  - (d) *Demonstration projects”.*

40. In light of the discussion on the enabling activities required to assist Article 5 countries in commencing their reporting and regulatory activities in relation to the HFC control measures (decision 77/59(b)(ii)) and the discussion on the intended US \$27 million fast-start contributions from some of the non-Article 5 Parties (decision 77/59(d)), a comprehensive discussion of enabling activities in the context of the Kigali Amendment and decision XXVIII/2 is presented in document UNEP/OzL.Pro/ExCom/78/6.

## VII. Eligible incremental costs

Paragraph 15, decision XXVIII/2: “*To request the Executive Committee, in developing new guidelines on methodologies and cost calculations, to make the following categories of costs eligible and to include them in the cost calculation”.*

### Consumption manufacturing sector

41. Paragraph 15(a), decision XXVIII/2: “*For the consumption manufacturing sector:*

- (i) *Incremental capital costs (ICC);*
- (ii) *Incremental operating costs (IOC) for a duration to be determined by the Executive Committee;*
- (iii) *Technical assistance activities;*
- (iv) *Research and development, when required to adapt and optimize low-GWP or zero-GWP alternatives to HFCs;*
- (v) *Costs of patents and designs, and incremental costs of royalties, when necessary and cost-effective; and*
- (vi) *Costs of the safe introduction of flammable and toxic alternatives”.*

### Information from Executive Committee members in accordance with decision 77/59(c)

42. The Government of Argentina proposed the following:

- (a) Decision XXVIII/2 should be the main guiding document while taking into account the lessons learnt during HPMP implementation (i.e., ICC provided was not sufficient for some sectors and IOC should be extended for a much longer period in order to provide sufficient incentive for the conversion to new alternatives);
- (b) Non-Article 5 countries should demonstrate successful conversions to low-GWP alternatives in their countries and share their experience, especially with those Article 5 countries, which are facing difficulties in introducing new alternatives;
- (c) Cost-effectiveness thresholds should be developed using actual incremental costs of HFC phase-out. Those actual incremental cost items should become the basis for a list of standard, eligible equipment for the particular sector. The Executive Committee should then approve new cost-effectiveness thresholds and the associated standard list of equipment for each subsector. The Secretariat would be required to apply the thresholds and the standard list of equipment in its project review to ensure transparency and equity;
- (d) To implement this approach, a cost template should be developed by the Secretariat and implementing agencies (as was done for CFCs) for reviewing project costs. With the above standard costs and set of equipment, there would be no need to maintain artificial levels of IOC; and
- (e) Where required information for establishing the above thresholds is not available, the Executive Committee would commission an external technical review by experts selected by the Executive Committee to determine actual costs as experienced in developed countries and/or approve demonstration projects with an aim to obtain this information.

43. The Government of Germany provided the following information regarding the ICC and IOC for a duration determined by the Executive Committee:

- (a) General market considerations: Technology deployment will develop faster after the ratification of the Kigali Amendment; ICC/IOC need to be seen in light of the early phase-down in many non-Article 5 countries; the market will be very different five years from now; start with cost-effective alternatives, backload conversions where there are no cost-effective alternatives yet; incentive systems need to be developed for low-and zero-GWP alternatives versus technologies based on HFCs;
- (b) ICC need to take into account an ongoing review of prices for components, parts and refrigerants; and the starting point of cost-effectiveness considerations should be the existing HPMP guidelines, noting that with increasing market introduction, prices will decrease;
- (c) Approval of IOCs needs to take into account negative experiences with cash payments of IOCs, and consequently the need for seamless monitoring and control of the sustainability of such transitions. IOCs should not be extended over a longer period of time as they are only meant to compensate for a loss during the initial market introduction that is caused by a lack of established procedures. As new products are generally thought to be overall more competitive than the predecessor products/services they replace, there is no longer-term need for IOC. Keep the limit to transfer of funds from eligible ICC to IOC at 20 per cent. Considering the average implementation period of 36 months for approved projects, and that the application of present market prices for some alternatives, such as HFOs, for which there is presently only marginal production, is highly volatile and speculative, in these cases IOCs need to be based on real production price, rather than on speculative

prices stimulated by initially limited supplies. The Secretariat should be asked to describe marginal production costs of HFOs and HFC-32;

- (d) In manufacturing, prioritize subsectors with the highest impact, both with regard to the GWP of the alternative and the lifetime consumption (taking into account initial charge and refill). Based on the average lifetimes and leakage-rate per year for equipment in the various refrigeration and air-conditioning subsectors for Article 5 Parties, early action would have the largest impact in the industrial, commercial and stationary air-conditioning sector, while the impact in the domestic refrigeration sector would be lower (less than 10 per cent compared to the other sectors). The impact of lifetime emissions influences the impact of mitigation scenarios; for instance air-conditioning conversion to zero/low GWP has the highest reduction potential and cost-effectiveness compared to measures in the domestic refrigeration sector or conversion of air-conditioning to HFCs (e.g., converting 10 per cent of the R-410A used in stationary air-conditioning to propane would offset the total lifetime emissions of the domestic refrigeration sector (in MTCO<sub>2</sub> eq), while replacing by HFC-32 would require additional conversions in order to have the same effect); and
- (e) Based on the above, enabling activities need to build framework conditions and capacities to manage flammability and toxicity issues for the safe introduction of HFC-free alternatives and to initiate the local adaptation of rules and standards in support of demonstration projects.

#### Previous Executive Committee decisions and practice

##### *Cost-effectiveness thresholds and incremental capital cost*

44. In early 1995, cost-effectiveness threshold values were established to prioritize approvals of investment projects, since the level of funding requested in submitted projects was above the level of funding available at that time in the Multilateral Fund. This permitted an equitable distribution of the available funding between the various sectors, covering all Article 5 countries and ensuring that no sectors were left without financial support.<sup>15</sup>

45. The Secretariat has always reviewed project proposals based on the incremental cost<sup>16</sup> and in line with the guidelines and decisions of the Executive Committee. The incremental cost is assessed based on, *inter alia*, the baseline equipment in the enterprise, the number of products manufactured, the amount of controlled substances and other raw materials used, the consideration of technological upgrades<sup>17</sup> and the alternative technology selected. Once all technical and cost issues have been satisfactorily addressed and an agreement on the incremental cost has been reached between the Secretariat and relevant bilateral/implementing agencies, the cost-effectiveness of the project is calculated by dividing the agreed level of funding by the total amount of controlled substances to be phased out. In cases where an enterprise is partially owned by non-Article 5 capital, the agreed level of funding is adjusted by proportionally deducting the foreign share ownership of the enterprise.<sup>18</sup> As the total amount of controlled substances used by the enterprise counts as phase-out (irrespective of the local share ownership), the resulting “adjusted” cost-effectiveness value of the project will be lower (in absolute numbers) than if the enterprise was completely locally owned.

<sup>15</sup> UNEP/OzL.Pro/ExCom/58/47.

<sup>16</sup> Incremental costs comprise the ICC and IOC.

<sup>17</sup> Decisions 18/25 and 25/48.

<sup>18</sup> In line with the decision on transnational corporations adopted at the 7<sup>th</sup> meeting (paragraph 88 of document UNEP/OzL.Pro/ExCom/7/30).

46. At the 55<sup>th</sup> meeting (July 2008), the Secretariat prepared a document on revised analysis of relevant cost considerations surrounding the financing of HCFC phase-out (decisions 53/37(i) and 54/40<sup>19</sup>), which has served as a reference to bilateral and implementing agencies when preparing HCFC phase-out projects in the foam, refrigeration and air conditioning sectors.<sup>20</sup> In particular, Annex III of the document contains detailed information on equipment required and estimation of ICC and IOC for the conversion from HCFC to several alternatives (i.e., hydrocarbons (HC), HFC-245fa, methyl formate, and water-based) in several polyurethane (PU) foam applications (i.e., panels, pipe in pipe foam, thermoware, domestic refrigerators, spray foam, discontinuous block foam and integral skin), including several plant capacities. Annex IV of that document provides technical considerations relevant when replacing HCFC-22 in the refrigeration and air-conditioning sector with several alternatives (i.e., R-410A, R-407C, R-404A, HFC-134a and HC-290) and general estimations of ICC and IOC for the conversion of manufacturing plants to those alternatives in room and mini-split air-conditioning units, ducted commercial and packaged air-conditioners, chillers, and several commercial refrigeration applications (i.e., stand-alone equipment, stand-alone commercial-sized freezers, beverage vending machines, and condensing units).

47. In reviewing the HCFC phase-out in investment projects submitted as stand-alone projects or as a component of HPMPs related to the foam and commercial refrigeration manufacturing sectors, the Secretariat has taken into consideration the information contained in document UNEP/OzL.Pro/ExCom/55/47, as well as information obtained from precedent projects reviewed, updated information on alternatives produced by the TEAP and, when required, consultation with independent experts.

48. When required, the Executive Committee has requested the Secretariat to undertake additional studies to estimate incremental cost of specific applications and technologies. For example, at the 76<sup>th</sup> meeting, the Secretariat commissioned a study on the ICC and IOC related to conversions in the foam sector to non-HCFC alternatives,<sup>21</sup> and a study on the calculation of the level of incremental cost for the conversion of heat exchangers manufacturing lines in air-conditioning manufacturing enterprises converting to HC-290, HFC-32 and R-452b.<sup>22</sup> These studies, which were prepared by independent industry experts and incorporated comments by independent peer reviewers and the implementing agencies, have also produced valuable information that is taken into consideration in the review of projects.

49. In addition, in line with decision 60/44(f)(ii) the Secretariat used, as a reference for the recommendation on funding, the cost-effectiveness threshold values used for CFC phase-out,<sup>23</sup> and the additional cost-effectiveness threshold set in decision 62/13.<sup>24</sup> Funding of up to a maximum of 25 per cent above the threshold is provided when low-GWP alternative technologies are introduced (decision 60/44(f)(iv)). For stage II of the HPMPs, up to 40 per cent above the cost-effectiveness threshold is provided when low-GWP alternative technologies are introduced by SMEs in the foam sector with consumption of less than 20 metric tonnes (mt) (decision 74/50(c)(iii)). With regard to the aerosol,

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<sup>19</sup> UNEP/OzL.Pro/ExCom/55/47.

<sup>20</sup> Agencies are requested to use the technical information contained in document as a guide (decision 60/44(f)(i)).

<sup>21</sup> UNEP/OzL.Pro/ExCom/76/58.

<sup>22</sup> UNEP/OzL.Pro/ExCom/77/69.

<sup>23</sup> Paragraph 32 of the final report of the 16<sup>th</sup> meeting, document UNEP/OzL.Pro/ExCom/16/20.

<sup>24</sup> At the 60<sup>th</sup> meeting, the Government of Colombia submitted a stand-alone project for the conversion of four domestic refrigeration manufacturing enterprises using HCFCs for the production of PU rigid insulation foam. The project was approved with a cost-effectiveness of US \$12.02/kg, which was below the thresholds of US \$13.76/kg for domestic refrigeration and US \$15.21/kg for commercial refrigeration (UNEP/OzL.Pro/ExCom/60/25). However, at the 62<sup>nd</sup> meeting, based on the experience gained from the review of similar projects, the Committee established the cost-effectiveness threshold for rigid insulation refrigeration foam at US \$7.83/kg with a maximum of up to 25 per cent above this threshold for low-GWP alternatives.



fire extinguisher and solvent sectors, the eligibility of incremental costs is considered on a case-by-case basis (decisions 60/44(f)(xvi) and 74/50(c)(xvii)).

50. As CFCs were not extensively used in the stationary air-conditioning manufacturing sector, a cost-effectiveness threshold for this sector has not been established. However, in reviewing HCFC phase-out investment projects submitted under this sector, the Secretariat has been guided by the technical information contained in the document on the revised analysis of relevant cost considerations surrounding the financing of HCFC phase-out (in line with decision 60/44(f)(i)),<sup>25</sup> and the maximum allowable level of incremental operating costs of US \$6.30/kg (in line with decision 60/44(f)(viii)).

51. At the 71<sup>st</sup> meeting (December 2013), the Executive Committee considered an analysis on the ICC and IOC from stage I of the HPMPs, based on the costs included in the project proposals as submitted in the respective HPMPs and further adjusted during the project review process and/or by the Executive Committee at the time of approval of the relevant HPMP. Although the analysis also considered additional information on actual costs incurred at several foam enterprises, difficulties were encountered in determining whether all of the costs incurred were eligible incremental costs as per the approved project proposals. Implementing agencies also encountered difficulties in completing the required information as providers grouped equipment items differently than in the approved project proposals, and in some cases, providers' invoices contained eligible incremental costs as well as other costs related to decisions made by the enterprises during the conversion stage (e.g., installation of higher capacity equipment as compared to the baseline or modifications to the plant layout paid by the enterprise).<sup>26</sup>

52. At the 77<sup>th</sup> meeting (November/December 2016), the Senior Monitoring and Evaluation Officer presented the Final report on the evaluation of HCFC phase-out projects in the refrigeration and air-conditioning manufacturing sector.<sup>27</sup> The report indicated *inter alia* that the mission was unable to collect reliable financial data at the enterprise level and therefore to carry out a meaningful analysis.

53. A summary of the existing cost-effectiveness thresholds currently being applied is presented in Table 2 below.

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<sup>25</sup> UNEP/OzL.Pro/ExCom/55/47.

<sup>26</sup> More information available in document UNEP/OzL.Pro/ExCom/71/57.

<sup>27</sup> UNEP/OzL.Pro/ExCom/77/9.

**Table 2: Cost-effectiveness thresholds for CFC and HCFC phase-out**

Sector	National ODS phase-out plans (UNEP/OzL.Pro/ExCom/16/20 para 32)			HPMPs (decisions 60/44, 62/13 and 74/50)		
	Baseline substance	Main alternatives introduced	CE threshold (US \$/kg)	Baseline substance	Main alternatives introduced	CE threshold (US \$/kg)
Domestic refrigeration (refrigerant and PU foam panel components)	CFC-12	HFC-134a R-600a	13.76	n.a.	n.a.	n.a.
	CFC-11	HCFC-141b cyclopentane		HCFC-141b	Cyclopentane	7.83 (*)(**)
Commercial refrigeration (refrigerant and PU foam panel components)	CFC-12	HFC-134a	15.21	HCFC-22	HFC-32, HC-290, HFC-134a, CO <sub>2</sub> , ammonia, cascade systems	15.21 (*)
	CFC-11	HCFC-141b cyclopentane water		HCFC-141b	Cyclopentane, water, methyl formate, methylal, HFC-245fa, reduced HFOs	
Rigid PU foam (including PU foam panel in commercial refrigeration)	CFC-11	HCFC-141b cyclopentane water	7.83	HCFC-141b	Cyclopentane, water, methyl formate, methylal, HFC-245fa, reduced HFOs	7.83 (*)(**)
Flexible PU foam	CFC-11	HCFC-141b cyclopentane water	6.23	HCFC-141b	Cyclopentane, water, methyl formate, methylal, HFC-245fa, reduced HFOs	6.23 (*)(**)
Integral skin	CFC-11	HCFC-141b cyclopentane water	16.86	HCFC-141b	Cyclopentane, water, methyl formate, methylal, HFC-245fa, reduced HFOs	16.86 (*)(**)
XPS foam	CFC-12	HFC-134a	8.22	HCFC-22/ HCFC-142b	HC, CO <sub>2</sub>	8.22 (*)(**)
Aerosol	CFC-12/ CFC-11	HC	4.40	HCFC-22/ HCFC-141b	HC HFC-134a, HFC-152a, perchloroethylene, HFO	Case- by-case
Fire extinguishing	Halon	ABC dry powder, CO <sub>2</sub>	1.48	HCFC-123	No projects approved yet	Case- by-case
Solvent	CFC-113	Heat cleaning, aqueous cleaning, trichlorethylene, HC, others	19.73	HCFC-141b	Iso-paraffin	Case- by-case
Solvent	TCA		38.50	n.a.	n.a.	n.a.
Metered dose inhaler (MDI)	CFC-12/ CFC-11	HFC-134a	n.a.	n.a.	n.a.	n.a.
Mobile air-conditioning	CFC-12	HFC-134a	n.a.	n.a.	n.a.	n.a.
Domestic air-conditioning manufacturing (room AC, domestic heat pumps)	n.a.	n.a.	n.a.	HCFC-22	R-410A HFC-32 HC-290	Case- by-case

Sector	National ODS phase-out plans (UNEP/OzL.Pro/ExCom/16/20 para 32)			HPMPs (decisions 60/44, 62/13 and 74/50)		
	Baseline substance	Main alternatives introduced	CE threshold (US \$/kg)	Baseline substance	Main alternatives introduced	CE threshold (US \$/kg)
Other refrigeration and air-conditioning manufacturing (heat pumps, transport, chillers, industrial)	CFC-11/ CFC-12 (chillers)	HFC-134a/HFC-123 (chillers)	n.a	HCFC-22	R-410A HFC-32 HC-290 CO <sub>2</sub> , ammonia, cascade systems	Case-by-case

\*Funding of up to a maximum of 25 per cent above the cost effectiveness threshold will be provided for projects when needed for the introduction of low-GWP alternatives (decision 60/44(f)(iv)).

\*\* For SMEs in the foam sector with consumption of less than 20 mt, the maximum would be up to 40 per cent above the cost-effectiveness threshold (decision 74/50(c)(iii)).

54. The Multilateral Fund has provided funding to convert enterprises using HCFCs to low-GWP alternatives in several projects for almost all sectors listed in the Table 2. The Multilateral Fund also approved in the past projects to phase out CFC in sectors that currently use HFCs and never used HCFCs. This includes several domestic and commercial refrigeration manufacturing enterprises converted from CFC-12 to HFC-134a; the conversion of enterprises manufacturing mobile air-conditioning from CFC-12 to HFC-134a; and the conversion of MDIs manufacturing enterprises from CFC-11 and CFC-12 to HFC-134a. The cost of conversion of these enterprises varied depending on their baseline equipment and production capacity, the technology selected and other local conditions.

55. With regard to the PU foam sector, a large number of enterprises used CFC-11 pre-blended polyols for the production of foams. A similar situation occurred with the phase-out of HCFC-141b used as a blowing agent. Subsequent to the agreed cost guidelines for stage I of HPMPs (decision 60/44), the Executive Committee established in decisions 61/47, 63/15, 66/51<sup>28</sup> and 68/42(c)<sup>29</sup> the conditions for funding of eligible enterprises using HCFC-141b contained in imported pre-blended polyols, including the addition of the average tonnage used between 2007 and 2009 to the starting point. Similarly, there may be eligible enterprises using HFCs contained in imported pre-blended polyols. The Executive Committee may also wish to decide whether to provide funding to convert eligible enterprises using HFCs contained in imported pre-blended polyols that will not be reported as part of consumption, and decide on the conditions for accessing this funding. Such a decision could be taken separately from a decision on the cost guidelines, as was the case with the cost guidelines for HCFCs.

56. During the phase-out of HCFCs, the Executive Committee approved projects prior to the finalization of the cost guidelines, and has addressed issues that have arisen during the implementation of HPMPs as needed (e.g., decision 63/15 on HCFC-141b contained in imported pre-blended polyols). For example, the Executive Committee approved four stand-alone HCFC investment projects<sup>30</sup> to phase-out HCFCs at the 59<sup>th</sup> meeting, prior to the finalization of the stage I cost guidelines at the 60<sup>th</sup> meeting.

<sup>28</sup> To consider discounting from a country's starting point for aggregate reductions in HCFC consumption the amount or average amount of HCFC-141b contained in pre-blended polyols exported for the year or years on which the starting point had been based.

<sup>29</sup> To encourage relevant Article 5 countries to consider establishing a national system for recording the amounts of HCFC-141b contained in pre-blended polyols imported and/or exported (where applicable) to support the ban on imports of pure HCFC-141b, as well as that contained in pre-blended polyols, to be issued once all the foam enterprises had been converted, and to facilitate monitoring of these enterprises to sustain the phase-out of HCFC-141b.

<sup>30</sup> Decisions 59/29, 59/32, and 59/34; the Executive Committee also approved two HCFC demonstration projects at that meeting (decisions 59/30 and 59/31).

Similarly, the Executive Committee decided, *inter alia*, to allow those Article 5 countries that wished to submit their stage II HPMPs prior to a decision on the criteria for funding of stage II HPMPs, on the understanding that any such proposals would be considered on the basis of the existing guidelines for stage I HPMPs, and the funding level approved for stage II would not be modified on the basis of the criteria to be adopted for funding HCFC phase-out in the consumption sector for stage II HPMPs (decision 70/21).

### *IOCs*

57. At their Fourth Meeting (November 1992), the Parties established the Multilateral Fund and approved the indicative list of categories of incremental costs, as set out in Annex VIII to the report of the meeting (decision IV/18). In doing so, the Parties noted that the evaluation of requests for financing the incremental costs of a given project should take into account a number of general principles, including the principle that the funding of incremental costs is intended as an incentive for early adoption of ozone-protecting technologies. The Parties also noted that incremental recurring costs (i.e., IOCs) apply only for a transition period to be defined. In this respect, the Executive Committee was given the mandate to decide on the appropriate time scales for payment of incremental costs in each sector.

58. Further to this mandate, the Executive Committee has considered a variety of factors in deciding the duration of IOC. In particular, the Committee considered that incremental costs were intended as an incentive for early adoption of alternatives and, therefore, providing IOCs for a transitional period was considered to help safeguard those enterprises that phase-out their consumption of controlled substances early from being at a competitive disadvantage.

59. On this basis, the Executive Committee has approved IOCs for projects whose duration has varied by sector and with time, as described below:

- (a) For projects in the domestic refrigeration sub-sector, the following two options were approved to determine IOCs: ten per cent of ICC to be paid up-front; or, six months of IOC calculated at current prices and paid up-front, or IOC for a duration of one year adjusted according to the prevailing costs at the time of disbursement, when the modified plant was operating, whichever was greater.<sup>31</sup> One of the rationales for providing IOC as 10 per cent of the ICC was to provide an immediate and often sufficient incentive for enterprises to undertake a phase-out project. Similarly, a rationale for providing up-front six months of IOC calculated at current prices was that this mechanism would allow the enterprise to know at the time of project approval how much money had been committed to IOC, which may provide an incentive to enterprises that would be wary of the uncertainty of other cost calculations;<sup>32</sup>
- (b) Approved a time-frame of up to two years for the calculation of IOCs of all rigid PU foam projects other than those relating to the domestic refrigeration sector (decision 18/8);
- (c) For projects where an enterprise opted to collect the IOC after the project had been implemented, IOC were calculated as follows: for projects in the domestic refrigeration sector, the production level to be used for the calculation of IOC was the level prior to preparation of the project as specified in the approved project proposal. For multi-phase projects that involved a development phase and a separate phase to convert production facilities, the production level to be used for the calculation of IOC was that of the second phase, in which the production facilities were converted. ODS consumption was

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<sup>31</sup> Paragraph 167 of document UNEP/OzL.Pro/ExCom/15/45.

<sup>32</sup> Page 4 of the English version of document UNEP/OzL.Pro/ExCom/15/44.

calculated as the consumption in the year, or the average of the three years, immediately preceding preparation of the second-phase conversion project (paragraph 32(b) of document UNEP/OzL.Pro/ExCom/16/20). For any other multi-phase project, IOC were calculated separately for each phase, in accordance with the requirements of the decision in paragraph 32 of UNEP/OzL.Pro/ExCom/16/20, provided that the overall level of funding for the enterprise does not exceed the maximum level available under the threshold funding cap calculated using the ODS consumption presented in the first phase of the project (decision 21/6);

- (d) For projects in the production of slabstock foam using liquid carbon dioxide (LCD) technology, the methodology for calculation of the IOC or savings were based on the methodology approved for use with methylene chloride projects, i.e., net present value of four years of IOC, where the IOC per year are based on the cost for chemicals required to manufacture the products produced with CFC technology in the year prior to project preparation compared with the costs of the chemicals required for the same level of production of the same products manufactured with LCD technology; incremental yield losses were based on losses of the finished product produced by the LCD process, calculated at 4 per cent in the first year, 2 per cent in the second year, and no losses in the subsequent years (decision 24/58);
- (e) For terminal umbrella projects<sup>33</sup> IOC or savings will not be included in project costs (decision 25/50(d)(iv)), while IOC for the transportation refrigeration sector were not resolved (decision 27/75);
- (f) For the commercial refrigeration end-user sector conversion projects, IOC and savings should be calculated as for other commercial refrigeration projects for a two-year period (decision 28/44<sup>34</sup>); and
- (g) For the phase-out of HCFCs, the current practice of the Executive Committee is to determine IOC on the basis of one-year duration. In considering a stand-alone project proposal in the aerosol sector submitted to the 62<sup>nd</sup> meeting, the Committee noted that in decision 60/44 the duration of IOC had been agreed for a one-year period for most of the other sectors,<sup>35</sup> and decided that the IOC for the aerosol sector should be determined on the basis of a one-year duration (decision 62/9).

60. Another factor that the Executive Committee had considered in determining the duration of IOCs is that the differential between the cost of controlled and non-controlled substances and associated technologies tends to decrease with time. For example, in considering the IOCs for the domestic refrigeration sub-sector, the Executive Committee considered that “the demand and supply of CFCs and their substitutes will continue working against the CFC users. This means that the price of CFC will continue to go up, with the substitutes going on the downward trend” (paragraph 49 of document UNEP/OzL.Pro/ExCom/13/40).

61. As the difference in price between controlled and non-controlled substances is an important determinant of IOC, another factor considered by the Executive Committee is that this difference does not

<sup>33</sup> The Executive Committee decided that enterprises could be grouped in a series of separate umbrella projects. The final project could then be submitted as a terminal umbrella project (decision 25/50(c)).

<sup>34</sup> At the 28<sup>th</sup> meeting (July 1999), the Executive Committee approved guidelines for ODS phase-out in the commercial refrigeration end-user sector, for an initial period of 18 months. Pending review, priority should be given to projects for the conversion of cold stores in the agricultural, fisheries or other food-chain industries which are important for the economies of the countries concerned.

<sup>35</sup> Paragraph 39 of document UNEP/OzL.Pro/ExCom/62/62.

only vary with time but also by country and region. In order to ensure that the Multilateral Fund would not be used to subsidize taxes and duties, which would be an additional transfer to the host Government rather than providing assistance to the enterprise undertaking the conversion, the Executive Committee decided that national pricing of commodities be used except where it was higher than 20 per cent of the regional border price (decision 22/25).

62. The Executive Committee has also considered the issue of how payment of IOCs should be monitored and reported. For example, having considered the Final report on the evaluation of solvent sector projects,<sup>36</sup> the Executive Committee decided, *inter alia*, to request that, as far as possible, invoices for the purchase of ODS solvents by beneficiary enterprises be certified by the implementing agencies, with the cooperation of the National Ozone Units, for future verification; and requested implementing agencies to report in project completion reports (PCRs) on savings arising from lower IOC and/or higher incremental operating savings than anticipated and approved (decision 35/10). Based on an initial review by the Secretariat, the PCRs submitted to date include insufficient information to determine the level of IOC or savings that resulted from project implementation. The Executive Committee decided to limit the flexibility countries would have to allocate approved funding from ICC to IOC (but not vice versa).

63. Specifically, the Executive Committee decided that for stage I of HPMPs IOCs for the foam sector would be considered at US \$1.60/metric kg for HCFC-141b, and US \$1.40/metric kg for HCFC-142b, for the air-conditioning subsector at US \$6.30/metric kg and for the commercial refrigeration subsector at US \$3.80/metric kg. In addition, countries would have the flexibility to allocate the approved funding from IOC to ICC and to allocate up to 20 per cent of the approved funding for ICC to IOC, as long as the use of the flexibility does not change the intent of the project. Any reallocation should be reported to the Executive Committee (decision 60/44, paragraph (f)(iii)). This decision was reaffirmed for stage II of HPMPs in paragraph (c)(ii) of decision 74/50. In addition, for stage II, for PU foam projects that make transition to low-GWP alternatives, IOC would be considered up to US \$5/metric kg, and when clearly demonstrated that low-GWP alternatives with IOCs at this level was not feasible, higher level of IOCs would be funded for the introduction of low-GWP by SMEs (decision 74/50(c)(vi)).

64. At its 77<sup>th</sup> meeting, in the context of the document on the overview of issues identified during project review,<sup>37</sup> the Executive Committee considered the issue on the temporary manufacturing of high GWP-based refrigeration and air conditioning equipment at enterprises that received funding to convert to low-GWP alternatives. During the discussion, members expressed concerns with regard to challenges faced by enterprises during conversion to the selected low-GWP technologies, the fact that the cases were interim in nature, and how IOCs were paid. Subsequently, the Executive Committee decided *inter alia* not to pay any IOC that had been approved for the manufacturing enterprises until it had been verified that the enterprises were manufacturing products and/or equipment using the approved technology (decision 77/35).

#### *Technical assistance activities*

65. The Executive Committee adopted the project eligibility criteria at its 3<sup>rd</sup> meeting on the basis of Decision II/8 and Annex I of the Second Meeting of the Parties, indicating that projects other than capital investment projects would also qualify for assistance under the Fund, including technical assistance. Since then technical assistance projects have been provided funds in practically all ODS consuming sectors.

66. In addition to the technical assistance provided through individual projects, investment projects include a component of technical assistance, training and trials which is accounted within the ICC. This technical assistance is intended to support the adoption of the technology by the beneficiary enterprise

<sup>36</sup> UNEP/OzL.Pro/ExCom/35/12.

<sup>37</sup> UNEP/OzL.Pro/ExCom/77/26 and Add.1.

and its value varies according to the type of project and size of the enterprise. Project proposals for larger enterprises include specific budget lines for technical assistance, training and trials at each enterprise, while for smaller enterprises a technical assistance component could be approved to assist several enterprises.

67. In some cases, in addition to the investment projects, a technical assistance component has been approved to support the conversions mainly addressing the entire sector or sub-sector in a country, all accounted within the cost-effectiveness. The examples below illustrate the type of activities that have been funded as part of technical assistance in the implementation of HPMPs:

- (a) Stage I of the HPMP for Thailand included technical assistance activities in the PU foam and refrigeration and air-conditioning manufacturing sectors. In the PU foam sector systems houses received technical assistance to develop formulations and facilitate the transition to alternative technologies and to phase out 4.4 ODP tonnes in 53 micro-enterprises. In the air-conditioning sector technical assistance was provided to address technical and regulatory barriers before HFC-32 air-conditioners could be effectively introduced in Thailand (i.e., revise safety and performance regulation to accommodate introduction of HFC-32 air-conditioning in the local market, acquire plant safety know how and establish good practices in installation). In the refrigeration sector, technical assistance was provided to a compressor manufacturer to develop low-GWP (HC-290 and CO<sub>2</sub>) compressors for the commercial refrigeration sector. The technical assistance activities related to the refrigeration and air-conditioning sectors led to a reduction in remaining eligible consumption of 10.85 ODP tonnes, based on the assumption that these activities would eventually contribute to the replacement of HCFC-22; and
- (b) In the case of stage I and stage II of the HPMP for China, given the large level of HCFC consumption in all manufacturing sectors, in addition to the individual conversion of enterprises to non-HCFC alternative technologies, each sector plan included technical assistance activities to support the conversion of enterprises and to facilitate the introduction of alternative technologies in the sectors. The technical assistance activities in stage II<sup>38</sup> included *inter alia* assistance to systems houses for the development of HC-based pre-blended polyols; training on alternative technologies to support the conversion of a large number of SMEs; development of standards on the safe design and operation of PU foam plants using HC; production of a manual on safe production of XPS foam using CO<sub>2</sub> technology; technical advice to FECCO, local Environmental Protection bureaus and audit agencies in carrying out on-site project and safety verifications; formulation and revision of technical standards and guidelines on XPS foam products; awareness-raising activities to support the transition to alternatives and their market adoption; training to authorities to manage HCFC-141b phase-out in the solvent sector; and a number of research activities in each sector, which will be described in the next section.

68. Although the funding level for the production sector has to date been determined by plant closure (see production sector section below), the approval of the HCFC production phase-out management plan (HPPMP) for China has also included funding for technical assistance, comprising costs for monitoring, verification, policy development, coordination with stakeholders and related government authorities, study on the environment impact of plant closure, research and development of standards for HCFC alternatives; training of officials in monitoring illegal production; establishment of an information management system; and awareness and publicity. During implementation, a research study on HFC-23 conversion/pyrolysis technologies, an investigation on the mechanisms and technical feasibility of

<sup>38</sup> UNEP/OzL.Pro/ExCom/76/25.

reducing the HFC-23 generation ratio in HCFC-22 production,<sup>39</sup> and a research study on production of low-GWP alternatives was included, which either could be considered under “technical assistance” or “research and development.”

69. The indicative list of categories of incremental costs includes for end-users the “cost of providing technical assistance to reduce consumption and unintended emission of ODS”. Some of these activities relate to the refrigeration servicing sector. Technical assistance provided to LVC countries with consumption exclusively in the refrigeration servicing sector is accounted for in the funding approved in line with decision 60/44 for stage I and 74/50 for stage II of the HPMPs. The technical assistance activities needed in the refrigeration servicing sector are described below in the servicing sector section.

*Research and development, when required to adapt and optimize low-GWP or zero-GWP alternatives to HFCs*

70. The indicative list of categories of incremental cost includes the “cost of research and development” (paragraph (b)(v)) and “the cost of research to adapt technology to local circumstances” (paragraph (a)(i) and (iii)). In addition, when considering laboratory and analytical uses of ODS, at their Seventh Meeting (December 1995), the Parties urged non-Article 5 Parties to provide funding within their countries and on a bilateral basis for Article Parties to undertake research and development and activities aimed at ODS alternatives for laboratory and analytical uses (decision VII/11).

71. At the 8<sup>th</sup> meeting (October 1992), the Executive Committee decided that proposals regarding research and development on substitutes, and equipment production facilities for recycling and destruction can be considered on a case-by-case basis provided that the costs incurred are of an incremental nature (paragraph 108 of document UNEP/OzL.Pro/ExCom/8/29).

72. In line with the indicative list of categories of incremental cost, the Executive Committee has funded research and development, usually as part of technical assistance. Indeed, the Secretariat notes that in many cases it is difficult to distinguish between activities that have traditionally been considered under “technical assistance” versus those that are “research and development.” For example, technical assistance to optimise and adapt formulations in the aerosol (including MDIs) and the foam sectors is a form of research and development. Similarly, conversions of compressor manufacturers to alternative technologies and conversion of (domestic and commercial) refrigeration and air room air-conditioning manufacturing enterprises to flammable alternatives have included funding for prototype manufacturing, trials and testing, and system, component and process redesign.

73. During the phase-out of CFCs, the alternative technologies used in Article 5 countries largely followed the technology route adopted in non-Article 5 countries, so there were limited research and development projects funded in Article 5 countries. During the phase-out of HCFCs, low-GWP alternative technologies that provided ozone and climate benefits in accordance with decision XIX/6 were considered during the approval of HPMPs even in cases where such technologies had not been extensively used in non-Article 5 countries. For example, some of the early conversions in Article 5 countries in the room air-conditioners sector to HC-290 technology included research and development to validate and optimize the technology.

74. Stage I of the HPMP for China included, for example, research on optimization of CO<sub>2</sub> and ethanol technology in the XPS foam sector (including on the use of carbonate nucleation agents in the production of XPS foam; testing of secondary expansion foaming and horizontal vacuum foaming; and tests on alternative flame retardants); research on low-GWP alternatives in the PU foam sector to assess the effectiveness of implementation of the foam conversions and the availability of raw materials in the market); research to promote low-GWP alternatives in the room air-conditioning sector including

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<sup>39</sup> Paragraphs 22 and 36 of document UNEP/OzL.Pro/ExCom/78/9.



experiments and risk assessment on leakage of HC-290 based on concentration, location and distribution of HC-290 leaked from an air-conditioner in a room with furniture; combustion characteristics of indoor and outdoor units; effectiveness of risk mitigation with safety measures; performance optimization of HC-290 compressor based on reduced lubricant use; charge reduction through the use of microchannel technology; and research on R-161 refrigerant in larger capacity RAC, compressor and accessories development, and safety-related issue, and on existing efficiency codes and standards on refrigerant uses.

75. Stage II of the HPMP of China similarly included a variety of research activities including continued research and development of technical and safety standards related to flammable alternatives; technology research and development in product design and new requirements for components when using alternatives; research to improve product performance to meet standards; research and assessment of alternative technologies; development of application technologies (e.g. natural refrigerants in high ambient temperatures, research on product reliability, energy efficiency, and performance); tests and studies to support potential revision of international standards; and research to improve application and efficiency of alternatives, develop guidelines for and promote the safe use of the alternatives.

76. The Executive Committee has also funded demonstration projects on low-GWP alternatives to HCFC, which by nature are research and development projects.<sup>40</sup> One issue the Executive Committee has considered in relation to research and development is the ownership of intellectual property that may result from projects funded by the Multilateral Fund.

*Costs of patents and designs, and incremental costs of royalties, when necessary and cost-effective*

77. The indicative list of categories of incremental cost includes the “cost of patents and designs and incremental cost of royalties” as part of the cost of conversion of existing production facilities (paragraph (a)(i)) and the use in manufacturing as an intermediate good (paragraph (b)(i)). The costs of patents are also considered in several sector guidelines (i.e., LCD systems as an alternative to CFC-11 in the manufacturing of PU foam sector, dry ice technology as an alternative of CFC-11 in tobacco expansion, use of HFC-134a formulations as an alternative of CFCs in the manufacturing of MDIs).

78. The costs of patents or royalties have been explicitly paid by the Multilateral Fund in only few projects in the consumption sector. In such cases, the level of funds paid for technology transfer or licenses has been negotiated with the suppliers and approved by the Executive Committee in line with existing cost-effectiveness thresholds, when applicable. In the production sector, as projects have focused on the closure of production lines, the costs covered by the Fund have been mostly associated with lost revenue of these facilities rather than with the costs of patents.

79. The cases where the cost of patents or royalties have been explicitly paid by the Multilateral Fund are: two refrigerator manufacturer conversions in Thailand where technology transfer fees were paid to Sanyo Japan and KKC for new CFC-free refrigerator designs and for new technology developed for HFC-134a compressors; a chlorinated rubber manufacturing process in India converted from carbon tetrachloride to aqueous-based systems where a technology transfer was paid to the enterprise owning the patent for the process; tobacco expansion projects in China, Indonesia and Philippines, where royalties were paid to the patent holder of dried ice expanded tobacco process used instead of CFC-11; the demonstration project of supercritical CO<sub>2</sub> in spray foam in Colombia, where a technology transfer fee was paid to the patent holder; projects to replace the use of CFC-11 by LCD technology in flexible PU slabstock foam in several countries, which included a licensing fee per machine; and the projects to replace the use of CFCs by HFC-134a in the manufacturing of MDIs in several countries, which included payment of a technology transfer fee to pharmaceutical or components enterprises developing the product formulations and providing technical expertise in the conversions.

<sup>40</sup> A description of all demonstration projects so far approved by the Executive Committee is contained in document UNEP/OzL.Pro/ExCom/78/6.

80. Although the number of cases where the cost of patents explicitly paid is low, the costs of patents have also been covered by the Multilateral Fund indirectly as it can be embedded in other category of costs, for example the price of equipment paid under the ICC to convert manufacturing enterprises, the price of PU foam systems and ODS alternatives paid as part of the IOCs of conversion projects, or technical assistance costs.

81. The issue of patents and royalties has been discussed by the Parties during their consideration of the Kigali Amendment. Several studies, including by the Ozone Secretariat<sup>41</sup> and by the Center for Climate and Energy Solutions,<sup>42</sup> present an analysis of the costs of patents under the Multilateral Fund. Those studies appear to suggest that, given the Fund's focus on using the most cost-effective options to favour proven technologies and the time lag before Article 5 countries are required to make reductions, patents may have expired before the relevant technologies are transferred. In other cases, the Fund has not incurred such costs because the technology being introduced is in the public domain, whether because it is not patented, the patents have not been filed in the country where the patented technology is used, or the technology owner have made the technology available without charge for public use.

*Costs of the safe introduction of flammable and toxic alternatives*

82. Before the acceleration of the HCFC phase-out the Executive Committee had already agreed to several decisions on the introduction of flammable alternatives, specifically HCs. At its 16<sup>th</sup> meeting (March 1995), the Executive Committee recognized that in some domestic refrigeration projects using HC technologies there were significant costs related to the provision of safety equipment and agreed that in calculating the cost-effectiveness of such projects, the safety-related costs should be identified and deducted from the total project cost before the calculations on the project's cost-effectiveness are made. These costs would, however, be considered in determining the level of project costs and funding (paragraph 32 of document UNEP/OzL.Pro/ExCom/16/20).

83. At its 17<sup>th</sup> meeting (July 1995), the Executive Committee, recognizing the higher cost of HC technologies, primarily due to safety factors, and desiring to ensure an equality between technology options consistent with that decision, decided *inter alia* that for the purposes of calculating the cost-effectiveness value of projects utilizing such technologies, the numerator should be discounted by up to 35 per cent. It was expected that these figures would be adjusted in the light of experience and a study on safety matters to be conducted by the Secretariat (decision 17/14).

84. At its 20<sup>th</sup> meeting (October 1996), the Executive Committee decided *inter alia* with regard to domestic refrigeration projects that there was an increase in both the capital and total cost per unit for all- HC technologies compared to HCFC/HFC-based technologies (the increase in capital plus operating costs ranged between 15.6 per cent to 55.1 per cent for different categories of projects); and discounting

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<sup>41</sup> "Briefing Note on Intellectual Property Rights and the Montreal Protocol: past practices and current challenges," UNEP Ozone Secretariat, April 2016. Available at [http://conf.montreal-protocol.org/meeting/oweg/oweg-37/pre-session/Background\\_documents/Briefing\\_note\\_on\\_IPR.pdf](http://conf.montreal-protocol.org/meeting/oweg/oweg-37/pre-session/Background_documents/Briefing_note_on_IPR.pdf)

<sup>42</sup> "Patents and the Role of the Multilateral Fund," Center for Climate and Energy Solutions, October 2015. This study was presented at a side event at the resumed 36<sup>th</sup> and 37<sup>th</sup> OEWG and is available at <http://conf.montreal-protocol.org/meeting/oweg/oweg-37/events-publications/Observer%20Publications/patents-role-multilateral-fund.pdf>. "10 Myths about Intellectual Property Rights and the Montreal Protocol," Center for Climate and Energy Solutions, July 2016. This study was presented at a side event at the 37<sup>th</sup> OEWG and is available at <http://conf.montreal-protocol.org/meeting/oweg/oweg-37/events-publications/Observer%20Publications/ten-myths-about-intellectual-property-rights-montreal-protocol.pdf>. "Status of Legal Challenges: Patents Related To The Use Of Hfo-1234yf In Auto Air Conditioning," Center for Climate and Energy Solutions, July 2016, available at <https://www.google.ca/url?sa=t&rc=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwjxoKrTqsLSAhUT9WMKHHTOD5cQFgghMAE&url=https%3A%2F%2Fwww.c2es.org%2FdocUploads%2Fstatus-of-legal-challenges-07-2016.pdf&usg=AFQjCNH121RaYOXNLxdFADSANHbXqgQdWg&sig2=6kOYkiXX33RLcAqz0b8PEw>.

the numerator by 35 per cent was sufficient to maintain parity between HCFC-141b/HFC-134a and cyclopentane/HFC-134a technology options in the domestic refrigeration sector. With regard to the commercial refrigeration and other PU foam projects there was no need for the introduction of a discounting factor to account for the additional safety costs needed for technology because, on average, projects using HC technology were already below the cost-effectiveness threshold for the sector, and thus would not be disadvantaged for consideration for funding (decision 20/45).

85. At its 23<sup>rd</sup> meeting (November 1997), the Executive Committee decided *inter alia* that safety standards should follow international standards, where these are higher than standards in the country concerned (the practical application of established standards should be based on industry norms and practice in European countries; and projects should be prepared and reviewed on the basis of this principle) (decision 23/18).

86. At its 25<sup>th</sup> meeting (July 1998), the Executive Committee decided to approve an HC Safety Cost Study<sup>43</sup> submitted by the Secretariat to be used as guidance for the implementing agencies, for enterprises in Article 5 countries in the preparation of investment projects and for the Secretariat in reviewing the submitted projects (decision 25/47).

87. During the HCFC phase-out, the provision in decision 60/44(f)(iv) that funding of up to a maximum of 25 per cent above the thresholds is provided when low-GWP alternative technologies are introduced has been used primarily to help the use of HCs in medium-sized enterprises, noting that the provision refers to all low-GWP alternatives. This provision was maintained in decision 74/50(c)(iii) for stage II HPMPs. In addition, in decision 74/50(c)(iii) the Executive Committee provided a further incentive to encourage the transition to low-GWP alternatives by providing for a maximum of up to 40 per cent above the cost-effectiveness threshold when low-GWP alternative technologies are introduced by SMEs in the foam sector with consumption of less than 20 mt. Based on the stage II of HPMPs reviewed, PU foam SMEs have used this provision for the introduction of high-cost non-flammable alternatives (i.e., HFOs) rather than to cover safety costs related to flammable blowing agents, which are generally used only by larger enterprises.

#### Production sector

Paragraph 15(b), decision XXVIII/2: “For the production sector:

- (i) *Lost profit due to the shutdown/closure of production facilities as well as production reduction;*
- (ii) *Compensation to displaced workers;*
- (iii) *Dismantling of production facilities;*
- (iv) *Technical assistance activities;*
- (v) *Research and development related to the production of low-GWP or zero-GWP alternatives to hydrofluorocarbons with a view to lowering the costs of alternatives;*
- (vi) *Costs of patents and designs or incremental costs of royalties;*

<sup>43</sup> UNEP/OzL.Pro/ExCom/25/54. The report was prepared by a recognized industry consultant to evaluate safety costs for conversion of the production of domestic refrigerators to HC technology taking into account international standards and industry norms and practice in European countries. It addressed safety standards, enterprise baseline situation, safety principles, hazardous area classification, conversion aspects, and related safety costs.

- (vii) *Costs of converting facilities to produce low-GWP or zero-GWP alternatives to hydrofluorocarbons when technically feasible and cost-effective;*
- (viii) *Costs of reducing emissions of HFC-23, a by-product from the production process of HCFC-22, by reducing its emission rate in the process, destroying it from the off-gas, or by collecting and converting it to other environmentally safe chemicals. Such costs should be funded by the Multilateral Fund to meet the obligations of Parties operating under paragraph 1 of Article 5 specified under the Amendment”.*

Relevant information from Executive Committee members in accordance with decision 77/59(c)

88. The Government of Argentina indicated that the approval of HFC funding guidelines should not preclude the approval of HFC phase-down activities, particularly for HFC-23 emissions that must be eliminated by 2020. The most important action would be to agree on the HCFC and HFC production guidelines and ensure that funding is swiftly provided to swing plants for production closure/conversion. The most effective way to reduce HFC-23 by-product is to close HCFC-22 production and provide guidance and sufficient funding for that. Reduction of emissions of HFC-23, a by-product from the production process of HCFC-22, by reducing its emission rate in the process, destroying it from the off-gas, or by collecting and converting to other environmentally safe chemicals, should be funded by the Multilateral Fund, to meet the obligations of Article 5 countries specified under the HFCs Amendment.

89. The Government of Germany noted that eligible production sector costs include lost profit from shutdown or reduction, displaced worker compensation, dismantling facilities, technical assistance, research and development to lower the cost of alternatives, patents and royalties, and conversion costs to low-GWP alternatives; and that similar issues are currently being considered for HCFCs by the production sub group. The Government asked how to handle the read-across between HCFC and HFC guidelines and indicated that asking China and other producers to provide information on HFC-23 destruction options may need independent verification.

90. In addition, Executive Committee members from Argentina, Germany and Japan also provided information related to sub-paragraph (viii) of decision XXVIII/2 which are contained in the document on Key aspects related to HFC-23 by-product-control technologies.<sup>44</sup>

Previous Executive Committee decisions and practice

91. The Seventh Meeting of the Parties (December 2005) decided that the determination of eligible incremental costs in the production sector should be based on the conclusions of the Executive Committee's guidelines on the phase-out of the production sector and consistent with paragraph 2(a) of the indicative list of categories of incremental costs (decision VII/9, paragraph 5), namely:

- (a) Cost of conversion of existing production facilities:
  - (i) cost of patents and designs and incremental cost of royalties;
  - (ii) capital cost of conversion;
  - (iii) cost of retraining of personnel, as well as the cost of research to adapt technology to local circumstances;
- (b) Costs arising from premature retirement or enforced idleness, taking into account any guidance of the Executive Committee on appropriate cut-off dates:

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<sup>44</sup> UNEP/OzL.Pro/ExCom/78/9.

- (i) of productive capacity previously used to produce substances controlled by existing and/or amended or adjusted Protocol provisions; and
  - (ii) where such capacity is not replaced by converted or new capacity to produce alternatives;
- (c) Cost of establishing new production facilities for substitutes of capacity equivalent to capacity lost when plants are converted or scrapped, including:
- (i) cost of patents and designs and incremental cost of royalties;
  - (ii) capital cost; and
  - (iii) cost of training, as well as the cost of research to adapt technology to local circumstances;
- (d) Net operational cost, including the cost of raw materials; and
- (e) Cost of import of substitutes.

92. The incremental costs for phasing down HFCs as indicated above have maintained all the categories of cost approved at the Fourth Meeting. In addition, the cost of reducing emissions of HFC-23 was added to the list. In response to (decision 77/59(b)(iii)), the Secretariat prepared document UNEP/OzL.Pro/ExCom/78/9 which provides preliminary information related to HFC-23 by-product control technologies.

93. To date, the process by which phase-out projects in the production sector have been reviewed and approved by the Executive Committee has differed from the process used in the consumption sector. In accordance with the practices and procedures in decision 19/36, each Article 5 producer country provides preliminary data and informs the Executive Committee eight months before it is ready to submit its sector phase-out; the Executive Committee then commissions a technical audit of the production sector in conjunction with the preparation of the sector plan prepared by the relevant implementing agency. The results of the technical audit, which should be incorporated into the sector plan, serve as a reference point for reviewing the plan. After review by the Secretariat, the plan is considered by the production sector sub-group, a group constituted by the Executive Committee. If needed, additional technical audits may be commissioned to address specific questions or issues. The plan is reviewed based on the technical audit, and in accordance with the indicative list of eligible costs. While the indicative list of eligible costs includes the cost of conversion of existing production facilities to produce substitutes, as well as the cost of establishing new production facilities for substitutes of capacity equivalent to capacity lost when plants are converted or scrapped, including the cost of patents and designs and incremental cost of royalties, the Executive Committee has to date always provided funding for the production sector on the basis of cessation of production of the controlled substance, which for the circumstances considered was the most cost-effective and efficient option. The cost of closure includes lost profit, compensation to displaced workers, the cost of dismantling production facilities, and other costs.

94. On this basis, the Executive Committee has approved phase-out projects in the production sector for CFCs in Argentina, China, India, Mexico, the Democratic People's Republic of Korea, Romania, and the Bolivarian Republic of Venezuela; for halons in China and India; for carbon tetrachloride in China, India, the Democratic People's Republic of Korea, and Romania; for methyl bromide in China and Romania; and for 1,1,1-trichloroethane (TCA, also referred to as methyl chloroform) in China and the Democratic People's Republic of Korea.

95. Although the cost guidelines for phasing out HCFCs in the production sector are still under discussion,<sup>45</sup> the HPPMP for China was considered and approved following the approach described above. While the funding level for the HPPMP for China was approved based on plant closure, that funding level also included technical assistance, which China used *inter alia* to support research and development for the production of alternatives to HCFCs, for reducing the HFC-23 by-product ratio, and for conversion of HFC-23 to other chemicals or useful products (see technical assistance section above).

### Refrigeration servicing sector

Paragraph 15(c), decision XVIII/2: “*For the servicing sector:*

- (i) *Public-awareness activities;*
- (ii) *Policy development and implementation;*
- (iii) *Certification programmes and training of technicians on safe handling, good practice and safety in respect of alternatives, including training equipment;*
- (iv) *Training of customs officers;*
- (v) *Prevention of illegal trade of HFCs;*
- (vi) *Servicing tools;*
- (vii) *Refrigerant testing equipment for the refrigeration and air-conditioning sector; and*
- (viii) *Recycling and recovery of HFCs”.*

Paragraph 16, decision XVIII/2: “*To request the Executive Committee to increase in relation to the servicing sector the funding available under decision 74/50 above the amounts listed in that decision for Parties with total HCFC baseline consumption up to 360 metric tonnes when needed for the introduction of alternatives to HCFCs with low-GWP and zero-GWP alternatives to HFCs and maintaining energy efficiency also in the servicing/end-user sector”.*

### Information from Executive Committee members in accordance with decision 77/59(c)

96. The Government of Argentina requested clarifications on what is intended by the request given in paragraph 16 of decision XVIII/2 and how the servicing sector is related to energy efficiency.

97. The Government of Germany proposed in developing new guidelines on methodologies and cost calculations, to include aspects related to the refrigeration servicing sector, taking into account previous policy documents, case studies, and monitoring and evaluation reviews. The following was also proposed:

- (a) To review the servicing sector activities. In the past servicing sector activities have not necessarily been designed as a package of policies, regulations, enforcement, skill training and conformity monitoring to build a functioning, qualitative service infrastructure in developing countries. Especially with regard to the formulation and enforcement of regulations countries need more support;

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<sup>45</sup> At the 77<sup>th</sup> meeting, the Executive Committee decided to continue discussion of the eligibility of swing plants producing HCFC-22 at the next meeting of the sub-group on the production sector and consider that issue in the context of its discussion of by-product controls of HFC-23 arising from the Kigali Amendment.

- (b) Cost categories considered to be eligible and included in the cost calculation are training of customs officers; preventing illegal trade of HFCs; policy development and implementation; public awareness activities; training of technicians in good practices and the safety of alternatives, including training equipment and servicing tools; certification programmes, monitoring conformity of products, equipment and services in the RAC sectors; recycling and recovery of HFCs; [and best practice on energy efficiency];
- (c) It is important to integrate servicing activities for HCFC and HFCs and rationalise the implementation of activities. A strategy needs to be in place that illustrates the necessary actions with regard to the introduction of low-GWP alternatives under both plans;
- (d) This requires a larger degree of differentiation between the various subsectors, alternatives and applications in a country. It will require a stricter formalization of servicing sectors in the countries, specifying requirements in terms of education, quality assurance, tools and conditions under which new technologies with low-GWP alternatives need to be serviced and maintained;
- (e) This necessarily includes a review of local standards. Countries need to make sure that there are no concessions on safety for users, independent of whether new or refurbished equipment is in use. Furthermore, this should include a review of vocational training systems, and the qualification and certification that can be provided through them. In addition, for local quality assurance, certifiers may be needed to confirm the scope of local supplies, the compliance of services with standards, product checks, final inspection as required for certification of equipment, and regular inspection;
- (f) A holistic approach would result in robust local qualitative infrastructure that builds capacity throughout the sectors and institutions: national vocational training system, national certification bodies, policy makers in government and associations, code of practice and skill developers, enforcement authorities, and local providers of certification, testing and quality assurances. Therefore, the delivery of a holistic approach will require longer-term formalized structural changes of processes and institutions. It needs to be assisted by agents who are sufficiently experienced in delivering institution building in Article 5 countries in the field of national vocational training and certification;
- (g) Together developing countries need to provide a qualitative infrastructure to install, operate and disassemble products and equipment operating on low-GWP alternatives, with new operational and safety requirements. In this regard, it needs to be recognised that the Executive Committee has already anticipated the need and has adapted guidelines to significantly increased servicing sector funding for Article 5 countries in view of managing the more difficult introduction of low-GWP alternatives, with a priority on those Article 5 countries with consumption below 360 mt of HCFC; and
- (h) In summary, addressing the servicing sector can have a big impact on emissions and energy use, and it should be addressed holistically. Given the flammability and toxicity of alternatives, local needs for certification need must be seen in the context of regulations and standards and should be reviewed for all Multilateral Fund funded activities in this sector.

98. The Government of the United States of America provided a comprehensive set of documents containing relevant technical information regarding activities being implemented domestically in the refrigeration servicing sector but with principles applicable to many Article 5 countries. Information from these documents is summarized in Annex IV to the present document related to the refrigeration servicing sector.

Previous Executive Committee decisions and practice

99. Phasing out CFC use in the refrigeration servicing sector has been one of the Committee's priorities. As early as 1991, training programmes for refrigeration technicians, and recovery and recycling projects were funded in several Article 5 countries. Since then, recovery and recycling projects and stand-alone training programmes have been replaced by refrigerant management plans (RMPs) and terminal phase-out management plans (TPMPs) for LVC countries, and national phase-out plans (NPPs) for non-LVC countries. Subsequently, the great majority of Article 5 countries have received assistance for activities in the refrigeration servicing sector as part of their HPMPs.

100. All the categories of eligible costs included in paragraph 15(c) of decision XXVIII/2 have already been funded in the past as part of the refrigeration servicing sector (i.e., public-awareness activities; policy development and implementation; certification programmes and training of technicians on safe handling, good practice and safety in respect of alternatives, including training equipment; training of customs officers; prevention of illegal trade of ODS; servicing tools; refrigerant testing equipment for the refrigeration and air-conditioning sector; and recycling and recovery of ODS).

101. The costing of activities in the refrigeration servicing sector is influenced by the prevailing circumstances at the country level, such as: population size; geographical distribution of the main economic activities; consumption level; the types and capacities of refrigeration and air-conditioning systems in operation; the characteristics of the service workshops; and the technical skills of servicing technicians. For the HCFC phase-out, the costs were estimated based on the Fund's experience in CFC phase-out activities in the servicing sector. Using the main components of TPMPs and NPPs, funding was proposed for reviewing ODS legislation and licensing systems; training and awareness of major stakeholders (i.e., customs officers, refrigeration technicians, code of good practices, certification schemes, establishment of technicians associations); implementing technical assistance activities (e.g., basic tooling kits for technicians, a few additional recovery/recycling machines and introduction of non-HCFC refrigerants); and monitoring and reporting.<sup>46</sup>

102. Decision XIX/6 introduced a number of elements into the approach to implementing projects (including in the refrigeration servicing sector) by requesting the Parties to promote the selection of alternatives to HCFCs that minimize environmental impacts, in particular impacts on climate, while achieving HCFC phase-out, and by asking the Executive Committee to give priority to cost-effective projects and programmes which focus on *inter alia* substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account GWP, energy use and other relevant factors.

103. Currently, the funding level approved to enable Article 5 countries with total HCFC baseline consumption of up to 360 mt to phase out all HCFCs used in the servicing sector is shown in Table 3; while the level of funding for all other Article 5 countries is calculated at US \$4.80/metric kg of HCFC used in the servicing sector, in line with decision 74/50.

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<sup>46</sup> UNEP/OzL.Pro/ExCom/58/47.



**Table 3. Level of funding for the refrigeration servicing sector in low-volume consuming countries**

Consumption (mt)*	Total funding (US \$)**
>0 <15	587,500
15 <40	750,000
40 <80	800,000
80 <120	900,000
120 <160	950,000
160 <200	1,000,000
200 <320	1,600,000
320 <360	1,800,000

(\*) Level of HCFC baseline consumption in the refrigeration servicing sector.

(\*\*) Represents the maximum funding eligible.

104. Additional information regarding the refrigeration servicing sector is contained in Annex IV to the present document.

#### Other costs

Paragraph 25, decision XXVIII/2: “*The Parties may identify other cost items to be added to the indicative list of incremental costs emanating as a result of the conversion to low-GWP alternatives*”.

105. Paragraph 25 of decision XXVIII/2 has been included in the template for the cost guidelines contained in Annex I.

### **VIII. Institutional strengthening (IS)**

Paragraph 21, decision XXVIII/2: “*To direct the Executive Committee to increase IS support in light of new commitments related to HFCs under this Amendment*”.

106. Considering the relevance of IS for the implementation of the Montreal Protocol, and the number of decisions adopted by the Executive Committee, a comprehensive discussion of IS in the context of the Kigali Amendment and decision XXVIII/2 is presented in document UNEP/OzL.Pro/ExCom/78/7.

### **IX. Energy efficiency**

Paragraph 22, decision XXVIII/2: “*To request the Executive Committee to develop cost guidance associated with maintaining and/or enhancing the energy efficiency of low-GWP or zero-GWP replacement technologies and equipment, when phasing down HFCs, while taking note of the role of other institutions addressing energy efficiency, when appropriate*”.

#### Information from Executive Committee members in accordance with decision 77/59(c)

107. The Government of Argentina, noting that energy efficiency is not included in agreed incremental costs, wanted to know if energy efficiency is going to be financed. Argentina also stated the first decision that should be taken into account and be taken to the Parties’ consideration, before deciding whether the Executive Committee should invest time in developing this cost guidance. The government also indicated that there is a need to establish a definition for low-GWP alternatives, and that in terms of energy efficiency, the Executive Committee has not approved funding for improved energy efficiency of refrigeration and air-conditioning equipment, as this is not considered as an eligible incremental cost under the MLF and because the focus was on phasing-out of ODS. Past Executive Committee decisions determined that technological upgrades go beyond what is covered as eligible incremental costs and would not be funded unless they were unavoidable as part of the project.

108. The Government of Germany provided a comprehensive input containing questions, recommendations and suggestions in four areas: coordination among donors and integration with other funding initiatives (including, among other points, the need for an action plan for parties to maximize energy efficiency in HCFC and HFC phase down based on opportunities, funds available from several sources and a supportive national framework and strategy; and a description of several sources of funding for energy efficiency); assessing the readiness of Article 5 countries to facilitate the implementation of energy efficiency measures (through, among others, a list of relevant needs and methodologies to assess national baselines and performance metrics, measures to implement energy efficiency certification processes and testing, options for attaching energy efficiency strictly to HFC phase-down activities, options for verifying funded energy efficient products compliance during operation); strategic planning under the Kigali Amendment (HCFC phase-down provides sufficient level playing field to generate best practice examples based on regular implementation modalities); the role of UN Environment Compliance Assistance Programme; and plus up administration. The complete text of the information provided by the Government of Germany on this (and all other) topics is contained in Annex II of document UNEP/OzL.Pro/ExCom/78/1/Add.1.

109. The Government of Japan mentioned that incorporating energy efficiency in cost guidelines would be a complicated work as evaluation criteria and standards for energy efficiency vary among countries. The member further indicated that this aspect has to be given very careful consideration.

110. The Government of the United States of America provided a comprehensive set of documents on best practices and standards related to servicing that highlight proper installation and maintenance procedures to reduce refrigerant leakage and maintain a system's energy efficiency in refrigeration and air-conditioning equipment. The Government also noted that minimum energy conservation standards by the United States Department of Energy combined with the Energy Star labelling program have resulted in significant benefits, both for consumers in lower energy bills and for the environment in fewer greenhouse gas emissions. Without a minimum energy efficiency standard for equipment, the refrigeration and air-conditioning equipment manufacturers are likely to continue to produce least-cost, low-energy efficient equipment because there will continue to be a consumer market for it, even while they convert production lines to manufacture energy efficient units. The United States requested that the Secretariat include consideration of the role that adequate and enforceable minimum energy efficiency standards can play in meeting the Parties' goals outlined in decision XXVIII/2 in documents being prepared for the 78<sup>th</sup> meeting. Some of the technical information provided by the Government of the United States of America has been taken into consideration in the preparation of Annex V to the present document. The complete set of information provided by the Government of the United States of America on this topic is contained in Annex II of document UNEP/OzL.Pro/ExCom/78/1/Add.1.

#### Previous Executive Committee decisions and practice

111. While the indicative list of categories of incremental costs did not include enhancing energy efficiency, the Executive Committee has nonetheless sought opportunities to promote energy efficiency improvements and adopt technologies to achieve minimum energy efficiency levels in HCFC-free alternatives in some cases.<sup>47</sup>

112. During the phase-out of CFCs, the Executive Committee sought opportunities to demonstrate potential business models to phase out ODS consumption and improve the energy efficiency in chillers.<sup>48</sup>

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<sup>47</sup> Decision 65/40 (stage I of the HPMP for Jordan).

<sup>48</sup> UNEP/OzL.Pro/ExCom/12/37 (decision in para 160(i): Recommended that in selecting alternative technology in the chiller sector, it would include both direct effects (refrigerant global warming potential) and indirect effects (system energy efficiency); decision 37/21(b)(ii): Requested the Secretariat to report to a future meeting of the Executive Committee on clarification of the nature of savings that could be envisaged as a result of increased energy efficiency and decision 68/8 requested the Secretariat to prepare annually a report on the progress of ongoing chiller projects,

The final outcomes of those projects are still pending. The Senior Monitoring and Evaluation Officer work program approved at the 77<sup>th</sup> Meeting of the Executive Committee will examine, *inter alia*, the impact of energy efficiency gains achieved through the chiller projects (see Annex V).

113. One of the criteria identified by the Committee in selecting demonstration projects for low-GWP alternatives to HCFCs was that the project should *inter alia* promote energy efficiency improvements (see UNEP/OzL.Pro/ExCom/78/6).

114. In line with decision XIX/6, the Secretariat developed the Multilateral Fund Climate Impact Indicator (MCII), as a tool to assess the impact on the climate associated with the conversion of RAC manufacturing enterprises associated with stage I of approved HPMPs with the results being included in relevant project documents submitted to the Executive Committee. The MCII aims to be reliable without being too complex, and standardizes the calculations of the climate impact in a way that provides fair and comparable results between alternative technologies. It calculates the climate impact of a conversion project as the difference between the climate impact after and before conversion, with the climate impact being calculated for the emissions both over the product lifetime of both the substance, and related to the use of energy for the given application. It may be noted that the objective of the MCII is only to offer an indication of the climate impact and does not replace any detailed analysis of the performance of refrigeration and air-conditioning equipment.

115. Annex V to the present document contains information relating to maintaining/enhancing energy efficiency.

## **X. Capacity-building to address safety**

Paragraph 23, decision XXVIII/2: “*To request the Executive Committee to prioritize technical assistance and capacity-building to address safety issues associated with low-GWP or zero-GWP alternatives*”.

Paragraph 3, decision XXVIII/2: This paragraph, while not having a mandate to the Executive Committee, is related to the subject: “*To recognize the importance of timely updating international standards for flammable low-global-warming potential (GWP) refrigerants, including IEC60335-2-40, and to support promoting actions that allow safe market introduction, as well as manufacturing, operation, maintenance and handling, of zero GWP or low-GWP refrigerant alternatives to HCFCs and HFCs*”.

116. This subject is being addressed in the present document in the context of manufacturing and the refrigeration servicing sector, as well as in document UNEP/OzL.Pro/ExCom/78/6 on enabling activities.

## **XI. Disposal**

Paragraph 24, decision XXVIII/2: “*To request the Executive Committee to consider funding the cost-effective management of stockpiles of used or unwanted controlled substances, including destruction*”.

Information from Executive Committee members in accordance with decision 77/59(c)

117. None.

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highlighting key progress in implementation of activities including any energy efficiency gains achieved through chiller conversions.

Previous Executive Committee decisions and practice

118. Through decision XX/7, the Parties requested the Executive Committee to consider as a matter of urgency commencing pilot projects that might cover the collection, transport, storage and destruction of ODS, giving initial priority to projects with a focus on assembled stocks of ODS with high net GWP, in a representative sample of regionally diverse Article 5 countries. In addition to protecting the ozone layer, these projects were intended to generate practical data and experience on management and financing modalities, achieve climate benefits, and explore opportunities to leverage co-financing.

119. At the 58<sup>th</sup> meeting (July 2009), the Executive Committee approved the guidelines for ODS disposal projects (decision 58/19) with funding limited to a maximum of US \$13.2/kg for ODS transport, storage and destruction. It was also established that ODS collection was not eligible, that projects should cover aspects not yet covered by other projects, and that requests for preparatory funding should include, among other things, an estimate of the amount of ODS to be destroyed, a demonstration of existing stocks already collected for destruction, and an indication of elements covered by the project (transport, storage, destruction).

120. The guidelines established that project submission should include, among other things, updated and more detailed information for all issues mentioned for preparatory funding, a detailed description of management and financial set-up, sources of funding for costs not covered by the Multilateral Fund, and proof of destruction by the end of the project. Implementing agencies were requested to report annually to the Executive Committee on progress and experiences gained in demonstration projects on disposal.

121. A total of fifteen demonstration and technical assistance projects were approved for US \$11.5 million. The Executive Committee set aside a US \$3 million funding window for ODS disposal projects in LVCs at its 63<sup>rd</sup> meeting in light of decision XXI/2. The Executive Committee allowed the submission of outstanding ODS disposal projects only where project preparation funding had been approved no later than the 72<sup>nd</sup> meeting (decision 69/5(i)). A brief description of the pilot demonstration projects is contained in document UNEP/OzL.Pro/ExCom/78/6.

122. Some of the main challenges identified so far in the implementation of these projects include verifying data on already collected ODS waste and identifying sources of co-financing. Furthermore, the use of small portable destruction units was not economically feasible in countries with small waste streams. The approach of aggregating waste from nearby countries appeared to be a good approach to ensure larger quantities in a shorter time, public awareness helps to make the public cognizant of options to dispose of ODS-based appliances, and there are opportunities for exploring synergies with other multilateral environmental agreements, in particular those related to climate and chemicals. One project obtained co-financing from carbon markets. However, the overall potential of disposal projects appears limited for several reasons, including the low volume of collected ODS for disposal.

123. A report submitted by the Secretariat concluded that, as at the 64<sup>th</sup> meeting (July 2011) there was limited experience in the implementation of the full pilot projects. A report submitted by the Secretariat at the 69<sup>th</sup> meeting (April 2013)<sup>49</sup> concluded that experience with the use of the interim guidelines for the preparation of pilot ODS disposal projects and in developing full demonstration projects had been positive. However, no concrete information on the final results of the projects was made available as the projects were still ongoing.

124. The ODS destruction projects approved are expected to generate valuable information on options to ensure sound management of ODS banks and to finance the disposal of ODS. This information will be shared with other Article 5 countries when the projects are completed. At the 77<sup>th</sup> meeting, the Executive

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<sup>49</sup> UNEP/OzL.Pro/ExCom/70/54.

Committee decided to include in the work programme of the Senior Monitoring and Evaluation Officer an evaluation of the ODS disposal projects.

## **XII. Eligibility of Annex F substances subject to high ambient temperature exemptions**

125. The Parties made available an exemption for Parties with high-ambient temperature conditions where suitable alternatives do not exist for the specific sub-sector of use, as described in paragraphs 26 to 40 of decision XXVIII/2. Specifically on issues related to funding, the Parties indicated in paragraph 35 of the decision “*that amounts of Annex F substances that are subject to the high ambient temperature exemption are not eligible for funding under the Multilateral Fund while they are exempted for that party.*”

126. Paragraph 35 of decision XXVIII/2 has been included in the proposed template for a draft cost guidelines contained in Annex I to the present document.

### Information from Executive Committee members in accordance with decision 77/59(c)

127. None.

### Previous Executive Committee decisions and practice

128. For reference, the Executive Committee may wish to note that the Parties have not provided exemptions to meet ODS compliance targets prior to the final phase-out of the respective controlled substance. Moreover, there is no precedent practice on exemptions for Parties with high ambient temperature conditions in the Multilateral Fund. Previous exemptions authorized by the Parties for ODS include essential-use exemptions and critical-use exemptions.

129. Regarding essential-use exemptions, the Executive Committee decided at its 51<sup>st</sup> meeting (March 2007) that Article 5 Parties with plants manufacturing CFC- MDIs should be advised of the timing on which to begin considering the need for essential use exemptions beyond the 2010 phase-out date and that the preparation of a nomination for essential use exemptions might begin in 2007 for submission to the Parties for their consideration in 2008 (decision 51/34). At the 54<sup>th</sup> meeting (April 2008), the Executive Committee decided that that all information required under decision 51/34 and additional supporting data requested in decision 54/5 had to be submitted for consideration by the Executive Committee by the 55<sup>th</sup> meeting to provide ample time for project initiation before the 2010 phase-out and to avoid, to the extent possible, the need for essential-use exemption requests.

130. The Executive Committee also considered the issue of production for essential-uses, and acknowledged the importance of assuring the supply of pharmaceutical-grade CFCs for Parties with essential-use exemptions in accordance with decision XXI/4 (decision 59/44). The Executive Committee subsequently modified the CFC production sector phase-out plan for China and India to permit exemptions for the production of CFCs for essential uses approved for other Parties, subject to certain conditions (decisions 60/47, 66/54 and 71/50).

131. Regarding critical-uses, at its 43<sup>rd</sup> meeting (July 2004), the Executive Committee decided to adopt criteria for the submission of requests for the prolongation of accelerated phase-out agreements pursuant to decision Ex. I/2, including *inter alia*, for those projects with difficulties, to take into account whether exemptions for critical- uses have been granted in non-Article 5 countries, facing similar circumstances. In so doing, the Executive Committee may request the advice of the TEAP and the Methyl Bromide Technical Options Committee (decision 43/14). Agreements between Article 5 countries and the Executive Committee for methyl bromide phase-out included an exclusion for any critical uses the Parties may authorize for that country in defining the maximum allowable level of consumption (e.g., China, Thailand, and Viet Nam). At the 77<sup>th</sup> meeting, in the case of two Article 5 countries that did not have such

an exclusion in their Agreement, the Executive Committee took note that the maximum level of consumption of methyl bromide for those countries for 2015 was zero, as in the respective Agreement, except for any critical-use exemptions authorized by the Parties.

#### **RECOMMENDATION**

132. The Executive Committee may wish to take note of document UNEP/OzL.Pro/ExCom/78/5 on information relevant to the development of the cost guidelines for the phase-down of HFCs in Article 5 countries: Draft criteria of funding.

## Annex I

### PROPOSED TEMPLATE FOR A DRAFT COST GUIDELINES FOR THE PHASE-DOWN OF HFCs

The present annex contains a proposed template for a draft cost guidelines for the phase-down of HFCs based on previous cost guidelines agreed by the Executive Committee, namely, criteria for funding stage I of HCFC phase-out management plans (HPMPs) (decision 60/44), and criteria for funding stage II of HPMPs (decision 74/50). Text is already included for the following elements of decision XXVIII/2 that were agreed by the Parties at their Twenty-eighth Meeting: flexibility in implementation; cut-off date; second and third conversions; other costs; and eligibility of Annex F substances subject to high ambient temperature exemptions.

#### **Flexibility in implementation that enables parties to select their own strategies and priorities in sectors and technologies**

1. Article 5 countries will have flexibility to prioritize HFCs, define sectors, select technologies and alternatives and elaborate and implement their strategies to meet agreed HFC obligations, based on their specific needs and national circumstances, following a country-driven approach.

#### **Eligibility of Annex F substances subject to high ambient temperature exemptions**

2. The amounts of Annex F substances that are subject to the high-ambient-temperature exemption are not eligible for funding under the Multilateral Fund while they are exempted for that Party.

#### **Cut-off date for eligible capacity**

3. The cut-off date for eligible capacity is 1 January 2020 for those parties with baseline years from 2020 to 2022 and 1 January 2024 for those parties with baseline years from 2024 to 2026.

#### **Second and third conversions**

4. To apply the following principles for second and third conversion projects:

- (a) First conversions, in the context of a phase-down of HFCs, are defined as conversions to low-GWP or zero-GWP alternatives of enterprises that have never received any direct or indirect support, in part or in full, from the Multilateral Fund, including enterprises that converted to HFCs with their own resources;
- (b) Enterprises that have already converted to HFCs in phasing out CFCs and/or HCFCs will be eligible to receive funding from the Multilateral Fund to meet agreed incremental costs in the same manner as enterprises eligible for first conversions;
- (c) Enterprises that convert from HCFCs to high-GWP HFCs, after the date of adoption of the Amendment, under HCFC phase-out management plans already approved by the Executive Committee will be eligible to receive funding from the Multilateral Fund for a subsequent conversion to low-GWP or zero-GWP alternatives to meet agreed incremental costs in the same manner as enterprises eligible for first conversions;
- (d) Enterprises that convert from HCFCs to high-GWP HFCs with their own resources before 2025 under the Amendment will be eligible to receive funding from the Multilateral Fund to meet agreed incremental costs in the same manner as enterprises eligible for first conversions; and

- (e) Enterprises that convert from HFCs to lower-GWP HFCs with Multilateral Fund support when no other alternatives are available will be eligible to receive funding from the Multilateral Fund for a subsequent conversion to low-GWP or zero-GWP alternatives if necessary to meet the final HFC phase-down step.

**Sustained aggregate reductions in HFC consumption and production**

[TBD]

**Enabling activities**

[TBD]

**Eligible incremental cost**

[TBD]

*Consumption manufacturing sector*

[TBD]

*Production sector*

[TBD]

*Refrigeration servicing sector*

[TBD]

*Other costs*

5. The Parties may identify other cost items to be added to the indicative list of incremental costs emanating as a result of the conversion to low-GWP alternatives.

**Capacity building to address safety**

[TBD]

**Energy efficiency**

[TBD]

**Disposal**

[TBD]



## Annex II

### LIST OF RELEVANT DECISIONS RELATED TO THE COST GUIDELINES FOR THE PHASE-DOWN OF HFCs PURSUANT TO DECISIONS 77/59(B)(V) AND XXVIII

1. This annex contains a set of decisions adopted by the Executive Committee and the Parties that could be used as a reference during the discussion of the elements of the cost guidelines for the phase-down of HFCs pursuant to decisions 77/59(b)(v) and XXVIII/2. It does not intend to present an exhaustive compendium of past decisions related to incremental cost.<sup>1</sup>

#### **Overarching principles and timelines**

- Decision 53/37: Options for assessing and defining eligible incremental costs for HCFC consumption and production phase-out activities (follow-up to decision 52/4)
- Decision 54/39: Draft guidelines for the preparation of HCFC phase-out management plans incorporating HCFC surveys (decision 53/37(h))
- Decision 55/43: Revised analysis of relevant cost considerations surrounding the financing of HCFC phase-out (decisions 53/37(i) and 54/40)
- Decision 56/16: Cost structure for determining funding levels for preparation of HCFC investment and associated activities (decision 55/13(d))
- Decision 59/11: Prioritization in the phase-out of HCFCs
- Decision 60/15: Additional policy issue raised by Canada : Accelerated phase-out of HCFCs
- Decision 60/44: Outstanding HCFC issues: Cut-off date, level of incremental operating costs, funding provided to the servicing sector, and incremental capital cost (decision 59/46)
- Decision 62/12 on sector prioritization (stage I of HPMPs)
- Decision 74/50: Criteria for funding HCFC phase-out in the consumption sector for stage II of HPMPs

#### **Sustained aggregate reductions in HFC consumption and production**

- Decision 35/57: Study on defining a starting point for determining the remaining ODS consumption eligible for funding by the Multilateral Fund: Follow up to decision 34/66 (a)
- Decision 37/66 (c): Selection of options pursuant to decision 35/57
- Decision 60/44 (c)(d) and (e) (refer to decision 60/44 in overarching principles and timelines)

#### **Eligible incremental cost**

- Decision taken at the 16<sup>th</sup> meeting (1995) on cost-effectiveness threshold
- Decision 18/25: Technology upgrade
- Decisions 22/25 and 23/52: Prices of chemicals
- Decision 25/48: Baseline equipment and unavoidable technological upgrades
- Decision 25/49: Incremental operating costs for compressors
- Decision 62/9: Incremental operating costs in the aerosol sector for HCFC phase-out
- Decision 62/13: Cost-effectiveness threshold for the rigid insulation refrigeration foam sub-sector
- Decisions 61/47, 63/15, 66/51 and 68/42 related to HCFC-141b contained in imported pre-blended polyol systems

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<sup>1</sup> For consultation on any additional Multilateral Fund policies, procedures, guidelines and criteria, please refer to: <http://www.multilateralfund.org/Our%20Work/policy/default.aspx>.

**Refrigeration servicing sector**

- Decision 28/44: Guidelines for end-user conversion in the commercial refrigeration sector
- Decision 31/45: Subsector for the assembly, installation and servicing of refrigeration equipment
- Decision 64/14 on prioritization of the servicing sector by non-LVCs (stage I of HPMPs)
- Decision 64/53: Funding for countries with HCFC consumption between 361 and 400 metric tonnes in the servicing sector
- Decision 72/41: Minimizing adverse climate impact of HCFC phase-out in the refrigeration servicing sector
- Decisions 72/17 and 73/34 on retrofit of existing HCFC-based refrigeration and air-conditioning equipment to flammable or toxic refrigeration

**Disposal**

- Decision 58/19: Interim guidelines for funding of demonstration projects for the disposal of ODS
- Decision 64/50: Report on implementation of disposal projects (decision 58/19)
- Decision 70/22: Report on progress and experiences gained in demonstration projects for the disposal of unwanted ODS (decision 64/50)

**Overarching principles and timelines**

**Decision 53/37: Options for assessing and defining eligible incremental costs for HCFC consumption and production phase-out activities (follow-up to decision 52/4)**

1. At the conclusion of the discussion on options for assessing and defining eligible incremental costs for HCFC consumption and production phase-out activities, the Executive Committee decided:

- (a) That ratification of or accession to the Copenhagen Amendment was the prerequisite for an Article 5 Party to access Multilateral Fund funding for phasing out the consumption of HCFCs;
- (b) That ratification of or accession to the Beijing Amendment was the prerequisite for an Article 5 Party to access Multilateral Fund funding for phasing out the production of HCFCs;
- (c) That, in the case of a non-signatory country, the Executive Committee might consider providing funding for conducting an HCFC survey and the preparation of an accelerated HCFC phase-out management plan, with the commitment of the government to ratify or accede to the necessary Amendment and on the understanding that no further funding would be available until the Ozone Secretariat had confirmed that the government had ratified or acceded to that Amendment, through the deposit of its instrument in the Office of the United Nations Headquarters in New York;
- (d) That the existing policies and guidelines of the Multilateral Fund for funding the phase-out of ODS other than HCFCs would be applicable to the funding of HCFC phase-out unless otherwise decided by the Executive Committee in light of, in particular, decision XIX/6 of the Nineteenth Meeting of the Parties;
- (e) That institutions and capacities in Article 5 countries developed through Multilateral Fund assistance for the phase-out of ODS other than HCFCs should be used to economize the phase-out of HCFCs, as appropriate;
- (f) That stable and sufficient assistance from the Multilateral Fund would be provided to guarantee the sustainability of such institutions and capacities when deemed necessary for the phase-out of HCFCs;
- (g) That the production sector sub-group would be reconvened at the 55<sup>th</sup> meeting to consider issues pertaining to the phase-out of HCFC production, taking into account decision XIX/6 of the Nineteenth Meeting of the Parties and the following issues, as well as further elaboration and analysis of those issues to be prepared by the Secretariat in consultation with technical experts:
  - (i) The continued applicability of the current approach to funding HCFC production phase-out being based on the assumption of plant closures;
  - (ii) The timing of funding HCFC production phase-out in view of the long duration between the HCFC freeze in 2013 and the final phase-out in 2030, taking into consideration that production and consumption phase-out could take place simultaneously;
  - (iii) The eligibility of the CFC/HCFC-22 swing plants in view of the commitment in the CFC production phase-out agreement not to seek funding again from the

- Multilateral Fund for closing down HCFC facilities that use the existing CFC infrastructure;
- (iv) The cut-off date for funding eligibility of HCFC production phase-out;
  - (v) Other measures that could facilitate management of HCFC production phase-out; and
  - (vi) Other issues related to the HCFC production sector, taking in account subparagraph (g)(ii) above.
- (h) That the Secretariat would work with the implementing agencies to examine the existing guidelines for country programmes and sector plans (decision taken at the 3<sup>rd</sup> meeting of the Executive Committee and decision 38/65), and propose draft guidelines to the 54<sup>th</sup> meeting for the preparation of HCFC phase-out management plans incorporating HCFC surveys, taking into consideration comments and views relating to such guidelines expressed by Executive Committee members at the 53<sup>rd</sup> meeting and the submissions to the 54<sup>th</sup> meeting referred to in paragraph (l) below, and that the Executive Committee would do its utmost to approve the guidelines at its 54<sup>th</sup> meeting;
- (i) That the Secretariat, in consultation with technical experts with knowledge of experiences in Article 5 countries with different levels of development and non-Article 5 countries, would prepare by 25 March 2008 a preliminary discussion document providing analysis on all relevant cost considerations surrounding the financing of HCFC phase-out, taking into account the views expressed by Executive Committee Members in the submissions referred to in paragraph (l) below, and including:
- (i) Information on the cost benchmarks/ranges and applicability of HCFC substitute technologies; and
  - (ii) Consideration of substitute technologies, financial incentives and opportunities for co-financing which could be relevant for ensuring that the HCFC phase-out resulted in benefits in accordance with paragraph 11(b) of decision XIX/6 of the Nineteenth Meeting of the Parties;
- (j) That the current classifications of low-volume-consuming (LVC) countries and small and medium-sized enterprises (SMEs) should be maintained until the cost-effectiveness thresholds of HCFC phase-out had been developed and the potential impact of those thresholds on LVC countries and SMEs had become better known. It would then be possible to review those classifications including a classification for very low-volume consuming countries, and current policies and funding arrangements targeting those countries and enterprises;
- (k) To note that the following cut-off dates for funding HCFC phase-out had been proposed:
- (i) 2000 (Cap of HCFC production/consumption in one major country);
  - (ii) 2003 (Clean Development Mechanism);
  - (iii) 2005 (proposal for accelerated phase-out of HCFCs);
  - (iv) 2007 (Nineteenth Meeting of the Parties);

- (v) 2010 (end of the baseline for HCFCs);
- (vi) Availability of substitutes;
- (l) As a matter of priority, and taking into account paragraphs 5 and 8 of decision XIX/6 of the Nineteenth Meeting of the Parties, to invite Executive Committee Members to submit their views on the following issues to the Secretariat, by 15 January 2008, with the understanding that the Secretariat would make the submissions available to the 54<sup>th</sup> meeting:
  - (i) Elements the Secretariat should consider in the draft guidelines for the preparation of national HCFC phase-out management plans;
  - (ii) Cost considerations to be taken into account by the Secretariat in preparing the discussion document referred to in paragraph (i) above;
  - (iii) Cut-off date for funding eligibility; and
  - (iv) Second-stage conversions;
- (m) To approve 2008 expenditure of up to US \$150,000 to cover the costs of consultations with technical experts and other stakeholders required for the preparation of the documents referred to in the present decision.

**Decision 54/39: Draft guidelines for the preparation of HCFC phase-out management plans incorporating HCFC surveys (decision 53/37(h))**

1. The Executive Committee decided to adopt the following guidelines:
  - (a) Countries should adopt a staged approach to the implementation of an HCFC phase-out management plan (HPMP), within the framework of their over-arching-strategy;
  - (b) As soon as possible and depending on the availability of resources, countries should employ the guidelines herein to develop, in detail, stage one of the HPMPs, which would address how countries would meet the freeze in 2013 and the 10 per cent reduction in 2015, with an estimate of related cost considerations and applying cost guidelines as they were developed;
  - (c) The elaboration of stage one of the HPMP and subsequent stages should be developed as follows:
    - (i) For countries with consumption in the servicing sector only:
      - a) To be consistent with existing guidelines for the preparation of RMPs/RMP updates pursuant to decisions 31/48 and 35/57; and, if applicable, with the preparation of TPMPs pursuant to decision 45/54;
      - b) To contain commitments to achieve the 2013 and 2015 HCFC control measures and include a performance-based system for HPMPs based on the completion of activities in the HPMP to enable the annual release of funding for the HPMP;
    - (ii) For countries with manufacturing sectors using HCFCs, HPMPs should contain a national performance-based phase-out plan (NPP) with one or several substance

or sector-based phase-out plans (SPP) consistent with decision 38/65 addressing consumption reduction levels sufficient to achieve the 2013 and 2015 HCFC control measures and provide starting points for aggregate reductions, together with annual reduction targets;

- (d) For countries that chose to implement investment projects in advance of completion of the HPMP:
  - (i) The approval of each project should result in a phase-out of HCFCs to count against the consumption identified in the HPMP and no such projects could be approved after 2010 unless they were part of the HPMP;
  - (ii) If the individual project approach was used, the submission of the first project should provide an indication of how the demonstration projects related to the HPMP and an indication of when the HPMP would be submitted;
- (e) Consideration should be given to providing funding for assistance to include HCFC control measures in legislation, regulations and licensing systems as part of the funding of HPMP preparation as necessary and confirmation of the implementation of the same should be required as a prerequisite for funding implementation of the HPMP;
- (f) In cases where there were multiple implementing agencies in one country, a lead agency should be designated to coordinate the overall development of stage one of the HPMP;
- (g) HPMPs should contain cost information at the time of their submission based on and addressing:
  - (i) The most current HCFC cost guidelines at the time of submission;
  - (ii) Alternative cost scenarios based on different potential cut-off dates for new capacity if a specific cut-off date had not yet been decided, for funding eligibility of manufacturing facilities as specified in decision 53/37(k), as well as the current policy for a 25 July 1995 cut-off date;
  - (iii) Alternative cost scenarios for the operational and capital costs for second conversions;
  - (iv) The incremental costs of regulating import and supply to the market of HCFC dependent equipment once proven alternatives were commercially available in the country and describing the benefits to the servicing sector of associated reduced demand;
  - (v) Cost and benefit information based on the full range of alternatives considered, and associated ODP and other impacts on the environment including on the climate, taking into account global-warming potential, energy use and other relevant factors;
- (h) Countries and agencies were encouraged to explore potential financial incentives and opportunities for additional resources to maximize the environmental benefits from HPMPs pursuant to paragraph 11(b) of decision XIX/6 of the Nineteenth Meeting of the Parties;
- (i) HPMPs should address:

- (i) The use of institutional arrangements mentioned in decision 53/37(e) and (f);
- (ii) The roles and responsibilities of associations of refrigeration technicians and other industry associations and how they could contribute to HCFC phase-out; and
- (j) HPMPs should, as a minimum, fulfil the data and information requirements, as applicable, listed in the indicative outline for the development of HPMPs, as set out in Annex XIX to the present report.

**Decision 55/43: Revised analysis of relevant cost considerations surrounding the financing of HCFC phase-out (decisions 53/37(i) and 54/40)**

1. A contact group was set up, with Australia, as convenor, to discuss the cost considerations of financing HCFC phase-out further. The convenor of the contact group reported to the Executive Committee that the group, following extensive discussions had reached agreement on a text, taking into account the comments made by Members of the Executive Committee.

2. On that basis, the Executive Committee decided:

- (a) To take note of the discussion paper providing an analysis of relevant cost considerations surrounding the financing of HCFC phase-out contained in document UNEP/OzL.Pro/ExCom/55/47;
- (b) To invite bilateral and implementing agencies to prepare and submit project proposals to the Secretariat for those HCFC uses addressed in paragraphs (c), (d), (e) and (f) below so that the Executive Committee could choose those projects that best demonstrated alternative technologies and facilitated the collection of accurate data on incremental capital cost and incremental operating costs or savings, as well as other data relevant to the application of the technologies, on the understanding that the quantity of HCFC to be phased out under those projects needed to be deducted from the starting point for sustained aggregate reductions in eligible consumption as set by the HCFC phase-out management plan (HPMP);
- (c) To note the limited introduction of several of the HCFC alternative technologies available to date in Article 5 countries, the need to validate them and optimize their use in the light of the local conditions prevailing in Article 5 countries, and the wide variation in costs of replacement equipment and raw materials and, accordingly:
  - (i) To request the Secretariat to gather technical information related to HCFC phase-out in the aerosols, fire extinguishers and solvents sectors on an ongoing basis, to review any project in those sectors when submitted and to refer it, as appropriate, for individual consideration by the Executive Committee;
  - (ii) To consider deferring to its first meeting in 2010 any decision it might wish to take on policies for the calculation of incremental operating costs or savings from HCFC conversion projects, as well as the establishment of cost-effectiveness thresholds, in order to benefit from the experience gained through review of HCFC phase-out projects as stand-alone projects and/or as components of HPMPs prior to that Meeting;
- (d) To agree that the technical information contained in document UNEP/OzL.Pro/ExCom/55/47, was sufficient to enable preparation, review and

submission on a case-by-case basis of a number of stand-alone projects for HCFC phase-out in the foam, refrigeration and air conditioning sectors;

- (e) To invite bilateral and implementing agencies, as a matter of urgency, to prepare and submit a limited number of time-specific project proposals involving interested systems houses and/or chemical suppliers for the development, optimization and validation of chemical systems for use with non-HCFC blowing agents on the following basis:
  - (i) As part of the projects, following the development and validation process, the collaborating systems houses would provide technology transfer and training to a selected number of downstream foam enterprises to complete the phase-out of HCFCs in those enterprises;
  - (ii) Agencies would collect and report accurate project cost data as well as other data relevant to the application of the technologies;
  - (iii) In order to be of benefit for the preparation and implementation of the HPMPs, as well as any stand-alone projects, these specific projects would be completed within a period not exceeding 18 months and a progress report on each of the two implementation phases as outlined in paragraphs (i) and (ii) above, would be made available to the Executive Committee;
  - (iv) Bilateral and implementing agencies and relevant collaborating systems houses were encouraged to address the technological issues surrounding preparation and distribution of premixed polyols containing hydrocarbon blowing agents;
- (f) To invite bilateral and implementing agencies to submit a limited number of demonstration projects for the conversion of HCFCs in the refrigeration and air conditioning sub-sectors to low-global warming potential (GWP) technologies to identify all the steps required and to assess their associated costs;
- (g) To continue its deliberations on policy relating to second-stage conversions and determination of the cut-off date for installation of HCFC-based manufacturing equipment, after which incremental costs for the conversion of such equipment would not be eligible for funding, with a view to concluding its considerations prior to submission of stand-alone projects;
- (h) To further analyse if an approach of the type outlined in document UNEP/OzL.Pro/ExCom/55/47 provided a satisfactory and transparent basis for the prioritization of HCFC phase-out technologies to minimize other impacts on the environment, including on the climate as originally envisaged in decision XIX/6 of the Nineteenth Meeting of the Parties, and to request the Secretariat to continue with its evaluation in order to report in a more detailed fashion at a subsequent Executive Committee Meeting;
  - (i) To request the Secretariat to approach other institutions with the objective of identifying individual, regional or multilateral funding mechanisms that might be suitable and compatible as sources for timely co-financing to top up Multilateral Fund ozone funding in order to achieve additional climate benefits and to provide a further report to a future Meeting; and
- (j) To consider, at a future Meeting, issues relating to whether or not to retire, prematurely, functioning equipment once the 2013 and 2015 compliance targets had been addressed.



**Decision 56/16: Cost structure for determining funding levels for preparation of HCFC investment and associated activities (decision 55/13(d))**

1. The Executive Committee decided:

- (a) To note document UNEP/OzL.Pro/ExCom/56/13 regarding a cost structure for determining funding levels for preparation of HCFC investment and associated activities (decision 55/13(d));
- (b) To define the elements of a cost structure for funding the preparation of an overall HCFC phase-out management plan (HPMP) in line with decision 54/39 and comprising several components as follows:
  - (i) Assistance for policy and legislation, e.g. to develop new or extend existing legislation regarding HCFC, products containing HCFCs, quotas, and licences;
  - (ii) Survey of HCFC use and analysis of data;
  - (iii) Development and finalization of the HPMP including its stage one to address the 2013 and 2015 control measures, the latter being akin to a terminal phase-out management plan (TPMP) or a refrigeration service sector plan;
  - (iv) Development of investment activities for the HCFC-consuming manufacturing sectors for stage one of an HPMP, if such activities were necessary;
- (c) To provide funding for elements (b)(i) to (iii) above as specified in the table below, based on the countries' HCFC consumption for 2007, while applying decision 55/13(a), (b) and (c):

<b>Group according to consumption pattern</b>	<b>Funding for above components (b)(i) to (iii)</b>
Countries with zero consumption of HCFC	US \$30,000
Countries with consumption only of HCFC-22, or consumption below 6 ODP tonnes/year	US \$85,000
Countries with medium consumption, between 6 ODP tonnes/year and 100 ODP tonnes/year	US \$150,000
Countries with consumption higher than 100 ODP tonnes/year	US \$195,000

- (d) To limit the maximum funding provided for the element (b)(iv) of the HPMP for any country with a manufacturing sector using HCFCs as per the following table based on the countries' HCFC consumption for 2007, on the understanding that those limits represented maximum amounts and requests for project preparation would have to justify the level of funding up to that amount, and on the understanding that preparation costs for demonstration projects according to decision 55/43 paragraphs (b) to (f) were not taken into account when calculating that level of funding;

<b>Consumption limit (ODP tonnes)</b>	<b>Investment preparation limit (US \$)</b>
Up to 100	100,000
101 –300	200,000
301-500	250,000
501 – 1,000	300,000
1,001 and above	400,000

- (e) To define five manufacturing sub-sectors as follows: air-to-air air conditioning systems; refrigeration (including all refrigeration, heat pumps and air conditioning sub-sectors except air-to-air air conditioning systems); polyurethane foam; extruded polyurethane (XPS) foam; and solvent uses in manufacturing;
- (f) To provide funding for the element (b)(iv) of the HPMP for countries with manufacturing capacity up to a maximum specified below, to be determined by the total number of enterprises to be converted under HPMP stage one in the relevant sub-sector as defined under paragraph (e) above, excluding those enterprises with demonstration projects that might be chosen by the Executive Committee according to decision 55/43, paragraphs (b) to (f):
  - (i) One enterprise to be converted in a manufacturing sector: US \$30,000;
  - (ii) Two enterprises to be converted in a manufacturing sector: US \$60,000;
  - (iii) Three to 14 enterprises to be converted in a manufacturing sector: US \$80,000;
  - (iv) Fifteen or more enterprises to be converted in a manufacturing sector: US \$150,000;
- (g) That in the case where Parties wish to submit requests for preparation of sub-sector plans in the approved sectors, the total funding available for all sub-sector plans in each sector should not exceed US \$150,000;
- (h) Not to apply the provisions in subparagraphs (c), (e) and (f) above to China;
- (i) To request that for demonstration projects, according to decision 55/43 paragraphs (b) to (f), the request for preparation funds should include specification of country, sector, brief description of the project, approximate ODP tonnes phase-out to be achieved, the enterprise(s) to be addressed, if relevant, and the date when they began operation, reference to the relevant sub-paragraph of decision 55/43, and a description of compelling reasons as to why the Executive Committee should choose this project as described in decision 55/43 (b). Funding could be provided up to the following levels:
  - (i) Stand-alone demonstration projects (55/43) in a manufacturing sector, per project: US \$30,000;
  - (ii) Umbrella demonstration projects (55/43) with three to 14 beneficiaries in one manufacturing sector, per umbrella project: US \$80,000;
  - (iii) Projects addressing 15 or more beneficiaries could not receive preparation funding for demonstration projects related to decision 55/43; and
- (j) To request the Secretariat to apply this cost structure when assessing the eligibility for funding of the different elements of the HPMP preparation, and to propose adjustments to the structure, in particular with regard to investment and associated activities, to the Executive Committee when necessary.

**Decision 59/11: Prioritization in the phase-out of HCFCs**

1. After hearing the report from the convener of the contact group, the Executive Committee decided:

- (a) To request bilateral and implementing agencies to submit, as a priority, HCFC-141b phase-out projects to enable compliance with the reductions in consumption for the years 2013 and 2015, in accordance with decision XIX/6, paragraph 11(a), of the Nineteenth Meeting of the Parties; and
- (b) To consider HCFC consumption phase-out projects for HCFCs with ODP lower than HCFC-141b, where national circumstances and priorities required their submission, in order to comply with the 2013 and 2015 control measures.

**Decision 60/15: Additional policy issue raised by Canada: Accelerated phase-out of HCFCs**

1. The representative of Canada raised an additional policy issue for consideration by the Executive Committee with respect to several HCFC projects submitted to the 60<sup>th</sup> meeting that proposed levels of HCFC phase-out greater than the 10 per cent required to be phased out by 2015. In some cases, levels of phase-out proposed represented 30 to 40 per cent of the baseline. He said that while that might be appropriate in some cases, namely, in very LVC countries where levels of tonnage were small or where funding was provided over a shorter period to facilitate management or achieve economies of scale, the Multilateral Fund could not sustain such high levels of phase-out within the current replenishment period, especially for larger countries. However, the Executive Committee could support accelerated phase-out in LVC countries where the phase-out could be achieved and sustained and where there was a strong commitment. Where countries had proposed accelerated phase-out of HCFCs, the Executive Committee should make decisions on a case-by-case basis taking into account levels of HCFC consumption in LVC countries and the rationale behind the accelerated phase-out.

2. Following the presentation, the Executive Committee decided that projects which accelerated the phase-out of consumption of HCFCs could be considered on a case-by-case basis for low-volume-consuming countries that had a strong national level of commitment in place to support accelerated phase-out.

**Decision 60/44: Outstanding HCFC issues: Cut-off date, level of incremental operating costs, funding provided to the servicing sector, and incremental capital cost (decision 59/46)**

1. The Executive Committee decided:

In determining criteria for funding HCFC phase-out in the consumption sector in Article 5 countries:

Cut-off date

- (a) Not to consider any projects to convert HCFC-based manufacturing capacity installed after 21 September 2007;

Second-stage conversion

- (b) To apply the following principles in regard to second-stage conversion projects for the first stage of HCFC phase-out management plan (HPMP) implementation to achieve the 2013 and 2015 HCFC phase-out compliance targets, to be reviewed by the Executive Committee no earlier than the last meeting in 2013:

- (i) Full funding of eligible incremental costs of second-stage conversion projects will be considered in those cases where an Article 5 Party clearly demonstrates in its HPMP that such projects are necessary to comply with the Montreal Protocol HCFC targets up to and including the 35 per cent reduction step by 1 January 2020 and/or are the most cost-effective projects measured in ODP tonnes that the Party concerned can undertake in the manufacturing sector in order to comply with these targets;
- (ii) Funding for all other second-stage conversion projects not covered under paragraph (b)(i) above will be limited to funding for installation, trials, and training associated with those projects;

Starting points for aggregate reductions in HCFC consumption

- (c) To establish the starting points for aggregate reductions in HCFC consumption, for those Article 5 countries that submit projects in advance of their assessed baseline, at the time of submission of either the HCFC investment project or the HPMP, whichever is first submitted for the consideration of the Executive Committee;
- (d) To allow Article 5 countries to choose between the most recent reported HCFC consumption under Article 7 of the Montreal Protocol at the time of the submission of the HPMP and/or the investment project, and the average of consumption forecast for 2009 and 2010, in calculating starting points for aggregate reductions in HCFC consumption;
- (e) To adjust the agreed starting points for aggregate reductions in HCFC consumption in cases where calculated HCFC baselines based on reported Article 7 data are different from the calculated starting point based on the average consumption forecast for 2009-2010;

Eligible incremental costs of HCFC phase-out projects

- (f) To apply the following principles in regard to eligible incremental costs of HCFC phase-out projects for the first stage of HPMP implementation to achieve the 2013 and 2015 HCFC phase-out compliance targets, subject to a review in 2013:
  - (i) When preparing HCFC phase-out projects in the foam, refrigeration and air-conditioning sectors, bilateral and implementing agencies shall use the technical information contained in document UNEP/OzL.Pro/ExCom/55/47 as a guide;
  - (ii) The current cost-effectiveness threshold values used for CFC phase-out projects in paragraph 32 of the final report of the 16<sup>th</sup> meeting of the Executive Committee (document UNEP/OzL.Pro/ExCom/16/20), to be measured in metric kilogrammes, shall be used as guidelines during the development and implementation of the first stage of HPMPs;
  - (iii) That countries will have the flexibility to allocate the approved funding from incremental operating costs to incremental capital costs and to allocate up to 20 per cent of the approved funding for incremental capital costs to incremental operating costs, as long as the use of the flexibility does not change the intent of the project. Any reallocation should be reported to the Executive Committee;

- (iv) Funding of up to a maximum of 25 per cent above the cost effectiveness threshold will be provided for projects when needed for the introduction of low global warming potential (GWP) alternatives;

HCFC phase-out in the foam sector

- (v) Incremental operating costs for projects in the foam sector will be considered at US \$1.60/metric kg for HCFC-141b and US \$1.40/metric kg for HCFC-142b consumption to be phased out at the manufacturing enterprise;
- (vi) For group projects linked to systems houses, incremental operating costs will be calculated on the basis of the total HCFC consumption to be phased out for all downstream foam enterprises;
- (vii) The Executive Committee will consider, on a case-by-case basis, funding higher levels of incremental operating costs than indicated in paragraph (f)(v) above when required for the introduction of low-GWP water-blown technology;

HCFC phase-out in the refrigeration and air-conditioning manufacturing sector

- (viii) Incremental operating costs for projects in the air-conditioning sub-sector will be considered at US \$6.30/metric kg of HCFC consumption to be phased out at the manufacturing enterprise;
- (ix) Incremental operating costs for projects in the commercial refrigeration sub-sector will be considered at US \$3.80/metric kg of HCFC consumption to be phased out at the manufacturing enterprise;
- (x) Consistent with decision 31/45 of the Executive Committee, incremental operating costs will not be considered for enterprises categorized under the refrigeration equipment assembly, installation and charging sub-sector;

HCFC phase-out in the refrigeration servicing sector

- (xi) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes must include in their HPMP, as a minimum:
  - a. A commitment to meeting, without further requests for funding, at least the freeze in 2013 and the 10 per cent reduction step in 2015, and if the country so decides, the 35 per cent reduction step in 2020. This shall include a commitment by the country to restrict imports of HCFC-based equipment if necessary to achieve compliance with the reduction steps and to support relevant phase-out activities;
  - b. Mandatory reporting, by the time funding tranches for the HPMP are requested, on the implementation of activities undertaken in the refrigeration servicing sector and in the manufacturing sector when applicable, in the previous year, as well as a thorough and comprehensive annual work plan for the implementation of the following activities associated with the next tranche;
  - c. A description of the roles and responsibilities of major stakeholders, as well as the lead implementing agency and the cooperating agencies,

where applicable;

- (xii) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes will be provided funding consistent with the level of consumption in the refrigeration servicing sector as shown in the table below, on the understanding that project proposals will still need to demonstrate that the funding level is necessary to achieve the 2013 and 2015 phase-out targets, and if the country so decides, the 2020 phase-out targets:

Consumption (mt)*	Funding up to 2015 (US \$)	Funding up to 2020 (US \$)
>0 <15	51,700	164,500
15 <40	66,000	210,000
40 <80	88,000	280,000
80 <120	99,000	315,000
120 <160	104,500	332,500
160 <200	110,000	350,000
200 <320	176,000	560,000
320 <360	198,000	630,000

(\*) Level of baseline HCFC consumption in the refrigeration servicing sector

- (xiii) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes and that receive funding consistent with the above table, will have flexibility in utilizing the resources available to address specific needs that might arise during project implementation to facilitate the smoothest possible phase-out of HCFCs;
- (xiv) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes, used in both the manufacturing and refrigeration servicing sectors, could submit HCFC phase-out investment projects in accordance with prevailing policies and decisions of the Multilateral Fund, in addition to funding for addressing HCFC consumption in the servicing sector;
- (xv) Article 5 countries that have total HCFC consumption above 360 metric tonnes should first address consumption in the manufacturing sector to meet the reduction steps in 2013 and 2015. However, if such countries clearly demonstrate that they require assistance in the refrigeration servicing sector to comply with these targets, funding for these activities, such as training, will be calculated at US\$4.50/metric kg, which will be deducted from their starting point for aggregate reductions in HCFC consumption.

#### HCFC phase-out in the aerosol, fire extinguisher and solvent sectors

- (xvi) The eligibility of incremental capital and operating costs for HCFC phase-out projects in the aerosol, fire extinguisher and solvent sectors will be considered on a case-by-case basis.

#### **Decision 62/12: Prioritization of HCFCs (stage I of HPMPs)**

1. After hearing the report of the contact group and noting that project proposals for HCFCs with ODP lower than HCFC-141b could be considered where national circumstances and priorities required their submission in order to comply with the 2013 and 2015 control measures as requested by decision 59/11, the Executive Committee decided:

- (a) To request bilateral and implementing agencies, when submitting activities to phase out HCFC-22 used in the manufacture of refrigeration and air-conditioning equipment, to estimate the total future amount of HCFC-22 that could potentially be required until 2020 for servicing such equipment;
- (b) To request bilateral and implementing agencies, when submitting activities to phase out HCFC-22 used in the refrigeration servicing sector, to clearly demonstrate how the proposed activities would reduce the growth rate in the servicing sector and contribute to meeting the reduction steps in 2013 and 2015; and
- (c) To consider projects for the phase-out of HCFC-22/HCFC-142b used for the manufacture of extruded polystyrene (XPS) foam when it was clearly demonstrated that they would be required by national circumstances and priorities to comply with the 2013 and 2015 control measures, and to consider all other XPS foam projects after 2014.

**Decision 74/50: Criteria for funding HCFC phase-out in the consumption sector for stage II of HPMPs**

1. The Executive Committee decided, in determining criteria for funding HCFC phase-out in the consumption sector for stage II of the HCFC phase-out management plans (HPMPs) in Article 5 countries:

*Cut-off date*

- (a) Not to consider any projects to convert HCFC-based manufacturing capacity installed after 21 September 2007;

*Second-stage conversion*

- (b) To apply the following principles in respect of second-stage conversion projects:
  - (i) Full funding of eligible incremental costs of second-stage conversion projects would be considered in those cases where an Article 5 Party clearly demonstrated in its HPMP that such projects:
    - a. Were necessary to comply with the Montreal Protocol HCFC targets up to and including the 35 per cent reduction step by 1 January 2020; and/or
    - b. Were the most cost-effective projects measured in ODP tonnes that the Party concerned could undertake in the manufacturing sector in order to comply with those targets; and/or
    - c. Would make the transition to low global-warming potential (GWP) alternatives;
  - (ii) Funding for all other second-stage conversion projects not covered under sub-paragraph (b)(i) above would be limited to funding for installation, trials, and training associated with those projects;

*Eligible incremental costs of HCFC phase-out projects*

- (c) To apply the following principles in respect of eligible incremental costs of HCFC phase-out projects for stage II of HPMPs, subject to a review in 2020:
- (i) The current cost-effectiveness threshold values used for CFC phase-out projects in paragraph 32 of the final report of the 16<sup>th</sup> meeting of the Executive Committee (document UNEP/OzL.Pro/ExCom/16/20), to be measured in metric kilograms, and a cost-effectiveness threshold of US \$7.83/metric kilogram for rigid insulation refrigeration foam, should be used as guidelines during the development and implementation of the second and subsequent stages of HPMPs;
  - (ii) Article 5 countries would have the flexibility to allocate the approved funding from incremental operating costs to incremental capital costs and to allocate up to 20 per cent of the approved funding for incremental capital costs to incremental operating costs, as long as the use of the flexibility did not change the intent of the project. Any reallocation should be reported to the Executive Committee;
  - (iii) Funding of up to a maximum of 25 per cent above the cost-effectiveness threshold would be provided for projects when needed for the introduction of low-GWP alternatives; however, for small and medium-sized enterprises (SMEs) in the foam sector with consumption of less than 20 metric tonnes, the maximum would be up to 40 per cent above the cost-effectiveness threshold;

*HCFC phase-out in the foam sector*

- (iv) Incremental operating costs for projects in the polyurethane foam sector would be considered at US \$1.60/metric kilogram for HCFC-141b; however, for projects that make the transition to low-GWP alternatives, incremental operating costs would be considered at up to US \$5.00/metric kilogram;
- (v) Incremental operating costs for projects in the extruded polystyrene foam sector would be considered at US \$1.40/metric kilogram for HCFC-142b, HCFC-142b/HCFC-22, or HCFC-22 consumption to be phased out at the manufacturing enterprise;
- (vi) For group projects linked to systems houses, incremental operating costs would be calculated on the basis of the total HCFC consumption to be phased out for all downstream foam enterprises;
- (vii) When it was clearly demonstrated that low-GWP alternatives with incremental operating costs as indicated in sub-paragraph (c)(iv) above were not feasible, the Executive Committee would fund higher levels of incremental operating costs when needed for the introduction of low-GWP alternatives by SMEs;

*HCFC phase-out in the refrigeration and air-conditioning manufacturing sector*

- (viii) Incremental operating costs for projects in the air conditioning sub-sector would be considered at US \$6.30/metric kilogram of HCFC consumption to be phased out at the manufacturing enterprise;
- (ix) Incremental operating costs for projects in the commercial refrigeration subsector



would be considered at US \$3.80/metric kilogram of HCFC consumption to be phased out at the manufacturing enterprise;

- (x) Consistent with decision 31/45 of the Executive Committee, incremental operating costs would not be considered for enterprises in the refrigeration equipment assembly, installation and charging subsector category;

*HCFC phase-out in the refrigeration servicing sector, including servicing for all the relevant refrigeration and air-conditioning subsectors*

- (xi) Article 5 countries with total HCFC consumption of up to 360 mt, and former low-volume-consuming (LVC) Article 5 countries with HCFC consumption in the refrigeration servicing sector only above 360 metric tonnes, must include in their HPMPs, as a minimum:
- a. A commitment to meeting, without further requests for funding at least the 35 per cent reduction step in 2020, and, if the country so decided, the 67.5 per cent reduction step in 2025 or the complete phase-out of HCFCs in line or ahead of the Montreal Protocol schedule. This should include a commitment by the country to restrict imports of HCFC-based equipment if necessary to achieve compliance with the reduction steps and to support relevant phase-out activities;
  - b. Mandatory reporting, by the time funding tranches for the HPMP were requested, on the implementation of activities undertaken in the refrigeration servicing sector and in the manufacturing sector when applicable, in the previous year, as well as a thorough and comprehensive annual work plan for the implementation of the activities associated with the next tranche;
  - c. A description of the roles and responsibilities of major stakeholders, as well as the lead implementing agency and the cooperating agencies, where applicable;
- (xii) Article 5 countries with total HCFC consumption of up to 360 mt would be provided with funding consistent with the level of consumption in the refrigeration servicing sector, as shown in the table below, on the understanding that project proposals would still need to demonstrate that the funding level was necessary to achieve the 2020 and 2025 phase-out targets, or if the country so decided, later reduction targets:

Consumption (mt)*	Funding (US \$)(**)		
	Up to 2020	Up to 2025	Total phase-out
>0 <15	205,625	396,500	587,500
15 <40	262,500	506,250	750,000
40 <80	280,000	540,000	800,000
80 <120	315,000	607,500	900,000
120 <160	332,500	641,250	950,000
160 <200	350,000	675,000	1,000,000
200 <320	560,000	1,080,000	1,600,000
320 <360	630,000	1,215,000	1,800,000

(\*) Level of HCFC baseline consumption in the refrigeration servicing sector

(\*\*) This represents the maximum funding eligible, including funding already provided

- (xiii) Article 5 countries with HCFC consumption in the refrigeration servicing sector only above 360 mt would be provided with funding for phase-out activities at US \$4.80/metric kilogram;
- (xiv) Article 5 countries with total HCFC consumption in the servicing sector only of up to 360 mt would have flexibility in utilizing the resources available to address specific needs that might arise during project implementation to facilitate the smoothest possible phase-out of HCFCs, consistent with Executive Committee decisions;
- (xv) Article 5 countries with total HCFC consumption of up to 360 mt, used in both the manufacturing and refrigeration servicing sectors, could submit HCFC phase-out investment projects in accordance with the policies and decisions of the Executive Committee, in addition to funding for addressing HCFC consumption in the servicing sector;
- (xvi) Article 5 countries with total HCFC consumption above 360 mt used in both the manufacturing and refrigeration servicing sectors should prioritize consumption in the manufacturing sector to meet the reduction steps in 2020, where possible. Activities in the refrigeration servicing sector for such countries would be calculated at US \$4.8/metric kilogram, to be deducted from their starting point for aggregate reductions in HCFC consumption;

*HCFC phase-out in the aerosol, fire extinguisher and solvent sectors*

- (xvii) The eligibility of incremental capital and operating costs for HCFC phase-out projects in the aerosol, fire extinguisher, and solvent sectors would be considered on a case-by-case basis; and
- (d) The Executive Committee would be open to considering projects to promote transition to not-in-kind technologies in relevant sectors.

**Sustained aggregate reductions in HFC consumption and production**

**Decision 35/57: Study on defining a starting point for determining the remaining ODS consumption eligible for funding by the Multilateral Fund: Follow up to decision 34/66 (a)**

1. In the context of the Executive Committee agreement on strategic planning (decision 33/54), the Executive Committee agreed (at its 35<sup>th</sup> meeting) that further funding must be predicated on a commitment by the country to achieve sustainable permanent aggregate reductions in consumption and production, as relevant. In implementing this provision, the Executive Committee believes that all Article 5 countries should be treated equally. In that regard, each Article 5 country should select one option from two options below for determining the starting point for implementation of its national aggregate consumption.

Option 1

Montreal Protocol baseline  
as reported at the 35<sup>th</sup> meeting (Annex VI.2)

Projects approved but not yet implemented when the baseline was established in 1997, and projects approved since

Option 2

Latest reported data (1999 or 2000)  
as reported at the 35<sup>th</sup> meeting (Annex VI.2)

Projects approved but not yet implemented

Provisos relating to Decision 35/57:

A. If an Article 5 country selects option 2, it should be with the understanding that the Executive Committee may agree in exceptional cases to adjust the resulting baseline at the first instance a project from a country is considered, to take into account the demonstrated non-representative nature of the last year's data for reasons such as clearly demonstrated stockpiling in the specific 12-month period, and/or national economic difficulties in the specific 12-month period. In so considering, the Executive Committee shall not take into account illegal imports, as there should be agreement that firms that import illegally, or purchase illegal imports, should not benefit from Fund assistance. In any case, it must be perfectly clear that only the Montreal Protocol baseline will be used to determine compliance with the Montreal Protocol.

B. It is acknowledged that some future years' reported consumption may go above or below the levels that result from the agreed calculation, but if consumption numbers go above the resulting levels, such increases in consumption would not be eligible for funding. It is further noted that the resulting numbers represent maximum residual ODS that the Fund will pay to reduce, and that existing Fund guidance related to eligibility of projects would be maintained in all respects.

C. It is noted that RMPs and methyl bromide projects lead to a specific commitment of levels of reductions in national aggregate consumption relative to Montreal Protocol obligations, and that halon banking projects often lead to commitment for a total national phase-out and ban on the import of halon. Those projects should continue to be handled on that basis.

D. Institutional strengthening and non-investment activities, including UNEP activities and any country dialogues that may be approved, undeniably contribute to Article 5 reductions in the use of ODS, otherwise, there would be no need to fund these activities. That said, their direct ODS reduction impact has been notoriously difficult to quantify. The Technology and Economic Assessment Panel historically suggested that for methyl bromide, non-investment activities may be five times more cost-effective than phase-out projects, yielding a cost-effectiveness of under US \$4.25/kg. For the purposes of this endeavor, it has been agreed to take a much more conservative stance, and agreed that all future non-investment activities be given a value that is not many times more cost-effective than investment projects, which is at US \$12.10/kg, which is one third as cost-effective as the average investment project approved under the Fund. This should be used as an interim figure until more research can be done on the issue.

E. While countries are still explicitly given the option of proceeding on a project by project or sector/national basis, it should be noted that in the case of broader plans such as production sector plans, RMPs, solvents sector plans, halon sector plans or national CFC phase-out plans, complicated issues such as selecting a starting point and ensuring national sustained reductions become less critical, as the agreements themselves embody a specific commitment to eliminate national aggregate consumption or production of the given substance on a specific schedule.

**Decision 37/66 (c): Selection of options pursuant to decision 35/57**

1. The Executive Committee decided:
  - (a) For countries that had not made or confirmed their final selection of an option:
    - (i) To set a deadline for selection at eight weeks prior to the meeting at which the country concerned intended to submit a project for consideration by the Executive Committee;

- (ii) Automatically to apply Option 1 if such a country submitted a project without making a selection;
- (iii) Notwithstanding sub-paragraphs (i) and (ii) above, to consider requests from countries at risk of non-compliance;
- (iv) To request the Secretariat to assist those countries that were having technical difficulties in making their selection;

**Decision 60/44 (c)(d) and (e)**

(Refer to decision 60/44 under Overarching principles and timelines)

**Eligible incremental cost**

**Decision taken at the 16<sup>th</sup> meeting of the Executive Committee (1995) on cost-effectiveness thresholds**

1. The Executive Committee (UNEP/OzL.Pro/ExCom/16/20 (paragraph 32)):

- (a) Decided that the first option proposed by the Sub-Committee on Project Review, as outlined in paragraph 25 above, should be implemented on a trial basis for projects submitted to the Seventeenth Meeting of the Executive Committee and that it should be reviewed at the Eighteenth Meeting;
- (b) Decided that ODS consumption should be calculated on the basis of either the year, or an average of the three years, immediately preceding project preparation;
- (c) Adopted the following sector and sub-sector cost-effectiveness threshold values to be applied to projects submitted to the Seventeenth Meeting;

<u>Sector</u>	<u>US \$/kg ODP</u>
AEROSOL	
Hydrocarbon	4.40
FOAM	
General	9.53
Flexible polyurethane	6.23
Integral skin	16.86
Polystyrene/polyethylene	8.22
Rigid polyurethane	7.83
HALON	
General	1.48
REFRIGERATION	
Commercial	15.21
Domestic	13.76
SOLVENT	
CFC-113	19.73
TCA	38.50

- (d) Decided to review the above values at the Eighteenth Meeting;

- (e) Recognized that in some domestic refrigeration projects using hydrocarbon technologies there are significant costs related to the provision of safety equipment and agreed that in calculating the cost-effectiveness of such projects, the safety-related costs should be identified and deducted from the total project cost before the cost-effectiveness calculations are made. These costs would, however, be considered in determining the level of project costs and funding;
- (f) Noted that it was difficult to determine cost-effectiveness thresholds for the mobile air conditioner and compressor sub-sectors and therefore agreed that an amount of US \$8,900,000 should be reserved for funding these projects in 1995;

### **Decision 18/25: Technology upgrade**

1. The Executive Committee decided:

- (a) That costs associated with avoidable technological upgrades should not be considered as eligible incremental costs and therefore should not be funded by the Multilateral Fund; and
- (b) That the following methodology for the quantification of technological upgrades will be used as guidance in the calculation of incremental costs:

In projects where add-on technological upgrading is established, but standard projects and production capacity/market expansion are not determined, the baseline scenarios should be constructed with respect to future investment and benefits streams. The projected investment and benefits profiles of the enterprise (with and without the conversion project) should be reviewed by the technical reviewer and the implementing agency to ensure broad consistency with the technological and commercial practices of the enterprise. The incremental costs would be calculated as:

$IC = [CC - NPV(FI)] + NPV[FBB - Fbp]$ , where,

IC is the incremental cost,

CC is the capital cost of the conversion project,

FI is future baseline investments (that would have occurred absent the conversion),

Fbb is the future baseline benefits (that would have occurred absent the conversion),

Fbp is the future benefits with the conversion project.

NPV refers the net present value of a stream of costs/benefits.

### **Decisions 22/25 and 23/52: Prices of chemicals**

1. Having considered the recommendations of the Sub-Committee on Project Review on the price of chemicals,<sup>2</sup> the Executive Committee decided to request the Secretariat and the implementing agencies to hold discussions on and review the process of setting the prices of ODS and other chemicals for the purpose of calculating incremental operating costs, taking fully into account the earlier decision of the Executive Committee on limiting the variation in prices to 20 per cent of the regional border price, and to prepare, by the 23<sup>rd</sup> meeting, a paper outlining the process proposed to be followed.

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<sup>2</sup> Paragraph 24 of document UNEP/OzL.Pro/ExCom/22/15.

2. Having considered a paper prepared jointly by the Secretariat and the implementing agencies in response to decision 22/25,<sup>3</sup> describing a process and a methodology for determining prices of chemicals for the purpose of calculating incremental operating costs, the Executive Committee decided:

- (a) To approve the document, amended by inserting in its paragraph 13 the words “and Article 5” following “Article 2”; and
- (b) To consider at a subsequent meeting a simplified methodology to be prepared by the representative of India.

### **Decision 25/48: Baseline equipment and unavoidable technological upgrades**

1. Having taken note of the comments and recommendations of the Sub-Committee on Project review,<sup>4</sup> and the proposals from the floor, the Executive Committee:

- (a) Noted that the Sub-Committee on Project Review proposed to take up, at its next meeting, the following issues: “the provision of replacement equipment constituted a technological upgrade in relation to the baseline conditions of enterprises for which retrofit of existing equipment was not feasible”; and “that unavoidable technological upgrade was to be taken into account in determining eligible incremental costs”; and
- (b) Decided that the baseline concept be adopted and implemented selectively, through application of Decision 18/25 on technological upgrade utilizing pro-rating of equipment costs, to the specific circumstances indicated below, and with the methodologies as also indicated:

#### For the domestic and commercial refrigeration and rigid polyurethane foam sub sectors:

- (i) The incremental cost of providing new foam machines where these are essential for conversion and none exist in the baseline should be based on either the difference between the cost of a low-pressure and a high-pressure foam machine, where a high-pressure machine is essential, or, alternatively, an agreed percentage of the cost of a low-pressure machine;
- (ii) For foam machines nearing the end of their useful life, the incremental cost of conversion should be based on the cost, from the same supplier, of a new machine, from which has been deducted the cost of a replacement ODS-technology machine, or a proportion thereof calculated according to decision 18/25;
- (iii) For foam machines in all other circumstances, the incremental cost of conversion should be based on the cost of retrofitting similar machines available through international bidding.

#### For the solvents sector:

- (iv) The incremental cost of conversion of existing solvent cleaning machines to use non-CFC or non-TCA solvents should be based on the cost of retrofitting similar machines available through international bidding (excluding conversion to aqueous/semi-aqueous technology which requires different equipment).

<sup>3</sup> UNEP/OzL.Pro/ExCom/23/64.

<sup>4</sup> paragraphs 88 to 91 of document UNEP/OzL.Pro/ExCom/25/17.

### **Decision 25/49: Incremental operating costs for compressors**

1. Having taken note of the comments and recommendations of the Sub-Committee on Project Review,<sup>5</sup> the Executive Committee decided to request the Secretariat to rethink the whole question of incremental operating costs for compressors, and to produce a new document based on a much simpler approach, such as, for example, a percentage of the capital costs.

### **Decision 62/9: Incremental operating costs in the aerosol sector for HCFC phase-out**

1. At its 62<sup>nd</sup> meeting, the Executive Committee decided that the incremental operating costs for the aerosol sector should be determined on the basis of a one-year duration.

### **Decision 62/13: Cost-effectiveness threshold for the rigid insulation refrigeration foam sub-sector**

1. The Executive Committee decided to set the cost-effectiveness threshold for rigid insulation refrigeration foam at US \$7.83/kg with a maximum of up to 25 per cent above this threshold for low-global warming potential alternatives.

### **Decisions 61/47, 63/15, 66/51 and 68/42 related to HCFC-141b contained in imported pre-blended polyol systems**

1. Two project proposals were submitted to the 59<sup>th</sup> meeting to phase out HCFC-141b contained in imported pre-blended polyols for foam<sup>6</sup>. In both cases, the amount of HCFC-141b to be phased out was not recorded as consumption as per the Montreal Protocol's definition. When consulted, the Ozone Secretariat had indicated that it was not possible to determine whether Parties included pre-blended polyols in their reported Article 7 data. It was further noted that the issue of not reporting HCFC-141b contained in pre-blended polyols was likely to occur in a number of Article 5 countries. Following a discussion, the Executive Committee *inter alia* requested the Fund Secretariat, in consultation with the Ozone Secretariat, to prepare a paper outlining the implications for Article 5 Parties and the Multilateral Fund associated with the import and export of HCFC-based pre-blended polyols (decision 59/12).

2. In response to decision 59/12, the Executive Committee considered at its 61<sup>st</sup> meeting (July 2010) a paper on the consumption arising from HCFC-141b contained in pre-blended foam chemicals (polyols)<sup>7</sup>. Given the importance of the matter and the desire to ensure that all eligible enterprises using HCFC-141b in pre-blended polyols could benefit from Multilateral Fund assistance, the Executive Committee decided (decision 61/47):

- (a) To take note of document UNEP/OzL.Pro/ExCom/61/53 on consumption arising from HCFC-141b contained in pre-blended foam chemicals (polyols) (decisions 59/12 and 60/50);
- (b) To confirm that the phase-out of HCFC-141b contained in pre-blended polyol systems that were imported and/or manufactured domestically, and counted as consumption under Article 7, was eligible for assistance according to existing guidelines;

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<sup>5</sup> Paragraphs 92 to 94 of document UNEP/OzL.Pro/ExCom/25/17.

<sup>6</sup> A mixture of several chemicals with HCFC-141b that was blended centrally and then distributed to different sites, as compared to other cases where the blending with HCFC-141b would occur only on site.

<sup>7</sup> UNEP/OzL.Pro/ExCom/61/53.

- (c) With regard to the import of HCFC-141b contained in pre-blended polyols, which had not been counted as consumption under Article 7, to request Article 5 countries that wished to seek assistance for the phase-out of such imports:
- (i) To include in the overarching strategy for their HCFC phase-out management plans (HPMPs) an indicative list of all the foam enterprises established prior to 21 September 2007 that used imported polyol systems, including the amount of HCFC-141b contained therein;
  - (ii) To include in the starting point for aggregate reduction in HCFC consumption the annual amount of HCFC-141b contained in imported polyol systems during the 2007-2009 period;
  - (iii) Also to include in their HPMPs a sector plan for the complete phase-out of the use of HCFC-141b in imported pre-blended polyol systems, covering the cost and funding schedule, taking into account that the share of imported polyol within the HPMP might need support under a schedule beyond 2015, and on the understanding that quantities of HCFC-141b in imported pre-blended polyol systems that had not been included in the overarching strategy for the HPMP would not be eligible for funding;
  - (iv) To include in the sector plan a commitment from the country to put in place, by the time the last foam manufacturing plant had been converted to a non-HCFC technology, regulations or policies banning the import and or the use of HCFC-141b pre-blended polyol systems;
- (d) That Article 5 Parties with eligible enterprises manufacturing HCFC-141b pre-blended polyol systems would be provided with assistance calculated on the basis of consumption of HCFC-141b sold domestically, on the understanding that the full consumption of HCFC-141b by those enterprises manufacturing pre-blended polyol systems would be deducted from the starting point.

3. At their Twenty-Second Meeting<sup>8</sup> the Parties noted with appreciation the cooperative manner in which the members of the Executive Committee addressed the issue of HCFCs in pre-blended polyols through decision 61/47 by agreeing on a framework on eligible incremental costs for Article 5 parties in their transition away from the use of these polyols, and affirmed that this issue had been addressed to the satisfaction of the parties (decision XXII/9).

4. At its 63<sup>rd</sup> meeting, the Executive Committee decided (decision 63/15) that Article 5 countries with HCFC consumption reported under Article 7 solely in the refrigeration servicing sector and with foam enterprises relying exclusively on imported HCFC-141b pre-blended polyol systems not reported as consumption could, on an exceptional and case-by-case basis, and consistent with decision 61/47, submit a funding request for the conversion of those enterprises during the implementation of stage I of the HCFC phase-out management plan (HPMP), on the understanding that:

- (a) There were no systems houses in the country concerned, and funding for the conversion of any of the foam enterprises was not requested but fully described in the submission of stage I of the HPMP;
- (b) All foam enterprises and the annual amount of HCFC-141b contained in imported pre-blended polyol, to be calculated based on the 2007-2009 average consumption

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<sup>8</sup> UNEP/OzL.Pro.22/9.



excluding those years in which no production was reported, would be included therein;

- (c) The eligibility of the foam enterprises would be determined at the time of the submission of the project, and the funding level would be based on the amount of HCFC-141b contained in imported pre-blended polyol systems as defined under subparagraph (b) above; and
- (d) The project proposal would completely phase out the use of HCFC-141b in imported pre-blended polyol systems and would include a commitment from the country to put in place, by the time the last foam manufacturing plant had been converted to a non-HCFC technology, regulations or policies banning the import and/or the use of HCFC-141b pre-blended polyol systems.

5. At the 65<sup>th</sup> meeting, in the context of a discussion on the issue of providing information on second-stage conversions in relevant project documents, it was noted that there were instances in which countries were seeking funding for second-stage conversions to phase out HCFC-141b-based pre-blended polyols not reported under Article 7. Under the HCFC guidelines, second-stage conversions were eligible for funding only if they were necessary or were the most cost-effective projects to meet the targets under the Montreal Protocol, based on consumption reported under Article 7. Following a discussion, the Executive Committee *inter alia*, requested the Secretariat to prepare a document on options for a tracking system to correlate, by country, the amounts of HCFC 141b-based pre-blended polyols exported by systems houses with the amounts used by foam enterprises in importing Article 5 countries that had been approved for phase-out, which could be updated on a periodic basis (decision 65/12(b)).

6. In response to decision 65/12(b), the Secretariat submitted to the 66<sup>th</sup> meeting (April 2012) a document on options for a tracking system<sup>9</sup>, which could be updated on a periodic basis, and which would correlate, by country, the amounts of HCFC-141b-based pre-blended polyols exported by systems houses on the one hand, with the amounts used by foam enterprises in importing Article 5 countries on the other. Following a discussion, the Executive Committee, *inter alia*, requested the Secretariat to update the document based on best available data on the amount of HCFC-141b in pre-blended polyols exported in 2009 and 2010 in Chile, China and Colombia, and to report back to the 68<sup>th</sup> meeting (decision 66/51).

7. Based on the document submitted to the 68<sup>th</sup> meeting pursuant to decision 66/51<sup>10</sup>, the Executive Committee decided (decision 68/42):

- (a) When stage II of the countries' HPMPs were submitted, to deduct the following amounts of HCFC-141b exported in pre-blended polyols from the starting point for aggregate reduction in HCFC consumption: 2.42 ODP tonnes for Chile; 137.83 ODP tonnes for China; 12.30 ODP tonnes for Colombia and 28.60 ODP tonnes for Mexico; and
- (b) To encourage relevant Article 5 countries to consider establishing a national system for recording the amounts of HCFC-141b contained in pre-blended polyols imported and/or exported (where applicable) to support the ban on imports of pure HCFC-141b, as well as that contained in pre-blended polyols, to be issued once all the foam enterprises had been converted, and to facilitate monitoring of these enterprises to sustain the phase-out of HCFC-141b.

### **Refrigeration servicing sector**

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<sup>9</sup> UNEP/OzL.Pro/ExCom/66/54.

<sup>10</sup> Options for a tracking system for HCFC-141b-based pre-blended polyols exported by systems houses and used by foam enterprises in importing Article 5 countries (UNEP/OzL.Pro/ExCom/68/46).

**Decision 28/44: Guidelines for end-user conversion in the commercial refrigeration sector**

1. The Executive Committee decided to adopt the following guidelines for end-user conversion in the commercial refrigeration sector:

For an initial period of 18 months, the relevant circumstances which must prevail before priority will be accorded to end-user conversion activities are:

- That the country has production and import controls on CFCs and CFC-based equipment in place and effectively enforced, and restricts the deployment of new CFC components;
- That, at the time of seeking compensation in the form of grants for end-user conversions, the country can establish that its major remaining consumption is for the servicing of refrigeration and air-conditioning equipment;
- To establish the above, that comprehensive data on the profile of all remaining consumption has been determined and made available to the Executive Committee;
- That either no other possible activities would allow the country to meet its CFC control obligations, or the comparative consumer price of CFCs, relative to substitute refrigerants, has been high for at least 9 months and is predicted to continue to increase.

The guidelines for the initial period of 18 months are:

- Retrofitting of commercial refrigeration equipment should continue to be assessed on a case-by-case basis;
- Training of refrigeration technicians should be recognized as part of end-user conversion activity in the refrigeration sector;
- Retrofitting of commercial refrigeration equipment would be considered for funding based on the experience gained from implementation of the relevant parts of a refrigerant management plan;
- For the initial period, pending review, priority should be given to projects for the conversion of cold stores in the agricultural, fisheries or other food-chain industries which are important for the economies of the countries concerned;
- For the initial period, the costs associated with replacement of the refrigerant, replacement of the oil and minor capital items where necessary, and labour at the local labour rate, will be eligible as incremental costs. More extensive conversions including reconditioning or replacement of compressors and major overhaul of refrigeration systems will not be considered under the initial guidelines. Incremental operating costs and savings should be calculated as for other commercial refrigeration projects for a two-year period;
- Enterprise consumption will be the average annual quantity of CFC refrigerant which can be established as having been added to the refrigeration system as per existing Executive Committee guidelines;
- No cost-effectiveness threshold needs to be established for this initial period but all existing baseline conditions and eligibility criteria will be applied. The funding for the initial period of 18 months will be limited to US \$10 million;

- These guidelines should be reviewed after being in operation for 18 months.

**Decision 31/45: Subsector for the assembly, installation and servicing of refrigeration equipment**

1. The Executive Committee decided:
  - (a) To adopt, for a period of 18 months, the guidelines for the subsector for assembly, installation and charging of refrigeration equipment contained in Annex IX.23 of document UNEP/OzL.Pro/ExCom/31/61;
  - (b) To pay attention to projects submitted under guidelines 3 and 4, in particular to determine whether there is any eligible incremental cost; and
  - (c) To consider projects on a case-by-case basis in order to gain experience.

**Decision 64/14 on prioritization of the servicing sector by non-LVCs (stage I of HPMPs)**

1. The Executive Committee decided to consider, on a case-by-case basis, project proposals from countries with total HCFC consumption above 360 mt that included funding requests for refrigeration servicing sector activities instead of the manufacturing sector.

**Decision 64/53: Funding for countries with HCFC consumption between 361 and 400 metric tonnes in the servicing sector**

1. The Executive Committee agreed to continue to consider, on a case-by-case basis, the need for equitable treatment of those countries with HCFC consumption between 361 and 400 mt in the refrigeration servicing sector whose maximum level of funding would be lower than that for countries with consumption of between 300 and 360 mt.

**Decision 72/41: Minimizing adverse climate impact of HCFC phase-out in the refrigeration servicing sector**

1. The Executive Committee decided:
  - (a) To take note of documents UNEP/OzL.Pro/ExCom/70/53/Rev.1 and UNEP/OzL.Pro/ExCom/72/42 on minimizing adverse climate impact of HCFC phase-out in the refrigeration servicing sector;
  - (b) To invite relevant bilateral and implementing agencies to consider the information contained in documents UNEP/OzL.Pro/ExCom/70/53/Rev.1 and UNEP/OzL.Pro/ExCom/72/42 when assisting Article 5 countries in the preparation and implementation of activities in the refrigeration servicing sector contained in their HCFC phase-out management plans (HPMPs); and
  - (c) To encourage Article 5 countries, when implementing their HPMPs, to consider, as needed and feasible:
    - (i) The development of regulations and codes of practice, and the adoption of standards for the safe introduction of flammable and toxic refrigerants given the potential risk of accidents and negative effects on health associated with their use;

- (ii) Measures to limit the import of HCFC-based equipment and to facilitate the introduction of energy efficient and climate-friendly alternatives; and
- (iii) Focusing activities in the refrigeration servicing sector on training of technicians, good practices, the safe handling of refrigerants, containment, recovery and recycling and reuse of recovered refrigerants rather than retrofitting.

### **Decisions 72/17 and 73/34 on retrofit of existing HCFC-based refrigeration and air-conditioning equipment to flammable or toxic refrigerants**

1. At its 72<sup>nd</sup> meeting, the Executive Committee decided to include in the approval of HCFC phase out management plans, tranches, projects or activities that proposed the retrofit of HCFC based refrigeration and air-conditioning equipment to flammable or toxic refrigerants that the Executive Committee notes that, if the country engages in retrofitting HCFC-based refrigeration and air-conditioning equipment to flammable or toxic refrigerants and associated servicing, it does so on the understanding that they assume all associated responsibilities and risks.

2. At its 73<sup>rd</sup> meeting, the Executive Committee decided that, if a country were to decide, after taking into account decision 72/17, to proceed with retrofits that used flammable substances in equipment originally designed for non-flammable substances, it should be done only in accordance with the relevant standards and protocols.

### **Disposal**

#### **Decision 58/19: Interim guidelines for funding of demonstration projects for the disposal of ODS**

1. The Executive Committee decided:
- (a) To approve the following interim guidelines for the funding of demonstration projects for the disposal of ODS in accordance with paragraph 2 of decision XX/7 of the Meeting of the Parties:
    - (i) For each separate category of activities for ODS disposal, namely collection, transport, storage and destruction, the definitions are as set out in Annex VIII to the present report;
    - (ii) The Multilateral Fund will fund a limited number of demonstration projects under the following conditions:
      - a. No funding would be available for the collection of ODS, except as a contribution to the monitoring of the sources of the ODS for an already existing, separately funded, collection effort for CFCs;
      - b. A limited number of demonstration projects for ODS disposal related to paragraph 2 of decision XX/7, covering aspects not yet covered by other demonstration projects, will be considered only at the 59th Meeting for project preparation funding;
      - c. The funding would be limited to a maximum level of up to US \$13.2/kg of ODS to be destroyed for non-low-volume-consuming countries, on the understanding that this would be based on expectation of high start-up costs for these new activities, and would not constitute a precedent. Should the project not foresee activities related to all of the following

areas (transport, storage and destruction), this threshold would be adjusted accordingly;

- d. For the disposal of halon and for the disposal of carbon tetrachloride (CTC), funding would be provided for a maximum of one demonstration project each, provided the respective projects have an important demonstration value;
- (iii) Bilateral and implementing agencies are requested to report annually to the first meeting of the Executive Committee on progress and experiences gained in demonstration projects on disposal, commencing in the first year after project approval. These reports should cover the amounts of the different ODS collected or identified, transported, stored and destroyed, as well as financial, managerial and co-funding arrangements, and any other relevant issues;
  - (iv) Bilateral and implementing agencies are requested, when submitting activities for funding that are related to the disposal of ODS, to provide:
    - a. In the case of requests for project preparation funding:
      - i. An indication of the category or categories of activities for the disposal of ODS (collection, transport, storage, destruction), which will be included in the project proposal;
      - ii. An indication whether disposal programmes for chemicals related to other multilateral environmental agreements are presently ongoing in the country or planned for the near future, and whether synergies would be possible;
      - iii. An estimate of the amount of each ODS that is meant to be handled within the project;
      - iv. The basis for the estimate of the amount of ODS; this estimate should be based on known existing stocks already collected, or collection efforts already at a very advanced and well documented stage of being set up;
      - v. For collection activities, information regarding existing or near-future, credible collection efforts and programmes that are at an advanced stage of being set up and to which activities under this project would relate;
      - vi. For activities that focus at least partially on CTC or halon, an explanation of how this project might have an important demonstration value;
    - b. In the case of project submissions:
      - i. Updated and more detailed information for all issues mentioned under project preparation funding contained in all sub-paragraphs of (iv) a. mentioned above;
      - ii. A detailed description of the foreseen management and financial

- set up; this should include details such as the total cost of the disposal activity including costs not covered by the Multilateral Fund, the sources of funding for covering these costs, description of the sustainability of the underlying business model, and an identification of time-critical elements of the implementation, which subsequently might be used to monitor progress;
- iii. A clear indication how the project will secure other sources of funding; these other sources of funding should be available, at least partially, before the end of 2011. In case of activities of the collection type, any other sources of funding necessary in line with sub-paragraph (iv) a. iv. above related to collection would need to be secured before the project is submitted to the Executive Committee;
  - iv. A concept for monitoring the origin of recovered ODS for future destruction, with the objective of discouraging the declaration of virgin ODS as used ODS for destruction. This concept should include or at least allow for external verification of the amounts destroyed, and the costs for its operation should be covered sustainably;
  - v. The project proposal should include valid assurances that the amount of ODS mentioned in the proposal will actually be destroyed, and the agencies should submit proof of destruction with the financial closure of the project;
  - vi. An exploration of other disposal options for the used ODS such as recycling and reuse opportunities;
- (b) To consider at its 60<sup>th</sup> meeting any decision taken by the Parties at their Twenty-first Meeting that might relate to these interim guidelines and definitions;
  - (c) To request the Fund Secretariat to provide, to the second meeting of the Executive Committee in 2011, a report on the experience gained in the implementation of the disposal projects, using reports from bilateral and implementing agencies and other relevant sources of information; and
  - (d) To consider whether to review the interim guidelines and related definitions at the 64th Meeting in light of the experience gained and any additional information and guidance available at that time.

**Decision 64/50: Report on implementation of disposal projects (decision 58/19)**

1. The Executive Committee decided:
  - (a) To note the report on the use of the interim guidelines for the funding of demonstration projects for the disposal of unwanted ODS, while mindful that there was as yet very little experience in the implementation of the full pilot projects;

- (b) To request implementing agencies to provide an update to the Secretariat on how those guidelines were used in carrying out the approved ODS disposal pilot projects as their implementation progresses, no later than the 69<sup>th</sup> meeting;
- (c) To reiterate that, in line with decision 58/19(a)(iii), bilateral and implementing agencies were requested to report annually to the first meeting of the Executive Committee on progress and experiences gained in demonstration projects on disposal, commencing in the first year after project approval, and to include in those reports information on: the amounts of the different ODS collected or identified, transported, stored and destroyed, as well as on financial, managerial and co-funding arrangements, and any other relevant issues, starting at the 66<sup>th</sup> meeting;
- (d) To request the Secretariat to prepare a report for the consideration of the Executive Committee at the 70<sup>th</sup> meeting based on subparagraph (b) above, summarizing the experience gained and making recommendations for future action; and
- (e) To request the Secretariat to continue using the interim guidelines and applying them also to pilot projects for low-volume-consuming countries until the Committee had considered the report requested in subparagraph (d) above.

**Decision 70/22: Report on progress and experiences gained in demonstration projects for the disposal of unwanted ODS (decision 64/50)**

1. The Executive Committee decided:

- (a) To note the report on the use of the interim guidelines for the funding of demonstration projects for the disposal of unwanted ODS, as approved by decision 58/19, as contained in documents UNEP/OzL.Pro/ExCom/70/54 and Corr.1; and
- (b) To request the Secretariat to continue using the interim guidelines and applying them to the remaining demonstration projects for the disposal of unwanted ODS due for submission no later than the 72<sup>nd</sup> meeting.





### **Annex III**

## **RULES OF PROCEDURE FOR MEETINGS OF THE EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL**

### **APPLICABILITY**

1. Unless otherwise provided for by the Montreal Protocol or by the decision of the Parties, or excluded by the Rules of Procedure hereunder, the Rules of Procedures for meetings of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer shall apply *mutatis mutandis* to the proceedings of any meeting of the Executive Committee.

#### **Rule 1**

2. These Rules of procedure shall apply to any meeting of the Executive Committee for the Interim Multilateral Fund under the Protocol on Substances that Deplete the Ozone Layer convened in accordance with Article 11 of the Protocol.

### **DEFINITIONS**

#### **Rule 2**

3. For the purposes of these rules:

- (a) "Executive Committee" means the Executive Committee for the Interim Multilateral Fund as established by decision II/8 at the Second Meeting of the Parties to the Montreal Protocol.
- (b) "Committee members" means Parties selected as members of the Executive Committee for the Interim Multilateral Fund.
- (c) "Meeting" means any meeting of the Executive Committee for the Interim Multilateral Fund.
- (d) "Chairman" means the Committee member selected Chairman of the Executive Committee.
- (e) "Secretariat" means the Multilateral Fund Secretariat.
- (f) "Fund" means the Interim Multilateral Fund.

### **PLACE OF MEETINGS**

#### **Rule 3**

4. The meetings of the Executive Committee shall take place at the seat of the Fund Secretariat, unless other appropriate arrangements are made by the Fund Secretariat in consultation with the Executive Committee.

## **DATES OF MEETINGS**

### **Rule 4**

5. Meetings of the Executive Committee shall be held at least twice every year.
6. At each meeting, the Executive Committee shall fix the opening date and duration of the next meeting.
7. The Executive Committee shall have the flexibility to hold two or three meetings annually, if it so decides, and shall report at each Meeting of the Parties on any decision taken there. The Executive Committee should consider meeting, when appropriate, in conjunction with other Montreal Protocol meetings.<sup>1</sup>

### **Rule 5**

8. The Secretariat shall notify all Committee members of the dates and venue of meetings at least six weeks before the meeting.

## **OBSERVERS**

### **Rule 6**

9. The Secretariat shall notify the President of the Bureau and the implementing agencies *inter alia* UNEP, UNDP, UNIDO and the World Bank of any meeting of the Executive Committee so that they may participate as observers.
10. Such observers may, upon invitation of the Chairman, participate without the right to vote in the proceedings of any meeting.

### **Rule 7**

11. The Secretariat shall notify anybody or agency, whether national or international, governmental or nongovernmental, qualified in the field related to the work of the Executive Committee, that has informed the Secretariat of its wishes to be represented, of any meeting so that it may be represented by an observer subject to the condition that their admission to the meeting is not objected to by at least one third of the Parties present at the meeting. However, the Executive Committee may determine that any portion of its meetings involving sensitive matters may be closed to observers. Nongovernmental observers should include observers from developing and developed countries and their total number should be limited as far as possible.
12. Such observers may, upon invitation of the Chairman and if there is no objection from the Committee members present, participate without the right to vote in the proceedings of any meeting in matters of direct concern to the body or agency which they represent.

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<sup>1</sup> Paragraph 8 of the “Terms of reference of the Executive Committee” as modified by the Meeting of the Parties in its decision XIX/11.

## **AGENDA**

### **Rule 8**

13. In agreement with the Chairman and the Vice Chairman, the Secretariat shall prepare the provisional agenda for each meeting.

### **Rule 9**

14. The Secretariat shall report to the meeting on the administrative and financial implications of all substantive agenda items submitted to the meeting, before they are considered by it. Unless the meeting decides otherwise, no such item shall be considered until at least twenty-four hours after the meeting has received the Secretariat's report on the administrative and financial implications.

### **Rule 10**

15. Any item of the agenda of any meeting, consideration of which has not been completed at the meeting, shall be included automatically in the agenda of the next meeting, unless otherwise decided by the Executive Committee.

## **REPRESENTATION AND CREDENTIALS**

### **Rule 11**

16. The Executive Committee shall consist of seven Parties from the group of Parties operating under paragraph 1 of Article 5 of the Protocol and seven Parties from the group of Parties not so operating. Each group shall select its Executive Committee members. The members of the Executive Committee shall be formally endorsed by the Meeting of the Parties.

### **Rule 12**

17. Each Committee member shall be represented by an accredited representative who may be accompanied by such alternate representatives and advisers as may be required.

## **OFFICERS**

### **Rule 13**

18. If the Chairman is temporarily unable to fulfil the obligation of the office, the Vice Chairman shall in the interim assume all the obligations and authorities of the Chairman.

### **Rule 14**

19. If the Chairman or Vice Chairman is unable to complete the term of office the Committee members representing the group which selected that officer shall select a replacement to complete the term of office.

### **Rule 15**

20. The Secretariat shall:

- (a) Make the necessary arrangements for the meetings of the Executive Committee, including the issue of invitations and preparation of documents and reports of the meeting;
- (b) Arrange for the custody and preservation of the documents of the meeting in the archives of the international organization designated as secretariat of the Convention; and
- (c) Generally perform all other functions that the Executive Committee may require.

#### **Rule 16**

21. The Chief Officer of the Secretariat shall be the Secretary of any meeting of the Executive Committee.

#### **VOTING**

#### **Rule 17**

22. Decisions of the Executive Committee shall be taken by consensus whenever possible. If all efforts at consensus have been exhausted and no agreement reached, decisions shall be taken by a two thirds majority of the Parties present and voting, representing a majority of the Parties operating under paragraph 1 of Article 5 and a majority of the Parties not so operating present and voting.

#### **LANGUAGES**

#### **Rule 18**

23. The meeting of the Executive Committee shall be conducted in those official languages of the United Nations required by members of the Executive Committee. Nevertheless the Executive Committee may agree to conduct its business in one of the United Nations official languages.

#### **AMENDMENTS TO RULES OF PROCEDURE**

#### **Rule 19**

24. These rules of procedure may be amended according to Rule 17 above and formally endorsed by the Meeting of the Parties to the Montreal Protocol.

#### **OVERRIDING AUTHORITY OF THE PROTOCOL**

#### **Rule 20**

25. In the event of any conflict between any provision of these rules and any provision of the Protocol, the Protocol shall prevail.

#### **DECISIONS PERTAINING TO MEETING COSTS**

26. Costs of meetings, including travel and subsistence of Executive Committee participants from Parties operating under paragraph 1 of Article 5 shall be disbursed from the Multilateral Fund as necessary.

(UNEP/OzL.Pro/2/3 Appendix II of decision II/8, para. 6).

(UNEP/OzL.Pro/4/15 Annex X to decision IV/8, para. 6).

27. The Executive Committee decided that budget line 3301 could be used to support travel of the Chairperson or Vice-Chairperson of the Executive Committee, irrespective of whether or not they represented countries operating under paragraph 1 of Article 5, if such travel was required to enable the Chairperson or Vice-Chairperson to represent the Executive Committee.

28. The Executive Committee decided in 1992 that when the President of the Bureau of the Meeting of the Parties to the Montreal Protocol is a national of a developing country operating under Article 5, paragraph 1, the costs of travel and daily subsistence allowance for his/her attendance or attendance of his/her representative as observer at the meeting should be paid from the Fund.

## Annex IV

### REFRIGERATION SERVICING SECTOR

1. For the majority of Article 5 countries, the refrigeration servicing sector continues to be the largest or the only consumer of controlled substances under the Montreal Protocol. About 95 Article 5 countries use HCFC-22 solely in this sector. For the remaining 50 countries, which have enterprises that use HCFCs in manufacturing, the refrigeration servicing sector becomes critical as HCFCs are being phased out from the manufacturing sector.

2. Decision XIX/6 introduced a number of elements in the approach to implementing projects (including in the refrigeration servicing sector) by requesting the Parties to promote the selection of alternatives to HCFCs that minimize environmental impacts, in particular impacts on climate, while achieving HCFC phase-out, and by asking the Executive Committee to give priority to cost-effective projects and programmes which focus on *inter alia* substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account GWP, energy use and other relevant factors.

3. At the 70<sup>th</sup> meeting (July 2013), the Secretariat prepared in consultation with the agencies a discussion paper on key issues and considerations involved in promoting strategies, approaches and technologies to minimize any climate impacts of HCFC phase-out in the refrigeration servicing sector in the context of decision XIX/6. Some the issues identified are summarized below:

- (a) The need to consider in addition to the traditional activities to reduce direct greenhouse gas (GHG) emissions (refrigerant leaks and venting), activities to reduce indirect emissions during the operation of equipment<sup>1</sup> by maintaining energy efficiency with *inter alia* appropriate settings of controls often performed or adjusted on-site, as well as the cleanliness of the heat exchangers and ease of related airflow;
- (b) The importance of influencing technology choice during the assembly, installation, initial charging and commissioning of new refrigeration equipment by servicing enterprises and technicians, in addition to the traditional servicing operations, where the choice of technology is limited by an already existing system;
- (c) The impact of reducing the refrigerant charge size in the design of systems where the service sector performs assembly and/or installation, thus reducing the amounts of refrigerants emitted;
- (d) The need for Article 5 countries to start giving due consideration to addressing barriers to enable the introduction of low-GWP refrigerants classified as flammable or toxic; including specialized training, development of regulations and codes of practice, adoption of standards for the safe introduction of flammable refrigerants, use of incentives, technology demonstration projects and awareness rising; and
- (e) The need to avoid using flammable refrigerants in equipment designed to operate with non-flammable refrigerants, which reverted in further discussion by the Executive Committee and decisions 72/17 and 73/34 on retrofits.

4. The phase-out of HFCs pure or in blends (e.g., HFC-134a, R-404A, R-410A and R-407C) also used in the refrigeration servicing sector has not been the focus of the Multilateral Fund as these were not

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<sup>1</sup> Despite increasing the efficiency of a refrigeration cycle through better design and higher-quality components, the energy consumption is inherently connected to the operation of a refrigeration system.

controlled substances under the Montreal Protocol. HFC consumption in the sector could be as large as or larger than HCFC consumption<sup>2</sup> and includes HFC use as an alternative to HCFCs in several applications (e.g., R-410A as an alternative to HCFC-22 in room air-conditioning, R-404A as an alternative to HCFC-22 in several commercial refrigeration systems), or its use in applications currently not targeted under HCFC phase-out management plans (HPMPs) (e.g., domestic and commercial refrigeration, and mobile air-conditioning).

5. Many of the activities currently being implemented to phase out HCFCs in the refrigeration servicing sector have a potential impact on the HFC phase-down. For instance, training on low-GWP alternatives, and technicians' certification schemes have a positive impact on both HCFC phase-out and HFC phase-down. In addition, many of the HCFC recovery and recycling units distributed in Article 5 countries can also be used to recover and recycle HFCs. While these synergies have been reported in the progress reports of HPMPs, an analysis of the activities and associated cost in the refrigeration servicing sector for HCFC phase-out and HFC phase-down has not taken place.

6. Given the need to implement the HCFC phase-out and the HFC phase-down, and given that many of the low-GWP alternatives are classified with some level of flammability or toxicity, Article 5 countries would need to consider long-term strategies for the sector focused on creating an adequate infrastructure to ensure the safe introduction of alternatives (e.g., technicians' training and certification in every country should ensure that a minimum level of knowledge has been acquired to ensure safe servicing operation by technicians). This will be in addition to reducing emissions of all controlled substances and maintaining existing equipment operating with minimum climate impact. Several Article 5 countries have already incorporated in their HPMPs activities in the refrigeration servicing sector to facilitate the safe handling of flammable refrigerants, including training, codes of practices and more streamlined adoption of technical standards. In this regard, the Parties requested the Executive Committee to prioritize technical assistance and capacity building to address safety issues associated with low-GWP and zero-GWP alternatives.<sup>3</sup>

7. Given the potential of the assembly and installation sector to influence technology choice, additional attention to this sector would be required in the future. For instance, the demonstration project on the introduction of trans-critical CO<sub>2</sub> in supermarkets in Argentina and Tunisia, and other similar initiatives taking place outside of the Multilateral Fund, would produce valuable data for Article 5 countries when implementing both the HCFC phase-out and the HFC phase-down.

8. The Government of the United States of America provided a comprehensive set of documents containing relevant information regarding the refrigeration servicing sector being implemented domestically but with principles applicable to Article 5 countries. The most recent ones are summarized below:

- (a) A report providing options to reduce emissions from the refrigeration and air-conditioning sector by using low-GWP refrigerants, low-emission technologies, and improved practices to properly recover refrigerant at equipment servicing and disposal.<sup>4</sup> The report analyses the effectiveness and cost of reducing HFC emissions by introducing 14 new technologies and using three types of improved technician practices in specific applications in six subsectors (e.g., 85 per cent of the refrigerant charge can be recovered during disposal and 95 per cent during servicing; leak repair can reduce emissions by 40 per cent in some systems). As an example of the analysis, it was determined that using ammonia or HC secondary loop and/or cascade systems in new large retail food systems

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<sup>2</sup> The preliminary results of the ODS alternatives surveys contained in document UNEP/OzL.Pro/ExCom/78/4, provides an overview of the HCFCs and HFCs currently used in the servicing sector in different Article 5 countries.

<sup>3</sup> Paragraph 23 of decision XXVIII/2.

<sup>4</sup> Global mitigation of non-CO<sub>2</sub> greenhouse gases 2010-2013 (U.S. EPA, 2013), section IV.2.

could have an incremental cost of US \$45,600 per supermarket (10 per cent more in Article 5 countries), annual operational savings in energy and refrigerant at around US \$5,900 (perhaps larger in Article 5 countries due to the cost of energy), and a 100 per cent reduction in HFC emissions;

- (b) An overview of the reclamation industry in the United States of America,<sup>5</sup> responsible for the reclamation of 12.6 million pounds of refrigerant (including 10 million pounds of HCFC-22) or 7.3 per cent of the refrigerant demand in the country. The analysis includes existing reclamation technologies and practices, potential environmental impact of reclamation, and best practices of reclamation and approaches to ensuring them. The study concludes that there is a large variety of reclaimer profiles and reclamation technologies used. Best practices to minimize leaks are common in the reclamation industry, as refrigerant losses represent a loss of revenue. Reclaimers agreed on the importance of reaching out to technicians to reduce refrigerant emissions, as the primary reason for releases is human error during refrigerant handling;
- (c) A report proposing twelve refrigerant leak reduction measures and energy conservation measures for commercial refrigeration and storage systems, and comparing the costs, savings and environmental impact of these practices.<sup>6</sup> The report concludes that energy conservation measures in supermarkets (e.g., display case lighting controls, reclaimed waste heat from refrigerant systems, mechanical sub-cooling, floating suction pressure efficiency, condenser-specific efficiency, floating head pressure, variable fan speed and variable set point condenser), and refrigerant leak reduction measures (e.g., measures to leak-tight piping and valves, corrosion-resistant service cases, refrigerant receiver level indicators, and pressure and vacuum testing to ensure leak-tight equipment installation) are cost-effective means of reducing overall GHG emissions from the retail food sector. On average, collectively the measures will enable supermarkets to reduce refrigerant use by two per cent, electricity use by eight per cent and natural gas use by 85 per cent. The savings are enough incentive to undertake the measures noting that the high initial added cost (US \$56,000 to US \$176,000) may be a barrier for many supermarkets;
- (d) A technical support document analysing the costs and benefits of implementing refrigerant servicing practices being proposed in a revised regulation on refrigerant recycling and emission reduction (2016).<sup>7</sup> The analyses proposed adjustments to add non-ODS refrigerants (e.g., HFCs) to current regulations on leak repair, record keeping and reporting, refrigerant sales restriction and other regulatory requirements. It estimates a total annual compliance cost of US \$24.5 million, annual savings of US \$44.0 million associated with reduced used of ODS and HFCs, total GHG emissions avoided of 7.3 MMTCO<sub>2</sub>eq, and a low cost of compliance for small businesses.

9. The Government of the United States of America also shared information on several best practices and standards documents related to the refrigeration servicing sector, including proper installation and maintenance of refrigeration and air-conditioning equipment to reduce refrigerant leakage and maintain energy efficiency. The documents provided include two articles on the effects of heat pump sizing and duct leakage on heating, ventilation and air conditioning equipment, and the decrease in rooftop unit capacity and coefficient of performance resulting from various problems with a system that can be addressed by servicing; guides on best practices for reducing leaks from commercial refrigeration systems; standards on installation and maintenance of commercial building heating, ventilation and air

<sup>5</sup> Analysis of equipment and practices in the reclamation industry. Draft report (USEPA, 2010).

<sup>6</sup> Greenhouse gas performance analysis for commercial buildings with large air conditioning systems (ICF international 2012, pages 3 to 14).

<sup>7</sup> Technical support document: Analysis of the economic impact and benefits of final revisions to national recycling and emission reduction programme (USEPA, 2016), sections 3.1.1.3 and Appendix D.



conditioning systems, maintenance of residential systems and quality installation specification; and a comprehensive set of material on energy efficiency that is described in the energy efficiency section in Annex V to the present document.

10. The information shared by the Government of United States of America contains detailed data on the cost and environmental impact of good practices in installation and maintenance of several types of refrigeration and air-conditioning systems, noting that while these are activities being implemented in the United States of America, there are some opportunities to replicate them in Article 5 countries. These and other sources of information available with the bilateral and implementing agencies will be of use for Article 5 countries in assessing options for activities that could be implemented and their cost.



## Annex V

### AN OVERVIEW OF ISSUES RELATED TO ENERGY EFFICIENCY

#### Background

1. At their Twenty-eighth Meeting, the Parties requested the Executive Committee to *inter alia* develop cost guidance associated with maintaining and/or enhancing the energy efficiency of low-GWP or zero-GWP replacement technologies and equipment, when phasing down HFCs, while taking note of the role of other institutions addressing energy efficiency, when appropriate.<sup>1</sup> The Parties also requested the Executive Committee to increase, in relation to the servicing sector, the funding available under decision 74/50 above the amounts listed in that decision for countries with total HCFC baseline consumption up to 360 mt when needed for the introduction of alternatives to HCFCs with low-GWP and zero-GWP alternatives to HFCs, and for maintaining energy efficiency in the servicing/end-user sector as well.<sup>2</sup>

2. In addition, the Parties requested the TEAP to provide a report to their Twenty-ninth Meeting on energy efficiency opportunities in the refrigeration and air-conditioning (RAC) sectors during the transition to low-GWP and zero-GWP alternatives, based on information submitted by Parties.<sup>3</sup>

#### Scope of the annex

3. This annex presents relevant decisions of the Parties and the Executive Committee on energy efficiency; presents a limited literature review on policies/regulations for energy efficiency enhancement; and presents aspects to be considered for energy efficiency enhancement in the manufacturing and servicing sectors; and briefly describes the Multilateral Fund Climate Impact Indicator (MCII).

#### Decisions of the Executive Committee related to energy efficiency

4. Prior to the adoption of the Kigali Amendment and decision XXVIII/2, energy efficiency was not considered an eligible incremental cost, though energy use was considered while developing funding criteria for HCFC phase-out projects.<sup>4</sup>

5. The Executive Committee has sought opportunities to promote energy efficiency improvements when phasing out CFCs and HCFCs. With regard to the CFC phase-out, the issue of energy efficiency was considered in the context of chillers projects as follows:

- (a) At the 12<sup>th</sup> meeting (March 1994), the Executive Committee considered a Report on strategic options for retrofitting of mobile air conditioners and chillers<sup>5</sup>. Based on this report, the Executive Committee decided *inter alia* that consideration be given to the Total Equivalent Warming Impact (TEWI) in selecting alternative technology in the chiller sector, which would include both direct effects (refrigerant GWP) and indirect effects (system energy efficiency), and to human health and safety aspects. The Committee also decided to approve the replacement of CFC chillers as a first priority of

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<sup>1</sup> Paragraph 22 of decision XXVIII/2.

<sup>2</sup> Paragraph 16 of decision XXVIII/2.

<sup>3</sup> Decision XXVIII/3.

<sup>4</sup> Paragraph 11(b) of decision XIX/6.

<sup>5</sup> UNEP/OzL.Pro/ExCom/12/37. In preparing this report, the Secretariat consulted with technology vendors, trade associations in non-Article countries and with industry representatives in Article 5 countries. The first draft of the report was circulated to some members of the Executive Committee whose countries have ongoing programmes in retrofits, and to the implementing agencies.

strategic options in ODS phase-out in the chiller sector; energy savings should be taken into consideration when calculating the incremental costs of replacement (decision in paragraph 160(i) and (iv) of document UNEP/OzL.Pro/ExCom/12/37;

- (b) At the 26<sup>th</sup> (November 1998) and 28<sup>th</sup> (July 1999) meetings the Executive Committee approved two chiller projects for Thailand and Mexico using the concessional loan mechanism (decisions 26/34 and 28/32);
- (c) At its 37<sup>th</sup> meeting (July 2002), the Committee requested the Secretariat to re-examine the issues raised in the chiller sub-sector, and to report to a future meeting on a possible update of policy guidance, clarification of the nature of savings that could be envisaged as a result of increased energy efficiency, and how soon those energy savings might be realized (decision 37/21);
- (d) The Sixteenth Meeting of the Parties (November 2004) decided to request the Executive Committee *inter alia* to consider funding of additional demonstration projects to help demonstrate the value of replacement of CFC-based chillers, pursuant to relevant decisions of the Executive Committee;
- (e) In its 46<sup>th</sup> meeting (July 2005), the Executive Committee decided *inter alia* to use the funding window of US \$ 15.2 million for additional demonstration projects in the chiller-subsector (decision 46/33) with the primary objective to minimise or eliminate use of CFCs in the chillers. Energy efficiency of new chillers was identified as one of the factors that would promote adoption of ODS free chillers (UNEP/OzL.Pro/ExCom/46/37);
- (f) In its 47<sup>th</sup> (November 2005) and 48<sup>th</sup> (April 2006) meetings, chiller demonstration projects were approved for Brazil, the Caribbean region, Colombia, Cuba, the East European region, Syrian Arab Republic, a global chiller replacement program, and the African region (decisions 47/26 and 48/24);
- (g) A desk study on the evaluation of chiller projects<sup>6</sup> examined efforts to set up co-funding programmes between the Multilateral Fund and other institutions, looked at the technical feasibility and financial attractiveness of chiller replacements and presented a number of conclusions, lessons learned and recommendations. Building on the findings of this evaluation, at the 68<sup>th</sup> meeting, the Executive Committee considered the Desk study on the evaluation of chiller projects<sup>7</sup> prepared by the Senior Monitoring and Evaluation Officer (SMEO). Further to a discussion, the Committee, *inter alia*, requested the Secretariat to prepare annually a report on the progress of ongoing chiller projects, highlighting key progress in implementation of activities, any further information on co-financing arrangements, information on ODS replaced and any energy efficiency gains achieved through chiller conversions; and also requested the implementing agencies to provide timely information to the Secretariat on the progress of chiller projects in order to enable it to prepare the annual reports (decision 68/8 (c) and (d)); and
- (h) The SMEO work programme approved at the 77<sup>th</sup> meeting (November – December 2006) included the second phase of the evaluation of chiller projects. The evaluation will examine, *inter alia*, the impact of energy efficiency gains achieved through the chiller projects.<sup>8</sup>

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<sup>6</sup> UNEP/OzL.Pro/ExCom/58/9.

<sup>7</sup> UNEP/OzL.Pro/ExCom/68/10 and Add.1.

<sup>8</sup> UNEP/OzL.Pro/ExCom/77/10/Rev.1, Annex I.

6. With regard to HCFCs, one of the criteria in selecting projects for demonstration of low-GWP alternatives to HCFCs was that the project should promote energy efficiency improvements (decision 72/40(b)(i)(f)). Fourteen demonstration projects related to the RAC sector were approved at the 74<sup>th</sup> (May 2015), 75<sup>th</sup> (November 2015) and 76<sup>th</sup> (May 2016) meetings in line with the guidance provided in decision 72/40. Energy efficiency performance was to be reported as apart of relevant project results. Detailed information on the demonstration projects is available in UNEP/OzL.Pro/ExCom/78/6.

7. In a few HPMPs, specific conditions on energy efficiency were included when approving those projects. For example, the HPMP for Jordan included a requirement that the overall air conditioning sector plan would incorporate policy and technical approaches to improve the energy efficiency of residential air-conditioning equipment to offset the climate impact of the R-410A; a commitment by the Government to achieve energy consumption for residential air-conditioners using R-410A at least equal to or lower than the HCFC-22 air-conditioners they replaced; and a commitment by one of the enterprises, Petra Engineering Industries Co., to develop, convert manufacture and actively promote hydrocarbon-based split air conditioners (decision 65/40). The HPMP for Thailand included technical assistance to support promoting adoption of energy efficient products beyond those that would be achieved as part of the conversion, and support assisting energy efficiency initiatives in buildings.

### **Policies and regulations for enhancing energy efficiency**

8. Policies and regulations that promote the introduction of energy-efficient RAC equipment and ensure its energy-efficient performance, coupled with an improvement in maintenance and servicing, could contribute extensively to mitigating climate change. However, implementing such initiatives at the country level would require overcoming policy, regulatory and institutional barriers; lack of information on and/or assessment of the cost-benefit ratio of introducing highly energy-efficient equipment at the national level; financial barriers; and technical barriers.<sup>9</sup>

9. Countries' readiness to facilitate energy efficiency measures while phasing down HFCs would vary and mainly depend upon national regulations associated with energy policy and energy efficiency, and institutional mechanisms. While studies also show that energy efficiency measures offer the least-cost path to achieving greenhouse gas (GHG) emission reductions, national regulations that result in the adoption of standards would play a key role in improving the energy efficiency of equipment. Minimum energy performance standards coupled with labelling would strengthen national processes to achieve higher energy efficiency levels. Lack of such standards would often result in manufacturing and/or sales of least-cost, low-energy-efficient equipment. This is also essential for verifiable results that can be reported on energy efficiency performance.<sup>10</sup>

10. Cost-benefit analyses for implementing new regulatory standards on energy efficiency and conservation would need to consider additional costs to industry compared to the baseline situation. For those cases where lower cost, less energy-efficient equipment continue to be available in the market, the adoption of new energy efficiency standards would need to be complemented by a revision of regulatory standards or other incentives for the market to take up the more energy-efficient equipment.<sup>11</sup>

11. Structured incentive programmes for promoting energy-efficient equipment adoption were implemented in different countries.<sup>12</sup> These programmes included *inter alia* bulk procurement of energy-

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<sup>9</sup> "Lessons Learned from Incentive Programs for Efficient Air Conditioners: A Review", Lawrence Berkeley National Laboratory, June 2016. EPA Energy and Environment Guide to Action, U.S. EPA, 2015.

<sup>10</sup> "Lessons Learned from Incentive Programs for Efficient Air Conditioners: A Review", Lawrence Berkeley National Laboratory, June 2016. EPA Energy and Environment Guide to Action, U.S. EPA, 2015.

<sup>11</sup> Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Small, Large, and Very Large Commercial Package Air Conditioning and Heating Equipment, U.S. Department of Energy, 2015.

<sup>12</sup> Lessons Learned from Incentive Programs for Efficient Air Conditioners, U.S. Department of Energy, 2015.

efficient equipment and subsidies for equipment, as well as safe disposal of the refrigerant in existing equipment. Such programmes could play an important role in promoting a faster pace of adoption of energy-efficient equipment.

### Manufacturing equipment

12. In manufacturing equipment, in addition to the choice of refrigerants, nominal energy efficiency of RAC equipment can be enhanced *inter alia* through the following:<sup>13,14</sup>

- (a) Redesign/modification of compressors;
- (b) Redesign/modification of heat exchangers;
- (c) Redesign/modification of thermostatic expansion valves/electronic expansion valves;
- (d) Redesign/modification of fan and compressor drives; and
- (e) Improved controls and design of the equipment.

13. The April 2013 report on “Cooling the planet: opportunities for deployment of superefficient room air-conditioners”<sup>15</sup> estimates a range of costs for the improvement of energy efficiency as shown in Table 1, noting that the energy savings figures presented are representative of conditions in Europe.

**Table 1: Efficiency improvement options and corresponding energy savings**

Option	Description	Improvement from base case	
		Min (%)	Max (%)
Efficient heat exchanger	High efficiency microchannel heat exchangers, larger sized heat exchangers	9.1	28.6
Efficient compressors	Two-stage rotary compressors, high efficiency scroll compressors with DC motors	6.5	18.7
Inverter/variable speed	AC, AC/DC or DC inverter-driven compressors	20	24.8
Expansion valve	Thermostatic and electronic expansion valves	5	8.8
Crankcase heating	Reduced crankcase heating power and duration	9.8	10.7
Standby load	Reduced standby loads	2.2	2.2

14. Broadly, improvement of the energy efficiency of any given equipment is usually associated with a potential increase in the cost of the equipment (e.g., due to a more complex design, additional material, and/or additional controls, optimising design) that could also result in an increase in the final price of sale to the consumer, but would save on the consumer’s energy costs over the life of the equipment. Studies tracking efficiency and price trends over time show that the efficiency of appliances and their components improve over time while the prices continue to decline. In Japan, for example, between 1995 and 2008, efficiency improved by 180 per cent while prices dropped by over 50 per cent in real terms.<sup>8</sup> While several factors, such as economies of scale and changes in mark-ups, have been identified as potential drivers of this overall trend, the primary driver is likely technological learning. Studies also show that the

<sup>13</sup> “Cost-benefit of improving energy efficiency of room air-conditioners (inverter and fixed speed) in India,” Energy Analysis and Environmental Impacts Division, Lawrence Berkeley National Laboratory, June 2016.

<sup>14</sup> The actual energy efficiency of equipment could be lower than nominal energy efficiency based on how the equipment is sited, maintained, and operated.

<sup>15</sup> Available at <http://superefficient.org/Activities/Technical%20Analysis/~media/Files/SEAD%20Technical%20Analysis%20Reports/SEAD%20Room%20AC%20Analysis/Final%20SEAD%20Room%20AC%20Report.pdf>

energy savings from new energy-efficient equipment generally results in consumers recovering the higher purchase prices for energy-efficient equipment within a few years.<sup>16</sup>

15. Research studies show that many of the low-GWP refrigerant alternatives under consideration can operate under similar or higher energy efficiency with only soft optimization, even in high-ambient-temperature conditions.<sup>17</sup> The researchers note that manufacturers can typically overcome performance losses of up to 5 per cent through further soft optimization, whereas 10 per cent losses may require additional engineering, and losses greater than 10 per cent may require complete unit redesign.<sup>18</sup> The study also shows that historical inflation-adjusted equipment cost in the United States of America decreased even when other regulations were implemented (e.g., minimum energy efficiency standards increased, and ODS phase-out enforcement was under implementation). The study also provides information on ways through which the equipment manufacturers are reducing transition costs to provide cost-effective energy-efficient systems to the consumers. In addition, another study shows that the introduction and updating of appliance standards is not associated with a long-term increase in purchase price; rather, quality-adjusted prices undergo a continued or accelerated long-term decline.<sup>19</sup>

16. There is limited experience in determining the incremental costs associated with converting manufacturing lines to improve the energy efficiency of the RAC equipment while adopting alternative refrigerants, or performing the cost-benefit analysis of improved energy efficiency. The levels of investment and target energy efficiency levels could vary depending upon the individual enterprise business strategy and could also be driven by national policies, noting that several studies, as mentioned earlier, show a decrease in the cost of equipment in the long run while there is an increase in energy efficiency of the equipment.

17. Monitoring the energy-efficient performance of redesigned equipment and the introduction of more energy-efficient equipment into the market would need to be assessed over time. To undertake such an assessment, data on baseline energy performance level is essential. Monitoring mechanisms for projects/programmes and energy efficiency at a national level would have to be defined in consultation with various stakeholders.

### **Installation, maintenance and servicing and use regulations**

18. Installation, maintenance and servicing play a critical role in ensuring energy-efficient operation of equipment over the life of equipment and could result in direct and indirect GHG emission reduction. Equipment suppliers and installers, as well as servicing enterprises, play an important role in this regard. In addition, national policies and regulations that relate to servicing practices and energy efficiency, particularly minimum energy performance standards, provide support for energy efficiency while using such equipment.

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<sup>16</sup> “Cost-Benefit of Improving the Efficiency of Room Air Conditioners in India,” Lawrence Berkeley National Laboratory, 2016. Available at <http://www.superefficient.org/~media/Files/PublicationLibrary/2016/India%20AC%20Cost%20Benefit%20report%202016.ashx>

<sup>17</sup> “The Future of Air Conditioning for Buildings,” U.S. Department of Energy, 2016. Available at [https://www.energy.gov/sites/prod/files/2016/07/f33/The%20Future%20of%20AC%20Report%20-%20Full%20Report\\_0.pdf](https://www.energy.gov/sites/prod/files/2016/07/f33/The%20Future%20of%20AC%20Report%20-%20Full%20Report_0.pdf)

<sup>18</sup> “Soft-Optimized System Test of Alternative Lower GWP Refrigerants in 1.5-Ton Mini-Split Air Conditioning Units,” Abdelaziz, Omar, and Som Shrestha. 2016. Available at [http://www.ahrinet.org/App\\_Content/ahri/files/RESEARCH/AREP\\_Final\\_Reports/AHRI\\_Low\\_GWP\\_AREP\\_Rpt\\_062.pdf](http://www.ahrinet.org/App_Content/ahri/files/RESEARCH/AREP_Final_Reports/AHRI_Low_GWP_AREP_Rpt_062.pdf)

<sup>19</sup> “A Retrospective investigation of energy efficiency standards: policies may have accelerated long term declines in appliance costs,” Environmental Research Letters, Buskirk et al., 2014. Available at <http://iopscience.iop.org/article/10.1088/1748-9326/9/11/114010/pdf>

19. For maintaining energy efficiency, an illustrative list of measures that are typically adopted are shown in Table 2 below.<sup>20</sup> A combination of these measures could form an integral part of other projects or programmes to maintain or enhance the energy efficiency of equipment while achieving HFC phase-down.

**Table 2: Measures for maintaining monitoring energy efficiency**

Particulars	Interventions
<b>Installation and maintenance of equipment</b>	
Training and capacity building	<ul style="list-style-type: none"> <li>• Leakage detection equipment for larger capacity equipment</li> <li>• Good practices in installation of air-conditioning equipment (e.g. tightly sealed joints, ensuring full refrigerant charge during equipment operations)</li> <li>• Good maintenance and service practices (e.g. periodic cleaning of heat exchangers)</li> <li>• Periodic operations and maintenance checks</li> <li>• Equipment servicing through qualified and trained technicians</li> </ul>
<b>Sector and national level actions</b>	
Strengthening standards for operation	<ul style="list-style-type: none"> <li>• Introduction of standards and labelling programmes for minimum energy efficiency performance</li> <li>• Integrated energy efficiency standards for end-use applications, including installation and maintenance practices</li> <li>• Introduction of standards of safe and efficient use of equipment including good maintenance practices<sup>21</sup></li> </ul>
Training and capacity building	<ul style="list-style-type: none"> <li>• Cost-effective training programmes for service technicians (e.g., adjusting controls, improved equipment repair quality, maintenance advice to users)</li> <li>• Infrastructure for testing equipment to verify the achievement of energy efficiency standards</li> </ul>
Integrated regulatory standards and policies	<ul style="list-style-type: none"> <li>• Development of policies promoting energy efficiency and climate-friendly refrigerant standards</li> <li>• Bulk procurement programmes (government or other) for energy-efficient equipment using low/zero GWP refrigerants</li> <li>• Prohibition of import of equipment using lower than specified energy efficiency standards (e.g., equipment using HCFCs that do not have high energy efficiency, second hand equipment)</li> <li>• Integrated housing finance policies for the adoption of energy-efficient equipment for existing and new buildings</li> <li>• Policies for energy-efficient and climate-friendly technologies in different industry segments (e.g., cold chain, tourism applications)</li> <li>• Policies to develop incentive programmes for utility companies to encourage the use of energy-efficient equipment</li> <li>• Policies for the adoption of not-in-kind technologies, wherever feasible</li> </ul>

<sup>20</sup> UNEP/OzL.Pro/ExCom/77/70. It may be noted that there are several technical studies that demonstrate linkage between good practices in servicing and maintenance with energy-efficient operations of equipment.

<sup>21</sup> While this is not directly linked to energy efficiency, through safe adoption of low-GWP /zero GWP refrigerants, energy efficiency would be promoted.



## Multilateral Fund Climate Impact Indicator

20. In line with decision XIX/6, the Secretariat developed the Multilateral Fund Climate Impact Indicator (MCII), a tool to assess the impact on the climate associated with the conversion of RAC manufacturing enterprises in approved HPMPs, with the results being included in relevant project documents submitted to the Executive Committee.

21. The MCII aims to be reliable without being too complex, and standardizes the calculations of the climate impact in a way that provides fair and comparable results between alternative technologies. It calculates the climate impact of a conversion project as the difference between the climate impact after and before conversion, with the climate impact being calculated for the emissions over both the product lifetime of the substance, and those related to the use of energy for the given application<sup>22</sup>. To undertake its calculations, the MCII contains an internal model that calculates the energy consumption of the system based on first principles for the thermodynamic circuit. It effectively calculates cycles based on average system characteristics, such as expected compressor efficiencies and heat exchanger performances. The performance of alternative refrigerants is then estimated based on first principles based on the thermodynamic differences with HCFC-22. The model assumes that the alternative refrigerants have no impact on compressor efficiency and heat exchanger performance, which in reality may not be the case as these components may be, or may need to be, optimized for the alternative selected.<sup>23</sup>

22. The objective of the MCII is merely to offer an indication of the climate impact prior to any conversion activities based on limited data, not to replace any analysis that could be undertaken on the basis of more detailed information on the performance of specific RAC equipment, such as a life-cycle climate performance or a life-cycle analysis.

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<sup>22</sup> UNEP/OzL.Pro/ExCom/69/34.

<sup>23</sup> UNEP/OzL.Pro/ExCom/73/54.