



**United Nations
Environment
Programme**

Distr.
GENERAL



UNEP/OzL.Pro/ExCom/82/64
2 November 2018

ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eighty-second Meeting
Montreal, 3-7 December 2018

**PRELIMINARY DOCUMENT ON ALL ASPECTS RELATED TO THE REFRIGERATION
SERVICING SECTOR THAT SUPPORT THE HFC PHASE-DOWN (DECISION 80/76(c))**

INTRODUCTION

1. The Twenty-Eighth Meeting of the Parties (October 2016) agreed to amend the Montreal Protocol and adopted decision XXVIII/2.¹ The Executive Committee was requested, *inter alia*:

- (a) In developing new guidelines on methodologies and cost calculations for the servicing sector, to make the following categories of costs eligible and to include them in the cost calculation: 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 HFCs; servicing tools; refrigerant testing equipment for the refrigeration and air-conditioning sector; and recycling and recovery of HFCs (paragraph 15(c));
- (b) 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 of up to 360 metric tonnes (mt) when needed for the introduction of alternatives to HCFCs with low-global warming potential (GWP) and zero-GWP alternatives to HFCs and maintaining energy efficiency also in the servicing/end-user sector (paragraph 16); and
- (c) To prioritize technical assistance and capacity building to address safety issues associated with low-GWP or zero-GWP alternatives (paragraph 23).

2. At its 80th meeting (November 2017), in the context of the discussion on the development of the cost guidelines for HFC phase-down under agenda item 10(c), the Executive Committee *inter alia* decided to include the categories of costs for the servicing sector in the draft template of the cost guidelines for the phase-down of HFCs (decision 80/76(a)(iv)); and requested the Secretariat to prepare a preliminary

¹ Decision related to the amendment phasing out HFCs.

document for the 82nd meeting, in cooperation with bilateral and implementing agencies, on all aspects related to the refrigeration servicing sector that support the HFC phase-down, taking into account:

- (a) Previous policy documents, case studies, monitoring and evaluation reviews, and the work undertaken by bilateral and implementing agencies in developing and implementing training and technical assistance programmes, in particular the partnership that the Compliance Assistance Programme (CAP) had established with world-recognized training and certification institutes;
- (b) Analysis of the existing capacities in Article 5 countries with the funding approved thus far for the refrigeration servicing sector and how those could be utilized for HFC phase-down, in relation to:
 - (i) The results of funded recovery, recycling and reclamation (RRR) activities and the provision of servicing tools, and their potential to reduce refrigerant emissions;
 - (ii) The extent of the involvement of the private and/or public sector (e.g., equipment, components and refrigerant suppliers) in introducing and adopting alternatives in the servicing sector;
 - (iii) Health and safety standards, protocols and equipment (including protective equipment) available for alternatives;
 - (iv) Training and certification programmes;
 - (v) If and how energy efficiency was addressed in the servicing/end-user sector; and
- (c) The minimum information needed for the development of training and competency-based certification programmes and modules for service technicians and customs officers for the transition to alternatives (decision 80/76(c)).

3. At its 81st meeting, in the context of the discussion on the development of the cost guidelines for HFC phase-down under agenda item 10(a), the Executive Committee decided to consider at the 82nd meeting the matter of prioritizing technical assistance and capacity building to address safety issues associated with alternatives with low and zero-GWP for all sectors, in light of the paper being prepared by the Secretariat in response to decision 80/76 regarding aspects related to the refrigeration servicing sector that supported HFC phase-down (decision 81/67(c)).

4. The Secretariat has prepared this preliminary document in response to decisions 80/76(c) and 81/67(c).

Sources of information used

5. In preparing this document, the Secretariat took into consideration all the decisions of the Executive Committee and the Parties to the Montreal Protocol related to the refrigeration servicing sector, the experience gained in the Multilateral Fund from the review of stand-alone activities² and phase-out plans³

² Including training programmes for refrigeration technicians and customs officers; recovery and recycling schemes; and retrofit of refrigeration equipment, approved since the 4th meeting of the Executive Committee (June 1991).

³ Including refrigerant management plans (RMPs), terminal phase-out management plans (TPMPs), national phase-out plans (NPPs) for non-low-volume consuming (non-LVC) countries, and more recently HCFC phase-out management plans (HPMPs).

addressing the servicing sector; case studies and evaluations completed by the Senior Monitoring and Evaluation Officer; and project completion reports (PCRs).

6. The Secretariat also considered:

- (a) Discussions with refrigeration servicing sector stakeholders in Article 5 countries and non-Article 5 countries, held during missions to several countries and meetings at the Secretariat between February and April 2018;
- (b) Discussions with experts from bilateral and implementing agencies on all aspects of the refrigeration servicing sector, during the two Inter-agency coordination meetings (IACM) in 2018⁴ and during a two-day meeting focusing only on the refrigeration servicing sector held in Montreal on 29-30 May 2018;
- (c) Presentations made and discussions held at the OzonAction International Stakeholders Workshop, Streamlining Support and Services to the Refrigeration Servicing Sector, held in Paris on 16-17 July 2018;⁵ and
- (d) Relevant publications issued by UNEP CAP, the Technology and Economic Assessment Panel (TEAP) and other international organizations.⁶

7. Prior to finalizing the present document, the Secretariat sent it to bilateral and implementing agencies for their comments. The Secretariat also sent the report to an independent expert for comments on the technical issues contained in the document. The Secretariat reviewed the inputs received and introduced modifications as required.

8. The Secretariat highly appreciates the insights, information and comments provided by the bilateral and implementing agencies.

Structure of the document

9. Given the substantial amount of information on the refrigeration servicing sector that was reviewed, in light of the guidance provided in decision 80/76(c), and to facilitate the review of the document by Executive Committee members, the document has been structured in five sections including a recommendation. To assist the Executive Committee in its deliberations, each section contains relevant information focussing more on the policy aspects of the subjects rather than on the more technical aspects. However, detailed technical information is available and could be made available upon request. A brief description of the five sections of the document is presented below.

- I. An overview of the refrigeration servicing sector:
Describes the evolution of technical and financial assistance that has been provided to the refrigeration servicing sector since the inception of the Multilateral Fund; presents an analysis of the current characteristics of the refrigeration and air-conditioning sectors; and identifies potential challenges for the phase-down of HFCs in the sector
- II. Analysis of existing capacity created with the funding approved for the refrigeration servicing sector:
Describes the capacity that has been established and strengthened in Article 5 countries in relation to: policy and regulatory frameworks including standards; training and

⁴ The first IACM was held on 6-8 March 2018; and the second IACM was held on 4-6 September 2018.

⁵ Meeting documentation is available at www.ozonactionmeetings.org.

⁶ Including the International Energy Agency (IEA) and the International Institute of Refrigeration (IIR).

certification of refrigeration technicians; and technical assistance including the provision of servicing tools for technicians, the establishment of RRR schemes, the retrofitting of refrigeration systems, and the maintaining of energy efficiency. The analysis of each of these areas include the involvement of the private and public sectors and how the capacity created can be used for HFC phase-down

III. Analysis of the minimum information needed for the development of training and competency-based certification programmes and modules for service technicians and customs officers for the transition to alternatives:

Discusses how common training modules could be applied to the circumstances prevailing in Article 5 countries, and analyses how the global products that have been developed by UNEP in partnership with other international organizations could support the activities in the refrigeration servicing sector funded by the Multilateral Fund

IV. Considerations for funding HFC phase-down in the refrigeration servicing sector:

Discusses the joint implementation of decisions XIX/6 and XXVIII/2 with regard to the refrigeration servicing sector, taking into consideration the overlapping schedule of HCFC phase-out and HFC phase-down; summarizes how the refrigeration servicing sector has been funded; and presents potential considerations to determine assistance for HFC phase-down

V. Recommendation

10. The document contains the following annexes:

- I: Relevant decisions related to the refrigeration servicing sector adopted by the Executive Committee and the Parties to the Montreal Protocol
- II: List of the evaluations related to the refrigeration servicing sector undertaken by the Multilateral Fund
- III: Global products developed by UNEP and other international organizations to assist the refrigeration servicing sector in Article 5 countries

I. AN OVERVIEW OF THE REFRIGERATION SERVICING SECTOR

11. Since the inception of the Multilateral Fund, the Executive Committee has considered the phase-out of controlled substances⁷ that are used in the refrigeration servicing sector⁸ to be one of its priorities. The Multilateral Fund began funding activities to address the consumption of controlled substances in the refrigeration servicing sector as early as its 4th meeting (June 1991). Given the constant emission of refrigerants into the atmosphere, the refrigeration servicing sector will become increasingly relevant in all Article 5 countries until the phase-down compliance targets under the Kigali Amendment are achieved.

Evolution of the activities related to the refrigeration servicing sector

12. Initial activities in the refrigeration servicing sector focused on phasing out CFC-12 used for servicing domestic refrigerators, stand-alone commercial refrigeration equipment and mobile

⁷ Prior to agreement on the Kigali Amendment, all controlled substances under the Montreal Protocol were ozone-depleting substances.

⁸ For the purpose of this document, the term “refrigeration servicing sector” will refer to both refrigeration and air-conditioning.

air-conditioning (MAC) units and, to a lesser extent, phasing out CFC-11 and CFC-115 used in chillers and other applications.

Stand-alone activities

13. Initial activities in the refrigeration servicing sector were first implemented as stand-alone projects, consisting of training refrigeration technicians in good servicing practices, providing basic tools and equipment for technicians, and establishing refrigerant recovery and recycling schemes. Frequently, assistance was provided to strengthen the import/export licensing systems for controlled substances under Article 4B of the Montreal Protocol;⁹ to develop specific regulations in support of the phase-out programme; and to train customs officers and law enforcement officers on the legislation and regulations aimed at phasing out controlled substances, including equipment for refrigerant identification.

Phase-out plans for CFCs

14. As the phase-out programme progressed, the stand-alone activities related to regulatory frameworks, training, and technical assistance were subsumed into a holistic funding plan applicable to low-volume consuming (LVC) countries: a refrigerant management plan (RMP). The overall objective of the RMP was to develop and plan a strategy that would manage the use and phase-out of virgin CFCs used for servicing refrigeration and air-conditioning equipment,¹⁰ taking into consideration the circumstances prevailing in the countries concerned. The first set of five RMPs was approved at the 23rd meeting (November 1997).¹¹

15. At its 33rd meeting (March 2001), the Executive Committee recognized the need for a country-driven approach, allowing flexibility to determine the approach that would enable a country to meet its obligations under the compliance period of the Montreal Protocol, and adopted the framework on the objectives, priorities, problems and modalities for strategic planning of the Fund in the compliance period. During this period, an Article 5 country must develop and establish national goals, policies and actions to achieve its compliance strategic plan, which may incorporate individual projects, sectoral plans or both. Funding must be predicated on a commitment to achieve permanent aggregate reductions in consumption and production, as relevant. In adopting this framework, the Committee noted that updates to RMPs¹² would provide Article 5 countries with a mechanism for national phase-out strategies and decided to encourage Article 5 countries to take advantage of that opportunity (decision 33/54). By 2007, when countries had to comply with the 85 per cent reduction in consumption of CFCs, 104 Article 5 countries had an approved RMP and/or RMP update, which were prepared following the country-driven approach adopted at the 33rd meeting. Similarly, to achieve the complete phase-out of CFCs, terminal phase-out management plans (TPMPs) for LVC countries, and performance-based national phase-out plans (NPPs) for non-LVC countries, were developed following the country-driven approach.

⁹ Article 4B requires that each Party establish and implement a system for licensing the import and export of new, used, recycled and reclaimed controlled substances in Annexes A, B, C and E of the Montreal Protocol. Since the adoption of the Protocol, the Parties and the Executive Committee have adopted a series of decisions to fund activities to enable Article 5 countries' compliance with their obligations related to Article 4B.

¹⁰ The strategy could include *inter alia* measures such as legal and economic incentives and disincentives targeting suppliers, service technicians and equipment owners; technician training; public awareness activities; customs controls on new CFC-based equipment and vehicles; bans on the introduction of after-market CFC-based MAC systems; the retirement of existing CFC-based equipment and vehicles; and a gradual increase in the supply of recycled CFCs.

¹¹ RMPs were approved for Bahamas, Georgia, Guyana, Saint Lucia and Trinidad and Tobago.

¹² LVC countries that have done RMPs will be given 50 per cent of the funding provided to develop their original RMP to do RMP updates (decision 35/57).

Phase-out plans for HCFCs

16. As a result of accelerating the phase-out of HCFCs as agreed in decision XIX/6 of the Parties, at its 53rd meeting (November 2007), the Executive Committee considered a document on options for assessing and defining eligible incremental costs for HCFC consumption and production phase-out activities.¹³ The document formed the basis for the development of guidelines for the preparation of HCFC phase-out management plans (HPMPs). A staged approach was proposed to allow countries to develop an overarching plan to achieve total phase-out while allowing for proposals to achieve the first two HCFC control measures in 2013 and 2015, and at the same time, allowing proposals for a subsequent stage, or stages if needed, to manage their HCFC phase-out. The Executive Committee acknowledged the importance of performance-based funding. This led to matching a funding commitment agreed in principle for each country to a maximum fundable consumption target for that country, with linear reduction steps.

17. Based on these guidelines, at its 61st meeting (April 2010), the Executive Committee approved the first two HPMPs for Article 5 countries.¹⁴ Since then, stage I (and in many cases stage II) of HPMPs have been approved for all Article 5 countries, except for the Syrian Arab Republic.¹⁵

18. Information from approved HPMPs shows that the use of HCFCs in 95 of the 145 Article 5 countries is solely for servicing refrigeration and air-conditioning equipment. For the remaining 50 countries, where HCFCs are also used in the manufacturing sector, the phase-out of HCFCs used in the refrigeration servicing sector becomes critical to meet their compliance obligations as HCFCs start to be phased out from manufacturing sectors.

19. In discussions on minimizing climate impact in phasing out HCFCs in the refrigeration servicing sector,¹⁶ it was acknowledged that training provided to technicians should expand beyond good refrigeration practices and focus on proper containment of controlled substances through preventive maintenance, enhancing installation quality, and maintaining/improving the energy efficiency of equipment through appropriate control settings, proper cleanliness of the heat exchangers, and ease of related airflow. Given the flammability of several of the low-GWP refrigerants and the potential risk of accidents associated with their use, training programmes would need to integrate rigorous approaches to the safe handling of flammable refrigerants and to the understanding of related regulations and standards. It was also suggested that the capacity of the training institutes should be enhanced so that they could continue conducting the required training for compliance with the Montreal Protocol on a permanent basis, and that updated and additional specialized training should be provided to trainers and targeted audiences (e.g., use of CO₂-based equipment in supermarkets, energy efficiency gains in the replacement of chillers, or replacement of window and split units in buildings by central systems, energy-efficient air-conditioning options and installation in new buildings, among others). Several of the HPMPs under implementation were adjusted based on these discussions and several of the suggestions presented were incorporated.

The refrigeration servicing sector post the Kigali Amendment

20. Globally, the refrigeration and air-conditioning sectors have grown substantially since the inception

¹³ UNEP/OzL.Pro/ExCom/53/60.

¹⁴ HPMPs were approved for the Former Yugoslav Republic of Macedonia and the Maldives.

¹⁵ Submission of stage I of the HPMP for Syrian Arab Republic has been included in the 2019 business plan.

¹⁶ Reflected in document UNEP/OzL.Pro/ExCom/70/53 on minimizing climate impact in phasing out HCFCs in the refrigeration servicing sector.

of the Multilateral Fund.¹⁷ The number of installed refrigeration and air-conditioning equipment,¹⁸ and the associated use of a wide range of refrigerants has significantly increased in the last 20 years and will continue to grow as a result of, *inter alia*: the continuous rise in global population compounded with the global trend toward urbanization;¹⁹ increases in the purchasing power of the population; the growing availability of equipment at affordable prices; and the expansion of the food cold chain.

21. By 2024, when the first consumption compliance obligation under the Kigali Amendment for Article 5 group 1 countries will enter into force, the majority of HCFC and HFC consumption in Article 5 countries will be in the refrigeration servicing sector.

Consumption of HFC-based refrigerants

22. At the time of the adoption of the Kigali Amendment, limited knowledge was available on the amount of Annex F substances produced and consumed by each Article 5 country, and their specific uses. Aggregated information on HFCs was provided in the reports prepared by the TEAP Task Force under decisions XXV/5 and XXVI/9 of the Parties, and in a scientific journal article published in Atmospheric Science.²⁰

23. Additional information on HFC consumption was made available in surveys of ODS alternatives conducted in 119 Article 5 countries²¹ in response to paragraph 4 of decision XXVI/9,²² which were submitted to the 80th meeting (November 2017).²³ The surveys provided disaggregated data on the level of consumption of HFCs and other alternatives to HCFCs, and their sectoral distribution. The disaggregated data made it possible to identify the main HFCs used and their sectoral distribution between LVC and non-LVC countries, an analysis that had not been feasible with the aggregated data provided in the reports of the TEAP task force.²⁴

24. Based on the reports prepared by the TEAP Task Force, aggregated HFC consumption in all Article 5 countries is estimated to increase from 284,326 mt in 2015 to 1,021,220 mt in 2030 under a business-as-usual scenario (which does not take into consideration the Kigali Amendment),²⁵ as shown in

¹⁷ For example, the International Energy Agency (IEA) estimates that of the 2.8 billion people living in the hottest parts of the world, only 8 per cent have an air-conditioning unit. Between 1990 and 2016 China's energy use for space cooling increased from 6.6 TWh to 450 TWh, and the demand in other countries has risen 15-fold since 1990 (The future of cooling – opportunities for energy efficient air-conditioning, 2018).

¹⁸ Researchers at Lawrence Berkeley National Laboratory estimate the global stock of room air conditioners will rise by an additional 700 million by 2030, and 1.6 billion by 2059.

¹⁹ It is expected that the world population of 7.0 billion in 2012 will increase to 9.3 billion by 2050, with over one billion additional citizens by 2025.

²⁰ The TEAP Task Force reports include HFC consumption and production data and projections for each five-year period between 2010 and 2030. Velders et al. (2015) report provides information on future atmospheric abundances and climate forcings from scenarios of global and regional HFC emissions.

²¹ Funding for 127 surveys was approved at the 74th meeting (May 2015) and the 75th meeting (November 2015).

²² To request the Executive Committee to consider providing additional funding to conduct inventories or surveys on alternatives to ODS in interested Article 5 parties upon their request.

²³ Results from surveys in 119 countries comprising 42 non-LVC countries and 77 LVC countries are contained in document UNEP/OzL.Pro/ExCom/80/54.

²⁴ Although surveys were conducted in 82 per cent of Article 5 countries (119 out of 145), those countries' aggregated HCFC baseline represents only 25 per cent of the aggregated HCFC baseline of all Article 5 countries. The aggregate HCFC baseline of the 42 non-LVC countries represents only 24 per cent of the aggregate baseline of all non-LVC countries, while the aggregate HCFC baseline of the 77 LVC countries represents 91 per cent of the aggregate baseline of all LVC countries. It is to be noted that surveys were not submitted by the largest consuming countries, including Brazil, China and India.

²⁵ As a reference, the HCFC baseline for consumption in Article 5 countries amounted to 538,749 mt, mainly constituted of three HCFCs: HCFC-22, representing the only HCFC used by all Article 5 countries (395,413 mt); HCFC-141b (107,971 mt); and HCFC-142b (31,580 mt).

Table 1. Over 95 per cent of the total HFC consumption is in the refrigeration and air-conditioning sector. The aggregated consumption of HFCs in the refrigeration servicing sector is expected to increase from 176,493 mt in 2020 to 468,550 mt in 2030 representing 46 per cent of the total consumption for all Article 5 countries. The majority of that consumption is expected to be in HFC blends.

Table 1. Distribution of HFC consumption in Article 5 countries under a business-as-usual scenario

Sectors	HFC consumption				
	2010	2015	2020	2025	2030
Metric tonnes					
RAC manufacturing	91,523	185,838	281,619	392,390	510,596
RAC servicing	33,476	87,033	176,493	305,922	468,550
Other sectors	2,010	11,458	19,506	33,092	42,074
Total (mt)	127,009	284,329	477,618	731,404	1,021,220
Per cent (%)					
RAC manufacturing	72.1	65.4	59.0	53.6	50.0
RAC servicing	26.4	30.6	37.0	41.8	45.9
Other sectors	1.6	4.0	4.1	4.5	4.1

25. Information collected from the 119 surveys of ODS alternatives²⁶ provides an overview of the main HFCs and HFC blends consumed and their sectoral distribution, as shown in Table 2.

Table 2. Main HFCs and HFC blends consumed in 119 Article 5 countries

HFC	No. of countries	% of total	Growth rate%*	Uses
HFC-134a	119	34	9	Domestic and commercial refrigeration and MAC; small uses in refrigeration, foam and aerosol applications
R-410A	119	43	40	Air-conditioning applications
R-404A	118	7	11	Low-temperature refrigeration applications
R-507A	70	1	21	Commercial refrigeration
R-407C	110	6	33	Air-conditioning applications
HFC-152a**	19	4	23	Industrial aerosol sector and extruded polystyrene foam
HFC-245fa***	10	2	9	Polyurethane foam
Others	64	3	35	Small uses in all applications

(*) Calculated as compounded annual growth rate between 2012 and 2015.

(**) Over 90 per cent of this consumption was reported for only one country.

(***) One country reported a high use of HFC-245fa for the foam sector (i.e., around 15 per cent of its total HFC consumption).

26. Of the total consumption of HFCs and HFC blends reported for 2015 by 77 LVC countries and 42 non-LVC countries,²⁷ over 90 per cent for non-LVC countries and over 95 per cent for LVC countries was used in the refrigeration sector including manufacturing and servicing, as shown in Table 3.

²⁶ The surveys of ODS alternative were a first attempt to collect consumption data of substances that were not yet controlled by the Montreal Protocol; furthermore, the methodology for collecting and analysing the data was not standardized. Therefore, the overview resulting from the surveys should be considered “best estimates”.

²⁷ The CFC and HCFC baselines for compliance of the 77 LVC countries that submitted reports on ODS alternatives represented 92 and 91 per cent, respectively, of all LVC countries, while the CFC and HCFC baselines of the 42 non-LVC countries that submitted reports represented 35 and 24 per cent, respectively, of all non-LVC countries.

Table 3. Total HFC consumption reported by 119 countries in 2015 (mt)

Sector	LVC	Non-LVC	Total	%LVC	%Non-LVC
Refrigeration	14,466	151,548	166,014	8.7	91.3
Other sectors*	751	15,376	16,127	4.7	95.3
Total (mt)	15,217	166,924	182,141	8.4	91.6

(*) Including aerosol, foam and fire-fighting sectors.

27. The main HFCs consumed in the refrigeration sector in 2015 were: HFC-134a (36 per cent), R-410A (47 per cent), R-404A (8 per cent) and R-407C (6 per cent), measured in mt. HFC consumption used for servicing refrigeration and air-conditioning equipment accounted for 78 per cent of the total consumption (i.e., 97 per cent of total consumption for LVC countries, and 76 per cent for non-LVC countries).

Technological advances in refrigeration and air-conditioning systems

28. The steep increase in refrigeration and air-conditioning equipment since the inception of the Multilateral Fund has given rise to substantial technological advances driven by the need to optimize those systems and enhance their energy efficiency. The number of electronic components, controls and variable speed drives installed in refrigeration and air-conditioning equipment is increasing; equipment manufacturers are currently developing sophisticated microprocessor-based diagnostic and control kits that manage the operation of the compressor and air-flow system.²⁸ Moreover, an increasing number and variety of refrigeration and air-conditioning equipment combined with restrictions on the consumption of HCFCs and HFCs, are expected to lead to an increasing number of refrigerant blends targeting those applications for retrofit and servicing purposes.

29. Table 4 illustrates the evolution of the refrigeration servicing sector's complexity by presenting a comparative analysis of the needs in the sector at different periods of implementation of the Montreal Protocol.

Table 4. The refrigeration servicing sector at different periods of the Montreal Protocol

Description	CFC phase-out	HCFC phase-out	HCFC phase-out/ HFC phase-down
Substances addressed	Mostly CFC-12 and, to a lesser extent, CFC-11 and CFC-115, R-502 (low temperature)	Mostly HCFC-22 (limited amounts of HCFC-141b used in flushing and HCFC-124 and HCFC-142b contained in blends)	HCFC-22, HFC-134a, R-410A, R-404A, R-407C, R-507, and other HFCs and blends (HFCs are used as an alternative to HCFC-22)
Baseline consumption in Article 5 countries in refrigeration and air-conditioning	The baseline in mt for refrigeration and air-conditioning is unavailable. The reported baseline of 164,923 ODP tonnes includes all CFCs used in all sectors. (baseline for compliance i.e., average 1995-1997 consumption)	318,474 mt of HCFC-22 used in the refrigeration and air-conditioning sector (average 2009-2010) 165,924 mt in manufacturing 152,550 mt in servicing	272,871 mt of HFC-134a, R-410A, R-407C, R-404A and R-507A estimated to be used in the refrigeration and air-conditioning sector in 2015 (both manufacturing and servicing) ²⁹ . In addition, there is remaining consumption of HCFC-22 to be phased out.

²⁸ <http://www.asme.org/engineering-topics/articles/technology-and-society/global-cooling-the-history-of-air-conditioning>

²⁹ TEAP Task Force report under decisions XXV/5 and XXVI/9.

Description	CFC phase-out	HCFC phase-out	HCFC phase-out/ HFC phase-down
Alternatives introduced or considered in the Manufacturing conversions	HFC-134a, HCFC-22 in some uses, R-404A and other blends, R-600a in part of the domestic refrigeration market	High-GWP HFC-blends, Low-GWP refrigerants where possible, with associated issues related to flammability or Toxicity or higher operating pressure or limited commercial availability. However, the market still offers large amounts of HFC-based equipment	Potential alternatives: hydrocarbon-based, HFOs, HFC/HFO blends, CO ₂ and ammonia, with associated issues Related to flammability or toxicity or higher operating pressure or limited commercial availability
Variety of blends	Limited (R-502) for low temperature applications	Limited (R-406A, R-409A) (limited temperature glide)	Large amount (R-404A, R-407C, R-410A, R-507A, (larger temperature glide)). Scattered use of many other HFC or HFC/HFO-based blends (e.g., R-448A, R-449A, R-450A, R-513A and others)
Applications (refrigerant charge)	Domestic and small commercial refrigeration; MAC manufacturing in few countries and servicing in all countries; small refrigerant charges	Only HCFC-22-based equipment, mostly in air-conditioning and some commercial refrigeration; larger refrigerant charges	All types of domestic, commercial, and industrial refrigeration, air-conditioning, refrigerated transport, MAC; all sizes of refrigerant charges
Eligible activities	Including <i>inter alia</i> assistance to develop legislation and regulations including import/export licensing systems; training for customs and law enforcement authorities; training in good refrigeration servicing practices; establishment of RRR schemes; end-user incentives for conversion; and in some cases technician certification, standards, strengthening associations, and leakage-reduction programmes		Categories of eligible incremental costs for HCFC phase-out/HFC phase-down are the same. Assistance focused on ensuring larger impact and long-term sustainability of the proposed activities
Impact of activities implemented	CFC phased out: Minimum changes during servicing when working with alternatives introduced. Impact of initial activities in servicing difficult to measure. Servicing sector adapted to alternatives. Customs departments and training centres strengthened	Ongoing evaluation. Expected changes during servicing to safely work with some low-GWP alternatives being introduced. Some activities typically from the servicing sector in HPMPs could help facilitate introduction of low-GWP alternatives	Activities in the servicing sector need to have a wider impact and sustain over time to support safe adoption of low-GWP technologies, including with regard to installation, operation, maintenance and decommissioning of systems

Barriers to broader penetration of low-GWP alternative technologies

30. In addition, the Kigali Amendment triggered the need to adopt technologies based on low-GWP refrigerants on a wider scale, which raises issues related to safety and costs. For instance, the use of flammable refrigerants with refrigerant charges above 150 grams requires a change in standards, as well as additional safety precautions during installation, operation, maintenance and decommissioning of refrigeration systems using those technologies. Other causes that limit the introduction of these technologies include:

- (a) The lack of standards for introduction, installation and proper servicing and maintenance of new equipment based on flammable or toxic refrigerants;
- (b) The lack of standards for proper transportation of refrigerants and building codes;

- (c) The lack of essential equipment and basic tools in servicing workshops; and
- (d) The slow pace of commercialization and availability of some refrigerants or the equipment operating with them.

31. Currently it is not possible to ascertain whether there would be sufficient technicians with the minimum skills required to service the growing base of more technologically advanced equipment, using a wide variety of refrigerants with different operating characteristics related to pressure, flammability and toxicity. A challenge faced by training institutes, the industry and refrigeration associations to enhance the skills of the technicians to properly service and maintain the technologically advanced equipment being introduced in the markets is that frequently technicians are seasonal; in the low season (typically winter) those technicians search for other employment opportunities and they tend to spend their limited time during high season on installation and servicing of equipment, rather than on training. Also, the trend in the number of new technicians entering the work force is downward as the refrigeration and air-conditioning industry appears to be less attractive than other disciplines such as information technology or electronics.

32. Article 5 countries are addressing several of these barriers through activities that are increasingly becoming standard components of the HPMPs, such as building the capacity of local training institutions; training of technicians focused on flammable and/or toxic refrigerants, and/or high-pressure refrigerants; revision of codes of good practice; development of regulations and adoption of standards associated with the installation and servicing of various hydrocarbon-based refrigeration systems; use of incentives; technology demonstration projects for low-GWP-based refrigerants; and awareness-raising programmes.

II. ANALYSIS OF EXISTING CAPACITY CREATED WITH THE FUNDING APPROVED FOR THE REFRIGERATION SERVICING SECTOR

33. The Multilateral Fund has been established as the financial mechanism of the Montreal Protocol for assisting Article 5 countries to be in compliance with the Montreal Protocol and its amendments. Given that controlled substances are used by all Article 5 countries for servicing and maintaining the refrigeration equipment, technical and financial assistance has been provided to this sector since the 4th meeting of the Executive Committee.

34. Since then, the Executive Committee has continuously taken decisions to strengthen that assistance and address emerging needs and issues in the sector to facilitate Article 5 countries' compliance with the Montreal Protocol. Furthermore, under the Monitoring and Evaluation work programme of the Multilateral Fund, the Executive Committee has undertaken desk studies, country case-studies, evaluations of the refrigeration servicing sector, and evaluations of stand-alone projects (e.g., import/export licensing systems and regulations; training programmes for customs officers; training programmes for refrigeration technicians; recovery and recycling schemes; and refrigerant management plans) to further assess the applicability of its decisions in the circumstances prevailing in Article 5 countries, and to assess the effectiveness of the funding activities in reducing emissions of controlled substances into the atmosphere. The lessons learned from those evaluations and the recommendations made as a result have continuously been incorporated into refrigeration servicing sector activities under implementation.³⁰

³⁰ For example, at its 49th meeting (July 2006), the Executive Committee considered document UNEP/OzL.Pro/ExCom/49/7 containing a compendium of recommendations relevant to the evaluation of RMPs and NPPs, prepared pursuant to decision 48/10. As a result, additional guidance was given when planning and implementing such plans and included *inter alia* cooperation with other government agencies; updating legislative measures; updating training programmes for technicians to include the latest information with regard to the application of good practices to reduce usage of controlled substances and to promote the use of alternative refrigerants, paying full attention to safety aspects in countries where training in the use of flammable refrigerants was carried out; mandatory certification of technicians; and taking into account decision 41/100 on recovery and recycling schemes.

35. For reference, Annex I to the present document contains relevant decisions related to the refrigeration servicing sector adopted by the Executive Committee and the Parties, and Annex II contains a list of the evaluations related to the refrigeration servicing sector undertaken by the Multilateral Fund.

Strengthening national capacity

36. The cumulative experience gained during the implementation of projects related to the refrigeration servicing sector has strengthened the national capacity engaged in those projects. In addition to national ozone units (NOUs), for which direct funding is provided under “institutional strengthening,” national capacity related to customs and law enforcement authorities and schools; teaching institutes and vocational schools for refrigeration technicians; and associations of refrigeration technicians have been established and/or strengthened. Capacity building has also been provided directly by UNEP CAP through its clearinghouse function and at the regional and global levels, mainly through regional network meetings since the 9th meeting (March 1993). Regional network meetings are conducted on an annual basis.

37. During the implementation of HPMPs in particular, several Article 5 countries have considered it relevant to ensure the long-term sustainability of proposed activities related to the refrigeration servicing sector by *inter alia* increasing and/or strengthening local capacity and institutions to provide comprehensive training programmes to a larger number of refrigeration technicians or customs officers; modifying the curricula of training institutes, vocational schools and/or customs authorities; revising and updating the code of good servicing practices and introducing systems to certify the competency of technicians to implement good installation and servicing practices; extending training to cover the handling of alternative technologies to HCFCs, particularly those based on flammable refrigerants; and promoting/facilitating the adoption of standards related to the refrigeration servicing sector.

Support to the policy and regulatory framework

38. The policy and regulatory framework established under the Multilateral Fund has been of particular relevance in supporting the phase-out activities in the refrigeration servicing sector, and will be even more relevant with the phase-down of HFCs. Therefore, this section of the document describes this framework in detail.

Regulatory framework established during the phase-out of CFC

39. Article 5 countries have reduced the supply of controlled substances under the Protocol by restricting imports and/or exports mainly through their licensing and quota systems. In addition, several countries have established, or are in the process of establishing, controls on the import and export, where applicable, of refrigeration equipment based on controlled substances, to limit their growth and reduce the size of the installed base of such equipment.

40. Such restrictions have become increasingly effective, as demonstrated by the verification reports submitted together with funding tranche requests of phase-out plans reviewed by the Secretariat, which showed significant improvements in co-ordination between the NOU, licence-issuing bodies, customs authorities and importers. The monitoring of imports of controlled substances under the Protocol has also improved greatly, and countries are increasingly using a computerized database for customs.

41. In support to the regulatory framework for controlled substances under the Protocol and its enforcement, extensive assistance has been provided for the training of customs officers and other law enforcement officers. For example, at the 48th meeting (April 2006), the Executive Committee requested bilateral and implementing agencies to prepare and implement phase-out plans in a manner that would ensure, where feasible, implementation of the following recommendations:

- (a) Introducing regulations regarding the exports, licensing schemes and a ban on sales to non-licensed companies of controlled substances; restrictions on the import of refrigeration and air-conditioning equipment based on controlled refrigerants; appointing customs officers to participate in the Ozone Committees, signing memoranda of understanding between the Customs Department and the NOU, and creating focal points for environment in customs with access to the top level of customs hierarchy; involving certification and normalization institutes in the identification of controlled substances in case there is a lack of adequately equipped laboratory facilities in customs offices; making customs codes more detailed by adding digits to the Harmonized Commodity Description and Coding System (Harmonized System) developed and maintained by the World Customs Organization; informing importing countries about licensed shipments and checking that the clients are on the list of authorized importers, to be provided by the importing countries on a regular basis;
- (b) Inviting high level officials from customs, other government departments and trade agents or brokers in charge of managing the clearance of shipments, to seminars to ensure the correct application of the licensing system and identification of imports of controlled substances; ensuring that phases of train-the-trainer and the training of customs officers take place in rapid succession and that a database of active trainers and trainees is maintained; expediting the dispatch of refrigerant identifiers supplied to customs services; and
- (c) Organizing seminars on regional cooperation between customs officers, supporting the harmonization of legislation and customs procedures by UNEP CAP; promoting the creation of informal regional networks of customs officials; amending training manuals for customs officers by adding information on customs controls and detection of illegal trade; and developing screening tools (e.g., the Customs Quick Reference tool, posters, check lists and databases), ensuring wide distribution to Article 5 countries.

Strengthening of the regulatory framework during the phase-out of HCFCs

42. Article 5 countries, and bilateral and implementing agencies have been following all the above recommendations, according to their particular circumstances. In this regard, the regulatory framework that had been established has been fully utilized for the accelerated phase-out of HCFCs as agreed by the Parties.

43. Funding to include HCFC control measures in legislation, regulations and licensing systems was provided as part of the funding for the preparation of HPMPs, as confirmation of the implementation of such control measures was a prerequisite for approving funding for the implementation of the HPMP (decision 54/39(e)). To further strengthen the licensing and quota system, the Executive Committee decided that for all funding requests for HPMPs submitted from the 68th meeting (December 2012) onwards, confirmation had to be received from the Government that an enforceable national system of licensing and quotas for HCFC imports and, where applicable, HCFC production and exports, was in place and that the system was capable of ensuring the country's compliance with the HCFC phase-out schedule (decision 63/17).

44. During implementation of their HPMPs, several Article 5 countries considered it relevant to introduce other regulatory control measures, including *inter alia* mandatory reporting by HCFC importers and exporters; bans on “non-refillable” (disposable) cylinders; fees for HCFC imports; extension of the licensing system to all refrigerants imported into the country; HCFC emission control measures; and options related to record-keeping.³¹

³¹ UNEP publication on HCFC policy and legislative options provides a comprehensive analysis of legislative and regulatory options that have been used by NOUs in designing and implementing their phase-out plans in the refrigeration servicing sector.

Regulatory framework post Kigali Amendment

45. In the context of HFC phase-down, Article 5 countries would need to review, update and/or further develop legislation, including import/export licensing and quota systems, to include HFCs which are currently not included in the existing Harmonized System, making difficult for Customs authorities to recognize the illegal nature of the relevant import or export of HCFCs and HFCs.³² The review of the regulatory framework is particularly urgent for those countries ratifying the Kigali Amendment before 1 January 2019, as they would need to establish a licensing system for HFCs by 2018 in order to satisfy the reporting requirements under Article 7 of the Montreal Protocol. The increased amount and variety of controlled substances, which include a large portion of refrigerant blends, as well as the measurement of compliance of HFC production and consumption in CO₂ equivalent tonnes, will also require updates and adjustments to the current customs training contents and to the application of licensing and quotas for imports and exports of HFCs.

46. Given the parallel implementation of HCFC phase-out and HFC phase-down, the regulatory framework could be further strengthened by including HFCs under the existing HCFC regulations, particularly those related to trade control and monitoring (e.g., import licensing and quota systems; reporting by importers; bans on non-refillable HFC cylinders; ban on imports of certain types of HFC-based equipment; record-keeping for certain types of HFC-based systems, and controls on HFC emissions).³³

47. Several non-Article 5 countries use regulatory measures to ensure a larger and sustained adoption of good refrigeration practices. For example, certification and training are preconditions for technicians servicing refrigeration systems; producers and distributors of refrigerant are obliged to receive used refrigerant for recycling or disposal; and refrigerant recovery is mandatory by certified technicians.

48. As many of the alternatives for HCFCs and HFCs are classified with some level of flammability, regulations, codes of practices, and standards³⁴ should be adopted to ensure safe operation of equipment based on those alternatives and their safe handling and management by all stakeholders involved (e.g., Customs departments, importers, service workshops and technicians). The adoption of these regulations and standards could delay the introduction of low-GWP alternative technologies. For example, among the barriers identified by UNEP for the adoption of standards are the complexity and length of the process; the lack of expertise and adequate institutional infrastructure; lack of connections with international/regional standardization bodies; resistance to modifying practices and the costs associated with acquiring the standards by smaller enterprises. NOUs can support national standardisation bodies to facilitate the process of developing, adopting and updating standards and to strengthen ties to the local refrigeration and air-conditioning associations and stakeholders.³⁵

49. At its 72nd meeting (May 2014), the Executive Committee encouraged Article 5 countries, when implementing their HPMPs, to consider, as needed and feasible, *inter alia*, the development of regulations and codes of practice, and the adoption of standards for the safe introduction of flammable and toxic

³² The Twenty-sixth Meeting of the Parties (November 2014) requested the Ozone Secretariat to liaise with the World Customs Organization to examine the possibility of designating individual Harmonized System codes for the most commonly traded fluorinated substitutes for HCFCs and CFCs classified under Harmonized System code 2903.39, and encouraged parties to take the necessary steps to recommend such international customs classifications and consider establishing domestic customs codes for the relevant substitutes (decision XXVI/8). The HS codes are updated every five years, therefore the earliest date for new HFC codes would be 2022.

³³ UNEP publication on Legislative and policy options to control HFCs, provides a comprehensive set of policy and regulatory options that could be considered when implementing HFC phase-down plans.

³⁴ For substances, for equipment, for refrigerant containers, and on storage, transportation, design of systems and components, maximum refrigerant charge, installation, servicing and disposal of equipment, among others.

³⁵ UNEP publication on international standards in refrigeration and air-conditioning, presents an introduction of the role of standards in the context of the HCFC phase-out in developing countries (2014).

refrigerants and refrigerants operating with very high pressure given the potential risk of accidents and negative effects on health associated with their use; and consider focusing activities in the refrigeration servicing sector on training of technicians, good practices, the safe handling of refrigerants, containment, recovery and recycling, and the reuse of recovered refrigerants (decision 72/41). Training in the installation, operation, maintenance and disposal of equipment using flammable substances has been considered a priority during stage I of the HPMPs in countries where these refrigerants were already in the market or expected to be introduced.

50. While some activities to adopt national standards to facilitate the introduction of low-GWP alternatives have been included in several HPMPs under implementation, additional work in this area would be required in the majority of Article 5 countries. In this regard, at its 79th meeting (July 2017) the Executive Committee agreed to the funding of enabling activities to support the phase-down of HFCs (decision 79/46), consisting of, but not limited to activities to facilitate and support the early ratification of the Kigali Amendment; activities aimed at initiating supporting institutional arrangements; the review of licensing systems; HFC data reporting; and demonstration of non-investment activities; and national strategies. The Committee also agreed that funding for the preparation of national HFC phase-down plans to meet initial reduction obligations could be provided, at the earliest, five years prior to those obligations, after a country had ratified the Kigali Amendment. At the time of finalization of the present document, 35 Article 5 countries had ratified the Kigali Amendment, all of them classified in group 1. For those countries funding requests could be received as early as 2019.

Training and certification of technicians

51. Training was initially provided to technicians as stand-alone training in good refrigeration servicing practices, which contained a train-the-trainer session followed by technician training. Although the coverage of the training programmes was limited and the resulting reduction of CFC consumption was not quantified, Multilateral Fund evaluations concluded that the introduction of good refrigeration servicing practices was an important factor in reducing CFC emissions into the atmosphere,³⁶ and in allowing countries to be in compliance with their obligations under the Montreal Protocol. In addition, training programmes increased awareness about conservation, preventive maintenance and substitute technologies, and contributed to updating the curricula of training-centre courses.

52. As training programmes for refrigeration technicians evolved from stand-alone activities to become integral components of sector and national phase-out plans, NOUs increased the involvement of national vocational/training centres in their implementation, and ensured that the subjects covered by the training (e.g., good practices in refrigeration, proper use of flammable refrigerants) were included in the centres' curricula.

53. The programmes for the training and certification of technicians implemented so far have allowed several countries to strengthen their local institutions, and have enabled them to provide training to technicians at different skill levels. Past evaluations of training programmes have also recommended supporting the establishment of technician certification systems. Many countries have moved toward establishing voluntary certification schemes supported by regulations. Making such schemes mandatory is more challenging, as such a decision would often go beyond the NOU's purview (i.e., an issue related to the ministries of education and/or labour) and would require additional institutional work. An alternative approach considered in some countries is the issuing of environmental licenses, which would be under the purview of the Ministries of Environment.

54. One of the evaluations of training programmes³⁷ recommended strengthening associations and involving them more closely in project implementation. This recommendation has been incorporated into

³⁶ Final report on the evaluation of the implementation of RMPs (UNEP/OzL.Pro/ExCom/41/7).

³⁷ UNEP/OzL.Pro/ExCom/31/20

the HPMPs of several Article 5 countries with positive results, to the extent that some governments have designated and supported refrigeration associations to implement the certification system for technicians, which could potentially generate income that would contribute to their sustainability. These results have been confirmed by the current evaluation of the refrigeration and air-conditioning servicing sector, where it has highlighted the importance of refrigeration associations as key stakeholders in project design and implementation, and where it has been recommended to strengthen them or strongly suggested to establish them if they are non-existent.³⁸

Utilization of the training capacity created for HFC phase-down

55. With the accelerated phase-out of HCFCs and the adoption of the Kigali Amendment, the number and variety of refrigeration and air-conditioning systems operating with low-GWP refrigerants has been gradually increasing. In this context, several countries have already started to strengthen the local institutions and bodies involved in technician training and certification during the implementation of their HPMPs. This will help create the conditions to ensure that technicians servicing equipment based on these alternative refrigerants have the knowledge, skill and tools to do it in a safe and environmentally sound manner.

56. Lessons learned from implemented projects indicated that training should become self-sustained in order to ensure broader coverage after project completion and to better contribute to a permanent change of behaviour in the refrigeration sector.

57. To ensure the long-term sustainability of refrigeration servicing practices beyond the assistance provided by the Multilateral Fund, further consideration should be given *inter alia* to continuously updating the training curricula of institutions and vocational schools to incorporate changes, technology upgrades of refrigeration systems and the introduction of alternative refrigerants; extending training to other stakeholders of the refrigerant and equipment supply chain and end-users; extending certification to enterprises involved in installation, servicing, maintenance and decommissioning refrigeration equipment; linking technician certification to regulatory norms or standards adopted by the country; determining the number and levels of technician certification according to the specific needs of the country; considering whether technician certification should be compulsory and ensuring a critical mass of technicians certified; and strengthening and involving refrigeration associations in the promotion or implementation of technician certification.

58. One of the issues that need to be further considered is the population of technicians without formal training who are not part of servicing workshops or associations, who are not registered as technicians, and who frequently do not work permanently in the refrigeration servicing sector. For example, in some countries this sector has been supported through *inter alia* training and awareness-raising activities implemented through non-conventional means (e.g., short courses and videos uploaded into a website; specific “apps” for cellular phones, and other means), and/or through the assistance of refrigeration associations. Given the increasing complexity of refrigeration and air-conditioning systems, the minimum level of skills and knowledge of these technicians would need to be enhanced.

Technical assistance including servicing tools and equipment

59. Three key forms of technical assistance in the refrigeration servicing sector supported under the Multilateral Fund are: the provision of basic servicing tools to refrigeration technicians; the establishment of recovery and recycling (R&R) or RRR schemes of refrigerants; and retrofit and equipment replacement.

³⁸ UNEP/OzL.Pro/ExCom/81/7 (preliminary report) and UNEP/OzL.Pro/ExCom/82/11 (synthesis report).

Basic servicing tools for technicians

60. Refrigeration servicing tools³⁹ have been distributed in the majority of Article 5 countries, allowing a higher number of technicians to apply good servicing practices. Distributed tool kits vary from country to country, depending on local priorities, the most common type of equipment serviced, the available budget and the number of technicians to be covered. Use of equipment and application of good practices for refrigerant circuit flushing operations have also been considered by several countries. Additional tools for servicing refrigeration equipment operating with flammable, higher pressure and/or higher toxicity refrigerants,⁴⁰ have been distributed during implementation of HPMPs.

Schemes for recovery, recycling and reclamation of refrigerants

61. The Executive Committee has been approving projects to recover and recycle refrigerants since 1991. The level of infrastructure created through the RRR projects implemented varies significantly from country to country. In some countries, multiple-refrigerant RRR equipment was provided, while in several other countries, only servicing tools were provided, as the volumes of refrigerant did not justify a reclaiming operation.

62. As documented in past evaluations,⁴¹ issues that prevented the effective implementation of the first CFC recovery and recycling projects included: lack of regulations to prohibit purposeful emissions of controlled substances; lack of an economic model combined with the low CFC prices that prevailed during most of the period of CFC phase-out; lack of awareness among technicians and end-users; high costs of recovery and recycling equipment and lack of supplies (e.g., filters) on local markets; logistical matters (e.g., weight of equipment, distance and small refrigerant charges to be recovered); and lack of proper monitoring and reporting systems.

63. Using the experience gained in previous recovery and recycling projects, several countries have considered in their subsequent phase-out plans and their current HPMPs additional factors to enhance the effectiveness of RRR schemes. For example, some countries replaced recycling units with relatively inexpensive reclaiming units that could guarantee the return of certified refrigerant.⁴² In other countries, reclaiming centres were established in large enterprises involved in the refrigerant sales business rather than in training centres or government bodies, according to a business model and with co-financing by the beneficiary enterprises. Reclaiming units were also set up to work with different types of pure refrigerants or contained in blends. Higher HCFC-22 recovery rates were achieved due to the larger charge size of HCFC-based equipment compared to the CFC-based equipment addressed in the past.

64. It was also found that a significant portion of the recovered refrigerant was generated from the decommissioning of equipment that had reached the end-of-life stage. In those cases, the enterprises recycled all of the components of the equipment, which generated additional income that could sustain the reclamation of refrigerant. In a few other countries, the recovery and recycling (or reclamation) project partnered with energy-efficiency programmes aimed at exchanging old, inefficient CFC-based domestic

³⁹ An indicative, not exhaustive list of typical tools include *inter alia* copper tube cutters, weighing scale, deburring tools, flaring tool, non-metallic abrasive pad, phosphorus brazing alloy, silver brazing alloy and flux, pipe calibration and pipe bending tools, wrench, torque wrench, vacuum gauge, tube expander tool and expander heads, vacuum pumps, oxy-acetylene torch set, electronic leak detector, calibrated leak test, torch igniter, rubber mallet, refrigeration ratchet, spray bottle (for leak detection), manifold gauge, and hoses. Personal protective equipment includes standard items such as goggles, gloves and fire extinguisher.

⁴⁰ An indicative, not exhaustive list of tools include *inter alia* gas detectors, electronic manifold gauges and hoses, ammonia and CO₂. Depending on the refrigerant, protective equipment may include special respiratory protection (e.g., canister type self-contained respirators or breathing equipment) and protective clothing.

⁴¹ Paragraphs 31 to 33 of document UNEP/OzL.Pro/ExCom/31/18.

⁴² AHRI Standard 700.

refrigerators for energy-efficient ones, with substantial amounts of CFC recovered (for reuse or destruction depending on the case) that otherwise would have been vented into the atmosphere during equipment disposal.

65. Despite the progress achieved so far, the latest evaluation of the refrigeration servicing sector identified that the sustainability of RRR systems remains challenging due to factors such as logistics costs, labour costs, lack of ancillary equipment and lack of economic incentives for reclamation given the low cost of virgin refrigerant.

Retrofit and equipment replacement

66. Guidelines for end-user conversion in the commercial refrigeration sector were adopted at the 28th meeting (July 1999),⁴³ and incentive programmes to encourage retrofitting of refrigeration equipment were allowed at the 32nd meeting (December 2000). The evaluation of TPMPs conducted in 2009 showed that those incentive programmes worked well in places where CFC-12 prices were rising rapidly, against a backdrop of stable prices of equally available alternatives. The price difference, the level of the incentive, and NOU-related activities also played a significant role.

67. Applying the principles of decision 28/44 to HCFCs, the relevant circumstances that must prevail before priority would be granted to end-user conversion activities are: (a) production and import controls on HCFCs and HCFC-based equipment that are in place and effectively enforced, and restrict the deployment of new HCFC components; (b) the country's major remaining consumption is for the servicing of refrigeration and air-conditioning equipment; (c) either no other possible activities would allow the country to meet its HCFC control obligations, or the comparative consumer price of HCFCs, relative to substitute refrigerants, has been high and is predicted to continue to increase; and (d) codes of practice and standards for the use of flammable refrigerants are in place and technicians servicing the equipment have received proper training and certification.

68. Currently, the available alternative refrigerants⁴⁴ suitable for retrofitting are high-GWP refrigerants, which would not represent an improvement in refrigerant emissions, or an improvement in energy use. HCFC-22-based equipment has, in almost all cases, a higher inherent efficiency compared to other potential retrofit refrigerants. Accordingly, the Executive Committee has encouraged Article 5 countries, when implementing their HPMPs, to consider *inter alia* 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 (decision 72/41(c)(iii)).

69. During implementation of HPMPs, it has been reported that in several Article 5 countries, R-290 is being used for retrofitting, operating and/or filling HCFC-22-based equipment. It appears that market conditions may be favourable for this practice, as it is taking place outside the HPMPs. Major concerns were raised regarding the safe use of flammable refrigerants in systems designed for non-flammable

⁴³ The guidelines established the circumstances that must prevail before priority can be granted to end-user conversion (a) production and import control on CFC and CFC-based equipment in place and effectively enforced, and restricts the deployment of new CFC components; (b) the country's major remaining consumption is for the servicing of refrigeration and air-conditioning equipment; (c) comprehensive data on the profile of all remaining consumption has been determined and made available to the Executive Committee, and (d) 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 (decision 28/44).

⁴⁴ The only HCFC-22 alternatives available for retrofit have high GWP (such as HFC-407C/F, HFC-404A). HFC-32 does not qualify as a retrofit candidate due to its higher operating pressures. The only low-GWP alternative that comes close to HCFC-22 is HC-290; however, its application is limited due to its flammability. HC-1270 (propylene) appears to have better volumetric capacity; but concerns about flammability and heat exchanger modifications remain.

refrigerants and the associated risks for technicians and end-users.⁴⁵ In response to this practice, the Executive Committee noted that, if the country engaged in retrofitting HCFC-based refrigeration and air-conditioning equipment to flammable or toxic refrigerants and associated servicing with assistance from the Fund, the country did so on the understanding that it assumed all associated responsibilities and risks and that such retrofitting should be done only in accordance with the relevant standards and protocols (decisions 72/17 and 73/34).

Assembly, installation and charging subsector

70. At its 31st meeting (July 2000), the Executive Committee defined the assembly, installation and charging subsector and agreed on guidelines for the calculation of incremental costs (decision 31/45). Additional guidance was agreed at the 62nd meeting (decision 62/14).⁴⁶ Since then, activities in this subsector have been approved in the context of umbrella projects or phase-out plans where the specific conditions of the enterprises assembling the equipment were not known in detail.

71. This subsector can potentially help facilitate the adoption of low-GWP alternatives as it assembles and install new refrigeration and air-conditioning systems. The subsector comprises several types of enterprises, including commercial refrigeration or air-conditioning manufacturers that charge the refrigerant *in situ* (they generally have manufacturing plants, production lines and warehouses, and assemble systems tailored to the client); contractors that install tailored refrigeration or air-conditioning systems to end-users; or end-users that install their systems with in-house technical capacity. This subsector provides systems to a wide range of industries including retail sellers such as supermarkets, minimarkets and butcheries; agroindustry, including flowers, food freezing warehouses, slaughter houses, milk-based products; the pharmaceutical sector; catering services for the army, schools, hospitals; restaurant chains; food process plants; the fisheries industry; hotels and office buildings, among others.

72. Furthermore, the actual distribution of the consumption of controlled substances between servicing and assembly, installation, and initial charging is not available.⁴⁷ In discussing the experience gained by bilateral and implementing agencies in the implementation of HPMPs, it was concluded that there is need for a better understanding of this subsector as it could facilitate the HFC phase-down, favour the introduction of low-GWP technologies, and promote safe and energy-efficient installation practices.

Utilization of the current technical assistance capacity for HFC phase-down

73. Service tools for technicians should continue to be considered as an important component of the refrigeration servicing sector. Rather than defining a universal tool-kit to be provided to all countries, each Article 5 country should determine which servicing tool-kits would best address the needs of their technicians at different stages of project implementation.

74. The strengthening of existing RRR schemes or the establishment of new ones should be based on a comprehensive business model suitable to the conditions of the country and the stakeholders involved, taking into account *inter alia* the price of virgin refrigerant and the expected amount of refrigerant to be

⁴⁵ These include: the qualifications of the technicians undertaking the retrofits, the need to install sensors to detect leaks, the need for visual labels indicating the refrigerant, and the size of the equipment being retrofitted.

⁴⁶ The Executive Committee requested agencies, when submitting projects related to the installation, assembly and charging subsector, to demonstrate that each of the enterprises participating in the project had invested in equipment, development of products, or training of personnel specific to HCFC technology significantly exceeding the level of such investments prevalent in the servicing sector; and that the activities foreseen for those enterprises represented incremental costs.

⁴⁷ As an example, one medium sized consuming country recently estimated that up to 25 per cent of the refrigerant bank has been installed by the subsector.

reclaimed.⁴⁸ The long-term sustainability and efficiency of these schemes should be supported with regulations for a mandatory containment of refrigerant,⁴⁹ and awareness-raising activities for technicians and end-users, with the participation of refrigeration associations. In cases where policies to replace low-energy-efficient refrigeration equipment are established, the proposal should include strategies to recover refrigerant from decommissioned equipment.

75. Under the Kigali Amendment, the larger amount and variety of HCFC and HFC-based refrigerated systems in operation provides larger opportunities for recovery and reclamation of refrigerants. It would be required to consider, among others: the capability of the equipment and ancillary (e.g., cylinders, refrigerant identifiers) to recover, recycle or reclaim both HCFCs and HFCs, including blends; proper management of potentially increasing amounts of non-reusable gas recovered (due to a large amount of zeotropic blends in the market, which after leakages could lose their original refrigerants composition); an analysis of the benefits and challenges of recovering, recycling and reclaiming flammable refrigerants (including regulatory certainty of safe recovery and transport capabilities); and an assessment of the economic feasibility of reclaiming facilities, particularly for zeotropic blends and their components.

76. Enterprises in the assembly, installation and initial charge sector, as well as manufacturing enterprises could help ensure good service practices and maintaining energy efficiency specially for larger systems, though pre-arranged periodic service contracts for the first years of operation and/or extended guarantees, which would also be helpful in cases where the offer of technicians able to provide service to newly introduced technologies is limited.

Considerations on energy efficiency in the refrigeration servicing sector

77. Although funding for enhancing energy efficiency of refrigeration equipment has not been approved, energy use of such equipment has been considered while developing funding criteria for HCFC phase-out projects.⁵⁰ Furthermore, the Executive Committee has sought opportunities to promote energy efficiency improvements. With regard to the CFC phase-out, energy efficiency was considered in the context of chiller projects. Two projects were approved at the 26th and 28th meetings using the concessional loan mechanisms (decisions 26/34 and 28/32) and at the 46th meeting, a funding window of US \$15.2 million was approved for additional demonstration projects in the chiller sub-sector (decision 46/33). The evaluation report on chillers submitted to the 80th meeting,⁵¹ concludes that energy efficiency and energy savings are important drivers in replacement of chillers; it also indicates that the recovery and recycling capabilities of the country would need to be considered for chiller replacement. While the report did not provide recommendations to interventions relating to servicing for promoting energy efficient operations; proper maintenance and servicing of chillers is essential for the efficient operation of the equipment.

78. With regard to HCFCs, the Executive Committee decided to approve demonstration of low-GWP alternatives to HCFCs; one of the criteria for selecting such projects was related to the promotion of energy efficiency improvements (decision 72/40(b)(i)(f)). Accordingly, 14 demonstration projects related to the

⁴⁸ For example, in one country, the minimum price of virgin refrigerant that allowed reclamation was US \$7.00/kg. In estimating the amounts to be reclaimed, it is important to consider that large unrecorded amounts of refrigerant are recovered, recycled with filters in-situ and reused without passing through a reclaiming centre.

⁴⁹ Including *inter alia* ban/control on intentional venting of refrigerant during servicing, economic instruments that can help the economic feasibility of the operation (e.g., levy on the cost of the refrigerant); ban on the use of non-reusable cylinders; mandatory leak testing for all equipment with a certain size of refrigerant charge; and logging and records for end-users; or measures built from existing regulations (e.g., chemicals or hazardous substances, producers responsibility programmes).

⁵⁰ Paragraph 11(b) of decision XIX/6.

⁵¹ UNEP/OzL.Pro/ExCom/80/9

refrigeration and air-conditioning sector were approved at the 74th (May 2015), 75th (November 2015) and 76th (May 2016) meetings. Energy efficiency performance was to be reported as a part of relevant project results.⁵²

79. Moreover, specific conditions linked to energy efficiency were included when approving some HPMPs. For example, the HPMP for Jordan⁵³ included a requirement that the 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 associated with the introduction of R-410A technology; and 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 (decision 65/40). The HPMP for Thailand⁵⁴ included technical assistance to support promoting the adoption of energy-efficient products beyond those that were part of the conversion, and to support assisting energy efficiency initiatives in buildings.

Installation, maintenance and servicing practices

80. Installation, maintenance and servicing practices play a critical role in ensuring energy-efficient operation of equipment over the life of equipment. 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.

81. According to the International Institute of Refrigeration, better optimisation, monitoring and maintenance of cooling equipment has the potential to save 30 Gt of CO₂ emissions by 2050. The TEAP report prepared by the task force on issues relating to energy efficiency while phasing down HFCs indicates that appropriate maintenance and servicing practices can curtail up to 50 per cent degradation in performance and maintain the rate performance over the lifetime of equipment. The International Energy Agency has compiled the most common faults associated with energy efficiency degradation for air-to-air heat pump due to poor installation and maintenance (i.e., faults associated with fan (26 per cent occurrence), controls and electronics (25 per cent) and temperature sensors (16 per cent)).

82. The use of incompatible refrigerants and in particular inappropriate drop-in refrigerants, could reduce energy efficiency of existing equipment. Further, the introduction of refrigerants with temperature glides (i.e., zeotropic refrigerants) could also reduce energy efficiency of the equipment. Effective servicing of central and large air-conditioning systems, by using good servicing practices can help in more efficient operations of these systems, minimising safety risks, better thermal comfort for occupants, lowering operating costs as a result of energy efficient operations and lowering capital expenditure for replacement of equipment.⁵⁵

83. Several of the good servicing practices being implemented under HPMPs will maintain the energy efficiency of the equipment (Table 5).⁵⁶ These measures should continue to be an integral component of the HFC phase-down plans.

⁵² Detailed information on the demonstration projects is available in UNEP/OzL.Pro/ExCom/78/6.

⁵³ UNEP/OzL.Pro/ExCom/65/39/Rev.1.

⁵⁴ UNEP/OzL.Pro/ExCom/68/41.

⁵⁵ TEAP Report: Volume 5, Decision XXIX/10. Task force on issues related to energy efficiency while phasing out HFCs (updated final report)

⁵⁶ 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 and the energy-efficient operation of equipment.

Table 5: Measures for maintaining and monitoring energy efficiency

Particulars	Interventions
Installation and maintenance of equipment	
Training and capacity building	<ul style="list-style-type: none"> • Leakage detection equipment for larger capacity equipment • Good practices in the installation of air-conditioning equipment (e.g. tightly sealed joints, ensuring full refrigerant charge during equipment operations) • Good maintenance and servicing practices (e.g. periodic cleaning of heat exchangers) • Periodic operations and maintenance checks • Equipment servicing through qualified and trained technicians
Sector and national level actions	
Strengthening standards for operation	<ul style="list-style-type: none"> • Introduction of standards and labelling programmes for minimum energy efficiency performance • Integrated energy efficiency standards for end-use applications, including installation and maintenance practices • Introduction of standards of safe and efficient use of equipment including good maintenance practices⁵⁷
Integrated regulatory standards and policies	<ul style="list-style-type: none"> • Development of policies promoting energy efficiency and climate-friendly refrigerant standards • Bulk procurement programmes (government or other) for energy-efficient equipment using low/zero GWP refrigerants • 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) • Integrated housing finance policies for the adoption of energy-efficient equipment for existing and new buildings • Policies for energy-efficient and climate-friendly technologies in different industry segments (e.g., cold chain, tourism applications) • Policies to develop incentive programmes for utility companies to encourage the use of energy-efficient equipment • Policies for the adoption of not-in-kind technologies, wherever feasible

III. ANALYSIS OF THE MINIMUM INFORMATION NEEDED FOR THE DEVELOPMENT OF TRAINING AND COMPETENCY-BASED CERTIFICATION PROGRAMMES AND MODULES FOR SERVICE TECHNICIANS AND CUSTOMS OFFICERS FOR THE TRANSITION TO ALTERNATIVES

84. As previously mentioned, Article 5 countries are currently at different stages of implementation of their HCFC phase-out plans, and at different levels of development of the capacities already established for addressing the phase-out of controlled substances related to the refrigeration servicing sector.

85. While common elements could be used by all countries to design training for technicians and customs officers, bilateral and implementing agencies have pointed out that it is important to maintain flexibility to determine priorities in each country based on its current status, strategic sectors, existing institutions and regulations. Similarly, legal frameworks and import/export licensing requirements vary from country to country. In some countries there are specific bodies in charge of developing technical norms and certifications, and technicians obtain a competency-based certification issued by the relevant education or labor body in the Government, while in other countries the certification can also be provided by refrigeration associations or is fully implemented by those associations.

⁵⁷ While this is not directly linked to energy efficiency, energy efficiency would be promoted through the safe adoption of low-GWP/zero-GWP refrigerants.

86. Therefore, whereas countries can profit from common technical modules that can be used as references for their customs officer and technician training, there is a preference for developing customs officer and technician training programmes and certification schemes tailored to the specific circumstances of each country over a single or harmonized approach.

Products developed to assist the refrigeration servicing sector in Article 5 countries

87. The experience gained by bilateral and implementing agencies in the refrigeration servicing sector has been continuously introduced into the manuals used as reference for training customs officers and refrigeration technicians, and into the code of good servicing practices for technicians. This experience has also been used to select basic service tool kits for technicians, identification kits of controlled substances mainly used by customs authorities at ports of entry, and cost-effective recovery and recycling units.

88. Furthermore, under UNEP CAP, the Executive Committee has approved funding for the development of tools, products and services that can be used by all Article 5 countries when implementing activities in the refrigeration servicing sector. A summary of these products is listed in Table 6 and more detailed information is included in Annex III.

Table 6. Tools, products and services for the refrigeration servicing sector developed by UNEP CAP

Product	Brief description
Factsheets/Briefs	
Kigali kit (20 factsheets, poster, handbook)	OzonAction factsheets, handbooks, technology/policy briefs, to raise the awareness of different stakeholders that can be disseminated and utilized by Article 5 countries to support phase-out projects and data collection activities.
Safety factsheets	
Refrigerant classification (issued every six months)	
Energy efficiency in RAC servicing sector	
Cold chain technology briefs	
Mobile applications	
WhatGas?	These OzonAction mobile applications are available to Article 5 countries to help in identifying specifications/details about controlled substances, calculating ODP/GWP values, and in supporting training of refrigeration technicians.
GWP ODP calculator	
RAC videos	
Quick guide (flammable good servicing guide e-book)	
Refrigerant identifier video series	
Air-conditioner charge size calculator	
Online tools	
Refrigeration literacy (ASHRAE)	Article 5 countries can promote the use the OzonAction-ASHRAE refrigerant e-courses to support training activities for NOUs, stakeholders, RAC technicians either under HPMPs training programmes and/or through different stakeholders, e.g., training institutes, local refrigeration associations.
Refrigeration management (ASHRAE)	
RAC training tools	
Good practice videos (new: theory and good practice videos due 2019)	Article 5 countries can use OzonAction good practice videos to support training/capacity building of technicians either under HPMPs training programmes and/or through different stakeholders, e.g., training institutes, local refrigeration associations.
Universal training kit	Article 5 countries can use the OzonAction global training kit (a comprehensive modular package) to support training activities for refrigeration technicians at local training institutes/centres either under HPMPs or other programmes.

Product	Brief description
Refrigerant driving license (RDL) (a global qualification programme on sound management of refrigerants supported by international industry associations)	Article 5 countries can use of refrigerant driving license to ensure minimum level of competencies and skills acquired by the servicing sector across the refrigerants supply chain network.
Refrigerant management university course (elective course for mechanical engineering undergraduate students as per academic requirements)	Article 5 countries can utilize the OzonAction refrigerant management university course by national engineering universities and technical colleges.

IV. CONSIDERATIONS FOR FUNDING HFC PHASE-DOWN

89. Given the steep increase in refrigeration and air-conditioning equipment due to the continuous rise in the global population and the expansion of the food cold chain, the refrigeration servicing sector will become increasingly relevant in all Article 5 countries until the phase-down compliance targets under the Kigali Amendment are achieved.

Joint implementation of decisions XIX/6 and XXVIII/2 in regard to the refrigeration servicing sector: overlapping schedule of HCFC phase-out and HFC phase-down

90. The initial years of the phase-down of HFCs will overlap with the phase-out of the remaining consumption of HCFCs, which, for the majority of Article 5 countries, would be mainly used in the refrigeration servicing sector. Moreover, based on the survey of ODS alternatives submitted by 119 Article 5 countries, it is expected that over 70 per cent of the consumption of HFCs in non-LVC countries and over 95 per cent of consumption in LVC countries will be used in the refrigeration servicing sector.⁵⁸

91. Therefore, the overlapping schedule of HCFC phase-out and HFC phase-down could represent an opportunity for Article 5 countries to plan comprehensive, cost-effective and longer-term strategies for their refrigeration servicing sector, taking into account the proper management of all the refrigerants being used (including both controlled and non-controlled alternatives), and the need to strengthen relevant institutions and stakeholders, ensuring a proper and sustained replacement of ozone depleting and/or high-GWP refrigerants by low-GWP refrigerants. This would entail a unique holistic overarching refrigerant management strategy for the servicing sector, strengthening and enhancing the infrastructure and institutions in place, as formalizing the refrigeration servicing sectors.

92. Specifically:

- (a) Developing an overarching strategy for early staged introduction, adoption and/or optimization of low-GWP alternative technologies in the refrigeration sector in local markets prevailing in Article 5 countries, avoiding, as feasible, replacement of HCFC-based technologies with high-GWP HFC-based technologies, thus reducing the servicing needs of high-GWP HFCs;
- (b) Strengthening the introduction of relevant standards, codes and norms that facilitate the safe adoption, operation and servicing of low-GWP based technologies/refrigerants;
- (c) Supporting the development of comprehensive regulatory frameworks for refrigerants management including, among others, certification of technicians, licensing of enterprises/workshops, labelling, record keeping, reporting, accessibility to sell/buy

⁵⁸ It is to be noted that surveys on ODS alternatives were not submitted by the largest consuming countries, including Brazil, China and India.

refrigerants, enforcement and monitoring tools, and capacity building programmes for authorities and stakeholders; and assess emerging needs and support enforcement mechanisms;

- (d) Reviewing the curricula of the training programmes for customs and enforcement officers addressing the obligations under the Montreal Protocol including its Kigali Amendment; developing a core common curriculum and training programmes that could be used by all bilateral and implementing agencies, with updates every two years to reflect technology developments;
- (e) Strengthening the capacity of the national vocational training system and national certification bodies by reviewing the curricula of the training programmes for refrigeration technicians to address issues related to reducing the emission of refrigerants into the atmosphere, reducing energy consumption based on well-maintained and well-serviced equipment, and addressing safety issues related to flammability and/or toxicity of refrigerants being phased in;
- (f) Developing (or strengthening if in place) a robust self-sustained refrigerant containment strategy to ensure that currently installed equipment can continue operating until end-of-life, and considering , *inter alia*: the capability of the equipment and ancillary components (e.g., cylinders, refrigerant identifiers) to recover, recycle or reclaim both HCFCs and HFCs, including blends; the potential reuse of zeotropic blends, as after leakages those blends could lose their original refrigerant composition; proper management of potentially increasing amounts of non-reusable gas recovered (due to a large amount of zeotropic blends in the market); an analysis of the benefits and challenges of recovering, recycling and reclaiming flammable refrigerants; and an assessment of the economic feasibility of reclamation facilities, particularly for zeotropic blends and their components;
- (g) Strengthening the technical support to the assembly, installation and initial-charge subsector as it could influence the introduction of refrigeration technologies in Article 5 countries;
- (h) Introducing monitoring and reporting tools that can measure impacts of activities and programmes in the servicing sector;
- (i) Assessing the long-term sustainability of activities implemented in the refrigeration servicing sector through business models and/or additional resources;
- (j) Strengthening refrigeration and air-conditioning associations, ensuring their engagement in the implementation of activities and in promoting sound practices in local markets;
- (k) Developing database/directory for the servicing sector that include licensed and certified technicians, enterprises, training centres, and distributors of refrigerant and equipment; and
- (l) Utilizing the global products developed by UNEP CAP and other international organizations listed in Annex III to assist the refrigeration servicing sector.

Considerations for funding HFC phase-down

93. Up to the approval of the guidelines for the preparation of RMPs and the first group of RMP proposals at the 23rd meeting, activities in the refrigeration servicing sector were approved as stand-alone projects and funded on a case-by-case basis taking into consideration the prevailing circumstances at the country level, such as population size and geographical distribution of economic activities; level of

consumption of controlled substances in refrigeration and air-conditioning systems in operation; the characteristics of the service workshops; and the technical skills of servicing technicians.

94. RMPs constituted a multi-year phase-out plan in which LVC countries committed to achieving a 50 per cent reduction of their CFC baseline for compliance by 2005, with the funding approved for them. At its 35th meeting (December 2001), the Executive Committee decided to provide LVC countries with additional funding to develop their RMP updates, calculated at 50 per cent of the funding provided for their RMPs (decision 35/57), for those LVC countries that committed to achieving an 85 per cent reduction of their CFC baseline for compliance by 2007. Subsequently, at the 45th meeting (April 2005), further assistance was provided for LVC countries for the post-2007 period to achieve complete phase-out of CFCs through TPMP proposals. Funding for TPMPs was subject to the level of CFC consumption baseline set out in an agreed table.⁵⁹ For the reduction in the CFC consumption in the refrigeration servicing sector, non-LVC countries received assistance as part of their NPPs, based on a cost-effectiveness of US \$5.00/kg.

95. For the phase-out of HCFCs, activities in the refrigeration servicing sector were included in the HPMPs for both LVCs and non-LVCs. Funding for those activities were based on the experience gained during the implementation of RMPs, TPMPs and NPPs. For non-LVC countries, funding was approved at US \$4.50/kg for stage I of HPMPs and US \$4.80/kg for stage II of HPMPs, while for LVC countries funding was based on the level of HCFC consumption in the servicing sector as shown in Table 7.

Table 7. Level of funds approved to LVCs under HPMPs (stage II) (decision 74/50(c)(xii))

Consumption in the servicing sector (mt)	Maximum funding eligible (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

(*) US \$164,500 for stage I (decision 60/44) and increased for stage II in decision 74/50.

(**) US \$210,000 for stage I (decision 60/44) and increased for stage II in decision 74/50.

Considerations to determine assistance for HFC phase-down

96. As discussed in this document, all the categories of costs eligible for the servicing sector agreed by the Executive Committee and to be included in the cost calculation for HFC phase-down have already been funded in the past as part of assistance for the refrigeration servicing sector. These categories are public-awareness activities; policy development and implementation; certification programmes and training of technicians on safe handling, good practices and safety in respect of alternatives, including training equipment; training of customs officers; prevention of illegal trade of HFCs; servicing tools; refrigerant testing equipment for the refrigeration and air-conditioning sector; and recycling and recovery of HFCs.

⁵⁹ US \$205,000 for countries with CFC baseline below 15 ODP tonnes, US \$295,000 for countries with baselines between 15 to 30 ODP tonnes; US \$345,000 for countries with baselines between 30 to 60 ODP tonnes; US \$520,000 for countries with baselines between 60 to 120 ODP tonnes; and US \$565,000 for countries with baselines above 120 ODP tonnes.

97. Preliminary considerations to determine the level and modality of funding required for HFC phase-down in the refrigeration servicing sector include:

- (a) In line with paragraph 16 of decision XXVIII/2, whether to increase in relation to the servicing sector the funding available under decision 74/50 for LVC countries (Table 7) when needed for the introduction of alternatives to HCFCs with low- and/or zero-GWP refrigerants and maintaining energy efficiency in the servicing/end-user sector;
- (b) In line with paragraph 23 of decision XXVIII/2, whether to consider early approval of technical assistance and capacity building to facilitate the safe adoption of low- and/or zero-GWP alternatives;
- (c) The additional challenges that have been summarized in the present document, as well as the synergies from implementing activities that benefit both HCFC phase-out and HFC phase-down, taking into consideration the funding levels to ensure compliance with the phase-down steps, rather than a specific tonnage to be phased out. Such an approach would allow Article 5 countries flexibility to allocate funding to strategic priorities based on their consumption (e.g., support introduction of specific technologies in specific sectors, address assemblers, prioritize specific refrigerants to phase down); and
- (d) Whether to consider energy efficiency and the disposal of unwanted refrigerants separately under the HFC cost guidelines.

V. RECOMMENDATION

98. The Executive Committee may wish:

- (a) To note the preliminary document UNEP/OzL.Pro/ExCom/82/64 on all aspects related to the refrigeration servicing sector that support the HFC phase-down; and
- (b) To take into consideration the document in determining the level and modality of assistance required to phase down HFC in the refrigeration servicing sector.

Annex I

RELEVANT DECISIONS RELATED TO THE REFRIGERATION SERVICING SECTOR ADOPTED BY THE EXECUTIVE COMMITTEE AND THE PARTIES TO THE MONTREAL PROTOCOL

Decision Number	Sector/ Sub-sector/Title	Decision Text
12 th ExCom meeting (Annex v)	Recovery, reclamation and recycling	The Eighteenth Meeting of the Executive Committee decided to consider the provision of recovery/recycling equipment to commercial refrigeration companies in projects related to servicing and recovery/recycling in the refrigeration sector in the future.
12 th ExCom meeting (para 159-160)	Mobile air-conditioning (MAC)	The Twelfth Meeting of the Executive Committee adopted the following recommendations on mobile air conditioners (MAC) project proposals: (a) that Article 5 countries be encouraged to pursue a more aggressive recycling and reclamation programme in the MAC sector, and to convert their CFC-12 MAC production plants to HFC-134a technology for new vehicles. Implementing agencies should be requested to intensify their efforts in the implementation of investment projects and technical assistance activities already approved by the Executive Committee and to prepare new investment projects in those areas. (b) that Article 5 countries be encouraged to develop and adopt regulatory measures for better containment and recycling and conversion of MAC manufacturing to HFC-134a technology. Implementing agencies should provide the necessary assistance in transferring the available knowledge and experience for this particular area within their technical assistance activities. (c) that approval of projects in MAC retrofitting be delayed until the retrofitting technology is proven cost-effective and is adequately mature to be transferred to Article 5 countries. The Executive Committee may wish to request the Secretariat to follow closely the progress in the development of retrofitting technology in the developed countries and to report to the Executive Committee on the state-of-the-art situation. (d) that the Executive Committee should encourage Article 5 countries to adopt necessary measures to regulate import of vehicles with CFC-12 based MACs. The Executive Committee further recommended that in countries where specific data were not available, appropriate pilot studies should be supported by the Fund when presented to facilitate making a cost-effective choice. Such studies should only be undertaken if they were cost-effective.
12 th ExCom meeting (para 159-160)	Chillers	The Twelfth Meeting of the Executive Committee adopted the following recommendations on chiller project proposals: (a) 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 global warming potential) and indirect effects (system energy efficiency), and to human health and safety aspects. (b) that the Executive Committee approves refrigerant containment and better operation and maintenance practices, including recovery/recycling/reclamation as a strategic option in ODS phase-out in the chiller sector in Article 5 countries. Article 5 countries should be encouraged to pursue a more aggressive refrigerant containment programme, including recovery/recycling/reclamation. The Implementing Agencies should be requested to intensify their efforts in formulation of new investment projects in this area. (c) that the Executive Committee approves conversion of CFC-based chiller manufacturing facilities as a strategic option of ODS phase-out in the chiller sector. The Implementing Agencies should be requested to increase their activities in identifying and preparing project proposals in this area. (d) that the Executive Committee approves the replacement of CFC chillers as a first priority of strategic options in ODS phase-out in the chiller sector. Implementing agencies should be requested to focus their activities on the replacement options in addressing ODS phase-out in the chiller sector. Energy savings should be taken into consideration when calculating the incremental costs of replacement. (e) that the Executive Committee defer consideration of projects to retrofit chillers, except in special cases and when definite substitutes are used. (f) that the Executive Committee encourages the governments in Article 5 countries to give full consideration to appropriate regulatory and legislative action facilitating the implementation of CFC phase-out projects in the chiller sector. These should include an immediate cessation in the installation of new CFC chillers.
ExCom 17/12	Recovery and recycling of refrigerants	The Seventeenth Meeting of the Executive Committee decided that there should be an investigation of the practicality and implications of taking operating savings resulting from recovery and recycling into account and adjusting at a subsequent meeting of the Executive Committee institutional-strengthening grants or any other Fund-supported activity related to ozone layer protection for the country concerned on the basis of reported quantities of recovered ozone-depleting substances. This would not apply to small demonstration projects, and requested the Secretariat to prepare a paper on the subject for submission to the Committee at its Eighteenth Meeting.

Decision Number	Sector/ Sub-sector/Title	Decision Text
ExCom 20/4	Refrigerant management plans (RMPs)	The Twentieth Meeting of the Executive Committee decided: (a) to request Implementing Agencies, when preparing institutional-strengthening projects for low-volume ODS consuming countries, to give due consideration to the need for formulating a refrigerant management plan, including a recovery and recycling project in the refrigeration sector; (b) that, while the Implementing Agencies could proceed immediately with the disbursement of the first one-year tranche of the funds approved for institutional strengthening in low-volume ODS consuming countries, subsequent disbursements would be contingent on the submission of a report to the Executive Committee on the status of development of a refrigerant management plan, including a recovery and recycling project, for the country concerned.
ExCom 21/40	Training guidelines	The Twenty-first Meeting of the Executive Committee decided: (a) to take note of the discussion paper for the establishment of training guidelines for identification of needs and coordination of activities (UNEP/OzL.Pro/ExCom/21/35), as introduced by the representative of UNEP; (b) to note that, at the Twenty-first Meeting of the Executive Committee, there was insufficient time to have a full discussion of the paper; (c) to invite members of the Committee who wished to do so to submit written comments on the paper to the Secretariat and UNEP; (d) to request UNEP, in consultation with the Secretariat and the other Implementing Agencies, to proceed with the development of the training guidelines in line with the framework proposed in the discussion paper, taking into account the comments received in writing from members of the Committee.
ExCom 21/5	RMPs	The Twenty-first Meeting of the Executive Committee decided: (a) to take note of the 1997 business plans of the Implementing Agencies; (b) to request the Implementing Agencies to revise their 1997 business plans in the light of Executive Committee decision 21/3, subparagraph (b), and in conformity with its decisions 21/11, 21/12, 21/13 and 21/14, on the 1997 work programmes of the Implementing Agencies, and to submit them to the Executive Committee at its Twenty-second Meeting; (c) to request the Implementing Agencies, when implementing their 1997 business plans, to integrate the preparation of projects for national recovery and recycling in low-volume-consuming countries into refrigerant management plans; (d) to request the Secretariat to work with the Implementing Agencies to develop more standardized criteria for evaluating their performance so that it would be possible to examine the relative performance of the agencies prior to consideration of their 1998 business plans; (e) to request the Secretariat to work with the Implementing Agencies to produce a summary status report for each Article 5 country that would, using the latest available data, include information on the consumption of each country, the number of tonnes to be reduced through implementation of projects already approved by the Fund, the status of implementation of such projects, the amount of ODS that was expected to be reduced through planned approvals in 1997, and an indication of the relative difficulty that each country might face in meeting the 1999 freeze and, as far as practicable, subsequent control measures; (f) to request the Secretariat to submit a report to the Executive Committee on the exercises referred to in subparagraphs (d) and (e) above. The Monitoring, Evaluation and Finance Sub-Committee established by decision 21/35 would consider this report and make recommendations to the Executive Committee.
ExCom 22/22	Recycling projects in CFC-producing countries	The Twenty-second Meeting of the Executive Committee decided: (a) to note the potential usefulness of demonstration projects for refrigeration recovery and recycling in other ODS-producing countries; (b) to note that, while in many cases there may be financial benefits in recycling projects, there could be cases in which the operational costs of refrigerant recovery and reclamation projects could exceed their benefits; (c) to note that measures needed to support recovery and recycling projects needed to be appropriate to local circumstances and could involve, for example, incentives affecting the operational level or regulatory measures.
ExCom 22/23	RMPs	The Twenty-second Meeting of the Executive Committee decided: (a) that future refrigerant recovery and recycling projects should be prepared within the context of the refrigerant management plan/strategy of the country concerned; but that small demonstration projects designed to inform a larger country could be considered; (Note: as amended by Decision 23/16). (b) to urge the Implementing Agencies to work with the countries concerned to ensure that the prerequisites for success were put in place before refrigerant recovery and recycling projects were implemented; (c) to request the Implementing Agencies to make available to the consultants responsible for implementation of the proposed Multilateral Fund monitoring and evaluation exercise information on, inter alia, the extent to which refrigerant recovery and recycling projects had succeeded in reducing consumption of ODS and on the lessons learned from their implementation, bearing in mind that the majority of consumption was the result of poor servicing practices; (d) to request UNDP to make available to the Executive Committee, when completed, some of the evaluations that were being carried out by the United Nations Office for Project Services (UNOPS) on ongoing refrigerant recovery and recycling projects. Other Implementing Agencies that had completed recycling projects should also be requested to submit information on the results of those projects; (e) to take note of the view that it was necessary to take account of the costs involved in undertaking the necessary support measures for refrigerant recovery and recycling projects, such as training and efforts to reduce CFC emissions resulting from leakages; (f) to urge the Implementing Agencies to take time at the forthcoming fifteenth meeting of the Open-Ended Working

Decision Number	Sector/ Sub-sector/Title	Decision Text
		Group of the Parties to the Montreal Protocol to reach out to, and develop appropriate assistance requests for, all Parties that had not yet received Fund assistance and might be in danger of not meeting the freeze; (g) to request the Secretariat, the Implementing Agencies, Parties involved in bilateral co-operation activities and other interested members of the Executive Committee to meet before the next meeting of the Committee to elaborate draft guidelines for refrigerant management plan projects for the consideration of the Sub-Committee on Project Review and the Executive Committee at its Twenty-third Meeting.
ExCom 22/24	Development of RMPs	The Twenty-second Meeting of the Executive Committee decided: (a) to request UNEP, in consultation with the Secretariat, the Implementing Agencies and members of the Executive Committee, to review the proposed guidelines for refrigeration management plans and bring forward a revised proposal to the September 1997 meeting of the Sub-Committee on Project Review, with comments from members of the Executive Committee to be provided by the end of June 1997; (b) to authorize low-volume-consuming countries that have approved country programmes and now need to take near-term action in this area to meet the freeze, to submit refrigeration management plans based on the draft guidelines recommended by the Sub-Committee on Project Review (with the input coming from the consultations noted in subparagraph (a) above) along with any associated projects, to the next meeting of the Executive Committee and, in this respect, to approve US \$140,000 for UNDP and US \$60,000 for UNIDO for this purpose; (c) to urge the Implementing Agencies not to view this discussion as an opportunity to develop recycling programmes, but rather as an opportunity to help countries think through the measures they need to take to facilitate compliance with the Protocol. In this regard, recycling projects should not be proposed unless there are incentives or regulatory measures that will be in place prior to proposed implementation of any proposed recycling projects to ensure that such projects will be sustainable; (d) to request UNEP to adjust country programmes presently under preparation to accommodate the requirements of the draft guidelines for refrigeration management plans as recommended by the Sub-Committee on Project Review and to urgently finish that work; (e) in cases where no country programmes for very-low-/low-volume-consuming Parties have yet to be started, to request UNEP to reach out to those countries to develop refrigeration management plan/country programme combination documents based on the draft guidelines, authorizing US \$200,000 for this initial UNEP work and requesting UNEP to report on the status of related activities at the Twenty-third Meeting of the Executive Committee.
ExCom 23/15	RMPs	The Executive Committee decided that the Guidelines for the Preparation of Refrigerant Management Plans be approved, subject to the insertion of the following new section before Section 3 - Principles and Steps in Formulating RMPs: "SECTION 2 OVERALL OBJECTIVE. The overall objective of a Refrigerant Management Plan is to develop and plan a strategy that will manage the use and phase-out of virgin CFC refrigerants for servicing refrigeration and air-conditioning equipment."
ExCom 23/48	Training guidelines	The Twenty-third Meeting of the Executive Committee decided: (a) to note the Training Guidelines for Identification of Needs and Coordination of Activities contained in UNEP/OzL.Pro/ExCom/23/Inf.4; (b) to authorize UNEP/IE to proceed with their implementation.
ExCom 25/32 (para 64(c)(d))	Training	The Executive Committee, having noted the comments and recommendations of the Sub-Committee on Project Review (UNEP/OzL.Pro/ExCom/25/17, paragraphs 46 to 50), decided: (c) To request that the possibility of carrying out more cost-effective regional training be considered in future projects. (d) to request the Secretariat to undertake further study on the question of the gains arising from recovered and recycled ozone-depleting refrigerants, which would lead to a renewed discussion within the Sub-Committee on the issue of offsetting benefits in large recycling efforts.
ExCom 26/33	Customs training	The Twenty-sixth Meeting of the Executive Committee also decided: (b) to stress the need for each country to obtain and ensure reliable data on imports of ODS, particularly through a system of import licensing and control, and in that context customs training was of special importance; (c) to request the Fund Secretariat to notify the Implementation Committee of the Montreal Protocol of this problem at its next meeting in Cairo and suggest that the Implementation Committee might send letters to the Governments of Malawi and of the United Republic of Tanzania requesting them to provide updated data on ODS consumption.
ExCom 26/34	Installation, assembly and charging subsector	The Sixty-second Meeting of the Executive Committee decided:(a) To request bilateral and implementing agencies, when submitting projects related to the installation, assembly and charging sub-sector, to demonstrate that each of those enterprises participating in the project had invested in equipment, development of products, or training of personnel specific to HCFC technology significantly exceeding the level of such investments prevalent in the service sector; and (b) That the activities foreseen for those enterprises represented incremental costs.
ExCom 27/19	Customs training and legislation	The Twenty-seventh Meeting of the Executive Committee decided: (a) that no funds should be expended on customs-training projects until either the relevant legislation was already in place or substantial progress had been made towards promulgating such legislation; (b) to request Implementing Agencies to transfer to countries that were in the process of preparing legislation information on ODS issues of relevance to customs authorities so that,

Decision Number	Sector/ Sub-sector/Title	Decision Text
		as stakeholders, they would be able to provide informed inputs into the legislation preparation process; (c) to examine, mindful of its decision 25/32, customs-training projects on a case-by-case basis in order to determine whether or not chemical-identification equipment should be included in them.
ExCom 27/35	Customs training and legislation	The Executive Committee also decided: (a) no funds should be expended on customs-training projects until either the relevant legislation was already in place or substantial progress had been made towards promulgating such legislation; (b) UNEP is requested to transfer to countries in the process of preparing legislation, information on ODS issues of relevance to customs authorities so that, as stakeholders, they would be able to provide informal inputs into the legislation-preparation process.
ExCom 28/10	Recovery, recycling and reclamation	The Twenty-eighth Meeting of the Executive Committee decided to request those Implementing Agencies to report to its Twenty-ninth Meeting on the steps taken at the national level to expedite the provision of the necessary regulatory and legislative measures required for successful recovery and recycling projects.
ExCom 28/44	End-user conversion in commercial refrigeration	The Twenty-eighth Meeting of 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; 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. 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.
ExCom 31/15	Desk study on recovery and recycling projects	The Thirty-first Meeting of the Executive Committee decided: (a) the Implementing Agencies should seek information from governments and/or national ozone units on the status of all the recovery and recycling projects they have implemented so as to ascertain whether they are in operation. The reports should be based on a standardized format for data collection, both at the individual equipment user level and as summarized information at the project level. This format should be developed by the Senior Monitoring and Evaluation Officer in consultation with the Implementing Agencies and interested national ozone units, and should be presented to the Executive Committee at its 32nd meeting; (b) an evaluation of recovery and recycling projects should be undertaken, particularly for those projects implemented as a component of a refrigerant management plan, as soon as they had been monitored for a reasonable period and data had been collected by the national ozone units and the Implementing Agencies and forwarded to the Multilateral Fund Secretariat. Depending on the information received from the national ozone units and the Implementing Agencies, as well as that contained in the project completion reports, the evaluation could be undertaken under the 2001 or 2002 work programme for monitoring and evaluation. The terms of reference for the evaluation would be presented to the Executive Committee for consideration. The draft terms of reference would take account of comments made by members of the Sub-Committee on Monitoring, Evaluation and Finance at its 11th meeting; (c) the national ozone units together with the Implementing Agencies should also be requested to obtain costing data for recovery and recycling which should include the operating cost of equipment, to arrive at the

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		cost of recovery and recycling, as well as the price trends in refrigerants. The data would permit the conditions for economically viable recycling and recovery operations to be determined, and they should be made available to the Implementing Agency, with a copy to the Multilateral Fund Secretariat.
ExCom 31/17	Training projects	The Thirty-first Meeting of the Executive Committee decided: (a) to take note of the findings and recommendations in the report on the evaluation of training projects prepared by the Senior Monitoring and Evaluation Officer (UNEP/OzL.Pro/ExCom/31/20); (b) to request the members of the Executive Committee to submit their comments on the report within 60 days of the adoption of its decision; (c) to request the Senior Monitoring and Evaluation Officer to circulate the reports on the countries evaluated for their comments; (d) to further request the Senior Monitoring and Evaluation Officer to prepare a recommendation on the matter for the 32nd meeting of the Executive Committee, taking into account the comments made by the members of the Executive Committee, the observations made during the 11th meeting of the Sub-Committee, and the views of the countries covered by the evaluations, as well as any further observations submitted by the Implementing Agencies.
ExCom 31/45	Assembly, installation and servicing of refrigeration equipment	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; (b) to pay attention to projects submitted under guidelines 3 and 4, in particular to determine whether there is any eligible incremental cost; (c) to consider projects on a case-by-case basis in order to gain experience.
ExCom 31/48	RMPs	The Executive Committee decided: A. Already approved refrigerant management plans (RMPs) for low-volume-consuming countries (LVCs) (a) To request national ozone officers, with the assistance of the implementing agency concerned, to review and assess the content, implementation to date and expected outcomes of their RMPs against their objective to phase out all consumption in the refrigeration sector according to the Montreal Protocol timetable. In undertaking this review, national ozone officers should: (i) Calculate current and forecast future consumption in relation to the freeze, 50% cut in 2005, 85% cut in 2007 and phase-out in 2010 and calculate the size of consumption cuts in the refrigeration sector required to meet these targets; (ii) Include forecast cuts in consumption attributable to the activities already approved under the RMP, including training activities and recovery/recycling; (iii) Ensure that the current and expected future consumption of all subsectors, including the informal sector, small and medium-sized enterprises and mobile air conditioners, are included in the review; (iv) For each activity identified, consider the cost and means of funding, including national financing; (v) Ensure that the RMP and government strategy for delivering phase-out includes adequate provision for monitoring and reporting on progress; (b) That LVCs (or groups of LVCs) with already approved RMPs may submit to the Executive Committee requests for funding additional activities necessary to reduce consumption and thereby ensure compliance with the Protocol. Such additional activities should be essential parts of their comprehensive strategy for phase-out in the refrigeration sector. Additional funding shall not exceed 50% of the funds approved for the original RMP or, where relevant, RMP components. With the possible exception of the post-2007 period noted in subparagraph (d) below, no further funding beyond this level, including funding related to retrofits, would be considered for activities in this sector; (c) That requests for additional funding consistent with subparagraph (b) above should be accompanied by: (i) A justification for the additional activities to be funded in the context of the country's national phase-out strategy; (ii) A clear explanation of how this funding, together with the initial RMP funding and steps to be taken by the government, will ensure compliance with the Protocol's reduction steps and phase-out; (iii) A commitment to achieve, without further requests for funding for the RMP, at least the 50% reduction step in 2005 and the 85% reduction step in 2007. This shall include a commitment by the country to restrict imports if necessary to achieve compliance with the reduction steps and to support RMP activities; (iv) A commitment to annual reporting of progress in implementing the RMP and meeting the reduction steps; (d) That it will review in 2005 whether further assistance is needed for the post-2007 period, and what assistance the Fund might consider at that time to enable full compliance with the Protocol's phase-out requirements; B. Preparation and approval of new RMPs for LVCs (e) That the project preparation phase for RMPs should, as intended by the existing guidelines, include a full survey of CFC consumption in all subsectors, the development of a comprehensive government phase-out strategy and a commitment by the government to enact regulations and legislation required for the effective implementation of activities to phase out the use of CFC refrigerants. To enable these preparatory activities, including the development of legislation and regulations, to be completed in full, the funding provided for the project preparation phase should be double the level traditionally provided; (f) That the provisions relating to existing RMPs in section A, subparagraphs (a), (c) and (d) above shall also apply to new RMPs submitted pursuant to this decision; (g) That in lieu of the ability given to already approved RMPs to request additional funds, the total level of funding for the implementation of new RMPs could be increased by up to 50% compared to the level of RMP funding typically approved to date, with flexibility for the country in selecting and

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		implementing the RMP components which it deems most relevant in order to meet its phase-out commitments. With the exception of the post-2007 phase noted in section A, subparagraph (d) above, no further funding beyond this level, including funding for retrofits, would be considered for activities in this sector; (h) That the following text should be added to the RMP guidelines (decision 23/15) after the last bullet in section 3.1: "The elements and activities proposed for an RMP, whether they are to be funded by the Multilateral Fund or the country itself, should reflect the country's particular circumstances and address all relevant sectors including the informal sector. They should be sufficient to ensure fulfilment of the countries' control obligations at least up to and including the 85% reduction in 2007, and should include mechanisms for reporting progress." C. RMPs for higher-volume-consuming countries (i) That, taking into account the need for large consuming countries to initiate planning for dealing with this large and complex sector, as well as the related decision of the Meeting of the Parties, it will consider requests for funding the development of long-term strategies for the refrigeration sector for high-volume-consuming countries. High-volume-consuming countries that have not yet undertaken country programme updates should undertake this strategic RMP development in the context of such updates, consistent with any Executive Committee guidance on country programme updates; (j) That future Executive Committee decisions on funding the implementation of the elements of such RMP strategies should take into account the relative priority in national government planning of CFC reductions in the refrigeration sector and the availability of other reduction opportunities in meeting the country's control obligations; (k) That, in that context, the Executive Committee may consider whether certain activities often considered to be part of an RMP (such as training of customs officers) could be initiated before an RMP was developed.
ExCom 32/10 (para.21 (b))	RMPs	The Thirty-second Meeting of the Executive Committee decided to request UNDP to comply with Decision 31/48 for countries which apply for the 50 per cent increase to their current RMP funding level. Funding requests should be accompanied by a justification for the proposed additional activities based on a full assessment as described in Decision 31/48, para. (a), and a clear explanation of how this funding will ensure compliance with the Montreal Protocol phase-out schedule to January 2007.
ExCom 32/16	Recovery, reclamation and recycling	The Thirty-second Meeting of the Executive Committee decided to request the Senior Monitoring and Evaluation Officer to review the objectives of the evaluation exercise with a view to improving the exercise and lightening the burden on respondents. That did not imply that the same procedures would apply to all recovery and recycling projects in the future.
ExCom 32/19	Customs training evaluation	It is recommended: 1. that all future non-investment activities related to the refrigeration servicing sector in low-volume countries (such as training of technicians in good services practices and customs training) should continue to be part of the Refrigerant Management Plan in order to place them in the context of a comprehensive plan for sector phase-out. For non low-volume countries, projects such as training of technicians and training of customs officers would be prepared in the framework of a national long-term strategy for the refrigeration sector and considered in accordance with Decision 31/48, part C. When preparing new RMPs, as well as during implementation of approved RMPs, training activities related to the refrigeration servicing sector and customs officers should build on the results of any earlier training activities. Consideration should be also given to strengthen the relevant industry associations and to involve them more closely in project preparation and implementation. 2. that during the compliance period, the capacity of NOUs for development of national policies and regulations regarding monitoring and controlling consumption and trade of ODS and ODS-based equipment should continue to be enhanced. 3. that countries are encouraged to develop a certification system to recognize those trainees who have successfully participated in training programmes through appropriate regulations or other policies. Such regulations are most effective when they are developed with active industry participation and create common certification requirements across the country, either through national legislation or regulations consistent across states/provinces. 4. that national and regional activities should be planned and implemented in a complementary way. Regional workshops/seminars should focus on issues of common interest and should address priority requests in the region. National training programmes should respond to the specific requirements of countries concerned. 5. that a list of relevant past and planned training events, bilateral and multilateral, should be made available by UNEP as part of its information exchange activities to all Parties. It would enable the Parties to consult such information on a timely basis and eliminate the possible duplication of similar events world-wide. 6. that project proposals should include baseline data and indicators by which the results of the project could be assessed. Adequate monitoring systems should be developed to facilitate subsequent reporting on the results of training activities, and each project should foresee a budget line and adequate time for monitoring and reporting. 7. that the PCR format for non-investment projects used for reporting on training projects should be revised. The PCR should correspond to the related indicators defined for the approved project and should include information on the results and follow-up of training projects. 8. that the model of charging participants' fees for training of technicians, as included in the relevant German (GTZ) bilateral projects, in order to make training programmes sustainable should be closely monitored. If successful,

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		countries should be encouraged to adopt it for future projects. 9. that national training handbooks, similar to the ones prepared for 10 African countries by GTZ, should be produced as part of the training materials for other countries as well, taking into account previous training materials developed. 10. that innovative solutions should be developed to reach out with training to the informal sector.
ExCom 32/27	Licensing systems	The Thirty-second Meeting of the Executive Committee decided that it was prepared to approve project proposals for the development of implementation of licensing schemes. In that process, the Secretariat would be requested, in each case, to seek information from countries on the status of their ratification of the Montreal Amendment, as well as whether they had a licensing system in place, and to report such information to the Executive Committee
ExCom 32/28	RMPs	The Thirty-second Meeting of the Executive Committee decided that project proposals for incentive programmes to encourage retrofitting of refrigeration equipment could be submitted within an RMP, on the understanding that, where the project was to make use of the 50 per cent additional funding for an existing RMP available under Decision 31/48: (a) the Implementing Agency concerned should consult with the country and all other agencies implementing components of the RMP; (b) the country concerned was fully informed about all the investment and non-investment activities which might be available; (c) the timing of the proposed activity was appropriate for the country's circumstances.
ExCom 32/9	Training projects	The Thirty-second Meeting of the Executive Committee, having considered the report on evaluation of training projects decided to adopt the recommendations contained in Annex IX.5.
ExCom 33/13	Funding of updates of RMPs	The Thirty-third Meeting of the Executive Committee decided: (a) proposals to update refrigerant management plans should be in conformity with decision 31/48 and should be accompanied by: (i) a progress report from Implementing Agencies on the status of work being undertaken in the projects approved as part of the refrigerant management plan; and (ii) a written justification from countries for additional activities, explaining how the additional activities were related to the refrigerant management plan and the country's phase-out commitments. (b) the level of funding of such requests could be up to 50 per cent of the level of funding approved prior to the Thirty-first Meeting for the preparation of the original refrigerant management plan; (c) approval of the additional funding would be contingent on submission of the progress reports and the written justification referred to above.
ExCom 33/49	RMPs/ Terminal Phase-out plans (TPMPs)	Having considered the recommendation of the Sub-Committee on Project Review (UNEP/OzL.Pro/ExCom/33/17, paras. 87 and 88), the Executive Committee decided: (a) To invite members to provide comments in writing to the Secretariat on the draft prerequisites and guidelines, as contained in document UNEP/OzL.Pro/ExCom/33/25, for compilation and presentation to the Executive Committee at a future meeting; (b) To use the current draft prerequisites and guidelines, as contained in Annex VII to the present report, in a flexible manner, on a case-by-case basis, for consideration of terminal phase-out proposals related to pending requests to be submitted to future meetings of the Executive Committee.
ExCom 33/51	Customs training	The Thirty-third Meeting of the Executive Committee decided: (a) national customs training for each country should continue to be funded. However, UNEP should look for opportunities to implement regional and sub regional customs training as a cost-effective substitute for national customs training, wherever appropriate, and should look for opportunities to make use of existing regional customs training facilities; (b) in order to reach the large number of customs officers, in the countries concerned in a cost-effective manner, national customs training should be through the "train the trainers" approach and be followed by training of customs officers by trainers; (c) for demonstration purposes, additional sub regional or regional training programmes might be considered for funding where regional trading blocs or trading agreements containing relevant regulatory mechanisms were in place, and after the results of already approved regional and sub regional training programmes had been presented to the Executive Committee for review; (d) regional and sub regional customs training activities and the regional ozone officers networks should be used to conduct outreach to representatives of regional trading blocs and customs associations with a view to encouraging the formation of informal networks for information dissemination and data management.
ExCom 35/57 (para.112(b))	RMPs	The Thirty-fifth Meeting of the Executive Committee also decided that countries shall be provided with country programme update funding that is 75 per cent of the level originally provided to them to do country programmes. Low-volume consuming countries that have done RMPs will be given 50 per cent of the funding provided to develop their original RMP to do RMP updates, but will not be given funding to do country programme updates. New country programmes should, consistent with existing Executive Committee guidelines, continue to include RMPs.
ExCom 35/58	RMPs	In view of the above considerations, the Executive Committee decided at its Thirty-fifth Meeting: (a) to encourage Article 5 countries to take advantage of the opportunity of updating the country programmes to prepare the national strategy for complying with the Montreal Protocol obligations; (b) to provide funding for national efforts in updating the country programme. Taking into consideration Decision 31/48 of the Executive Committee on funding of refrigerant management plans, funding of country programme update should be linked with the funding of RMPs. Specifically: (i) in countries where the remaining controlled substance consumed is confined to CFC refrigeration servicing and the RMP has been funded, updating the country

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		programme/RMP should be accomplished by the countries concerned when requesting the additional funding of 50 per cent of their original RMP funding level. Funding should be provided to enable countries to undertake this exercise; (ii) in countries where the preparation of the RMP or a strategy for the refrigeration sector has been funded and is under way, supplementary funding for country programme update should cover CFC consumption in other sectors and controlled substances other than CFCs; (iii) in countries where the RMP has yet to be prepared, funding of country programme update should be combined with the preparation of the RMP. (c) to request that country programme updating be completed within 12 months, on average, from the time that funding is approved by the Executive Committee; (d) to encourage Article 5 countries to take advantage of the opportunity of updating the country programme to develop performance-based sector-wide or substance-wide phase-out agreements; (e) to adopt the Format for Country Programme Update included in Annex VIII.2 to the present report, which could be augmented by countries according to their strategic planning needs; (f) to invite Implementing Agencies, in finalizing their 2002 business plans, to incorporate to the extent possible, requests for assistance for those Article 5 countries seeking to prepare country programme updates at this time.
ExCom 36/14 (b)(c)	Recovery, recycling and reclamation	The Thirty-sixth Meeting of the Executive Committee decided: (b) to remove institutional strengthening, halon banking, customs training, recovery and recycling, and demonstration projects from the list of projects with implementation delays, but to continue to monitor them, as appropriate; (c) to note that the Secretariat and the Implementing Agencies would take actions according to the assessment of status, i.e., progress, some progress, or no progress, as mandated in Decision 34/13.
ExCom 36/5 (para 38 (f)(ii))	Refrigeration servicing	The Thirty-sixth Meeting of the Executive Committee decided: (f) noting that the overall coordination of projects was the responsibility of the country concerned, that: (ii) implementing and bilateral agencies should coordinate among themselves when preparing activities for phase-out of ODS in the servicing sector, with a view to bringing to the Executive Committee one complete national proposal for the servicing sector, in line with the principles and requirements of Decision 31/48 on Refrigerant Management Plans (RMP);
ExCom 37/19	RMPs	The Thirty-seventh Meeting of the Executive Committee decided that, for RMPs in large-volume-consuming countries, interim steps should not be used in performance agreements unless the use of CFCs for manufacturing had been completely phased out, and that the agreement should result in complete phase-out as if it were part of a national CFC phase-out plan or a sector plan.
ExCom 37/70, (para. 121 (a))	Terminal Phase-out plans (TPMPs)	The Thirty-seventh Meeting of the Executive Committee decided to request the Secretariat, in collaboration with the Implementing Agencies and interested Executive Committee members to prepare a document on the issue of whether RMP activities included in business plans could be submitted as new terminal phase-out management plans if countries requested agencies to do so, taking account of the content of Decision 31/48, for consideration at the 38 th Meeting.
ExCom 37/9	Refrigeration servicing	The Twenty-first Meeting of the Executive Committee decided: (a) to take note of the 1997 business plans of the Implementing Agencies; (b) to request the Implementing Agencies to revise their 1997 business plans in the light of Executive Committee decision 21/3, subparagraph (b), and in conformity with its decisions 21/11, 21/12, 21/13 and 21/14, on the 1997 work programmes of the Implementing Agencies, and to submit them to the Executive Committee at its Twenty-second Meeting; (c) to request the Implementing Agencies, when implementing their 1997 business plans, to integrate the preparation of projects for national recovery and recycling in low-volume-consuming countries into refrigerant management plans; (d) to request the Secretariat to work with the Implementing Agencies to develop more standardized criteria for evaluating their performance so that it would be possible to examine the relative performance of the agencies prior to consideration of their 1998 business plans; (e) to request the Secretariat to work with the Implementing Agencies to produce a summary status report for each Article 5 country that would, using the latest available data, include information on the consumption of each country, the number of tonnes to be reduced through implementation of projects already approved by the Fund, the status of implementation of such projects, the amount of ODS that was expected to be reduced through planned approvals in 1997, and an indication of the relative difficulty that each country might face in meeting the 1999 freeze and, as far as practicable, subsequent control measures; (f) to request the Secretariat to submit a report to the Executive Committee on the exercises referred to in subparagraphs (d) and (e) above. The Monitoring, Evaluation and Finance Sub-Committee established by decision 21/35 would consider this report and make recommendations to the Executive Committee.
ExCom 38/38	Recovery, recycling and	Having considered the comments and recommendations of the Sub-Committee on Project Review (UNEP/OzL.Pro/ExCom/38/14, paragraphs 67 and 68), the Executive Committee decided: (a) That in future, in proposing for approval any projects that included a CFC recovery and recycling programme, the implementing agencies would: (i) Examine the possibility of collaboration for leveraging additional financing, for example from the Global Environment Facility (GEF), to fund the acquisition of machinery which could be used for recovery and recycling of both HFCs and CFCs; and (ii) Consistent with

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		previous decisions, not commence the recovery and recycling component of the RMPs until the legislation controlling CFC imports was in place and measures had been taken to ensure that the local market prices of CFCs and non-ODS refrigerants were similar; (b) For projects to phase out CFCs by conversion to HCFC technologies, Governments had officially endorsed the choice of technology and it had been clearly explained to them that no further resources could be requested from the Multilateral Fund for funding any future replacement for the transitional HCFC technology that had been selected.
ExCom 38/64	RMPs / TPMPs	The Executive Committee decided that specific requests for funding of terminal CFC phase-out plans for LVC countries might be considered on a case by case basis, provided that: (a) The country concerned has a licensing system in operation and has enacted or improved legislation to phase-out ODS consumption; (b) The Government concerned is committed to achieve, without further request for funding from the Multilateral Fund, the complete phase out of CFCs in accordance with its obligation under the Montreal Protocol; (c) The Government is committed to annual reporting of progress in implementing the activities proposed and meeting the reduction steps; and (d) Implementing and/or bilateral agency(ies) responsible for implementing the terminal phase-out plan be requested to advise the Government concerned on the financial implications to the country for submitting a terminal phase out plan, and make every effort to assist the Government concerned to achieve phase-out targets specified in the plan.
ExCom 39/16	RMPs	The Thirty-ninth Meeting of the Executive Committee decided: (a) to request agencies to coordinate their project preparation requests associated with RMPs or RMP updates so that the total funding sought remained within the limits established by the guidelines in Decision 31/48; (b) to require, with the first project preparation request, nomination of all the agencies that would be involved in the RMP and the lead agency that would be responsible for overall RMP implementation, including its phase-out objectives, and for reporting on overall progress and on achievement. However, in order to be consistent with the country-driven approach, a country would be entitled to change the agency responsible or request additional support from another agency (within the limits of the approved financing), with the Secretariat then being notified of such changes.
ExCom 40/7	Reorient the approach to RMPs to facilitate compliance	The Fortieth Meeting of the Executive Committee decided to set up an open ended working group to discuss, in the margins of the 41st Meeting of the Executive Committee, ways to reorient the approach to RMPs to better facilitate compliance, with members chosen from both the Sub Committee on Project Review and the Sub-Committee on Monitoring, Evaluation and Finance as well as representatives of the Implementing Agencies.
ExCom 41/100	RMPs	Following a discussion, in recognition of the fact that in certain cases Article 5 countries needed flexibility in implementing refrigerant management plans in order to reflect changing circumstances, the Executive Committee decided: (a) To recommend that bilateral and implementing agencies, in collaboration with Article 5 countries preparing and implementing refrigerant management plans, be given flexibility, within historically agreed funding levels, to implement refrigerant management plan components that are adapted to meet the specific needs of relevant Article 5 countries, and that planned changes to project activities be clearly documented and available for future monitoring and evaluation in accordance with Fund rules; and (b) That in developing appropriate interventions, Article 5 countries and bilateral and implementing agencies should give consideration to: (i) Concentrating support on the development of legislation and coordination mechanisms with industry, where these are not yet in place, and on further training programmes for refrigeration technicians and customs officers, using existing national capacities and providing expert support and resources such as equipment and tools required; this should also include efforts to raise awareness of the value of skilled technicians for end users and for stakeholders; (ii) Also concentrating recovery and reuse of CFC on large-size commercial and industrial installations and mobile air conditioner (MAC) sectors, if significant numbers of CFC-12 based systems still exist and the availability of CFC is strongly reduced by the adoption of effective import control measures; (iii) Further exploring possibilities for facilitating cost-effective retrofitting and/or use of drop-in substitutes, possibly through incentive programmes; (iv) Becoming more selective in providing new recovery and in particular recycling equipment by: a. establishing during project preparation a sounder estimate of the likely demand for recovery and recycling equipment; b. delivering equipment to the country only against firm orders and with significant cost participation by the workshops for equipment provided, using locally-assembled machines to the extent possible; c. procuring, delivering and distributing equipment in several stages, after reviewing the utilization of equipment delivered and verifying further demand; and d. ensuring that adequate follow-up service and information are available to keep the recovery and recycling equipment in service; and (v) Monitoring the use of equipment and knowledge acquired by the beneficiaries, on an ongoing basis, through regular consultations and collection of periodic reports from the workshops, to be carried out by national consultants in cooperation with associations of technicians. Progress reports based on such monitoring should be prepared annually by the consultant and/or the National Ozone Units, in cooperation with the implementing agency, as provided for in Decision 31/48, and sufficient additional resources should be made available to allow for such follow-up and reporting work

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ExCom 41/5, (para. 36(a))	Final report on the evaluation of the implementation of RMPs	The Forty-first Meeting of the Executive Committee decided to note the information provided in document UNEP/OzL.Pro/ExCom/41/7.
ExCom 44/63	Guidelines relating to collection, recovery, recycling and destruction of ODSs	The Forty-fourth Meeting of the Executive Committee recalling decision IV/18 by which the Meeting of the Parties identified, as agreed incremental costs for illustration, the cost of collection, recovery, recycling, and, if cost effective, destruction of ozone-depleting substances, recalling also that decision IV/11 facilitated access to and transfer of approved destruction technologies in accordance with Article 10 of the Protocol, together with provision for financial support under Article 10 of the Protocol for the Parties operating under paragraph 1 of Article 5, noting that decision IV/24 urged the Parties to take all practicable measures to prevent releases of controlled substances into the atmosphere, including, inter alia, the recovery of controlled substances for the purposes of recycling, reclamation or destruction and the destruction of unneeded ozone-depleting substances where economically feasible and environmentally appropriate, noting that decision X/7 requested the Parties to consider promoting appropriate measures to ensure the environmentally safe and effective recovery, storage, management and destruction of halons in preparing halon management strategies, mindful that the Technology and Economic Assessment Panel Task Force on Collection, Recovery and Storage, in its 2002 report, pursuant to decision XII/8, had concluded that the collection, recovery and storage of ozone-depleting substances was technically feasible and economically viable, recognizing that several million ODP tonnes of ozone-depleting substances were estimated to have been installed in equipment and as foams in 2002, according to the report of the Task Force, and were likely to be released into the atmosphere if preventive measures were not taken, decided: (a) to request the Secretariat to collect existing guidelines relating to collection, recovery, recycling and destruction of ozone-depleting substances in the light of paragraph 6 of decision IV/18 of the Meeting of the Parties on the indicative list of categories of incremental costs and to report its findings to the 46th Meeting of the Executive Committee; and (b) to consider whether to elaborate further guidelines for the funding of projects for the collection, recovery, recycling and destruction of ozone-depleting substances while ensuring economically feasible and environmentally appropriate management of ozone-depleting substances at the 46th Meeting on the basis of the report of the Secretariat.
ExCom 45/10	Evaluation of customs officers training and licensing systems projects	The Forty-fifth Meeting of the Executive Committee decided: (a) to take note of the report on the evaluation of customs officers training and licensing system projects contained in document UNEP/OzL.Pro/ExCom/45/11, including the recommendations in Section V of the document; (b) to request the Senior Monitoring and Evaluation Officer to revise the language of the recommendations to make them less prescriptive and more general and to include a section on conclusions; (c) to request the Secretariat: (i) to draft a covering note, for submission to the Parties, reflecting the comments on the report made by members of the Executive Committee at the 45 th Meeting, to which the revised report would be annexed; (ii) to post a revised version of the report on its intranet to enable the members to review the text and send in their comments; and (iii) to submit the revised report and the covering note, after approval by the Chair of the Executive Committee, to the 25th Meeting of the Open-ended Working Group.
ExCom 45/54	RMPs / TPMPs	Following a discussion on the need to provide assistance to low-volume-consuming countries for the post-2007 period, the Executive Committee decided: (a) To urge bilateral and/or implementing agencies on behalf of low volume consuming countries without an approved terminal phase out management plan (TPMP) to submit TPMP proposals, on the understanding that: (i) TPMP project proposals should be in conformity with all relevant decisions taken by the Executive Committee; (ii) TPMP project proposals should contain, as a minimum, a commitment by the government concerned to the phased reduction and complete phase-out of the consumption of CFCs in the country according to a specific phase out schedule, which was at a minimum consistent with the Montreal Protocol's control measures; (iii) No additional resources would be requested from the Multilateral Fund or bilateral and/or implementing agencies for activities related to the phase out of CFCs and other ODS where applicable; (iv) The government concerned 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 ODS; (v) Annual reporting on the implementation of the activities undertaken in the previous year, as well as a thorough and comprehensive work plan for the implementation of the following year's activities, would be mandatory; and (vi) The roles and responsibilities of the major national stakeholders, as well as the lead implementing agency and the cooperating agencies when applicable, must be defined; (b) That additional funding of up to US \$30,000 could be requested for the preparation of a TPMP proposal on the understanding that up to US \$10,000 of this funding could be earmarked for the bilateral and/or implementing agencies to report on the implementation and impact of the approved recovery and recycling programme, where applicable, and that this report should be integrated within the resulting TPMP proposal; (c) That future TPMP proposals for the post-2007 period might

Decision Number	Sector/ Sub-sector/Title	Decision Text												
		<p>include requests for funding up to the levels indicated in the table below, on the understanding that individual project proposals would still need to demonstrate that the funding level was necessary to achieve complete phase-out of CFCs. Up to 20 per cent of approved funds should be used by the bilateral or implementing agency and/or country concerned to ensure comprehensive annual monitoring and reporting of the TPMP, including the recovery and recycling programme:</p> <table border="1" data-bbox="848 388 1558 594"> <thead> <tr> <th data-bbox="848 388 1205 418">CFC baseline(ODP tonnes)</th> <th data-bbox="1205 388 1558 418">Funding level (US \$)</th> </tr> </thead> <tbody> <tr> <td data-bbox="848 418 1205 449"><15</td> <td data-bbox="1205 418 1558 449">205,000</td> </tr> <tr> <td data-bbox="848 449 1205 480">15 to 30</td> <td data-bbox="1205 449 1558 480">295,000</td> </tr> <tr> <td data-bbox="848 480 1205 511">30 to 60</td> <td data-bbox="1205 480 1558 511">345,000</td> </tr> <tr> <td data-bbox="848 511 1205 542">60 to 120</td> <td data-bbox="1205 511 1558 542">520,000</td> </tr> <tr> <td data-bbox="848 542 1205 594">> 120</td> <td data-bbox="1205 542 1558 594">565,000</td> </tr> </tbody> </table> <p>(d) To require, on an annual basis, verification of a randomly selected sample of approved TPMPs for low-volume-consuming countries under implementation (i.e., 10 per cent of approved TPMPs). The costs associated with verification would be added to the relevant work programme of the lead implementing agency; and (e) To approve, on a case-by-case basis, up to US \$30,000 for the preparation of a transitional strategy for CFC-MDIs in low-volume-consuming countries where the need for a strategy had been fully demonstrated and documented.</p>	CFC baseline(ODP tonnes)	Funding level (US \$)	<15	205,000	15 to 30	295,000	30 to 60	345,000	60 to 120	520,000	> 120	565,000
CFC baseline(ODP tonnes)	Funding level (US \$)													
<15	205,000													
15 to 30	295,000													
30 to 60	345,000													
60 to 120	520,000													
> 120	565,000													
ExCom 46/17	RMPs / TPMPs	Following a discussion, the Executive Committee <u>decided</u> to request bilateral and implementing agencies preparing reports under decision 45/54 to prepare the reports in a format similar to the reports currently prepared under decision 31/48 for refrigerant management plan (RMP) updates and to provide a similar comprehensive overview of the implementation of the RMP.												
ExCom 46/18, (para. 90 (b))	RMPs	The Forty-sixth Meeting of the Executive Committee decided to request Bilateral and Implementing Agencies preparing reports under decision 45/54 to prepare the reports in a format similar to the reports currently prepared under decision 31/48 for refrigerant management plan (RMP) updates and to provide a similar comprehensive overview of the implementation of the RMP.												
ExCom 46/36	Phase-out agreement: flexibility conditions	The Forty-sixth Meeting of the Executive Committee decided: (a) to note with appreciation the report on the review of guidelines relating to collection, recovery, recycling and destruction of ozone depleting substances in documents UNEP/OzL.Pro/ExCom/46/42 and Corr.1; (b) to request the Secretariat to prepare a paper covering terms of reference, budget and modalities for a study regarding collection, recovery, recycling, reclamation, transportation and destruction of unwanted ODS, taking into account the proposal of Austria and Japan set out in Annex VII.4 to the present report and the comments made at the 46th Meeting of the Executive Committee; and (c) to request the Secretariat to present the paper to the 47th Meeting of the Executive Committee.												
ExCom 47/52 (a)(i)(ii)(iii)	Collection and disposition of non- reusable and unwanted ODS	The Forty-seventh Meeting of the Executive Committee decided: (a) to request the Secretariat: (i) to organize a meeting of experts in Montreal, Canada, from 22 to 24 February 2006 to assess the extent of current and future requirements for the collection and disposition (emissions, export, reclamation and destruction) of non-reusable and unwanted ODS in Article 5 countries; (ii) to recruit consultants to collect and elaborate as many data as possible on unwanted, recoverable, reclaimable, non-reusable and virgin ODS in Article 5 countries for dissemination to participants in the meeting of experts; (iii) to develop, in cooperation with the consultants, a standard format for reporting data on unwanted, recoverable, reclaimable, non-reusable and virgin stockpiled ODS;												
ExCom 48/10	Evaluation	Following the discussion, the Executive Committee decided: (a) To note with appreciation the final report on the intermediate evaluation of refrigerant management plans and national phase-out plans in non-low-volume-consuming countries focusing on the refrigeration servicing sector contained in document UNEP/OzL.Pro/ExCom/48/12; and (b) To request the Senior Monitoring and Evaluation Officer to develop a comprehensive and categorized compendium of recommendations relevant to that evaluation, distinguishing between new recommendations and those that had already been approved by the Executive Committee, and to present that compendium to the 49th Meeting of the Executive Committee.												
ExCom 48/11	Customs training	The Forty-eighth Meeting of the Executive Committee decided: (a) to take note of the recommendations contained in the report of the Executive Committee on the evaluation of customs officers training and licensing system projects to the Twenty fifth Meeting of the Open ended Working Group (follow up to												

Decision Number	Sector/ Sub-sector/Title	Decision Text
		decision XVII/16, paragraph 8, of the Seventeenth Meeting of the Parties to the Montreal Protocol), as contained in document UNEP/OzL.Pro/ExCom/48/13; (b) to submit the recommendations listed under paragraph 8(b) in document UNEP/OzL.Pro/ExCom/48/13, as amended to include the phrase “where feasible” before the words “in cooperation with other relevant government ministries/agencies:” to the Ozone Secretariat in the context of the ongoing studies and discussions on how best to deal with illegal trade in ODS; (c) to request implementing agencies and bilateral agencies to prepare and implement national phase-out plans and terminal phase-out management plans in a manner that would ensure, where feasible, implementation of the recommendations listed under paragraph 8(b), and to implement the recommendations listed under paragraph 8(c) in document UNEP/OzL.Pro/ExCom/48/13; and (d) to request UNEP to implement the recommendations under paragraph 8(d) in document UNEP/OzL.Pro/ExCom/48/13.
ExCom 49/36	Recovery, recycling and reclamation	The Forty-ninth Meeting of the Executive Committee decided: (a) to take note with appreciation of document UNEP/OzL.Pro/ExCom/49/42, which included the proposed terms of reference for a study regarding collection, recovery, recycling, reclamation, transportation and destruction of unwanted ozone-depleting substances; (b) to inform the Parties, through a letter from the Chair of the Executive Committee to the Ozone Secretariat, that: (i) the Executive Committee was discussing the above-mentioned terms of reference and was of the view that there were substantial commonalities between those terms of reference and those being considered by the Parties in relation to decision XVII/17 of the Seventeenth Meeting of the Parties; (ii) the issues raised by both sets of the above-mentioned terms of reference could be considered by the Executive Committee of the Multilateral Fund, given that it had already held substantial discussions and initiated some work with respect to studying the issue of collection, recovery, recycling, reclamation, transportation and destruction of unwanted ozone-depleting substances; (iii) a request could be addressed to the Executive Committee to develop consolidated terms of reference and if agreed by the Executive Committee to initiate a study based on the consolidated terms of reference, and to report to the Nineteenth Meeting of the Parties on the progress made in that respect; and (c) to consider the issue at the 50th Meeting of the Executive Committee, in light of any guidance provided by the Eighteenth Meeting of the Parties.
ExCom 49/6	RMPs / National Phase-out Plans (NPPs)	Following discussion of those modifications, the Executive Committee decided: (a) To recommend that National Ozone Units (NOUs) in planning and implementing refrigerant management plans and national or terminal phase-out plans consider, where feasible and in cooperation with other relevant government ministries/agencies: (i) Updating and complementing ODS-related legislation where additional legal measures were needed and further specification of enforcement mechanisms had been identified, including, for example: Banning the import and export of CFC-based second-hand refrigeration equipment; Mandatory certification of technicians performing professional activities in refrigeration servicing; Specification of a system of sanctions in cases of violation of legal regulations; Improvement of the mechanisms for import and export quota allocations under the licensing system and the monitoring of their actual use; Enhancement of cooperation between the NOU and the customs authorities; (ii) Upgrading the curriculum for technical training in refrigeration, where needed, and providing all training institutions with the latest relevant information with regard to the general application of good practices to significantly reduce usage of ODS and to promote the use of alternatives; (b) To request implementing and bilateral agencies, when implementing ongoing national phase-out plans and when planning new national phase-out plans, to take into consideration decision 41/100 for the recovery and recycling part of national phase-out plans, in particular the following paragraphs: (i) “Concentrating recovery and reuse of CFCs in large-size commercial and industrial installations and mobile air conditioning sectors, if significant numbers of CFC-12-based systems still existed and the availability of CFC was strongly reduced by the adoption of effective import control measures; (ii) Further exploring possibilities for facilitating cost-effective retrofitting and/or use of drop-in substitutes, possibly through incentive programmes; (iii) Becoming more selective in providing new recovery, and in particular recycling, equipment by: a. Establishing during project preparation a sounder estimate of the likely demand for recovery and recycling equipment; b. Delivering equipment to the country only against firm orders and with significant cost participation by the workshops for equipment provided, using locally-assembled machines to the extent possible; c. Procuring, delivering and distributing equipment in several stages, after reviewing the utilization of equipment delivered and verifying further demand; d. Ensuring that adequate follow-up service and information was available to keep the recovery and recycling equipment in service; (iv) Monitoring the use of equipment and knowledge acquired by the beneficiaries, on an ongoing basis, through regular consultations and collection of periodic reports from the workshops, to be carried out by national consultants in cooperation with associations of technicians. Progress reports based on such monitoring should be prepared annually by the consultant and/or the National Ozone Units, in cooperation with the implementing agency, as provided in decision 31/48, and sufficient additional resources should be made available to allow for such follow-up and reporting work” (from decision 41/100); (c) To request bilateral and multilateral implementing agencies, in cooperation with the

Decision Number	Sector/ Sub-sector/Title	Decision Text
		<p>relevant national institutions: (i) To base the training of technicians on a strategy combining theoretical training with practical exercises during seminars with limited numbers of participants, and assisting in upgrading the curriculum of technical training institutes for refrigeration servicing in countries where it had not yet been done; (ii) To pay full attention to safety aspects and the necessary modification or replacement of electrical components in countries where training in the use of hydrocarbons and particularly retrofitting was carried out; and (iii) To select carefully the type of refrigerant identifiers to be purchased, taking into account preferences for small portable units, suitable for identifying different types of refrigerants, and including a test phase, where feasible, before buying larger numbers. Moreover, the administrative details of their distribution, usage and storage should be planned in advance in order to avoid delays and to increase the effectiveness of their use; (d) To request the Fund Secretariat, in cooperation with bilateral and multilateral implementing agencies, to develop recommendations for indicative lists of appropriate equipment for the main target groups and share information about competitive suppliers, including from Article 5 countries; and (e) To request the Fund Secretariat, in cooperation with bilateral and multilateral implementing agencies, to develop an appropriate reporting format for the tracking of cumulative progress achieved in the annual work programmes, summarizing in standardized overview tables the information requested in decision 47/50, with a view to simplifying and rationalizing the overall reporting requirements and to report back to the 51st Meeting of the Executive Committee. Such assessment should contain a “comparison of what had been planned in the previous annual tranche and what had been achieved. The disbursement information should be provided cumulatively and data concerning actual or planned commitments could also be provided, as appropriate. The information should also specify how the relevant flexibility clause in the agreement was implemented and/or how to allocate unused funds from previous tranches” (from decision 47/50, subparagraph (b)(i)).</p>
ExCom 50/42	Unwanted ODS	<p>The Fiftieth Meeting of the Executive Committee decided: (a) to request the Multilateral Fund Secretariat to develop specific terms of reference for a study on the treatment of unwanted ozone-depleting substances, identifying a contractor and commissioning the study described below by the end of March 2007, if possible. The study would be completed by 1 February 2008. (b) to define the two distinct objectives of the study as follows: (i) to compile information on management approaches in five non-Article 5(1) countries for the equipment, to provide guidance and to describe the applicability of these management approaches to Article 5(1) countries; and (ii) to compile information on management approaches and markets in five non-Article 5(1) countries for the recovery, collection, recycling and reclamation of ozone-depleting substances that result in those ODS being locally unusable, and the possible options for the disposition (e.g., reuse in other markets, transformation, destruction) of this locally unusable ODS and describe the applicability of these options for Article 5(1) countries. (c) to request that the detailed activities under the objective in paragraph (b)(i) consist of: (i) selecting five non-Article 5(1) countries that represent a wide spectrum of existing management approaches for the collection, transport and disposal of CFC-containing refrigeration and air-conditioning equipment; (ii) compiling information from the five non-Article 5(1) countries and describing: a. the institutions, technologies and processes involved in all steps of collection, transport and disposal of the equipment; b. the costs of the various steps in collecting, transporting and processing the equipment; c. the legal and regulatory requirements and the voluntary administrative procedures for dealing with the CFCs in the equipment; and d. the volume of equipment collected historically and currently; (iii) using the information compiled from the five non-Article 5(1) countries to describe the economic and financial arrangements among the various individuals and entities in the system for disposing of CFC containing refrigeration and air-conditioning equipment; and (iv) collecting information on experiences regarding management approaches for the collection, transportation and disposal of CFC-containing refrigeration and air-conditioning equipment in eight Article 5(1) countries, to be collected by contacting national and local government officials who will recommend additional contacts in industry and institutions in order to describe challenges that may be posed in translating the non-Article 5(1) countries’ experiences to the situation in Article 5(1) countries given domestic, social and economic factors. The selection of the countries should represent a wide spectrum of countries that have already identified challenges and should have regional representation; (d) to request that the detailed activities under the objective in paragraph (b)(ii) consist of: (i) using the data from the Meeting of Experts to Assess the Extent of Current and Future Requirements for the collection and disposition of non-reusable and unwanted ODS in Article 5 countries held in March 2006, data already published in reports from the Technology and Economic Assessment Panel and its subsidiary bodies, and other relevant existing data to describe possible economic incentives and their cost-effectiveness, whether inherent or external to the institutions under the Montreal Protocol, that would encourage disposition (e.g., reuse in other markets, transformation, destruction) of ODS that is locally unusable; (ii) describing the capacity and location of all global existing facilities with destruction technologies approved by the Parties to the Montreal Protocol, comparing this capacity to the estimated volume of ODS predicted to be recovered and locally unusable in the March 2006 Experts’ Meeting report, the viability and potential costs of using these existing destruction technologies, and the regulatory requirements for transporting the locally unusable ODS; and (iii) describing opportunities</p>

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		other than existing destruction technologies for the disposition of locally unusable ODS, and the viability and potential costs of using these other approaches; (e) to request the Secretariat to report to the 51st Meeting of the Executive Committee on the status of the process for contracting a consultant for carrying out the study; (f) to consider at the 52 nd Meeting of the Executive Committee the content of a progress report to be submitted to the Nineteenth Meeting of the Parties; and (g) to approve a budget for carrying out the study.
ExCom 52/5	Licensing	The Fifty-second Meeting of the Executive Committee decided: (a) to note the report on the status/prospects of Article 5 countries in achieving compliance with the initial and intermediate control measures of the Montreal Protocol as contained in UNEP/OzL.Pro/ExCom/52/7/Rev.1; (b) to request UNDP and El Salvador to expedite the submission of the terminal phase out management plan proposal to the 53rd Meeting; (c) to urge those countries that have not established licensing systems to endeavour to establish such systems as soon as possible; The Fifty-second Meeting of the Executive Committee decided: (a) to note the report on the status/prospects of Article 5 countries in achieving compliance with the initial and intermediate control measures of the Montreal Protocol as contained in UNEP/OzL.Pro/ExCom/52/7/Rev.1; (b) to request UNDP and El Salvador to expedite the submission of the terminal phase out management plan proposal to the 53rd Meeting; (c) to urge those countries that have not established licensing systems to endeavour to establish such systems as soon as possible;
ExCom 52/6	Retrofit	Following the discussion, the Executive Committee decided: (a) To urge Article 5 countries and respective implementing agencies to intensify their efforts to advance the implementation of approved incentive programmes in order to meet the established targets and phase-out schedules; (b) To draw the attention of Article 5 countries for which terminal phase-out management plans had been approved or would be approved in the near future to incentive programmes as a possibility for achieving CFC phase-out in the refrigeration servicing sector, provided the necessary pre-conditions were in place and lessons learned from previous programmes were taken into account; (c) To request the implementing and bilateral agencies concerned to disseminate the lessons learned from the implementation of incentive programmes among Article 5 countries, including through the regional network meetings; (d) To request all bilateral and implementing agencies that were implementing or considering implementing incentive programmes for retrofits to take into account all the elements contained in paragraph (e) below, as they might apply to their programmes; and (e) To request UNDP in cooperation with the Fund Secretariat: (i) To provide, as part of the guidelines, a template for calculating estimated operating savings and efficiency gains resulting from retrofitting or replacing a given refrigeration system, as well as the economic benefits of extending the life time of retrofitted equipment; (ii) To clarify, during the preparation of incentive programmes, the methodology of calculating planned and actual CFC phase-out, taking into account local circumstances; (iii) To include in the guidelines the preparation of country-specific implementation milestones in order to facilitate monitoring and avoid delays; iv) To foresee in the guidelines the possibility of adapting the scale and sequence of payments to local situations and to increase the maximum limit of US \$10,000 for large-sized end-users in order to motivate them to proceed with the conversion where the total cost might significantly exceed their maximum entitlement; and (v) To incorporate into the guidelines a preference for the use of drop-in alternatives based on natural substances such as hydrocarbons, and to use HCFC ternary blends as drop-in substitutes for CFC-12 only in exceptional circumstances, taking into account safety issues.
ExCom 52/7, para. 57	Customs training	The Fifty-second Meeting of the Executive Committee decided: (a) to request the Senior Monitoring and Evaluation Officer to reorganize the final report on the evaluation of the Compliance Assistance Programme (CAP), (UNEP/OzL.Pro/ExCom/52/9), around the seven issues identified in paragraphs 9(a) to 9(g) of that document; (b) to request UNEP to consider further regionalization of CAP resources; (c) to request UNEP to focus the CAP on: (i) countries in potential or actual non-compliance, taking into account the likely difficulties of a number of countries in meeting the 85 per cent reduction target for CFC in 2007, to be followed by the total phase-out of CFCs, halons and carbon tetrachloride by 31 December 2009; (ii) latecomers to the Montreal Protocol, in order: a. to strengthen their institutional structures and develop local capacities; b. to facilitate the establishment of appropriate ODS-related legislation and regulations; and c. to support their public awareness activities. (iii) further involving more advanced and experienced Article 5 countries to assist and advise less advanced in the same region; (iv) further strengthening local capacities of trained trainers and partner training institutes formed during the “train the trainers” phase to enable future and continued training of customs officers and refrigeration technicians on a sustainable basis. UNEP should also develop a strategy that would integrate the local training capacity created, placing emphasis on national ownership and securing access to appropriate know-how beyond 2010; (v) further promoting collaboration between customs and environmental authorities, in cooperation with professional associations, in order to strengthen the enforcement of legal regulations; (vi) assisting, where applicable, the enforcement of unified regulations in regional customs unions or other areas of political and economic cooperation; and (d) to urge UNEP and the other agencies to ensure close

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		coordination of activities in order to avoid overlapping actions; in particular, UNEP should always consult with the lead agency for national phase-out plans, terminal phase-out management plans or other phase-out plans and projects before providing technical or policy advice.
ExCom 54/11 (a)	Evaluation of management, monitoring and verification of NPPs in non-LVC countries	The Fifty-fourth Meeting of the Executive Committee decided: (a) to encourage Article 5 countries implementing phase-out plans to consider: (i) issuing decrees (orders usually emanating at the ministerial level), to the extent possible, so as to introduce the needed policies, bans and restrictions, given the complexity and time required to create or amend legislation; (ii) undertaking a comprehensive needs analysis for the further training of customs officers, and developing a training plan utilizing the train the trainer approach and integrating ODS issues into the regular curriculum in order to create sustainable training capacities; (iii) the possibility of eventually charging participants or their employers fees for technician training so as to increase their sense of ownership and generate funds for additional training activities; (iv) using voucher systems to enable workshops to select the recovery and recycling (R&R) equipment that they wanted and needed, while paying for part of the cost both to increase the likelihood of that equipment being used and to allow a greater amount of equipment to be purchased; (v) when developing business plans for reclamation centres, demonstrating how such centres could be made self-sustainable; (vi) undertaking a needs analysis, where not yet done, or at the least an estimate based on best available information or surveys, and developing comprehensive training plans for the remaining numbers of refrigeration technicians to be trained; (vii) routinely monitoring local market-place conditions as prices for CFCs, and their substitutes tended to be good indicators of the potential risk for illegal trade;
ExCom 54/39	Guidelines for preparation of HPMPs	The Fifty-fourth Meeting of 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

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ExCom 58/6	Evaluation of TPMPs	<p>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.</p> <p>The Fifty-eighth Meeting of the Executive Committee decided: (a) to take note of the final report on the evaluation of terminal phase-out management plans (TPMPs) as presented in document UNEP/OzL.Pro/ExCom/58/8; (b) to request: (i) bilateral and implementing agencies assisting Article 5 countries in implementing TPMPs to provide the National Ozone Units regularly with updated financial reports on fund disbursement and commitments associated with the activities in the TPMP projects so that they would be in a position to account to their respective governments; (ii) Article 5 countries to give due consideration to enhancing their data collection and monitoring systems for control of ODS trade in order to improve the quality and reliability of the import/export data from customs authorities, companies and servicing workshops, where applicable; (iii) bilateral and implementing agencies, when implementing the last tranche(s) of the TPMPs, to advise and assist Article 5 countries in reviewing current ODS regulations, including licensing systems, and in incorporating import/export regulations on HCFCs; (iv) bilateral and implementing agencies and Article 5 countries to consider establishing effective and targeted monitoring and reporting mechanisms, which could include establishment of programme management units if countries chose to do so, in order to ensure adequate assessment, monitoring and reporting of the results of TPMPs, in particular regarding recovery and recycling and end-user projects; (v) bilateral and implementing agencies assisting Article 5 countries to provide information on technical feasibility and economic viability when considering the establishment of new ODS reclamation and recycling centres in future requests for TPMP tranches; (vi) Article 5 countries, when developing and/or designing training programmes for technicians, to include specific modalities for assisting the refrigeration service technicians who had not received formal training; and (c) to encourage Article 5 countries to establish and/or strengthen refrigeration technicians' associations in order to promote good practices in the refrigeration sector through recovery, recycling, leak detection and prevention of unnecessary use of ODS.</p>																											
ExCom 60/44	Cost guidelines stage I of HPMPs	<p>The Sixtieth Meeting of the Executive Committee decided, inter alia: Eligible incremental costs of HCFC phase-out projects 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:</p> <table border="1" data-bbox="762 1052 1780 1365"> <thead> <tr> <th>Consumption (metric tonnes)*</th> <th>Funding up to 2015 (US\$)</th> <th>Funding up to 2020 (US\$)</th> </tr> </thead> <tbody> <tr> <td>>0 < 15</td> <td>51,700</td> <td>164,500</td> </tr> <tr> <td>15 < 40</td> <td>66,000</td> <td>210,000</td> </tr> <tr> <td>40 < 80</td> <td>88,000</td> <td>280,000</td> </tr> <tr> <td>80 < 120</td> <td>99,000</td> <td>315,000</td> </tr> <tr> <td>120 < 160</td> <td>104,500</td> <td>332,500</td> </tr> <tr> <td>160 < 200</td> <td>110,000</td> <td>350,000</td> </tr> <tr> <td>200 < 320</td> <td>176,000</td> <td>560,000</td> </tr> <tr> <td>320 < 360</td> <td>198,000</td> <td>630,000</td> </tr> </tbody> </table> <p>(*) Level of baseline HCFC consumption in the refrigeration servicing sector.</p>	Consumption (metric tonnes)*	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
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		(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.
ExCom 72/17	Retrofit to flammable refrigerants	The Seventy-second Meeting of 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.
ExCom 72/41	Minimizing adverse climate impact of HCFC phase-out in the refrigeration servicing sector	The Seventy-second Meeting of 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.
ExCom 73/34	Retrofit to flammable refrigerants	The Seventy-third Meeting of 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.
ExCom 74/50	Cost guidelines stage II of HPMPs	At its Seventy-fourth meeting, 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, <i>inter alia</i> : 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 metric tonnes, 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 metric tonnes 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:

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ExCom 80/76	HFC phase-down cost guidelines	<p data-bbox="537 902 2003 1222">The Eightieth Meeting of the Executive Committee decided, <i>inter alia</i> (c) To request the Secretariat to prepare a preliminary document for the 82nd meeting, in cooperation with bilateral and implementing agencies, on all aspects related to the refrigeration servicing sector that support the HFC phase-down, taking into account: (i) Previous policy documents, case studies, monitoring and evaluation reviews, and the work undertaken by bilateral and implementing agencies in developing and implementing training and technical assistance programmes, in particular the partnership that the Compliance Assistance Programme had established with world recognized training and certification institutes; (ii) Analysis of the existing capacities in Article 5 countries with the funding approved thus far for the refrigeration servicing sector and how those could be utilized for HFC phase-down, in relation to: a. The results of funded recovery, recycling and reclamation activities and the provision of servicing tools, and their potential to reduce refrigerant emissions; b. The extent of the involvement of the private and/or public sector (e.g. equipment, components and refrigerant suppliers) in introducing and adopting alternatives in the servicing sector; c. Health and safety standards, protocols and equipment (including protective equipment) available for alternatives; d. Training and certification programmes; e. If and how energy efficiency was addressed in the servicing/end-user sector; and (iii) The minimum information needed for the development of training and competency-based certification programmes and modules for service technicians and customs officers for the transition to alternatives.</p>																																								
MOP IV/24	Recovery, recycling and reclamation	<p data-bbox="537 1232 2003 1416">The Fourth Meeting of the Parties decided: 1. to annul Decision I/12 H of the First Meeting of the Parties ("Imports and exports of bulk used controlled substances should be treated and recorded in the same manner as virgin controlled substances and included in the calculation of the Party's consumption limits"). 2. not to take into account, for calculating consumption, the import and export of recycled and used controlled substances (except when calculating the base year consumption under paragraph 1 of Article 5 of the Protocol), provided that data on such imports and exports are subject to reporting under Article 7. 3. the Parties also agreed on the following clarifications of the terms "recovery", "recycling" and "reclamation": (a) Recovery: The collection and storage of controlled substances from machinery, equipment, containment vessels, etc., during servicing or prior to disposal; (b) Recycling: The re-use of a recovered controlled substance following a basic cleaning process such as filtering and drying. For refrigerants, recycling normally involves</p>																																								

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		recharge back into equipment which it often occurs "on-site"; (c) Reclamation: The re-processing and upgrading of a recovered controlled substance through such mechanisms as filtering, drying, distillation and chemical treatment in order to restore the substance to a specified standard of performance. It often involves processing "off-site" at a central facility. 4. urged all the Parties to take all practicable measures to prevent releases of controlled substances into the atmosphere, including, inter alia: (a) to recover controlled substances in Annex A, Annex B and Annex C of the Protocol, for purposes of recycling, reclamation or destruction, that are contained in the following equipment during servicing and maintenance as well as prior to equipment dismantling or disposal: (i) stationery commercial and industrial refrigeration and air conditioning equipment; (ii) mobile refrigeration and mobile air-conditioning equipment; (iii) fire protection systems; (iv) cleaning machinery containing solvents; (b) to minimize refrigerant leakage from commercial and industrial air-conditioning and refrigeration systems during manufacture, installation, operation and servicing; (c) to destroy unneeded ozone-depleting substances where economically feasible and environmentally appropriate to do so.
MOP IX/8	Licensing	The Ninth Meeting of the Parties decided: 1. that the licensing system to be established by each Party should: (a) assist collection of sufficient information to facilitate Parties' compliance with relevant reporting requirements under Article 7 of the Protocol and decisions of the Parties; and (b) assist Parties in the prevention of illegal traffic of controlled substances, including, as appropriate, through notification and/or regular reporting by exporting countries to importing countries and/or by allowing cross-checking of information between exporting and importing countries; 2. to facilitate the efficient notification and/or reporting and/or cross-checking of information, each Party should inform the Secretariat by 31 January 1998 of the name and contact details of the officer to whom such information and requests should be directed. The Secretariat shall periodically prepare, update and circulate to all Parties a full list of these contact details; 3. that the Secretariat and Implementing Agencies should take steps to assist Parties in the design and implementation of appropriate national licensing systems; 4. that Parties operating under Article 5 may require assistance in the development, establishment and operation of such a licensing system and, noting that the Multilateral Fund has provided some funding for such activities, that the Multilateral Fund should provide appropriate additional funding for this purpose.
MOP VI/19 (b)	Recovery, recycling and reclamation	The Sixth Meeting of the Parties decided with respect to trade in previously used ozone-depleting substances, (d) to request all Parties with reclamation facilities to submit to the Secretariat prior to the Seventh Meeting of the Parties and on an annual basis thereafter a list of the reclamation facilities and their capacities available in their countries;
MOP VII/25	Customs training	The Seventh Meeting of the Parties requested the Executive Committee to provide specific support to low-volume-ODS-consuming countries (LVCs) by: (a) allocating sufficient funds for projects in low-volume-ODS-consuming countries to further strengthen and expand awareness and training programmes, especially in the area of refrigerant management; (b) supporting specialized assistance such as a workshop to establish regulatory and legislative measures required to facilitate the phase-out of ozone-depleting substances; (c) allowing financing of eligible retrofitting projects, in sectors vital to LVC economies on a case-by-case basis where this can be shown to be the best approach; (d) requesting the United Nations Environment Programme, due to its extensive experience with low-volume-ODS-consuming countries (LVCs), to take the lead in preparing an overall approach in addressing these needs; (e) providing funds to low-volume-ODS-consuming countries, on a regional basis, to organize training workshops for their customs and other officers on the harmonized system and other systems to control and monitor consumption of ozone-depleting substances; Approval of projects in low-volume-ODS-consuming countries and very low-volume-ODS-consuming countries should be based upon a more appropriate project-appraisal approach reflecting the particular circumstances encountered by the countries referred to above.
MOP VII/5	Recycled CFCs	The Seventh Meeting of the Parties decided, on the status of recycled CFCs and halons under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, that the international transfers of controlled substances of the Montreal Protocol which are recovered but not purified to usable purity specifications prescribed by appropriate international and/or national organizations, including International Standards Organization (ISO), should only occur if the recipient country has recycling facilities that can process the received controlled substances to these specifications or has destruction facilities incorporating technologies approved for that purpose.
MOP XII/8 (3(a))	Task force on destruction technologies	The Twelfth Meeting of the Parties decided: 3. to request the Technology and Economic Assessment Panel: (a) to evaluate the technical and economic feasibility for the long-term management of contaminated and surplus ozone-depleting substances in Article 5 and non-Article 5 countries, including options such as long-term storage, transport, collection, reclamation and disposal of such ozone-depleting substances;
MOP XIX/12	Licensing	The Nineteenth Meeting of the Parties decided: 1. to remind all Parties of their obligation under Article 4B of the Protocol to establish an import and export licensing system for all controlled ozone-depleting substances; 2. to urge all Parties to fully and effectively implement and actively enforce their

Decision Number	Sector/ Sub-sector/Title	Decision Text
		<p>systems for licensing the import and export of controlled ozone depleting substances as well as recommendations contained in existing decisions of the Parties, notably decisions IX/8, XIV/7, XVII/12, XVII/16 and XVIII/18; 3. that Parties wishing to improve implementation and enforcement of their licensing systems in order to combat illegal trade more effectively may wish to consider implementing domestically on a voluntary basis the following measures: (a) sharing information with other Parties, such as by participating in an informal prior informed consent procedure or similar system; (b) establishing quantitative restrictions, for example import and/or export quotas; (c) establishing permits for each shipment and obliging importers and exporters to report domestically on the use of such permits; (d) monitoring transit movements (trans-shipments) of ozone-depleting substances, including those passing through duty-free zones, for instance by identifying each shipment with a unique consignment reference number; (e) banning or controlling the use of non-refillable containers; (f) establishing appropriate minimum requirements for labelling and documentation to assist in the monitoring of trade of ozone-depleting substances; (g) cross-checking trade information, including through private-public partnerships; (h) including any other relevant recommendations from the ozone-depleting substances tracking study; 4. to request the Ozone Secretariat to continue to collaborate with the World Customs Organization in relation to possible actions by Parties on any new amendments to the Harmonized Commodity Description and Coding System with respect to ozone depleting substances and to report to the Meeting of the Parties on actions taken at the World Customs Organization.</p>
MOP XVII/16	Customs training	<p>The Seventeenth Meeting of the Parties decided: 1. to approve the terms of reference for a study on the feasibility of developing an international system of monitoring the transboundary movement of controlled ozone-depleting substances between Parties, as presented in Annex VI.3 to the present report, and to request the Ozone Secretariat to undertake such a study, to initiate the necessary tenders and to present the results to the Eighteenth Meeting of the Parties to the Montreal Protocol in 2006; 2. to invite the Ozone Secretariat to consult with other conventions or organizations who might benefit from the outcome of that study to contribute towards its work; 3. to urge all Parties, including regional economic integration organizations, to implement fully their obligations under Article 4B of the Montreal Protocol, in particular, the licensing systems for the control of imports, exports, re-exports (re-exports mean exports of previously imported substances) and, if technically and administratively feasible, transit of all controlled ozone-depleting substances, including mixtures containing them, regardless of whether the Party concerned is or is not recognized as the producer and/or importer, exporter or re-exporter of the particular substance or group of substances; 4. to request the Ozone Secretariat to revise the reporting format resulting from decision VII/9 to cover exports (including re-exports) of all controlled ozone-depleting substances, including mixtures containing them, and to urge the Parties to implement the revised reporting format expeditiously. The Ozone Secretariat is also requested to report back aggregated information related to the controlled substance in question received from the exporting/re-exporting Party to the importing Party concerned; 5. to invite Parties to submit information to the Ozone Secretariat by 30 June 2006 on any existing systems for exchanging information on import and export licenses between importing and exporting Parties; 6. to consider additional control measures with regard to the use of controlled ozone depleting substances in particular sectors or in particular applications, as this approach may effectively diminish illegal trade activities; 7. to encourage further work on the Green Customs initiative of the United Nations Environment Programme in combating illegal trade in controlled ozone depleting substances as well as further networking and twinning activities in the framework of regional networks aimed at the exchange of information and experience on both licit and illicit trade in controlled ozone depleting substances between the Parties, including enforcement agencies; 8. to request the Executive Committee to consider at its forty-eighth meeting the recommendations contained in the report of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the Evaluation of Customs Officers Training and Licensing System Projects to the twenty-fifth meeting of the Open-ended Working Group”, in particular where they relate to customs training and other elements of capacity building that are needed in combating illegal trade in controlled ozone-depleting substances; 9. to approve a maximum amount of \$200,000 from the Trust Fund of the Vienna Convention as a one-time measure to facilitate the feasibility study on developing a system for monitoring the transboundary movement of controlled ozone-depleting substances between the Parties.</p>
MOP XVII/17	Implications of the environmentally sound destruction of concentrated and diluted sources of ODSs	<p>The Seventeenth Meeting of the Parties decided: 1. to request the Technology and Economic Assessment Panel to prepare terms of reference for the conduct of case-studies in Parties operating under paragraph 1 of Article 5 of the Protocol, with regional representation, on the technology and costs associated with a process for the replacement of chlorofluorocarbon-containing refrigeration and air conditioning equipment, including the environmentally sound recovery, transport and final disposal of such equipment and of the associated chlorofluorocarbons; 2. that these studies should explore economic and other incentives which will encourage users to phase out equipment and ozone-depleting substances and to reduce emissions, as well as the viability and costs of setting up destruction facilities in countries operating under paragraph 1 of Article 5 of the Protocol, and that the said studies should include a regional analysis relating to the management, transport and destruction of chlorofluorocarbons; 3. also to request the Technology</p>

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		and Economic Assessment Panel to review possible synergies with other conventions such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants; 4. to request the Technology and Economic Assessment Panel to adopt the recovery and destruction efficiency parameter proposed in the Panel's report to the Open-ended Working Group at its twenty-fifth meeting as the parameter to be applied in developing the proposed study referred to above; 5. that said terms of reference shall be submitted to the Parties at the twenty-sixth meeting of the Open-ended Working Group, and that provision will be made for resources for this purpose in the 2006–2008 replenishment of the Multilateral Fund.
MOP XVII/18	Collection and disposition of non-reusable and unwanted ODS	The Seventeenth Meeting of the Parties decided to request the Technology and Economic Assessment Panel and its technical options committees to submit to the Multilateral Fund secretariat available data to enable the Multilateral Fund secretariat to assess the extent of current and future requirements for the collection and disposition (emissions, export, reclamation and destruction) of non-reusable and unwanted ozone-depleting substances in Article 5 Parties in pursuance of decision 47/52.
MOP XVIII (annex V)	Recovery, reclamation and recycling	The Eighteenth Meeting of the Executive Committee decided to consider the provision of recovery/recycling equipment to commercial refrigeration companies in projects related to servicing and recovery/recycling in the refrigeration sector in the future.
MOP XVIII/18	Customs training	The Eighteenth Meeting of the Parties decided: 1. to urge all Parties to implement fully Article 4B of the Protocol as well as to take into account recommendations contained in existing decisions of the Parties, notably decisions IX/8, XIV/7, XVII/12 and XVII/16; 2. to encourage all Parties to consider taking effective action to improve monitoring of transboundary movement of controlled ozone-depleting substances including, as appropriate, a better utilization of existing systems under other multilateral agreements for tracking trade in chemicals and to exchange relevant information specifically in the context of trade in ozone-depleting substances between Parties operating under paragraph 1 of Article 5 of the Protocol and Parties not so operating; 3. to encourage all Parties which have experience in using the United Nations commodity trade statistics database, commonly known as "UNComtrade", and the publicly available software Global Risk Identification and Detection, commonly known as "eGRID", which are used to monitor trade in ozone-depleting substances, to provide information on the suitability and costs of those tools to the Ozone Secretariat, which will report such information at the twenty-seventh meeting of the Open ended Working Group and subsequently at the Nineteenth Meeting of the Parties in 2007; 4. to encourage the United Nations Environment Programme's Compliance Assistance Programme to continue its efforts to train ozone officers and customs officers on best practices and to raise awareness and to disseminate examples of best practices for national licensing systems and regional cooperation to combat illegal trade; 5. to invite all Parties to submit written comments by 31 March 2007 to the Ozone Secretariat on the report, focusing in particular on their priorities with respect to the medium- and longer term options listed in the study and/or all other possible options with a view to identifying those cost-effective actions which could be given priority by the Parties both collectively through further action to be considered under the Protocol and at the regional and national levels; 6. to request the Ozone Secretariat to provide a compilation of those comments for consideration at the twenty-seventh meeting of the Open-ended Working Group and subsequently at the Nineteenth Meeting of the Parties in 2007.
MOP XX/7	Environmentally sound management of banks of ozone-depleting substances	The Twentieth Meeting of the Parties decided: 1. to invite Parties, international funding agencies, including the Multilateral Fund and the Global Environment Facility, and other interested agents to enable practical solutions for the purpose of gaining better knowledge on mitigating ozone-depleting substance emissions and destroying ozone-depleting substance banks, and on costs related to the collection, transportation, storage and destruction of ozone depleting substances, notably in Parties operating under paragraph 1 of Article 5 of the Montreal Protocol; 2. to request the Executive Committee of the Multilateral Fund to consider as a matter of urgency commencing pilot projects that may cover the collection, transport, storage and destruction of ozone-depleting substances. As an initial priority, the Executive Committee might consider projects with a focus on assembled stocks of ozone-depleting substances with high net global warming potential, in a representative sample of regionally diverse Parties operating under paragraph 1 of Article 5. It is understood that this initial priority would not preclude the initiation of other types of pilot projects, including on halons and carbon tetrachloride, should these have an important demonstration value. In addition to protecting the ozone layer, these projects will seek to generate practical data and experience on management and financing modalities, achieve climate benefits, and would explore opportunities to leverage co-financing; 3. to encourage Parties to develop or consider further improvements in the implementation of national and/or regional legislative strategies and other measures that prevent the venting, leakage or emission of ozone depleting substances by ensuring: (a) proper recovery of ozone-depleting substances from equipment containing

Decision Number	Sector/ Sub-sector/Title	Decision Text
		<p>ozone depleting substances, during servicing, use and at end of life, where possible in applications such as refrigeration, air conditioning, heat pumps, fire protection, solvents and process agents; (b) the use of best practices and performance standards to prevent ozone-depleting substance emissions at the end of the product life cycle, whether by recovery, recycling, reclamation, reuse as feedstock or destruction; 4. to encourage all Parties to develop or consider improvements in national or regional strategies for the management of banks, including provisions to combat illegal trade by applying measures listed in decision XIX/12; 5. to invite Parties to submit their strategies and subsequent updates to the Ozone Secretariat as soon as possible for the purpose of sharing information and experiences, including with interested stakeholders of other multilateral environmental agreements, such as the United Nations Framework Convention on Climate Change and its Kyoto Protocol and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. The strategies will be placed on the Ozone Secretariat website, which will be updated regularly; 6. to note that any project implemented pursuant to the present decision when applicable should be done in conformity with national, regional, and/or international requirements, such as those mandated by the Basel Convention and Rotterdam Convention; 7. to request the Technology and Economic Assessment Panel to conduct a comprehensive cost-benefit analysis of destroying banks of ozone-depleting substances taking into consideration the relative economic costs and environmental benefits, to the ozone layer and the climate, of destruction versus recycling, reclaiming and reusing such substances. In particular, the report should cover the following elements: (a) consolidation of all available data on ozone-depleting substance banks and summary of this information identifying the sectors where recovery of ozone-depleting substances is technically and economically feasible; (b) respective levels of likely mitigation amounts, based on the categorization of reachable banks at low, medium, and high effort according to substances, sectors, regions, and where possible, sub regions; (c) assessment of associated benefits and costs of respective classes of banks in terms of ozone depleting potential and global warming potential; (d) exploration of the potential “perverse incentives” or other adverse environmental effects that may be associated with certain mitigation strategies, in particular related to recovery and recycling for reuse; (e) consideration of the positive and negative impacts of recovery and destruction of ozone-depleting substances, including direct and indirect climate effects; (f) consideration of the technical, economic and environmental implications of incentive mechanisms to promote the destruction of surplus ozone-depleting substances; 8. to request the Technology and Economic Assessment Panel to provide an interim report in time for dissemination one month before the twenty-ninth meeting of the Open ended Working Group and to provide the final report one month before the Twenty First Meeting of the Parties to the Montreal Protocol; 9. to request the Ozone Secretariat, with the assistance of the Multilateral Fund Secretariat, to consult with experts from the United Nations Framework Convention on Climate Change, the Global Environment Facility, the Executive Board of the Clean Development Mechanism, the World Bank and other relevant funding experts to develop a report on possible funding opportunities for the management and destruction of ozone-depleting substance banks, to present the report to the Parties for review and comments one month prior to the twenty ninth meeting of the Open-Ended Working Group and, if possible, to convene a single meeting among experts from the funding institutions; 10. that the report referred to in paragraph 9 of the present decision would focus on describing possible institutional arrangements, potential financial structures, likely logistical steps and the necessary legal framework for each of the following, if relevant: (a) recovery; (b) collection; (c) storage; (d) transport; (e) destruction; (f) supporting activities; 11. to request the Ozone Secretariat to convene a workshop among Parties that will include the participation of the Montreal Protocol assessment panels, the secretariat of the Multilateral Fund and the Fund’s implementing agencies, and seek the participation of the secretariats of other relevant multilateral environmental agreements, non governmental organizations and experts from funding institutions for the discussion of technical, financial and policy issues related to the management and destruction of ozone depleting substance banks and their implications for climate change; 12. that the above workshop will be held preceding the twenty-ninth meeting of the Open ended Working Group and that interpretation will be provided in the six official languages of the United Nations; 13. further to consider, at the twenty-ninth meeting of the Open-ended Working Group, possible actions regarding the management and destruction of banks of ozone-depleting substances in the light of the report to be provided by the Technology and Economic Assessment Panel under paragraph 7 above, the working group report to be provided by the Secretariat under paragraph 9 above and the discussions emanating from the workshop under paragraph 11 above; 14. to request the Ozone Secretariat to communicate the present decision to the Secretariat of the United Nations Framework Convention on Climate Change and its Kyoto Protocol in time for possible consideration at the fourteenth meeting of the Conference of the Parties to the Convention and fourth meeting of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol on the understanding that the decision is without prejudice to any discussions that may be held on ozone-depleting substance banks within their forum.</p>

Decision Number	Sector/ Sub-sector/Title	Decision Text
MOP XXV/8	Refrigerant servicing	The Twenty-fifth Meeting of the Parties decided: Recalling the parties' decisions on previous terms of reference for studies on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol, Recalling also the parties' decisions on previous replenishments of the Multilateral Fund, 1. To request the Technology and Economic Assessment Panel to prepare a report for submission to the Twenty-Sixth Meeting of the Parties, and to submit it through the Open-ended Working Group at its thirty fourth meeting, to enable the Twenty-Sixth Meeting of the Parties to take a decision on the appropriate level of the 2015–2017 replenishment of the Multilateral Fund; 2. That, in preparing the report referred to in paragraph 1 of the present decision, the Panel should take into account, among other things: (f) The need to allocate sufficient resources to the activities in the servicing sector in stage II of hydrochlorofluorocarbon phase-out management plans through technical assistance such as recovery, training and other necessary activities;
MOP XXVIII/2 (para.15 (c))	Guidelines and cost calculation	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: (c) 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 hydrofluorocarbons; (vi) Servicing tools; (vii) Refrigerant testing equipment for the refrigeration and air-conditioning sector; (viii) Recycling and recovery of hydrofluorocarbons;
MOP XXVIII/2 (para.16)	HFC cost guidelines	To request the Executive Committee to increase in relation to the servicing sector the funding available under Executive Committee Decision 74/50 above the amounts listed in that decision for parties with total hydrochlorofluorocarbon baseline consumption up to 360 metric tonnes when needed for the introduction of alternatives to hydrochlorofluorocarbons with low-GWP and zero-GWP alternatives to hydrofluorocarbons and maintaining energy efficiency also in the servicing/end-user sector;

Annex II

MULTILATERAL FUND EVALUATIONS RELATED TO THE REFRIGERATION SERVICING SECTOR

Title	Description	Key Findings
Desk study on the recovery and recycling projects (PCRs) (UNEP/OzL.Pro/ExCom/31/18)	This document presents a desk study on recovery and recycling (R&R) projects, excluding those that are part of a refrigerant management plan (RMP). For this desk study, 50 completed R&R projects and 41 project completion reports (PCRs) were studied. Field assessments of R&R projects were conducted by consultants during the evaluation of training projects.	The implementation of an RMP in low-volume consuming (LVCs) countries is an efficient means to reduce CFC emissions. Training programmes for trainers, technicians and customs officers are necessary to implement good refrigeration management practices and to efficiently monitor and control the import of ODS. However, the motivation to recover and recycle is still very low because there is no financial benefit, and the limited purchasing power of end users favours the large-scale use of second-hand refrigerators from abroad, which implies frequent repairs resulting in an increase in ODS consumption. Regulations prohibiting the imports of such refrigerators, coupled with customs training, will reduce this incidence. (Decision 31/15)
Report on the evaluation of training projects (UNEP/OzL.Pro/ExCom/31/20)	This report is a synthesis of the desk study and the 10 country studies of training projects. The objective was to review: training strategies; the planning of training projects by IAs and the NOUs; the design and delivery of training; and the results, impact and sustainability of training projects.	Training projects developed for countries have been well defined and developed in collaboration with the NOUs, national experts and associations. The timing and funding for training activities is usually adequate to target most of the trainees in the formal sector. The study recommended to integrate a comprehensive plan for sector phase-out in all future non-investment activities in the sector; to organize a train-the-trainers and a "hands on" training programmes for technicians, along with a certification system; to introduce awareness-raising activities following new policies requirements; to strengthen and involve local associations; and to have innovative solutions to train the informal sector. (Decision 31/17)
Extended desk study on RMP evaluation (UNEP/OzL.Pro/ExCom/39/14)	The desk study evaluation, with selected country visits in LVC countries, was planned to assess the progress achieved in implementing RMPs. It focused on R&R and training activities as well as policy measures in a country compliance context.	The experiences from the countries visited suggested that difficulties in implementing RMPs are fairly similar in LVC countries across the region, including: the price difference between CFCs and alternative substances; the validity and reliability of import/export data; and the implementation complications brought by the informal sector. The report concluded, <i>inter alia</i> , that the NOUs play a key role in coordinating and implementing projects, improved by strengthening their institutional basis. Cooperation with the industry and the associations has proven important in achieving compliance. Recycling centres are under-utilised or not utilised at all, but retrofitting programmes can be effective if there is a good import licensing system, a reliable control of the level of CFC consumption, a narrowing price differential between controlled and alternative refrigerants, and the introduction of economic incentives to enterprises.
Final report on the evaluation of the implementation of RMPs (UNEP/OzL.Pro/ExCom/41/7)	The synthesis report of the evaluation of the RMPs reassesses the first phase of the evaluation (desk study and country evaluation reports) and analyzes an additional sample of seven LVC countries. The report presents findings, lessons learned, and recommendations to improve the effectiveness of RMPs and to enhance the capacity of LVC countries to achieve CFC phase-out in the refrigeration servicing sector.	RMPs have played a decisive role in coordinating activities for the reduction of CFC consumption in the servicing sector and in accelerating the phase-out process. Most countries visited had complied with the freeze target by 1999. The most important factors contributing to this progress were enforced legislation, strict import controls reducing the availability of CFCs and adequate training of customs officers and refrigeration technicians. In all countries where such progress can be reported, close cooperation between the NOU and the stakeholders (i.e., importers, distributors and workshops) has been established. Political commitment and the capacity of the NOUs play an important role in successful implementation. (Decision 41/5)

Title	Description	Key Findings
Desk study on the evaluation of customs officer training and licensing system projects (UNEP/OzL.Pro/ExCom/44/12)	The objective of this desk study is to identify the results and impact of the implementation of customs training projects and the adoption of import licensing systems and, subsequently, to identify evaluation issues for further analysis and to prepare the field visits.	ODS import licensing and customs training activities were first funded as stand-alone and regional projects, but their rapid increase saw them included in RMPs. Rigorous application of import licenses and the completion of phase-out projects to reduce demand are the most productive methods of controlling international trade and reducing illegal trade. To overcome the implementation issues these projects face, the evaluation recommended <i>inter alia</i> focusing on awareness-raising of customs officers regarding ODS issues, and building a specialized customs team to deal with environmental problems, strengthening local/provincial environment authorities to actively support the control procedures, and relying on technicians, university staff or governmental laboratories to assist customs in identifying suspicious shipments.
Executive Committee Report on the Evaluation of Customs Officers Training and Licensing System Projects (UNEP/OzL.Pro.WG.1/25/6)	The report was prepared in response to decision XIV/7, paragraph 6 of the 14 th Meeting of the Parties to the Montreal Protocol and presented to the 25 th Meeting of the Open-ended Working Group (OEWG) in June 2005.	The recommendations of the OEWG were: Improving the involvement of customs, including the higher levels of hierarchy, in the ODS phase-out; amending and upgrading the legislation framework in those Article 5 countries where it is incomplete, and improving enforcement and regional cooperation; accelerating and assisting implementation of customs training, including regional activities, where appropriate; and amending training materials and contents and putting supporting information materials and identifiers to effective use.
Extended desk study on the evaluation of national phase-out plans (NPPs) (UNEP/OzL.Pro/ExCom/45/12)	The objective of the evaluation is to undertake a review of experiences under the new modalities (national phase-out plans (NPPs), sector plans and terminal phase-out management plans (TPMPs)) with a view to determining whether the anticipated benefits have accrued and remain useful and relevant, or need adjustment or updating.	The NPPs and TPMPs are designed to accelerate policy development, facilitate implementation and enhance awareness amongst stakeholders. The commitments stipulated in the agreements signed by governments have made the work of the PMUs/NOUs easier when it comes to accelerating the implementation of regulations, and led to inter-departmental cooperation and shared databases that improve monitoring and enforcement. Predictable funding assures a level playing field and allows industries to commit to a specific phase-out plan, while helping them adjust their production and consumption patterns based on the timing of future activities and framework conditions. The phase-out plans improved the implementation of policy and regulations. (Decision 45/11)
Final report on the intermediate evaluation of RMPs and NPPs in non-LVC countries focusing on the refrigeration sector (UNEP/OzL.Pro/ExCom/48/12)	The evaluation of RMPs in non-LVC countries follows the earlier evaluation of RMPs in LVC countries (UNEP/OzL.Pro/ExCom/41/7). As per decision 46/7, the evaluation of RMPs in non-LVCs and of NPPs was combined and focused on the refrigeration servicing sector and the management aspects of the NPPs.	RMPs have played an important role in establishing legal frameworks and training programmes for technicians and customs officers, which are generally less advanced in countries without a RMP. The NPPs are favoured by the additional management capacities created with the PMUs. The NPPs enabled countries without a RMP to address the servicing sector and related legislation and training requirements in a coordinated way, while increasing equipment, trained technicians and customs officers, and completed legislation and enforcement mechanisms. The results of R&R projects implemented individually or under RMPs have in most cases fallen short of expectations. Certification of technicians and reporting on R&R activities performed by contracted service shops should become mandatory and should be combined with provisions that unused equipment can be taken back and transferred to other users. It is recommended to update legislation for additional legal measures such as: a ban on import and export of CFC-based second-hand refrigeration equipment, specification of a system of sanctions in cases of violation of legal regulations, improvement of the mechanisms of import quota allocations under the licensing system, and enhancement of cooperation between the NOU and Customs. (Decision 48/10)
Desk study on the evaluation of management and monitoring of NPPs (UNEP/OzL.Pro/ExCom/51/13)	This evaluation complements the evaluation of RMPs and NPPs in non-LVCs (UNEP/OzL.Pro/ExCom/48/12), focusing on the refrigeration sector and	The phase-out programmes reviewed are, in general, on target. The evaluation raised the question of the cost-effectiveness of the project management units (PMU) frameworks, which can either be a sub-set of the NOU or an entirely separated entity working remotely. Therefore, it is essential to ensure that the capacity building, especially working with the private and informal sectors, is not confined to the PMU, but communicated on an on-going basis to the NOU. No lack of coordination

Title	Description	Key Findings
	not analyzing in depth the management, monitoring and verification aspects of the NPPs. The evaluation and the field visits reviewed the indicators for assessing implementation delays and difficulties and analyzed the coordination between several IAs implementing a NPP.	or delays was reported between the agencies. The IAs need to assist the PMU and NOU in the development and implementation of the associated legislation and regulations, supported by capacity building, institutional strengthening, stakeholder participation and development of ownership. It is thus necessary to ensure that the NPP is mainstreamed into the national plans and policies of the country, which requires cooperation with other governmental agencies. (Decision 51/12)
Extended desk study on the incentive programmes for retrofits (UNEP/OzL.Pro/ExCom/52/8)	The objective of the extended desk study is to review the experience available to date in the implementation of the incentive programmes approved as individual activities under existing or new RMPs.	It can be concluded that the objectives of the incentive programmes were achieved for completed projects. The cost-effectiveness of incentive programmes proved to be at par and even more attractive than other activities traditionally included in RMPs, TPMPs and NPPs. Incentive programmes in the refrigeration servicing sector should be considered as one of the priorities, along with training of refrigeration technicians and R&R equipment. Defining boundary conditions for the incentive programme without prescribing a strict methodology allowed the Governments the flexibility to adapt the implementation of the programme to local circumstances and assured success while meeting the conditions. The case studies confirmed that it is essential for a country to meet the pre-requisites established by the Executive Committee for approval of incentive programmes, such as strict enforcement of quotas. (Decision 52/6)
Desk study on the evaluation of terminal phase-out management plans (TPMPs) (UNEP/OzL.Pro/ExCom/55/8)	This evaluation analyzes the role of TPMPs in LVC countries for achieving CFC phase-out in the servicing sectors and enabling compliance with the 85 per cent reduction target for 2007. It evaluates <i>inter alia</i> , the coordination between the lead and cooperating agencies, the quality of monitoring and reporting, sustainability of measures and institutional capacities, and lessons learned for the final phase-out of CFCs and the preparation of phase-out plans for HCFCs.	The evaluation noted that the establishment of PMUs in LVC countries has to be considered on a country-by-country basis, as some resulted in direct competition with the NOUs. The review of TPMPs demonstrated the absence of standardized methodology in conducting surveys and collecting ODS consumption data in Article 5 countries and in LVC countries in particular. Achieving early CFC phase-out is possible with: sound design, realistic planning allowing sufficient time to start up activities, commitment and cooperation on the part of the Government and stakeholders, and a full-time staff or a PMU, dedicated to implementing and monitoring the TPMP.
Final report on the evaluation of terminal phase-out management plans (UNEP/OzL.Pro/ExCom/58/8)	This synthesis report summarizes the evaluation reports on the role and the effects of TPMPs, which have been prepared in several LVC countries, and assesses the findings of a sample of country case studies carried out in eight LVC countries.	Early CFC phase-out has generally been achieved through an efficient public-private partnership forum consisting of all stakeholders, a strict implementation of quota system and the development of market conditions rather than through investment activities. The sustainability is ensured by the efficient operation and enforcement of the import licensing system and continued monitoring and public awareness campaigns. Experience with the phase-out of CFCs can and should be used for the development of a strategy of HCFC phase-out. Although none of the countries covered by this sample have established a PMU, they are all in compliance with the TPMP agreement and the CFC phase-out targets. However, they would benefit from strengthening their monitoring to provide regular and reliable data on R&R operations. Most countries benefited from the flexibility clause, which made it possible to shift resources from one activity to another if deemed necessary to achieve targets. (Decision 58/6)

Title	Description	Key Findings
<p>Desk study on the evaluation of the preparatory phase of the phasing out of HCFCs (decisions 68/9 and 69/12) (UNEP/OzL.Pro/ExCom/71/14)</p>	<p>The study aims to evaluate how the guidelines for the preparation of HPMPs have been used for the development of the stage I HPMPs, taking into account the preparation process itself and the resulting HPMPs. It also reviewed the reasons for delays in project preparation, the overarching strategy, main initiatives, policy and regulatory measures, and co-financing issues.</p>	<p>The preparation of stage I of HPMPs has taken significantly longer than the preparation of country programmes, RMPs and TPMPs. Although the most important reasons for delays (i.e., lack of experience with HCFC data collection, lack of guidelines, and the need to complete CFC activities) are not likely to occur again, the evidence suggests that the timely preparation of stage II would benefit from increased technical assistance to low- and medium-volume consuming countries. The technical assistance for the RAC servicing sector requires updated guidelines for technology selection and assessment of associated environmental impact. Policy assistance for stage II for LVC countries should concentrate on far-reaching measures, such as the support of energy efficiency, or the safe use of natural refrigerant alternatives. (Decision 71/25)</p>
<p>Desk study on the evaluation of HCFC phase-out projects in the refrigeration and air-conditioning manufacturing sector (UNEP/OzL.Pro/ExCom/75/9)</p>	<p>The desk study on the evaluation of RAC manufacturing projects has the objective of providing information on the progress made in the phasing-out of HCFCs in this sector and examines projects approved in various RAC sub-sectors in 25 countries, addressing issues related to low-GWP alternatives.</p>	<p>The policy framework for HCFC phase-out is quite homogeneous with regard to the control of import/export and trade of HCFCs and the ban of new production facilities relying on HCFCs. However, the standards for the use of alternative technologies are lacking in some cases and need to be thoroughly addressed. Every country evaluated used energy efficiency as a criterion for selection of the alternative technology, and many used it to establish synergies with other environmental agreements. It proved cost-effective to build on the CFC-related enforcement procedures and monitoring tools to control the use of HCFC. The slow development of national standards for the use of some alternatives has hindered the start of operations and the timely completion of a significant number of conversions towards low-GWP flammable or toxic alternatives. The projects using these alternatives included additional training and safety-related equipment for enterprises and technicians with the corresponding changes in project costs, and took steps towards implementing proper standards and codes. Eighty per cent of projects presented substantial delays mainly due to administrative and project management issues, such as staff rotation at the NOU. The demonstration projects have confirmed the feasibility and acceptability of the new technology and products in the local market of end-users and manufacturers alike. (Decision 75/7)</p>
<p>Final report on the evaluation of HCFC phase-out projects in the refrigeration and air-conditioning manufacturing sector (UNEP/OzL.Pro/ExCom/77/9 & Corrs.1 and 2)</p>	<p>The second phase of the evaluation of RAC manufacturing sector, based on the collection and analysis of information gathered at the enterprise level during field visits in several countries, assessed the progress made in the phasing out of HCFC in the RAC manufacturing sector in projects where the conversion process has been completed or is close to completion.</p>	<p>The evaluation concluded the importance of selecting alternative refrigerants and their operating systems based on a thorough analysis that includes energy efficiency, environmental impact, safety, economic considerations, as well as social consequences. Enterprises should evaluate the availability and/or limitations of equipment and refrigerants before converting. Lack of market demand and the servicing sector's reluctance to deal with flammable refrigerants has resulted in the manufacturing of high-GWP-based equipment in some enterprises, despite the fact that they had completed their conversion and developed prototypes for HFC-32. While large enterprises facing this issue may convert one or several production lines while increasing the production on other lines with high-GWP equipment, smaller enterprises cannot do this, as it would jeopardize their financial viability. It is recommended that countries and IAs report to the Executive Committee on the causes and strategies to address this situation, and enable the enterprises to start manufacturing equipment based on the agreed technology. In some countries, incremental operating costs were paid even if the enterprise was not manufacturing the agreed technology. Thus, sustainability is still an issue with the introduction of particularly R-290 and HFC-32 technologies and equipment. The technology selected to replace HCFC-22 in high ambient temperatures, while maintaining its condensing properties, is a critical issue. Countries should introduce licensing and import permits for all chemicals being used as refrigerants, as well as mandatory standards, proper training of servicing technicians and awareness campaigns regarding flammable, toxic and/or high-pressure refrigerants.</p>

Title	Description	Key Findings
<p>Desk study for the evaluation of the refrigeration servicing sector (UNEP/OzL.Pro/ExCom/80/10 and Corr.1)</p>	<p>The desk study analyses the progress made in the phase-out of HCFCs in the refrigeration servicing sector, focusing on the contribution of specific activities to reduce HCFCs, on the impact arising from the introduction of low-GWP alternatives, and challenges encountered during project implementation. The evaluation draws lessons from these projects to help future similar activities in the sector and attempts to identify potential issues that could be related to the phasing down of HFCs.</p>	<p>Energy efficiency standards should be made mandatory for RAC equipment, with labelling requirements and, where possible, incentives such as tax exemption should be given. (Decision 77/6)</p> <p>The results of HPMP implementation have been very positive so far. However, the reporting record of some of the countries points to the need for more focused assistance concerning HCFC consumption monitoring and reporting, which may affect future endeavours. Key lessons learned included: the importance of encouraging domestic innovative solutions to HCFC phase-out; the need to support training for handling of flammable or toxic refrigerants and the corresponding regulations and standards; the lack of availability of skilled technicians trained on new alternatives; the need to identify suitable alternatives for high-ambient temperature countries, particularly for the AC industry; the importance of strengthening the bridges between the NOU/PMU and other authorities in the country and empowering them with respect to central governments; the importance of training customs officers on the import/export licensing and quota systems, and ensuring the sustainability of training programmes by including the training modules in the curricula of the customs training institutions; and that refrigerant losses are mainly due to old equipment, which could be reduced and prevented by regular servicing and maintenance. (Decision 80/8)</p>
<p>Preliminary report for the second phase of the evaluation of the refrigeration servicing sector (UNEP/OzL.Pro/ExCom/81/7)</p>	<p>The preliminary synthesis report focused on the contribution of specific activities within servicing sector plans to reduce HCFCs, on the impact on servicing arising from the introduction of low-GWP alternatives, and on challenges encountered during project implementation in the field evaluation visits carried out before the 81st meeting, namely in Chile, Grenada, India, Oman and Samoa.</p>	<p>The HPMP implementation has had outstanding results, which may be attributed to the “cascade effect” of all the initiatives implemented within the HPMPs. It has achieved HCFC consumption reductions beyond countries’ obligations, has leveraged funding resources by building on the infrastructure supported during the CFC phase-out and will, in turn, reinforce the building blocks for the HFC phase-down. Some of the main achievements are: the demonstration projects facilitated the transition to low-GWP technologies by identifying common barriers to the adoption of new technologies; and the local RAC associations and training schools are strategic partners for HPMP design and implementation. Findings also show that there is a need for accessible and early adoption of new standards involving technical and financial support; that technical assistance may be necessary to design business models adapted to local markets for the sustainability of RRR systems; that the adoption of the new alternative technologies is hampered by their high cost, safety and security issues, and the lack of local expertise when dealing with flammable, toxic or high pressured refrigerant; and that there is a general unavailability of equipment and servicing tools in the local market. (Decision 81/5)</p>
<p>Final report on the evaluation of the refrigeration servicing sector (UNEP/OzL.Pro/ExCom/82/11)</p>	<p>The synthesis report aims to provide a thorough analysis of the project implementation in the refrigeration servicing sector in a sample of countries, formulates lessons learned for improving future similar projects, and assesses potential issues that could be related to the phasing down of HFCs in the servicing sector.</p>	<p>The HPMP implementation has achieved HCFC consumption reductions above and beyond the Montreal Protocol obligations. HPMPs have leveraged the Multilateral Fund resources by building on the institutional and physical infrastructure created by the CFC phase-out, which will be emulated for the HFC phase-down. Key findings from the synthesis show that training of RAC technicians is the activity that has had the most impact across all countries. Similarly, the establishment of policy and regulatory frameworks has proven to be a powerful tool for compliance. On the other hand, the establishment of refrigerant R&R networks still needs to provide consistent measurable results and seems to be lacking an attractive and sustainable economic model adapted to each local condition. Projects would benefit from a streamlined administration process and a more independent and stable NOU, benefiting from additional operational assistance. Very low-volume consuming countries reported the need for additional assistance for monitoring and reporting.</p>

Annex III

GLOBAL PRODUCTS DEVELOPED BY UNEP IN COOPERATION WITH INTERNATIONAL ORGANIZATIONS TO ASSIST THE REFRIGERATION SERVICING SECTOR IN ARTICLE 5 COUNTRIES

SUMMARY OF RELEVANT TOOLS

1. UNEP OzonAction has re-focused its clearinghouse activities to develop tools that can be utilized by different stakeholders at the local level. For this purpose, OzonAction partnered with several international organizations and associations to develop products that are technologically up-to-date and easy to use.

2. Table 1 summarizes the list of OzonAction key partnerships against relevant products and tools that can be utilized by A5 countries while implementing their phase-out/phase-down programs and projects.⁶⁰

Table 1. List of OzonAction key partnerships and relevant products and tools

Partner*	Product	Availability	Who could benefit
ASHRAE	Refrigerants Literacy: E-learning course with international certificate	(English) Available	Government officials, buildings owners, NOUs, consultants, other individuals who wish to learn about refrigerant progression, classification, applications and basic good management practices.
		(Spanish) Nov18	
		(French) Feb-19	
ASHRAE	Sound Management of Refrigerants: E-learning course with international certificate	(English) Nov-18	Servicing technicians and engineers as well as servicing contractors and building managers.
		(Spanish) Mar-19	
		(French) Mar-19	
	Refrigerant Management for Future Engineers (University Program)	Available	Engineering students: full-semester elective course on refrigerant management, designed as per academic requirements, offered at engineering universities and colleges.
EPEE	HFCs Outlook Model	Second pilot stage ongoing with eight countries. ⁶¹ Available to all countries in early 2019	NOUs that create a scenario model about HFCs vs. HCFCs projection (as substances and products based on those substances) against MP compliance targets.
AREA	Universal Training Kit	Mar-19	Training institutes and centres in A5 countries: the modular training kit can be used directly to build the desired format of any training course (subject/target groups/duration) through an online portal.
AHRI	Refrigerant Driving License (RDL)	Pilot stage ongoing with six countries. ⁶² Rollout to all countries expected in mid-2019	Industry stakeholders and governments: global industry-based qualification program on sound management of refrigerants, with international certificate recognized by the RAC industry. ⁶³

⁶⁰ It does not include information publications and events/functions that are developed in cooperation with partners, such as factsheets, technology briefs, O2C Roadshows, technical symposia/events that are already listed in the document titled "OzonAction list of products and tools."

⁶¹ Bosnia and Herzegovina, Dominican Republic, Gabon, Guatemala, Honduras, Mali, Senegal and Sri Lanka

⁶² Grenada, Suriname, Trinidad & Tobago, Rwanda, Maldives and Sri Lanka.

⁶³ RDL Industry supporting group includes: ABRAVA, ACAIRE, AREA, ASHRAE, EPEE, JRAIA, Refrigerant Australia, The Alliance.

Partner*	Product	Availability	Who could benefit
JRAIA	Risk Assessment Model (Roadmap) for use of flammable refrigerants	Part of PRAHA-II project. Ready by April 2019	Participating countries; all regions of the world with high ambient temperatures: a roadmap for building local risk assessment models, analysing risks and measures to be considered when using flammable refrigerants in the logistics (non-manufacturing) process, i.e. installation, operation and servicing of residential AC applications.
GFCCC, IIR, FAO & IEA	Cold Chain Database Model	Feb-19	Countries: A database model assisting in sorting and classifying cold-chain-related applications for better decision making about technology selection and phase-out/phase-down programs. The model will be offered as a tool that can be used during the preparation of Stage II of HPMPs, HFC plans and any relevant local surveys.
BFS	Good Practice Videos & Mobile App	Available	Technicians: a mobile app and a set of short educational videos about best practices in refrigeration servicing.
WCO	Customs E-Learning	Available	Customs and enforcement officers worldwide: a series of interactive training modules on the Montreal Protocol, legal trade facilitation and the prevention of illegal trade in ODS and alternatives.
UNODC / WCO	Customs Training Manual, Risk profiling guide	Available	Customs officers: a comprehensive guide to the Montreal Protocol and illegal trade issues. It provides guidance on the delivery of customs training workshops. The risk profiling guide (in development) provides guidance on applying intelligence-led enforcement to ODS trade.

* ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers; EPEE: European Partnership for Energy and Environment; AREA: European association of refrigeration, air conditioning and heat pump (RACHP) contractors; AHRI: Air-Conditioning, Heating and Refrigerating Institute; JRAIA: Japan Refrigeration and Air Conditioning Industry Association; GFCCC: Global Food Cold Chain Council; IIR: International Institute of Refrigeration; FAO: Food and Agriculture Organization; IEA: International Energy Agency; BFS: Bundesfachschule Kälte-Klima-Technik; WCO: World Customs Organization; UNODC: UN Office of Drugs & Crime.

3. The formal framework of cooperation between UNEP and ASHRAE includes joint international and regional technical events; strengthening refrigeration and air-conditioning associations in Article 5 countries; facilitating access of Article 5 countries to ASHRAE's knowledge tools; developing joint e-learning training courses and outreach materials; developing international guidelines (assessment program) for good management of refrigeration and air-conditioning installations; participation in ASHRAE's refrigeration and research committees to ensure that the needs of Article 5 countries are known to ASHRAE for its standards; research and global activities.

4. UNEP has also established partnerships with other international and regional bodies and initiatives, including the Global Refrigerant Management Initiative (GRMI); Bundesfachschule Kälte-Klima-Technik (BFS); the China Household Electric Appliances Association (CHEAA); the China Trust Fund; the Emirates Authority For Standardization and Metrology (ESMA); the European Partnership for Energy and the Environment (EPEE); the Pacific Islands Forum Fisheries Agency (FFA); the Secretariat of the Pacific Community (SPC); the Green Customs Initiative (GCI); the Gulf Cooperation Council (GCC) Secretariat; and the League of Arab States (LAS) Secretariat.

Refrigeration servicing sector: UNEP OzonAction tools, products and services

Introduction

5. For the majority of Article 5 countries, the refrigeration servicing sector continues to be the largest, or only, consumer of ODS and is therefore one of the most important sectors being addressed by the Multilateral Fund. The possibility of addressing HCFC phase-out concurrently with the HFC phase-down could potentially allow for a more holistic, robust and comprehensive approach to assist the sector in reducing consumption, ensuring safe handling and optimal equipment operation, thus reducing energy consumption. Servicing technicians and operators need to be properly trained to safely commission, service, repair and decommission equipment based on alternative technologies (flammable, higher-toxicity, higher-pressure). HPMPs provide countries with an opportunity to make the right technology choices, in favour of non-HCFC and non-HFC, low-GWP refrigerants. Over the last few years, CAP has widened its scope and outreach to forge new partnerships, supporting activities for sustainable technician training and good servicing practices, as well as a harmonized model RAC certification programme for Multilateral Fund-wide use.

6. This document provides an overview and a brief explanation of OzonAction tools, products and services that have already been developed and that are in progress for the refrigeration servicing sector.

I. PUBLICATIONS AND GUIDES

Ozone and Climate Benefits in the RAC Sector

7. A two-volume guide for technical and servicing technicians, and for purchasers/decision makers. The objective is to provide practical guidance on how best practices and operations can be adopted by servicing technicians to achieve ozone and climate benefits, and how these benefits can be measured and evaluated. It also covers issues such as system improvement, reliability, leakage and energy efficiency in the context of installation, commissioning and maintenance. The guide will be available in early 2019.

Good Servicing Practices for Flammable Refrigerants: A Quick Guide

8. The aim of this guide is to provide RAC servicing technicians with quick reference to key safety classifications and technical properties of commercially available flammable refrigerants. Additionally, it provides important safety guidance for the installation and servicing of room air-conditioners designed to use flammable refrigerants. The guide (published in 2018) has been distributed at relevant meetings, and is also available as an interactive e-book for smartphones (details on the OzonAction website).

Good Servicing Practices: Phasing out HCFCs in the Refrigeration and Air-Conditioning Servicing Sector

9. The main objective of this guide for trainers is to provide National Ozone Units and refrigeration and air-conditioning training institutes with a standardized module for delivering training programmes under the HCFC Phase-out Management Plan. It can be used together with web-based slides and interactive animated exercises. The guide (published in 2015) is available on the OzonAction website and has been distributed at relevant meetings.

Safe Use of HCFC Alternatives in Refrigeration and Air-conditioning: An overview for developing countries

10. This publication provides an overview of flammable, higher-toxicity, and high-pressure alternatives to HCFCs and HFCs, their general characteristics and their application in the context of the safety issues. It provides guidance for the National Ozone Units (NOUs), servicing technicians and other interested parties in developing countries on how they can advise and assist national stakeholders in the selection and implementation of alternative refrigerants. The guide (published in 2015) is available on the OzonAction website and has been distributed at relevant meetings.

International Standards in Refrigeration and Air-Conditioning: An introduction to their role in the context of the HCFC phase-out in developing countries

11. This guide provides an introduction to and a simple overview of the issues related to international standards in the refrigeration and air-conditioning sector and how they can be useful in the context of the phase-out of hydrochlorofluorocarbons (HCFCs) in developing countries as required by the Montreal Protocol on Substances that Deplete the Ozone Layer. The guide is available on the OzonAction website and has been distributed at relevant meetings (published in 2014).

II. FACTSHEETS AND INFORMATION NOTES

12. Following the adoption of the Kigali Amendment, UNEP's OzonAction prepared a series of factsheets related to policy and technical issues associated with the Kigali Amendment. In addition, the following factsheets, available on the OzonAction website and distributed at relevant meetings, have been developed:

- (a) *Refrigerant designations*: produced by ASHRAE in cooperation with UNEP OzonAction, this factsheet provides information on refrigerants' designation and safety classification. It is updated every six months to indicate refrigerants newly assigned with "r" numbers (ASHRAE designations);
- (b) *Safety factsheets*: Three factsheets on the safe use of HCFC alternatives in RAC (flammable refrigerants, higher-pressure refrigerants, higher-toxicity refrigerants);
- (c) *Cold Chain Technology Briefs*: A series of concise policy briefs for a range of target audiences, including the RSS. The briefs were developed in cooperation with the International Institute of Refrigeration (IIR) and deal with issues such as refrigeration in food production and processing; cold storage and refrigerated warehouses; transport refrigeration; commercial, professional and domestic refrigeration; and fishing vessel application.

III. MOBILE APPLICATIONS, VIDEOS & WEB-BASED TOOLS

GWP-ODP Calculator

13. This application was designed for the Montreal Protocol National Ozone Units and RSS technicians, and should also be useful for other related stakeholders. The application will automatically perform the conversion between metric tonnes, ODP tonnes and/or CO₂-equivalent tonnes (or kg), and display the corresponding converted values. The app includes both single-component substances and refrigerant blends; components of mixtures and their relative proportions (metric, ODP, CO₂-eq) are also

displayed. The application can be downloaded (at no cost) from the Google Play Store and iTunes/App Store. It is also available in a web version that can be used from the OzonAction website.

“WHAT GAS?”

14. WHAT GAS? is a searchable chemical database of ODS, HFCs and their alternatives. RSS technicians and other stakeholders can quickly obtain additional information on substances of interest. National Ozone Officers, customs and enforcement officers and other stakeholders will find this tool helpful. WHAT GAS? makes it easy to find the following information on any specific refrigerant and other chemicals: chemical name, formula and type; ASHRAE designation; trade names; HS code; CAS and UN numbers; Montreal Protocol annex and control measures; ozone depleting potential (ODP); global warming potential (GWP); blend components; toxicity and flammability class; and main uses. The application can be downloaded (at no cost) from the Google Play Store and iTunes/App Store. It is also available in a web version that can be used from the OzonAction website.

Refrigeration and Air-conditioning Technician Video Series

15. This application consists of a series of short instructional videos on techniques, safety and best practices for refrigeration and air-conditioning (RAC) technicians. It serves as a complementary training tool for technicians to revise and retain the skills acquired during hands-on training. The application can be downloaded (at no cost) from the Google Play Store and iTunes/App Store.

Good Servicing: Flammable Refrigerants Quick Guide

16. This application is an electronic, interactive version of the UNEP OzonAction Quick Guide on Good Servicing Practices for Flammable Refrigerants. It offers easy reference to key safety classification and technical properties of flammable refrigerants available on the market. It also provides important safety guidance for the installation and servicing of room air-conditioners designed to use flammable refrigerants. This interactive guide allows the user to scroll and browse the text, jump to specific chapters, or use the comprehensive dynamic index to locate specific keywords, figures and tables. The application also includes a refrigerant charge size calculator and a room size calculator for flammable refrigerants. It can be downloaded (at no cost) from the Google Play Store and iTunes/App Store.

Refrigerant Identifier Video Series

17. This application provides guidance on the application of a refrigerant identifier. It consists of short instructional videos showing how to use and maintain a refrigerant identifier. It is intended for use by technicians involved in the servicing and maintenance of refrigeration and air-conditioning systems, Montreal Protocol National Ozone Officers, and Customs and Enforcement Officers. The application will be available for download (at no cost) from the Google Play Store and iTunes/App Store (expected in November 2018).

IV. ONLINE TRAINING TOOLS

Refrigerants Literacy e-Learning Course

18. The Refrigerants Literacy e-Learning Course, developed in cooperation with ASHRAE, is the first of its kind for non-specialists. The course is offered to all NOUs and other stakeholders at no cost. The course is currently being translated into Spanish and French and will be offered in both languages by the end of 2018. Feedback on the course has been very positive due to its simplicity and thorough explanations of refrigerant-related issues in a language appropriate to both specialists and non-specialists. The course

includes interactive activities, knowledge checks, audio and video, and a final test. The course is mainly designed for non-specialists in HVAC&R operation and servicing, i.e. NOUs, policy makers, procurement officers, building owners, facility managers, etc., but is also recommended for HVAC&R engineers, consultants and technical people who wish to get a general, holistic overview. This course consists of four lessons on refrigerant types, refrigerant classification, refrigerant selection, and refrigerant management. It is available online on the ASHRAE training platform. ASHRAE creates an account, completes enrolment, and sends an email with instructions on how to access the course (details on the OzonAction website).

Sound management of refrigerants

19. Developed in cooperation with ASHRAE, this will be the first e-learning course for technicians and engineers on the sound management of refrigerants, including all good servicing practices and issues related to new and flammable refrigerants. The course is planned to be completed by the end of 2018.

V. TRAINING PACKAGES AND PROGRAMS

Universal Training Kit

20. The specialised “Universal Training Kit on Alternative Refrigerants” was developed in cooperation with AREA⁶⁴ for the use of training institutes and centres in developing countries, with the aim of offering state-of-the-art information and knowledge on the best practices and techniques in managing and handling future, mainly flammable, refrigerants in a sound and safe manner. The modular course can be adapted to suit different sectors and sub-sectors (small and medium, domestic and light commercial workshops, commercial AC, large service companies and workshops, mobile AC, commercial refrigeration, plant operators and managers) and focuses on trainers and master trainers. The modules are: general module; hydrocarbons; and low-GWP HFC/HFO.

21. The course comprises pre-assessment test (to be taken before the training), post-training assessment, venue requirements for training (equipment, tools, aids, consumables, etc.), instructors’ minimum qualification; guide for the instructor; checklists and procedures to start and hold a training course; supporting syllabus, textbook, manuals, tables, charts; PowerPoint presentations for instructors; and hand-out Materials for the attendees

22. The Universal Kit will be offered, starting from 2019, to all NOUs and training institutes in A5 countries. A dedicated website portal will be developed to maximize outreach.

The Refrigerant Driving License

23. The objective of the Refrigerant Driving License (RDL), an initiative by UNEP OzonAction and the Air Conditioning, Heating, and Refrigeration Institute (AHRI), is to develop a globally recognised and acceptable qualification program that sets minimum requirements for the proper and safe management of refrigerants in air-conditioning, heating, and refrigeration equipment. In close cooperation with industry and association partners, the initiative will set minimum qualification requirements and seek international recognition of such a program from industry and the governments. The RDL will address the requirements for sound management of different types of current and future refrigerants, including best practices for identifying, handling, charging, recovery and recycling, leak testing, storing, record-keeping, etc. The implementation of the RDL will be achieved through the HVAC&R industry business networks, which over time is expected to lead to its widespread recognition by governments and end users in both public and private sectors. AHRI and UNEP are promoting the RDL to HVAC&R associations via the Global

⁶⁴ The European association of refrigeration, air conditioning and heat pump (RACHP) contractors.

Refrigerant Management Initiative (GRMI) and the International Council of Air-Conditioning, Refrigeration, and Heating Manufacturers Associations (ICARHMA) in order to create the right momentum for a globally accepted qualification program. An Advisory Committee has been formed with industry associations that support the RDL to provide technical advice and ensure that it does not conflict with existing certification schemes.⁶⁵ The RDL program encompasses three categories of equipment:

- (a) Small Applications;
- (b) Commercial Refrigeration;
- (c) Commercial AC.

24. The RDL Pilot Framework is as follows

- (a) Sets Competency (Qualification) Level;
- (b) Sets Skills/Tasks Documentation;
- (c) Train the Trainers/Assessors Sessions;
- (d) Technician Training Sessions;
- (e) Technician Testing;
- (f) Endorsing the Granting of Certificates.

25. Expected outcomes:

- (a) Minimal global qualification programme for servicing technicians (Refrigerant Driving License) developed, launched and operational;
- (b) Developing a globally acceptable programme that sets out the minimum qualification requirements for the HVAC&R Supply-Chain network whilst at the same time creating the international recognition of such programs by the industry and the governments;
- (c) This unified programme should concomitantly address, but not be limited to, the requirements for sound management of different types of current and future refrigerants;
- (d) The global HVAC&R industry will be the catalyst for the programme by ensuring its introduction and enforcement through its business networks;
- (e) Resources for the RDL will be sought from different sources including, but not limited to, AHRI, participating associations and societies, and the Multilateral Fund. UNEP foresees that RDL shall be self-sustained in the long term in terms of resources and operation

⁶⁵ The Advisory Committee consists of: ABRAVA, ACAIRE, AREA, EPEE, JRAIA, Refrigerants Australia, the Alliance for Responsible Atmospheric Policy, the Russian Union of Refrigeration Enterprises and ASHRAE. ABRAVA: Brazilian trade association that represents refrigeration, air-conditioning, ventilation, heating, and air treatment equipment manufacturers. ACAIRE: Colombian air-conditioning and refrigeration association that represents business, institutes, professional members, technicians, correspondents, and students in the industry. AREA: Air conditioning and Refrigeration European Association. ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers. EPEE: European Partnership for Energy and the Environment. JRAIA: Japan Refrigeration and Air Conditioning Industry Association.

through a business-model concept which will be part of its core operational mechanism.

The Refrigerant Driving License: Phase II

26. The next stage of the RDL is to complete the documentation of RDL for other categories (Commercial Refrigeration, Commercial AC and Enterprises) and to finalize the organizational and operational arrangements of the RDL I programme for wider application.

Competency Requirements	(A) Small Applications	(B) Commercial AC	(C) Commercial Refrigeration	(D) Enterprises
Basic knowledge (environment, refrigerant classification / types, applications and relevant policies)	X	X	X	
Handling, transportation, storage and management of refrigerant containers	X	X	X	
Servicing skills of leak detection, R&R, evacuation, charging and system tightness	X	X	X	
Logging and record keeping		X	X	X
Tools and equipment for the job	X	X	X	X
Employment skills, training and certification				X

Refrigerant Management: Special Course for Future Engineers

27. The objective of this course, developed in cooperation with the American University in Beirut, is to support the engineering education process at various engineering institutes and colleges by acquainting future engineers with the knowledge and skills required to manage refrigerants soundly, as well as understand the technical and policy aspects associated with the refrigeration and air-conditioning industry. This special course is the first of its kind concerning refrigerant management that offers comprehensive scientific information and knowledge suitable for the academic level. The course was developed in accordance with academic requirements for engineering universities and colleges and it includes a complete set of lecture notes, presentations and activity sheets for a full-semester course (16 weeks). Through cooperation with ASHRAE and its university network of more than 450 engineering colleges and institutes worldwide, the course has been offered since early 2018; more than 40 universities and colleges have expressed interest in offering it. Twenty-four universities have already started offering the course in 2018 (including those in Brazil, Canada, Egypt, India, Indonesia, Lebanon, Pakistan, Peru, Philippines, Singapore, Serbia, Turkey, UAE & USA). The course outline is as follows:

- (a) Module 1 (4 weeks): Refrigeration & air-conditioning industry, evolution of refrigerants & environmental impacts;
- (b) Module 2 (3.5 weeks): Alternative refrigerants for different sectors & lubricants;
- (c) Module 3 (3 weeks): Containment of refrigerants, service & maintenance of air-conditioning & refrigeration systems;
- (d) Module 4 (2 weeks): Safe use & handling of refrigerants;
- (e) Module 5 (2 weeks): Related standards and codes for systems and substances.

VI. SPECIAL SERVICES IN COOPERATION WITH PARTNERS

Training and Certification Programs

28. The Montreal Protocol funding mechanism has assisted Article 5 governments in developing and introducing different schemes for certifying and qualifying RAC service technicians with the aim to ensure the provision of good service practices and to minimize emissions. The certification schemes differ notably between countries and regions in terms of their structure, comprehensiveness and ability to be adequately enforced. Accordingly, in collaboration with different partners, CAP has introduced different products and tools that can be incorporated into the national programs and HPMPs and complement national programs.

29. The competence of the personnel handling refrigerants is important from both an environmental and safety perspective. It is recommended that only certified technicians be allowed to install, maintain, repair, recover, and dismantle RAC systems and to purchase refrigerants. Certifications can be issued to personnel or enterprises, or to a combination of the two. Certification is the best practical method to verify the competence of personnel handling refrigerants and to ensure the correct installation, maintenance, repair and dismantling of refrigeration, air-conditioning and heat pump systems. OzonAction has developed a guide, “National Certification Schemes for Refrigeration and Air Conditioning Service Technicians,” that provides Ozone Officers and RAC associations with examples of strategies and requirements for their establishment and operation. OzonAction also regularly includes discussions on certification programmes in its Regional Network and Thematic meetings.

Risk Assessment Model for high ambient temperature (HAT)

30. OzonAction is building, in cooperation with partners, a comprehensive Risk Assessment Model for the logistics (installation, operation and servicing) of air-conditioning units that operate with lower-GWP refrigerants in high-ambient-temperature (HAT) countries. The project also assesses the technology transfer barriers, to reduce dependency on high-GWP alternatives and technologies. The project outcome will not only benefit the participating countries, but all regions of the world where high ambient temperatures are prevalent. Progress reports of EGYPRA and PRAHA-II projects, including the detailed analysis and comparison of HAT testing projects, have been shared during network meetings and through specific thematic workshops.

HFC Outlook Model

31. UNEP OzonAction teamed up with the European Partnership for Energy and the Environment (EPEE) in a project to develop the “HFCs Outlook Model.” The HFCs Outlook Model is a scenario model for comparing local consumption and use of HFCs and HCFCs in different consuming sectors historically and at present. It also presents different projection scenarios for each substance and sector, based on global, regional and local forecasts of technology trends obtained through exhaustive consultation process with local stakeholders and key players. Stage I of the project was piloted successfully in Bahrain and Kuwait, and was presented to all Article 5 parties at the Interregional Networks Meeting (January 2018 in Paris). Accordingly, and as requested by several Article 5 parties, OzonAction and EPEE started the second pilot of the HFCs Outlook Model with a focus on the servicing sector, which will engage additional countries, i.e.: Bosnia and Herzegovina, the Dominican Republic, Gabon, Guatemala, Honduras and Senegal.

Cold Chain Database Model for A5 Countries

32. UNEP OzonAction is developing, in cooperation with the GFCCC⁶⁶ and international RAC association partners, a Cold Chain Sector database model for the compilation of information and data about technologies and trends, with a view to pilot it in select Article 5 countries as part of the data collection and analysis work under the Kigali Enabling projects.

Customs and Enforcement: UNEP OzonAction Tools, Products and Services

Introduction

33. As part of CAP's work in assisting countries to comply with their HCFC phase-out commitments and sustaining compliance with prior targets, OzonAction provides support to strengthen national capacity for effective customs & trade controls. This is achieved through the development of a range of materials intended to support customs and enforcement officers in their work to implement national licensing systems for ozone-depleting substances, and future commitments on HFCs under the Montreal Protocol, to detect and prevent illegal trade in these chemicals, and to facilitate legal trade. Many of these materials are produced in cooperation with our partner organizations.

I. PUBLICATIONS AND GUIDES

Training Manual for Customs Officers: Saving the Ozone Layer - Phasing out Ozone-Depleting Substances in Developing Countries - Third Edition

34. The *Training Manual for Customs Officers* provides the necessary guidance and information to effectively monitor and facilitate legal trade in ozone-depleting substances and to combat their illegal trade. It presents information on the international policy context and an overview of technical issues, including information on chemicals and products traded and how these may be smuggled. The manual is intended for use in conducting training programmes for Customs Officers, as well as serving as a stand-alone reference document. Now in its third edition, it takes into account the developments in international trade and provides new material to reflect changes in the Montreal Protocol, Harmonized System codes, licensing systems and other relevant information added since its original publication in 2001 and its second edition in 2008. The guide (published in 2013) is available on the OzonAction website and has been distributed at relevant meetings.

Ozone-depleting substances smuggling and concealment case-study handbook

35. This handbook, which provides information and guidance on commonly used methods of smuggling and concealment of ODS, is intended to promote cooperation between criminal justice agencies within borders, and to strengthen the law enforcement response to illegal trade in chemicals controlled under the Montreal Protocol. The handbook is targeted to enforcement officers and is particularly beneficial to Police, Customs and Border Security Officials. It provides technical information that will reinforce officers' understanding of ODS and assist with the recognition and detection of illegal trade in these chemicals. The Handbook was developed in cooperation with the INTERPOL Environmental Crime Programme. It is available on demand only (due to its enforcement-sensitive content) and has been distributed at relevant meetings (published in 2013).

⁶⁶ Global Food Cold Chain Council.

Risk assessment of illegal trade in HCFCs

36. This report provides a summary of recent cases of illegal trade, and lists existing policy measures to combat HCFC smuggling. By considering market conditions for HCFCs and drawing parallels with the context and methods used by smugglers which led to chlorofluorocarbon (CFC) smuggling, the report provides an analysis of the risks of HCFC smuggling becoming entrenched, and makes recommendations on how this illegal trade can be prevented. The report was developed in cooperation with the Environmental Investigation Agency. The guide (published in 2011) is available on the OzonAction website and has been distributed at relevant meetings.

Informal Prior-Informed Consent (iPIC): Supporting compliance through prevention of illegal and unwanted trade in ozone-depleting substances

37. This short booklet briefly describes the mechanism and the advantages of the iPIC system. It provides some information on iPIC's results and successes and encourages countries that are not yet members to join and to begin to reap the benefits of this initiative. The booklet (published in 2015) is available on the OzonAction website and has been distributed at relevant meetings.

Legislative and Policy Options to Control Hydrofluorocarbons

38. This booklet provides developing countries with a suite of different options that they may wish to consider, including both mandatory and voluntary approaches to developing, enacting and enforcing different legislative and policy measures to facilitate a smooth HFC phase-down process. This guide complements the previous OzonAction publication, *HCFC Policy & Legislative Options: A Guide for Developing Countries* (2010). The booklet was published in 2018 and is available on the OzonAction website.

Establishing an HCFC import quota system

39. This booklet provides the necessary information and practical guidance for developing countries to design and implement a workable and effective quota system that will contribute to ensuring the country's compliance with the Montreal Protocol HCFC phase-out schedule. The booklet is available on the OzonAction website and has been distributed at relevant meetings (published in 2012).

II. FACTSHEETS AND INFORMATION NOTES

40. UNEP's OzonAction continues to prepare factsheets providing relevant information and describing the immediate and future challenges to be addressed by the different Parties. The following factsheets and information notes, available on the OzonAction website, are of specific interest to customs and enforcement officers, as well as NOUs:

Customs Poster

41. The updated Customs Poster provides concise information on ODS and alternatives and a short checklist of issues for customs officers to keep in mind when handling ODS shipments (updated in 2016).

Customs Officer's Quick Tool for Screening ODS

42. A quick reference tool for customs and enforcement officers that provides access to key information regarding ODS, their alternatives, and relevant customs codes.

Refrigerant Designations

43. Produced by ASHRAE in cooperation with UNEP OzonAction, this factsheet provides information on refrigerant designation and safety classification, and is updated every six months to indicate new refrigerants which are assigned “R” numbers (ASHRAE designations).

Harmonized System code factsheets:

- (a) HS nomenclature (HS codes) for HCFCs and certain other ozone-depleting substances (post-Kigali update);
- (b) Commonly traded HCFCs and mixtures containing HCFCs (post-Kigali update);
- (c) Commonly used non-ODS substitute refrigerants (post-Kigali update);
- (d) Common products and equipment containing or reliant on HCFCs;
- (e) HS codes for HFCs: Actions to take ahead of the of the new 2022 HS (in production, with WCO).

Free trade zones and trade in ODS

44. As part of international trade, many ODS shipments pass through Free Trade Zones (FTZ). Lack of proper oversight and controls in such zones can create an environment where illegal trade in ODS can proliferate. This paper provides a brief overview of the subject.

The informal prior-informed consent (iPIC) mechanism

45. The iPIC mechanism is a voluntary and informal system of information exchange on intended trade between the authorities in importing and exporting countries that are responsible for issuing ODS trade licenses. This factsheet gives an overview of how this informal mechanism operates and provides some interesting information on the results of ODS trade control and monitoring, conducted through iPIC.

The Kigali Amendment to the Montreal Protocol: HFC phase-down

46. This short paper provides an overview of the Kigali Amendment and its consequences.

The Kigali Amendment factsheet series and poster

47. Following the adoption of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, UNEP's OzonAction prepared a series of factsheets describing the immediate and future challenges to be addressed by the different Parties between now and the time when the Amendment comes into force. A timeline poster is also available.

III. MOBILE APPLICATIONS, VIDEOS & WEB-BASED TOOLS

48. In addition to the apps described in the refrigeration section above (“WHAT GAS?” app and the refrigerant identifier video app), the following products have been developed:

iPIC

49. The online iPIC system provides participating countries with real-time, 24-hour, 7-days-a-week personalized access to key licensing-system data in each of the 100 participating countries. The system provides a standardized and secured repository of iPIC data. Features of the online iPIC include the ability to search specific items of information; an interactive query and information sharing forum; the ability to easily and rapidly generate various reports and statistics; and the ability to update iPIC information with a simple click that will copy the information from a previous year. It is equipped with a FAQ section (which answers basic questions) and a Help section (which thoroughly explains how to use the online system); multi-lingual capability; and an interactive colour-coded map displaying country iPIC information sheet status. iPIC-online is accessible on an invitation-only basis (i.e. not open to the public). The platform is currently being upgraded and streamlined.

Combating illegal trade in ODS: training video

50. This 26-minute training video provides customs and enforcement officers with an overview of illegal trade in ODS, and shows specific cases and examples from around the world. It provides practical guidance and tips on identifying suspicious shipments and smuggled ODS. The video is available on demand only (due to its enforcement-sensitive content) and has been distributed at relevant meetings (published in 2014).

IV. ONLINE TRAINING TOOLS

E-Learning Modules for Customs Officers

51. OzonAction and the World Customs Organization (WCO) jointly developed an e-learning course in 2009 devoted to the enforcement of the Montreal Protocol. The course has been updated several times since then. The course is based on the *UNEP Training Manual for Customs and Enforcement Officers* (Third Edition) and reflects WCO's expertise in developing and delivering online training to customs officers worldwide. The e-learning modules are hosted and disseminated through the WCO CLIKC platform. Since it is a closed enforcement platform, the modules are accessible on an invitation-only basis to all customs officers and NOUs on request. Updates and maintenance are ongoing.

OzonAction Web pages

52. OzonAction hosts a specific customs and enforcement page with a range of materials intended to support customs and enforcement officers in their work to implement national licensing systems for ODS, to detect and prevent illegal trade in these chemicals, and to facilitate the legal trade.

V. SPECIAL SERVICES IN COOPERATION WITH PARTNERS

World Customs Organization (WCO)

53. UNEP and the WCO have had long-standing cooperation on the issues related to trade (and prevention of illegal trade) in ODS controlled under the Montreal Protocol and in their alternatives. This

cooperation was formalized with an MOU signed in 2003 as a cooperation framework between the two agencies, and has led to specific concrete initiatives, such as:

- (a) Developing e-learning modules on the Montreal Protocol and ODS trade with dissemination through WCO CLIKC platform (see above);
- (b) Cooperation on specific WCO operations:
 - (i) The *Sky-Hole Patching* initiative on ozone-depleting substances and hazardous waste (2006 to 2009);
 - (ii) The *Sky-Hole Patching II* project, in 2010: Customs from over 80 countries conducted a six-month global project to monitor trade and fight ODS smuggling, with support from the WCO, UNEP and National Ozone Units (NOUs); and
 - (iii) Ongoing operation on waste and ODS.
- (c) OzonAction representation at relevant meetings and workshops, including WCO Enforcement Committee, Customs Cooperation Council, Working Group on Commercial Fraud, and WCO Regional Intelligence Liaison Office (RILO) meetings;
- (d) Participation of WCO HQ and RILO representatives at OzonAction workshops and training sessions;
- (e) Cooperation on ECA and global ozone protection awards;
- (f) Survey/evaluation: comprehensive global assessment of customs training methodologies and infrastructure (Montreal Protocol), carried out in cooperation with the WCO;
- (g) Communication on issues of HS codes for ODS and alternatives, and other issues for joint factsheets, expert review of OzonAction factsheets and Customs Training Manual, and guidance to countries; and
- (h) OzonAction information materials and tools, uploaded on the secure *WCO Environet* platform.

Green Customs

54. OzonAction is a member of the Green Customs Initiative. This initiative, launched in 2004, is a partnership of international organizations cooperating to enhance the capacity of customs and other relevant border-control officers to monitor and facilitate legal trade and to detect and prevent illegal trade in environmentally sensitive commodities covered by relevant trade-related Multilateral Environmental Agreements (MEAs) and international conventions. OzonAction (in cooperation with the Ozone Secretariat) provided a chapter on the Montreal Protocol and illegal trade in ODS to the Green Customs Guide.