BRIEFING NOTE on Funding-Related Issues Identified in the Dubai Pathway

1. Scope of the Briefing Note

In 2015, at their Twenty-Seventh Meeting, the parties decided in decision XXVII/1 entitled "Dubai Pathway on HFCs" to "*work within the Montreal Protocol to an HFC amendment in 2016 by first resolving challenges by generating solutions in the contact group on the feasibility and ways of managing HFCs*". One of the challenges parties agreed to resolve was to "*maintain the MLF as the financial mechanism, and to agree that additional financial resources will be provided by non-Article 5 parties to offset the costs arising out of HFC management for Article 5 parties if obligations are agreed to. In this regard, key elements for financial support from the MLF for Article 5 parties will be developed by the contact group to provide guidance to the ExCom of the MLF, taking into account the concerns of the parties*".

The decision reached in Dubai recognizes the progress made in parties' discussions on a number of funding-related issues "*including development of a common understanding on issues related to flexibility of implementation, second and third stage conversions, guidance to the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol, enabling activities for capacity-building*". The decision endorses respective concepts, while recognizing that "*further progress still needs to be made, in particular with respect to other challenges identified in the contact group mandate, for example conversion costs, technology transfer and intellectual property rights*".

The objective of this briefing note is to provide information on the funding-related tools and policies developed under the Montreal Protocol that could be used, or developed further, to tackle a number of identified challenges. The note also presents a summary of funding provisions included in the four HFC amendment proposals put forward by a number of parties.[1] The briefing note comprises the following sections:

- Section 2 highlights key information on endorsed concepts related to funding (Annex II, decision XXVII/1);
- Section 3 provides an overview of additional issues identified where further progress still needs to be made. Issues related to intellectual property rights are discussed in a separate briefing note;[2]
- Section 4 outlines the main provisions on funding included in the HFC amendment proposals.

The present note has been prepared in consultation with the secretariat of the Multilateral Fund (MLF) which provided background information.[3] It also draws on relevant TEAP reports.

The information presented here is not intended to be exhaustive nor prescriptive.

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[1] The North American proposal put forward by Canada, Mexico and the United States of America: http://conf.montreal-protocol.org/meeting/oewg/oewg-37/presession/English/OEWG-37-3E.pdf; The Indian proposal put forward by India: http://conf.montreal-protocol.org/meeting/oewg/oewg-37/presession/English/OEWG-37-4E.pdf; The European Union proposal put forward by the European Union on behalf of its 29 member States: http://conf.montreal-protocol.org/meeting/oewg/oewg-37/presession/English/OEWG-37-5E.pdf; and The Island States proposal put forward by Kiribati, Marshal Islands, Mauritius, Micronesia (Federated States of), Palau, Philippines, Samoa and Solomon Islands: http://conf.montreal-protocol.org/meeting/oewg/oewg-37/presession/English/OEWG-37-6E.pdf

[2] Intellectual Property Rights and the Montreal Protocol: past practices and current challenges: http://conf.montreal-protocol.org/meeting/oewg/oewg-37/presession/Background_documents/Briefing_note_on_IPR.pdf

[3] The present document builds on the briefing note on funding issues that served as a background paper for the informal inter-sessional meeting on HFCs (Vienna, June 2015) entitled: Funding Issues on the feasibility of managing HFCs: http://conf.montreal-protocol.org/meeting/workshops/hfcs-intersessional-informal-consultation/SitePages/Home.aspx

2. Concepts discussed and endorsed in the Dubai Pathway

2.1 Funding

Endorsed concept
"Maintain the MLF as the financial mechanism and agree that additional financial resources will be provided by non-A5 parties to offset costs arising out of the management of HFCs for A5 parties, in the event any obligations are agreed to".

Article 10 of the Montreal Protocol established the financial mechanism to provide financial and technical cooperation, including the transfer of technologies, to Article 5 parties to enable their compliance with the Protocol's control measures. The mechanism includes the Multilateral Fund (MLF) and is to, *inter alia, "meet all agreed incremental costs of A5 parties. An indicative list of the categories of incremental costs shall be decided by the parties"*[4]. A summary of key elements of Article 10 of the Protocol along with the indicative list of categories of incremental costs is found in the Annex to the present note.

2.2 Flexibility

Endorsed concept
"Article 5 parties will have the flexibility to prioritize HFCs, define sectors, select technologies/alternatives, elaborate and implement their strategies to meet agreed HFC obligations, based on their specific needs and national circumstances, following a country driven approach. The Executive Committee shall incorporate the principle in the abovementioned paragraph in relevant guidelines and its decision making process".

Over time, the Executive Committee has adopted a number of decisions impacting the degree of flexibility for Article 5 parties to implement ODS phase-out activities[5] taking into account their national circumstances.[6,7] A number of such decisions recognized the special situation of different groups of countries and stakeholders, such as low-volume and very-low volume consuming (LVC and VLVC) countries, and small and medium-sized enterprises (SMEs).

[4] The indicative list of the categories of incremental costs was adopted at the 4th MOP (1992).

[5] ExCom 20 (1996) noted that alternative technology was evolving rapidly, and some degree of flexibility might be required. It was decided that, in exceptional cases, implementing agencies should be allowed to propose changes in the technology specified in particular projects after approval by the Committee (ExCom decision 20/8);

ExCom 33 (2001) agreed the need for a country-driven approach, allowing countries to retain flexibility to determine the type of approach that would best enable Article 5 countries to meet their obligations under the Montreal Protocol (ExCom decision 33/54);

ExCom 38 (2002) adopted the first guidelines for multi-year agreements (ExCom decision 38/65). Through such agreements Governments have greater responsibility for managing national phase-out programmes, where the relevance between the funded activities and compliance with the Montreal Protocol control measures has to be demonstrated;

[6] ExCom 54 (2008) adopted guidelines on the preparation of stage I of HCFC phase-out management plans (HPMPs) (ExCom decision 54/39). Subsequent agreements between the Executive Committee and parties normally contain clauses providing that: the country may have the flexibility to reallocate the approved funds, or part of the funds, according to the evolving circumstances, to achieve the smoothest phase-down and phase-out of the substances addressed by the project; and the country would use the flexibility available under this agreement to address specific needs that might arise during project implementation in the refrigeration servicing sector (quotes from HPMP agreements in MLF secretariat's compilation of HPMPs, November 2014). For stage II of HPMPs, the draft agreement template will be considered by ExCom at its 76th meeting in May 2016 (ExCom decision 75/66);

[7] In determining criteria for funding HCFC phase-out in the consmption sector for Stage II HPMPs, ExCom 74 (2015) decided, in respect of eligible incremental costs, that funding of up to a maximum of 40 per cent above the cost-effectiveness threshold would be provided for SMEs for the introduction of low-GWP alternatives in the foam sector with consumption of less than 20 metric tonnes, when it was clearly demonstrated that the threshold for low-GWP alternatives was not feasible for those enterprises (The guidelines for funding the preparation of stage II of HPMPs were approved by the ExCom in December 2013 (ExCom decision 71/42)).

This endorsed concept seeks to strengthen the flexibility of Article 5 parties in determining their national strategies in the event HFC controls are added to the Protocol and to the operations of the MLF.

2.3 Second and third conversions

Endorsed concept
"Enterprises that have already converted to HFCs in phasing out CFCs and/or HCFCs will be eligible to receive funding from the MLF to meet agreed incremental costs in the same manner as enterprises eligible for first conversions".

HCFCs have long been considered transitional substances in replacing CFCs and other ODS.[8] In light of this, the Executive Committee has adopted a series of decisions aimed at avoiding the use of HCFCs as alternatives to CFCs and other ozone depleting substances (ODS). Despite this objective, HCFCs were used because they met the needs of several enterprises in particular SMEs; were technically mature; were low-cost and commercially available; provided acceptable insulation values; did not require major changes in baseline equipment; and had the lowest investment and operating costs compared to other options at that time.

In 1994, the Executive Committee specified that project proposals using HCFCs should only be submitted in specific sectors, in cases where other alternatives were not available. Furthermore, the adoption of HCFCs was funded only if an enterprise certified in writing that it understood that HCFCs would have to be phased-out ultimately, and that the MLF would not pay for a second transition from HCFCs to ozone-safe alternatives.[9]

When the parties decided in 2007 to accelerate the HCFC phase-out, they also directed the Executive Committee to make the necessary changes to the eligibility criteria relating to second conversions (decision XIX/6(5)). Subsequently, the Executive Committee decided to fund second conversions in Stage I and II HPMP projects upon certain conditions.[10] As all second stage conversion projects have met the criteria adopted by the Executive Committee, their funding has been approved to cover all eligible incremental costs.

In the event of a possible HFC phase-down, second conversions (HCFCs to HFCs and then out of HFCs) or third conversions (CFCs to HCFCs then to HFCs and then out of HFCs) could potentially take place in more than 700 enterprises previously funded by the MLF. A list of the relevant sectors and substances is shown in table 1.

[8] HCFCs were mainly phased-in to replace CFC-11 as a foam blowing agent and CFC-12 as a refrigerant. Small amounts of HCFCs were also phased-in to replace CFCs as propellent and/or as solvent.

[9] UNEP/OzL.Pro/ExCom/71/57, Annex II, p.3. From May 1996, enterprises were informed that no MLF funding would be available for their conversion from HCFC to a non-ODS technology.

[10] Full funding of eligible incremental costs of second-stage conversion projects would be considered where it was demonstrated that they were necessary for complying with the Montreal Protocol's HCFC reduction schedule to 2020 (including the 35% reduction step); and/or the projects were the most cost-effective projects (measured in ODP tonnes) that the party could undertake in the manufacturing sector for compliance; and/or the enterprises would transition to low-GWP alternatives (this specific condition was added at the 74th ExCom meeting for stage II of HPMPs). Funding for all other second conversion projects not covered in the clause above would be limited to funding for installation, trials, and training (principles for second conversion projects in Stage I & II HPMPs were adopted at ExCom 60, 62 and 74).

Table 1: Potential second and third conversions in the event of an HFC phase-down[11]

Sector	First / second stage conversion	No. of projects/ enterprise	No. of countries	Phase-out (mt)	Completion first stage conversion	Second/ third stage conversion
Domestic refrigeration (refrigerant charge)	CFC-12 to HFC-134a	188*	39	4,400	95% (from 1996 to 2004)	HFC-134a to alternative
Commercial refrigeration (refrigerant charge)	CFC-12 to HFC-134a	271*	37	2,000	93% (from 1995 to 2004	HFC-134a to alternative
Metered dose inhalers	CFC-11/CFC-12 to HFC-134a	11	11	1,800	2009 to present	HFC-134a to alternative
Aerosol/solvent	CFCs to HFCs	7*	5	600	1997 to 2007	HFC to alternative
Mobile air-conditioning compressors	CFC-12 to HFC-134a	4**	4**	10**	1998	HFC-134a to alternative
Refrigeration and air-conditioning manufacturing	CFC-12 to HCFC-22 to HFC-32 or HFC-410A or HFC-134a	>100	11	16,400	2013 to 2018	HFC-32 or HFC-410A or HFC-134a to alternatives
XPS foam	HCFC-22/HCFC-142b to HFC-152a	4	1	1,700	2017	HFC-152a to alternative
PU foam	HCFC-141b to HFC-245fa	126	2	1,000	2017	HFC-245fa to alternative
Grand total		>700		27,910		
Servicing sector	Retrofit HCFC-22 equipment to HFC blends (R-407C, R-408 and R-409)	Not clear	Many	Unknown	Not clear	From HFC blends to alternative

Source: Compiled from inventory of projects of the MLF secretariat.

** The number of potential second conversions is larger than indicated because this list includes only individual projects. Projects approved as part of national phase-out plans are not shown here.*

*** Estimated data.*

[11] The list on the table does not contain projects that were part of national phase-out plans.

2.4 Guidance to the Executive Committee

Endorsed concept
"It is understood that guidelines and/or methodologies will have to be developed on the following issues related to HFC control measures, if agreed: • Determination of incremental costs • Calculation of incremental costs • Cost effectiveness thresholds • Energy efficiency and climate impacts of projects".

Determination and calculation of incremental costs

The 1992 indicative list of the categories of incremental costs (reproduced in the Annex to the present note) includes the following general concepts, which have been used by the Executive Committee to evaluate phase-out projects and to develop specific policies and guidelines on incremental costs in different sectors:[12]

- The most cost-effective and efficient option should be chosen, taking into account the national industrial strategy of the recipient party;[13]
- Consideration of project proposals should involve the careful scrutiny of cost items listed in an effort to ensure there is no double-counting;
- Savings or benefits gained at both strategic and project levels during the transition process should be taken into account case-by-case, according to criteria decided by the Parties and as elaborated in Executive Committee guidelines;
- The funding of incremental costs is intended as an incentive for early adoption of ozone protecting technologies. The Executive Committee shall agree which time scales for payment of incremental costs are appropriate in each sector.

These general concepts have been applied by the Executive Committee in determining eligible costs for projects. The two main categories of eligible incremental costs are capital costs and operational costs.[14] Determination of these costs is based on the indicative list of categories of incremental costs agreed by the parties, and criteria and policies that have been developed and adopted by the Executive Committee since the establishment of the MLF. The Executive Committee has determined eligible costs in the context of considering and approving stand-alone projects, sector plans or national management plans, submitted by bilateral and implementing agencies on behalf of Article 5 parties.

Further to decision XIX/6 on the accelerated phase-out of HCFCs, the Executive Committee gave due consideration to various issues for dealing with the phase-out of HCFCs, including costs of conversion projects and other activities required for an HCFC phase-out, taking full account of the experience and lessons learnt from the phase-out of CFCs[15]. This led to the development of project preparation and phase-out guidelines for stages I and II of the HPMPs for the consumption sector.

The Executive Committee has also focused considerable attention on determining eligible costs for phase-out activities in the ODS production sector. Based on the indicative list of categories of incremental costs, the funding for the ODS

[12] UNEP/OzL.Pro/ExCom/55/47.

[13] MOP2 (1990) noted that it should be considered carefully to what extent the infrastructure at the time used for production of the controlled substances could be put to alternative uses, thus resulting in decreased capital abandonment, and how to avoid deindustrialization and loss of export revenues.

[14] Funding of MLF projects has been based on the assessment of eligible Incremental Capital Costs (ICC) and Incremental Operational Costs (IOC). The ICC has been based on the cost of the equipment necessary to effectuate the conversion. The IOC has paid for the difference between the costs of the use of, for example, CFCs, and the HCFCs or HFCs that have replaced them, for a duration determined by the Executive Committee. That duration has varied between sectors, and has ranged between 0 to 4 years (UNEP/OzL.Pro/ExCom/55/47).

[15] The information is contained in document UNEP/OzL.Pro/ExCom/55/47.

phase-out in the production sector has been based on production closure under option *"2(a)(ii) costs arising from premature retirement or enforced idleness, taking into account any guidance of the ExCom on appropriate cut-off dates"* (Annex to the present note).[16] Other options were also examined, for example, whether the HCFC-22 facilities could be converted to producing HFC-32; or whether production capacity for controlled use could be utilized for feedstock production (under option *"2(a)(i) costs of conversion of existing production facilities"*). However, to date option 2(a)(ii) on production closures has been identified as the most cost-effective and efficient option for CFC, halon, carbon tetrachloride, methyl bromide, and HCFC production phase-out agreements.

Guidelines for the HCFC production sector have been considered at several meetings of the sub group since 2007, but are still under discussion. The absence of guidelines, however, has not prevented the funding of projects. The existing precedents have been used for assessing possible compensation scenarios. To date, the Executive Committee has approved one HCFC production phase-out (HPPMP) project.[17]

In addition to the eligible incremental costs in investment projects for the manufacturing and production sectors, the MLF has also funded diverse types of technical assistance and capacity building activities to support parties in meeting their MP obligations (see section "Enabling activities" below).

Cost-effectiveness thresholds

In order to prioritize the approvals of investment projects, the Executive Committee established cost-effectiveness thresholds[18] for various sectors, shown in Table 2. Cost-effectiveness thresholds for a number of sectors were first established in 1995, but have been adjusted over time to address specific circumstances mainly related to the technology selected. For example, the Executive Committee recognised that the conversion from CFCs to hydrocarbon technology in domestic/commercial refrigerator manufacture would require additional funding for the provision of safety equipment, and agreed that the safety-related costs would be discounted in a way that provided parity with other technology options (ExCom decision 20/45).[19]

With regard to stage I of HCFC phase-out projects, the Executive Committee agreed to provide funding of up to a maximum of 25 per cent above the cost effectiveness threshold for projects when needed for the introduction of low-GWP alternatives, and also to consider, on a case-by-case basis, funding higher levels of incremental operating costs when required for the introduction of low-GWP water-blown technology (ExCom decision 60/44). For stage II of HPMPs, in addition to allowing up to a 25 per cent increase above the cost-effectiveness threshold for introduction of low-GWP alternatives, the Executive Committee decided that SMEs in the foam sector with consumption of less than 20 metric tonnes could exceed the threshold by up to 40 per cent (ExCom decision 74/50).

[16] The Indicative List option 2(a)(ii) on production closures allows funding of premature retirement or closure. It does not allow such funding 'where such capacity is not replaced by converted or new capacity to production alternatives' despite the fact that the project funding for CFC closure allowed the production of an alternative HCFC with the understanding that no further funding would be approved for the HCFC closure.

[17] The cost of the approved project for HCFC production phase-out (HPPMP)[17] was estimated based on plants closure, including foregone profits, labour compensation and destruction of infrastructure, taking into consideration other factors, including non-A5 ownership and export to non-A5 countries; eligibility associated with the cut-off date; issue related to second conversion and swing plant; feedstock production and idle capacity; redirection of phased out capacity to feedstock production; continued monitoring of feedstock production; synchronization with the consumption sector and prioritization of HCFC-141b phase-out; and the incentive for early phase-out of HCFC production. The ExCom considered that there was no second conversion associated with the funding for HCFC production closure because the change from CFC to HCFC production used the exact same infrastructure (i.e. the infrastructure was not converted).

[18] The MLF secretariat reviews a project based on, *inter alia,* the equipment in the baseline, the number of products manufactured, the quantity of ODS and other raw materials used and the alternative technology selected. Once all technical and cost issues have been satisfactorily addressed and an agreement has been reached between the MLF secretariat and relevant bilateral and implementing agencies, the cost-effectiveness of the project is calculated by dividing the agreed level of funding by the total quantity of ODS to be phased-out (in kilogramme ODP for CFC and metric kilogramme for HCFCs). In cases where an enterprise is partially owned by investors from non-Article 5 parties, the agreed level of funding is adjusted by deducting an amount that is proportional to the foreign share of ownership of the enterprise.

[19] UNEP/OzL.Pro/ExCom/55/47, Annex I. ExCom discounted the numerator by 35%, which was considered sufficient to maintain parity between HCFC-141b/HFC-134a and cyclopentane/HFC-134a technology options in that sector.

Table 2: Cost-effectiveness (CE) threshold values established by the Executive Committee

Sector	Subsector	CE (US$/kg ODP)	HCFC CE (US$/kg)	HCFC CE Notes
Aerosol	Hydrocarbon	4.40	On a case by case basis	-
Foam	General	9.53	7.83	Plus 25% for low GWP alternatives or up to 40% for low-GWP alternative in SMEs
	Flexible polyurethane	6.23	N/A *(No HCFC used here)*	
	Integral skin	16.86	16.86	
	Polystyrene/polyethylene	8.22	8.22 (IOC up to 1.4/kg.)	
	Rigid polyurethane	7.83	7.83 (IOC up to $5/kg, SMEs could be higher when need for the introduction of low GWP alternatives)	
Fire protection	General	1.48	On a case by case basis	
Refrigeration	Domestic	13.76	N/A *(No HCFC used here)*	No HCFC used in domestic refrigeration except for the foam, which is already included in rigid polyurethane.
	Commercial	15.21	15.21 (IOC up to $3.8/kg.)	
	Room AC		No threshold determined (but max IOC $6.3/kg)	No threshold determined for RAC
	Refrigeration Servicing		4.80*	
Solvent	CFC-113	19.73	On a case by case basis	
	TCA	38.50		

Source: ExCom decision in UNEP/OzL.Pro/ExCom/16/20, para. 32, and ExCom decisions 60/44 and 74/50.

IOC: Incremental Operational Costs

** For the servicing sector in non-LVC countries only (ExCom decision 74/50, para. c(xiii)).*

Energy efficiency and climate impacts of projects

In terms of the climate impact of projects, the Executive Committee has taken due consideration of decision XIX/6 and examined options for giving priority to cost-effective projects and programmes for HCFC phase-out, which minimize other impacts on the environment, particularly with respect to climate.[20]

As mentioned above, to address concerns that low-GWP alternatives were in some cases more expensive than other options, the Executive Committee adopted decisions that permitted funding for projects of up to a maximum of 25 percent above cost-effectiveness thresholds when needed for the use of low-GWP alternatives; funding of higher levels of incremental operating costs if required for the use of water-blown technology in the foam sector, on a case-by-case basis;[21]and funding for small- and medium-size enterprises up to 40 percent above the cost-effectiveness thresholds if required for low-GWP alternatives in the foam sector for stage II HPMPs.[22]

As a result, the Executive Committee has approved a substantial amount of funds for HCFC phase-out projects aimed at reducing climate impact or achieving a transition to low-GWP alternatives. These include investment projects in the

[20] Decision XIX/6 calls for the MLF to give priority in its project evaluation and funding decisions "to cost-effective projects and programmes which focus on inter alia, to substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account global-warming potential, energy use and other relevant factors.

[21] UNEP/OzL.Pro/ExCom/60/54, Decision 60/44.

[22] UNEP/OzL.Pro/ExCom/74/56, Decision 74/50.

foam and refrigeration manufacturing sectors, projects in the refrigeration servicing sector, projects in other manufacturing sectors (i.e. aerosol and solvents) as well as demonstration projects specifically aiming at determining whether low-GWP alternatives are viable and cost-effective (see also box 6).

At its 55th meeting (2008), the Executive Committee initiated discussions on ways to incorporate into project reviews the effects on climate of shifting out of HCFCs for the refrigeration and air conditioning sectors.[23] This initiative resulted in the development of the Multilateral Fund Climate Impact Indicator (MCII) as a tool to inform parties about the overall climate impacts of refrigeration and air conditioning project proposals based on the characteristics of the type of equipment and refrigerant being considered for a specific technology change[24]. Other tools are also used to calculate the overall climate impact of projects in the aerosol, foam and solvent sectors. The Executive Committee decided at its 75th meeting to continue to use the MCII model as a tool to inform parties about the climate impacts of a proposal.[25]

In terms of energy efficiency, the Executive Committee has not approved funding for improved energy efficiency of refrigeration and air-conditioning equipment, as this is not considered as an eligible incremental cost under the MLF and because the focus was on phasing-out of ODS. In fact, the Executive Committee considered, whether component upgrades for air conditioning and refrigeration equipment should be supported as part of HCFC conversion projects.[26] Such upgrades could improve the energy efficiency of the products and thereby reduce their climate impacts consistent with Decision XIX/6. Past Executive Committee decisions determined that technological upgrades go beyond what is covered as eligible incremental costs and would not be funded unless they were unavoidable as part of the project.[27] In reviewing a range of potential options, the Executive Committee decided to *"maintain the established practice when evaluating component upgrades in HCFC conversion projects for the refrigeration and air-conditioning sectors, such that after conversion the defining characteristics of the components would remain largely unchanged or, when no similar component was available, would only be improved to the extent necessary to allow the conversion to take place, and to keep the Executive Committee informed of any deviation from this practice"*.[28]

Notwithstanding the above, programmes funded by the MLF have had indirect benefits in terms of climate impact and energy efficiency, as shown in box 4.

Box 4. Approaches to minimize climate impact and improve indirectly energy efficiency in the refrigeration servicing sector

Refrigeration and air conditioning units have a climate impact through emissions of refrigerants during their lifetime due to small leaks and ruptures, installation, operation, servicing and disposal practices (direct emissions) as well as through their energy consumption which typically causes the release of CO2 e.g. in the burning of fossil fuels for electricity generation (indirect emissions). ExCom has considered actions to improve practices in the servicing sector in A5 parties, which has contributed to minimizing the impact on climate. A number of measures have been identified,[29] including:

- Improvements in the regulatory and policy framework (e.g. establishment of codes of practices and standards for storage, transportation, design of systems and components, maximum refrigerant charge, installation, servicing and disposal of equipment; bans on "non-filable" (disposable) ODS containers etc);
- Training and certification of refrigeration technicians;
- Incentive schemes to encourage recovery, recycling and reclamation.

[23] UNEP/OzL.Pro/ExCom/55/47.

[24] UNEP/OzL.Pro/ExCom/75/78. The methodology also applies to other sectors but in those cases essentially focuses on the direct emissions based on the GWP of the substitute being considered. UNEP/OzL.Pro/ExCom/73/54, para. 14.

[25] UNEP/OzL.Pro/ExCom/75/85, Decision 75/68, para. 282.

[26] This issue was initially raised at the 59th Meeting of the Executive Committee in 2009.

[27] UNEP/Ozl.Pro/ExCom/18/75, Decision 18/25, para. 57.

[28] UNEP/OzL.Pro/ExCom/61/58, Decision 61/44, paragraph 106. The Executive Committee has also considered the use of more flammable and toxic alternatives that may have zero or low-GWPs. Decisions 72/17 and 73/34 make clear that the associated risks of such alternatives should be borne by the recipient country and that all relevant standards and protocols to address these issues should be met.

[29] UNEP/OzL.Pro/ExCom/70/53/Rev.1

In reviewing existing MLF practices concerning determining incremental costs, defining cost effectiveness thresholds, and addressing energy efficiency and climate impacts, parties may wish to consider whether any adjustments to those practices may be desirable to guide future decisions by the Executive Committee in the context of a possible amendment controlling HFCs.

2.5 Enabling activities

Endorsed concept
"Enabling activities will be supported by the MLF in any HFC phase down agreement. • Capacity building and training for handling HFC alternatives in the servicing sector, the manufacturing and production sectors • Institutional Strengthening • Article 4b Licensing • Reporting • Demonstration projects"

MLF capacity building activities and support for Institutional Strengthening

While not explicitly included in the indicative list of agreed incremental costs, capacity building in Article 5 parties has been recognized as an important component of the Montreal Protocol since the early years. The MLF provides capacity building support through institutional strengthening (IS); the regional network and activities of UNEP Compliance Assistance Programme (CAP); and training activities included in investment projects and national plans (e.g. training programmes are provided to customs/enforcement officers, refrigeration technicians, and farmers or fumigators).[30] Article 5 countries were also encouraged, when implementing their HPMPs, to consider, as needed and feasible, to develop and adopt standards for flammable and toxic refrigerants, and focus on training. [31] Over time, a number of policies were supported under the MLF, for institutional strengthening activities in Article 5 parties, resulting in funding of over US $122 million (including agency support costs), as illustrated by the examples in Box 5.

Box 5: Examples of policies developed by Executive Committee on institutional strengthening in the past

ExCom 5 (1991) agreed that *'Support IS within an A5 Party, though not explicitly contained in the guidelines on incremental costs adopted by the Parties, might, in exceptional cases, be an essential element in achieving the objectives of the Fund and the Montreal Protocol. As such, limited funding or assistance should be provided by the Fund for IS".*[32]

ExCom 7 (1992) considered that the main objective of IS was to provide necessary resources to enable A5 countries to strengthen a mechanism within their countries to facilitate effective implementation of ODS phase-out projects, ensuring liaison between the country, ExCom, the MLF secretariat and the implementing agencies.[33]

ExCom 19 (1996) agreed guidelines for the renewal of IS projects (ExCom decision 19/29)[34]

ExCom 30 (1999) adopted other detailed provisions on IS (ExCom decision 30/7).

ExCom 35 (2001) agreed to increase IS funding by 30% in order to assist Article 5 parties in implementing the MLF strategic framework (ExCom decision 35/57).

ExCom 47 (2005) decided, *inter alia*, to explore the extent, nature and eligibility of any additional measures that might be considered for funding by the Executive Committee to address surveys, institutional measures and/or other preparatory activities for HCFC phase-out (decision 47/49). Issues associated with IS projects were discussed in subsequent years leading to the adoption of the current (revised) format for IS renewals by ExCom 61 (2010)[35].

[30] A comprehensive review of funding for IS projects in response to ExCom decision 61/43(b) can be found in document UNEP/OzL.Pro/ExCom/74/51 prepared by the MLF secretariat.

[31] UNEP/OzL.Pro/ExCom/72/42

[32] Paragraph 28(d) of UNEP/OzL.Pro/ExCom/5/16.

[33] Paragraph 74 of UNEP/OzL.Pro/ExCom/7/30.

[34] Guidelines for renewal of IS proposals, document UNEP/OzL.Pro/ExCom/19/52 and Corr.1. http://www.multilateralfund.org/Our%20Work/countries/Shared%20Documents/1952andc1.pdf.

[35] Annex XV to UNEP/OzL.Pro/ExCom/61/58.

In 2015, the 74th meeting of the Executive Committee decided that approvals of IS projects and renewals would be at a level that is 28% higher than the historically agreed level, with a minimum level of IS funding of US $42,500 per year. The rationale of decision 74/51 was to continue support for compliance with the Protocol and to address the challenges related to the phase-out of HCFCs in line with the objectives of decision XIX/6 and the transition to alternatives that minimize environmental impact. Performance indicators were also included in the existing format for IS renewals.

In addition, the 74th and the 75th meetings of the Executive Committee approved funding for surveys of ozone depleting substances alternatives in 126 Article 5 countries as a response to decision XXVI/9.[36] The surveys will be conducted on a voluntary basis, information will be collected where available and the results will be presented solely for information purposes[37].

Licensing and quota systems

The obligation of all parties to the Montreal Protocol to establish and implement a system for licensing the import and export of new, used, recycled and reclaimed controlled ODS is stipulated in Article 4B (Licencing) of the Protocol. Each party is required to do so within three months of the entry into force of Article 4B (introduced to the Montreal Protocol through the 1997 Montreal Amendment).

Through the establishment of quota systems, a party is able to determine the amount of ODS that can be imported, exported and/or produced by authorized enterprises to ensure its compliance with the Protocol's control measures. For Article 5 countries, the establishment of licensing and quota systems is a prerequisite for funding under the MLF. Out of the 145 Article 5 countries under the Montreal Protocol, 144 have confirmed the establishment of their HCFC licensing/quota system with an increasing number of countries now using a computerized database for customs.

Funding for the establishment of licensing and quota systems has been provided to Article 5 countries since the 1990s. Updating licensing and quota systems to accommodate new control measures (methyl bromide) and adjustments (HCFCs) have been supported by the MLF. Most recently, funding for these systems was included in stage I of the HPMPs. Country programme data reporting provides an annual update on the operational status of licensing and quota systems.

The development of policy instruments such as licensing and quota systems have assisted parties in phasing out ODSs and could be equally important should limits on HFCs be adopted.

Reporting

All parties to the Montreal Protocol are required to report annually to the Ozone Secretariat data on ODS consumption and production under Article 7 of the Protocol. Data are reported in metric tonnage and converted to the appropriate ODP values. They are then aggregated by substance to assess compliance with the parties' obligations under the Protocol.

Article 5 parties receiving support from the MLF are also required to report country programme data to the MLF secretariat. These data go beyond what is reported to the Ozone Secretariat and are disaggregated by sectors and sub-sectors. They are used to assess funding requests through the guidelines and precedents of the Executive Committee. Training to assist Article 5 parties in reporting their data has been provided through the MLF as part of individual projects, sector and national plans, and through the work of UNEP by way of publications, thematic meetings, and network meetings.

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[36] In decision XXVI/9 the parties requested 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.

[37] The national surveys on ODS alternatives will be undertaken by Article 5 parties that had received funding from the MLF to cover the years 2012–2015, and using the methodologies and approaches agreed between those parties and the agencies (ExCom decision 75/67). The results of the surveys are to be analysed by the MLF secretariat and presented to the ExCom at its first meeting in 2017.

Demonstration projects

Demonstration projects have largely been funded by the MLF through special funding windows without consideration of cost-effectiveness thresholds. By the 75th meeting in 2015, the total funding approved by the Executive Committee for demonstration projects amounted to US $57 million. These projects spanned alternative technologies to methyl bromide and HCFCs, and for ODS destruction. Box 6 lists a series of demonstration projects funded by the MLF aimed specifically at low- and zero-GWP alternatives to HCFCs. The Executive Committee will be considering additional projects aimed at this objective at its 76th meeting in May 2016.

Box 6: Demonstration projects on low-GWP alternatives

Between the 56th (2008) and 64th (2011) meetings, the Executive Committee approved 14 demonstration projects for a total value of about US $17.9 million to promote the introduction of low-GWP/zero-ODP alternative technologies.

ExCom 69 (2013) approved a demonstration project to facilitate technology transfer and exchange of experiences regarding low-GWP refrigerants for air-conditioning sectors in high-ambient temperature conditions in West Asia ('PRAHA').

ExCom 72 (2014) allocated an additional US $10 million for other demonstration projects for low-GWP alternative technologies.

ExCom 74, (2015) considered 26 requests for project preparation and two fully-developed proposals to demonstrate low-GWP alternatives, at an estimated value of US $25.3 million, including support costs. Three feasibility studies on district cooling, at a funding level of US $300,000, were also submitted to the meeting. The Executive Committee decided, *inter alia*, to provide funding for one feasibility study for district cooling and the preparation of 13 projects to demonstrate low-GWP technologies.

ExCom 75 (2015) decided to approve an air-conditioning sector demonstration project in the amount of US $500,000, plus agency support costs (decision 75/40); and a PU foam sector demonstration project for SMEs, in the amount of US $280,500, plus agency support costs (decision 75/41). It also deferred eight low- or zero-GWP projects to be considered with the remaining seven projects due for submission to the 76th meeting (decision 75/42). The Executive Committee also approved two additional feasibility studies for district cooling.

Developing national strategies

Country programmes were funded since the 5th meeting of the Executive Committee (1991) to identify ODS use on a sector basis and to enable development of a national strategy for phasing them out. Country programme updates were also funded at the time of the development of the country-driven approach for phasing out ODSs excluding HCFCs. A total of 165 projects were approved at a value of US $8 million (including support costs). Project preparation was also used to fund the development of national and sector phase-out programmes through which national strategies were incorporated into funding requests for the implementation of those strategies. More recently, project preparation for stage I of HPMPs included the development of an overarching plan and further refinements of that plan in the preparation of stage II of the HPMPs. A total of US $34 million (including support costs) was approved for 422 activities associated with the HCFC phase-out to-date.

The previous sections have described the extensive efforts by the MLF over time in the areas of capacity building and training, institutional strengthening, licensing controls, reporting and demonstration projects. The parties may want to consider whether modifications in these areas are necessary in the context of a possible HFC amendment.

3. Challenges where further progress needs to be made

3.1 Conversion costs - Assessment of funding requirements to comply with ODS phase-out

In assessing the level of MLF funding that would be needed for Article 5 parties to comply with their ODS phase-out schedules, parties have typically sought the advice of the TEAP. The Panel has considerable expertise in developing detailed calculations of the funding level needed in MLF replenishments, as well as the costs of specific components and activities[38].

A number of the most recent TEAP reports have provided the parties with cost information relating to low-GWP alternatives, often drawing on existing MLF project information. TEAP's recent Decision XXV/5 Task Force Report, for example, estimated the cost of two mitigation scenarios addressing high-GWP substances in the refrigeration and air-conditioning sector in A5 regions, as follows:[39]

- Mitigation scenario 1 (MIT-1) estimated that the cost of converting of refrigeration sectors to high-GWP and MAC to low-GWP alternatives would lie in the range of US$ 459 - 972 million[40].
- Mitigation scenario 2 (MIT-2) assumed that the cost of mitigating activities, including converting MAC, refrigeration and stationary AC to low-GWP alternatives, would lie in the range of US$ 1,080 - 3,240 million.

The XXVI/9 TEAP report updated the MIT-2 scenario to include MIT-3/-4/-5 scenarios and calculated costs for a Mitigation scenario 3 (MIT-3) for conversion to lower GWP replacements than in previous scenarios. The cost range determined for conversion of all manufacturing operations (within a period of six years after the start) is reported to amount to US$ 2,057-2,719 million (or US$ 2,400 +/- 340 million). To this amount, costs for addressing reduction of HFC in servicing would need to be added. The XXVI/9 report also investigated the importance of the conversion of the manufacturing operations in the stationary AC sector in the total cost and determined that a delay of 5 years in the manufacturing conversion of stationary AC would increase overall costs. The report estimated that the compliance costs associated with this scenario would be US$ 2640-3380 million, or US$ 3010 ± 370 million.

The XXVII/4 TEAP March 2016 report extended the MIT scenarios from 2030 to 2050, but did not present a change in the demand pattern, which then would result in similar costs for converting manufacturing operations as determined in the XXVI/9 TEAP report.

In the event of an amendment to the Protocol to phase-down HFCs, TEAP would be in a position to provide information, identifying the level of funding that would be needed for the implementation of specific control measures.

3.2 Technology transfer

With regard to the transfer of technology to Article 5 parties, Article 10A of the Montreal Protocol states that each party shall take every practicable step, consistent with the programmes supported by the financial mechanism, to ensure that the best available, environmentally safe substitutes and related technologies are expeditiously transferred to Article 5 parties, and that these transfers occur under fair and most favourable conditions. In addition, the Meeting of the Parties has from time to time agreed on processes to improve the implementation of technology transfer and to

[38] Both the 2011 and 2014 TEAP replenishment task force reports focused on the funding needed for phasing-out consumption and production of HCFCs. The methodology applied was based on an analysis of past and current HCFC consumption per country. The analysis then determined the quantity of reductions in ODP tonnes called for by the Montreal Protocol phase-out schedule, and estimated costs based on phasing out highest ODP chemicals first (i.e. HCFC-141b), but also taking into account the necessity of phasing down a certain amount of HCFC-22 manufacturing and servicing. The amount of funding required was then calculated using average cost-effectiveness factors derived from approved projects under HPMP stage I. The cost-effectiveness factors considered were also determined on the basis of which type and size of operations (e.g. type and size of companies).

[39] TEAP Decision XXV/5 Task Force Report on additional information on alternatives to ODS, October 2014, p.6.

[40] MIT 1 and MIT 2, from TEAP report XXV/5.

help remove potential impediments. Meeting of the Parties (MOP) decisions related to technology transfer are listed in Box 7.

Box 7: MOP decisions relevant to the implementation of technology transfer

MOP 2 (1990) extended the mandate of the OEWG to consider, if necessary, the identification of the most appropriate modalities for the transfer of technologies designed for the protection of the ozone layer (decision II/15).

MOP 7 (1995) endorsed several action steps relating to technology transfer (inter alia) to improve the functioning of the financial mechanism (decision VII/22). They noted that the following actions should be updated periodically[41]:

- UNEP should prepare an inventory and assessment of environmentally sound and economically viable technologies and know-how conducive to ODS phase-out. This inventory should include an elaboration of terms under which transfers of such technologies and know-how could take place.
- ExCom should consider what practical steps can be taken to eliminate any impediments in the international flow of technology (Action 21 in Annex V of the report of MOP 7).

MOP 8 (1996) set up an Informal Group on Technology Transfer consisting of four A5 parties and four non-A5 parties to assist ExCom in identifying practical steps that could be taken to eliminate potential impediments to the transfer of ozone-friendly technologies to A5 parties under fair and most favourable conditions, for review by MOP (decisions VIII/7 and IX/14).

The issue of technology transfer has been addressed since the early meetings of the Executive Committee. The MLF has funded technology transfer and unintentional technical upgrades through the purchase of equipment normally, with transfer fees paid as required (decision 17/4); developed guidelines for technological upgrades (decision 18/25); allowed technology upgrades through counterpart funding; and developed guidelines for financing projects using technology that is not in the public domain (decision 38/63). It has also paid for technology transfer trial and support activities (decision 25/50); funded technology transfer agreements (decision 23/4); and paid for royalties or technology transfer fees and research and development (e.g. in the case of the Midea demonstration project (decision 61/35) and MDI project in Cuba (decision 41/41)). It has also provided funding for adapting technologies to local circumstances.

4. Funding provisions included in the proposed amendments

All four amendment proposals add HFCs to Article 10 (Financial mechanism). One proposal further adds a new provision to Article 10A (Transfer of technology) addressing the phase-down of HFCs. The common and varying funding provisions in the proposed amendments are summarized in table 3.

The proposed amendments share in common the core provision of bringing HFCs inside the purview of the Multilateral Fund. The North American proposal specifies that any funding received from other financial mechanisms to pay for agreed incremental costs should not also be paid for by the Multilateral Fund. The Indian proposal substitutes "full conversion costs" for the current provision in Article 10 which states that "agreed incremental costs" would be eligible for funding under the MLF. It then goes on to describe the key elements of full conversion costs. The Island States proposal specifies that funds would be available to Article 5 parties in advance of compliance schedules and that investments in energy efficiency would be eligible for funding.

[41] Action 21 in Annex V of the report of MOP 7.

Table 3: Funding provisions included in the HFC amendment proposals	
Common elements	
Adding HFCs into the existing provisions under Article 10 (paragraph 1)	
Varying elements *	
Article 10	
North American proposal	Where an Article 5 party chooses to avail itself of funding from any other financial mechanism that could result in meeting any part of its agreed incremental costs, that part shall not be met by the Financial Mechanism under Article 10 of the Protocol.
Indian proposal	The parties shall strengthen the financial mechanism for providing financial and technical cooperation, including transfer of technologies to A5 parties to enable their compliance with HFC control measures set out in the Articles of the Protocol. The financial mechanism shall meet compensation for lost profit stream for gradual closure of production facilities of HFCs, "Full costs of conversion" to HFC production facilities, manufacturing unit of equipment (s)/product(s) from HFCs to low-GWP/zero-GWP alternative (s), operating costs for at least 5 years and adequate funding for servicing sector including training of technicians, awareness, equipment support to technicians, compensation for obsolescence/ immature retirement of equipment, etc.
Island States proposal	Where an A5 party chooses to avail itself of funding from any other financial mechanism to meet any part of its agreed incremental costs, that part shall not be met by the financial mechanism under Article 10 of the Protocol; Where an A5 party chooses to comply with the HFC control measures in advance of the schedule agreed by the Parties, that party shall be able to avail itself of the funding described in Article 10 of the Protocol for such early compliance; The Parties shall strengthen the financial mechanism for providing financial and technical cooperation to A5 parties in order to promote energy efficiency and to overcome barriers to the uptake of technologies with low global warming potentials in order to implement the HFC control measures.
Article 10A	
Indian proposal	The Protocol shall ensure the transfer of technology, including technologies with Intellectual Property Rights, process and application patents to Parties operating under paragraph 1 of Article 5 of the Protocol for phase down of the production and consumption of HFCs.

***** *Only proposals introducing new text in Articles 10 and 10A of the Montreal Protocol are listed in this segment of the table.*

Annex: Main provisions of article 10 of the Montreal Protocol and indicative list of incremental costs

Article 10

The purpose of the mechanism is to provide financial and technical cooperation, including the transfer of technologies, to A5 parties to enable their compliance with the Protocol's control measures (Article 10(1));

- The mechanism shall meet all agreed incremental costs of A5 parties. An indicative list of the categories of incremental costs shall be decided by the Meeting of the Parties (Article 10(1));
- The mechanism shall include a Multilateral Fund. It may also include other means of multilateral, regional and bilateral co-operation (Article 10(2));
- The MLF shall be financed by non-A5 parties on the basis of the UN scale of assessments. Contributions by other parties shall be encouraged. Bilateral and, in particular cases agreed by a decision of the parties, regional co-operation may, up to a percentage and consistent with any criteria to be specified by a decision of the parties, be considered as a contribution to the MLF provided that such co-operations as a minimum:
  - Strictly relates to compliance with the provisions of the Protocol;
  - Provides additional resources; and
  - Meets agreed incremental costs (Article 10(6));
- The parties shall establish an Executive Committee (ExCom) to develop and monitor the implementation of specific operational policies, guidelines and administrative arrangements, including the disbursement of resources, for the purpose of achieving the objectives of the MLF (Article 10(5));
- The mechanism is without prejudice to any future arrangements that may be developed with respect to other environmental issues (Article 10(10)).

Indicative list of categories of incremental costs adopted at MOP 4 (1992)

1. The evaluation of requests for financing incremental costs of a given project shall take into account the following general principles:

a) The most cost-effective and efficient option should be chosen, taking into account the national industrial strategy of the recipient Party. It should be considered carefully to what extent the infrastructure at present used for production of the controlled substances could be put to alternative uses, thus resulting in decreased capital abandonment, and how to avoid deindustrialization and loss of export revenues;

b) Consideration of project proposals for funding should involve the careful scrutiny of cost items listed in an effort to ensure that there is no double-counting;

c) Savings or benefits that will be gained at both the strategic and project levels during the transition process should be taken into account on a case-by-case basis, according to criteria decided by the Parties and as elaborated in the guidelines of the Executive Committee;

d) The funding of incremental costs is intended as an incentive for early adoption of ozone protecting technologies. In this respect the Executive Committee shall agree which time scales for payment of incremental costs are appropriate in each sector.

2. Incremental costs that once agreed are to be met by the financial mechanism include those listed below. If incremental costs other than those mentioned below are identified and quantified, a decision as to whether they are to be met by the financial mechanism shall be taken by the Executive Committee consistent with any criteria decided by the Parties and elaborated in the guidelines of the Executive Committee. The incremental recurring costs apply only for a transition period to be defined. The following list is indicated:

(a) Supply of substitutes

(i) Cost of conversion of existing production facilities:

- cost of patents and designs and incremental cost of royalties;
- capital cost of conversion;

- cost of retraining of personnel, as well as the cost of research to adapt technology to local circumstances;

(ii) Costs arising from premature retirement or enforced idleness, taking into account any guidance of the Executive Committee on appropriate cut-off dates:
- of productive capacity previously used to produce substances controlled by existing and/or amended or adjusted Protocol provisions; and
- where such capacity is not replaced by converted or new capacity to produce alternatives;

(iii) Cost of establishing new production facilities for substitutes of capacity equivalent to capacity lost when plants are converted or scrapped, including:
- cost of patents and designs and incremental cost of royalties;
- capital cost;
- cost of training, as well as the cost of research to adapt technology to local circumstances;

(iv) Net operational cost, including the cost of raw materials;
(v) Cost of import of substitutes;

(b) Use in manufacturing as an intermediate good
(i) Cost of conversion of existing equipment and product manufacturing facilities;
(ii) Cost of patents and designs and incremental cost of royalties;
(iii) Capital cost;
(iv) Cost of retraining;
(v) Cost of research and development;
(vi) Operational cost, including the cost of raw materials except where otherwise provided for;

(c) End use
(i) Cost of premature modification or replacement of user equipment;
(ii) Cost of collection, management, recycling, and, if cost effective, destruction of ozone-depleting substances;
(iii) Cost of providing technical assistance to reduce consumption and unintended emission of ozone-depleting substances.

Source: Annex VIII of the report of the Fourth Meeting of the Parties (UNEP/OzL.Pro.4/15).