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IMPLEMENTATION OF THE MONTREAL PROTOCOL
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Item 11(b)(ii) of the provisional agenda[1]

OPERATIONAL FRAMEWORK TO FURTHER ELABORATE ON INSTITUTIONAL ASPECTS AND PROJECTS AND ACTIVITIES THAT COULD BE UNDERTAKEN BY THE MULTILATERAL FUND FOR MAINTAINING AND/OR ENHANCING THE ENERGY EFFICIENCY OF REPLACEMENT TECHNOLOGIES AND EQUIPMENT IN THE MANUFACTURING AND SERVICING SECTORS WHEN PHASING DOWN HFCs (DECISION 90/50(b)(ii))

Introduction

1. The Executive Committee requested the Secretariat to prepare, for its consideration at the 91st meeting, an operational framework to further elaborate on institutional aspects and projects and activities that could be undertaken by the Multilateral Fund for maintaining and/or enhancing the energy efficiency of replacement technologies and equipment in the manufacturing and servicing sector when phasing down HFCs in the categories set out in document UNEP/OzL.Pro/ExCom/89/12 in the context of implementing options 1 and 2 in table 3 of the document, taking into consideration the comments made by the Executive Committee during its 89th and 90th meetings (decision 90/50(b)(ii)).

2. The overall operating process relating to options 1 and 2 referred to above are presented in paragraphs 33 and 34 of document UNEP/OzL.Pro/ExCom/89/12.[2] Option 1 relates to the use of funds under regular contributions for energy efficiency related projects; and option 2 relates to additional contribution by donor countries outside the regular funds for use for energy efficiency related projects.

3. To prepare this report, the Secretariat reviewed the information on policies and guidelines for project implementation for HFC phase-down that are being discussed by the Executive Committee, and had consultations with implementing agencies on their experiences in implementing activities relating to maintaining and/or enhancing energy efficiency during implementation of their HCFC phase-out management plan (HPMP) conversion projects to low-global-warming-potential (GWP) alternative technologies; the Secretariat also obtained inputs on specific technical aspects and policy matters for

[1] UNEP/OzL.Pro/ExCom/91/1

[2] Identifying options, including the relevant procedures and conditions for mobilizing financial resources for maintaining and/or enhancing energy efficiency when replacing HFCs with low-global-warming-potential alternatives (decision 87/51)

sustainable adoption of energy efficient technologies while phasing down HFCs from experts dealing with energy efficiency issues in refrigeration, air-conditioning and heat pump (RACHP) applications. The Secretariat also took inputs on institutional aspects and energy efficiency related policy as well as capacity building aspects for activities to maintain and/or enhance energy efficiency in the context of HFC phase-down from a technical consultant. The Secretariat also took into consideration comments made by the Executive Committee at its 89th and 90th meetings.

4. The present document is linked to the document on criteria for pilot projects to maintain and/or enhance energy efficiency of replacement technologies and equipment in the context of HFC phase-down (decision 90/50(b)(i)) (UNEP/OzL.Pro/ExCom/91/63) and the report on consultations with the secretariats of the Global Environment Facility and the Green Climate Fund and other relevant funding institutions on opportunities for sharing information on policies, projects and relevant funding modalities relating to maintaining and/or enhancing energy efficiency while phasing down HFCs (decision 90/50(b)(iii)) (UNEP/OzL.Pro/ExCom/91/65). Wherever relevant, cross references to those documents are included in different sections.

5. The present document does not include specific details relating to strengthening capacity of national ozone units (NOUs), agencies and the Secretariat in the context of activities to maintain and/or enhance energy efficiency while phasing down HFCs as these need to be determined based on the policies and guidelines of the Executive Committee in this context.

6. The present document includes the following sections:

I. Analysis of the institutional aspects for addressing energy efficiency while phasing down HFCs under the Multilateral Fund (MLF)

II. Consideration of energy efficiency related projects within existing processes of the MLF

III. Overview of proposed funding modalities for energy efficiency while phasing down HFCs

IV. Key aspects of projects and activities related to maintaining and/or enhancing energy efficiency while phasing down HFCs in the manufacturing and servicing sector and their prioritisation

V. Criteria for projects for maintaining and/or enhancing energy efficiency while phasing down HFCs

VI. Project monitoring and impact assessment

VII. Conclusions

VIII. Recommendation

I. Analysis of institutional aspects for addressing energy efficiency while phasing down HFCs under the MLF

7. The Multilateral Fund was established to provide technical and financial assistance to Article 5 countries to enable them to meet their compliance obligations under the Montreal Protocol and its amendments and adjustments. While the Multilateral Fund's purpose is primarily to provide assistance for activities that are directly related to the phase-out of substances controlled by the Montreal Protocol to meet compliance, Parties to the Montreal Protocol have also given additional guidance and requested the Executive Committee to support other actions in Article 5 that do not directly result in a reduction of controlled substances but meet the larger objective of ozone layer and environmental protection.

8. At its Nineteenth Meeting, when the Parties to the Montreal Protocol agreed to adjustments to the Protocol related to HCFCs, the Executive Committee was requested to give priority to cost-effective projects and programmes with focus on substitutes and alternatives that minimize other impacts on the environment, including on climate, taking into account global-warming potential, energy use and other relevant factors. In this context the Multilateral Fund has also provided additional resources for projects and activities adopting low-GWP alternative technologies. For example, decision 60/44 provided funding of up to a maximum of 25 per cent above the cost effectiveness threshold for HCFC phase-out projects when needed for the introduction of low-GWP alternative technologies.

9. The Parties to the Montreal Protocol also decided in the past[3] to provide funding to Article 5 countries to address matters that were not related to the direct reduction of consumption of controlled substances but facilitated the process of conversion to environment friendly alternatives and contributed to other environmental benefits. These were supported by specific actions from the Executive Committee based on these directives from the Parties.

10. The Executive Committee has accordingly taken decisions for providing funding support, pursuant to decisions of the Parties, to address certain issues that do not have a direct and immediate impact on compliance. Funding windows have been considered under the Multilateral Fund for specific objectives, some examples include:

(a) A window amounting to US $15.2 million for the chiller sector in 2005, established in line with MOP Decision XVI/13 (decision 45/4(c)); and

(b) A window amounting to US $11.53 million for pilot projects for the destruction of unwanted ODS established in line with MOP Decision XX/7.

11. Further, through decision 77/60(d), the Executive Committee had accepted funding from several non-Article 5 countries to provide fast-start support for those interested Article 5 parties for the implementation of the Kigali Amendment through enabling activities. While these enabling activities were not directly linked to immediate compliance targets, they contributed to furthering the overall objectives of engaging countries in phasing down HFCs by becoming Parties to the Kigali Amendment and initiating certain activities.

12. These examples demonstrate that there are opportunities to consider funding for activities that may be additional and complementary to those that are for meeting compliance targets of the Montreal Protocol and the Executive Committee has taken decisions in the past supporting those activities within the framework of ODS phase-out.

13. Many Governments are taking steps to implement energy efficiency standards, labelling and other similar measures and these include the energy efficiency standards of RACHP equipment. As these standards currently may not fully address the type of refrigerants (i.e., whether a refrigerant is a high or low GWP refrigerant) used in the equipment, they could indirectly affect achievement of HFC phase-down targets as some high GWP HFC-based equipment may be the most energy efficient at present and lower-GWP based equipment that are energy efficient may still not be accessible.

[3] For example, decision VIII/4 on the 1997–1999 replenishment of the Multilateral Fund, included US $10 million to enable Article 5 Parties to apply the measures related to methyl bromide control measure in line with the Copenhagen Amendment; Decision IX/5, gave immediate priority to the use of Fund resources for the purpose of identifying, evaluating, adapting and demonstrating methyl bromide alternatives and substitutes in Article 5 Parties, and made available US $25 million per year for these activities in both 1998 and 1999 to facilitate the earliest possible action towards enabling compliance with the agreed control measures on methyl bromide; and MOP Decision XVI/13 for demonstrating value of replacement of CFC-based chillers.

14. During the adoption of the Kigali Amendment for the phase down of HFCs, the Parties requested the Executive Committee to, when developing the HFC cost guidelines, develop cost guidance associated with maintaining and/or enhancing the energy efficiency of low-GWP or zero GWP replacement technologies and equipment, when phasing down HFCs, while taking note of the role of other institutions addressing energy efficiency, when appropriate (paragraph 22 of decision XXVIII/2). Pursuant to paragraph 16 of decision XXVIII/2, the Executive Committee at its 89th meeting decided to provide additional support to LVC countries when needed for the introduction of alternatives to HCFCs with low or zero global-warming potential (GWP) and for maintaining energy efficiency in the refrigeration servicing sector (decision 89/6). Further, at the Thirty-Fourth Meeting of the Parties held in Montreal in November 2022, the Parties *inter alia* decided to request the Executive Committee to continue to support activities to maintain and enhance energy efficiency while phasing down HFCs in countries wishing to do so, as contained in the draft decision, enabling enhanced access and facilitating the transition to energy-efficient and low- or zero-GWP technologies.

15. The above decisions by the Parties and the Executive Committee show that there were decisions taken in the past wherein MLF has addressed matters of priority linked to overall phase-out and/or consumption reduction objectives of the Montreal Protocol and projects that contributed to additional environmental benefits. Although matters on energy efficiency are not compliance related and do not have specific compliance targets, or agreed performance metrics for measuring, monitoring, and reporting achievement of energy efficiency targets, pursuant to decision XXVIII/2, they could be considered for funding through the Multilateral Fund through a decision by the Executive Committee with relevant guidance.

II. Consideration of energy efficiency related projects within existing processes of the MLF

16. The MLF operates financial planning, project review and approval, project monitoring and evaluation of completed projects following policies and guidelines established by the Executive Committee since its inception. In considering the potential options for funding energy-efficiency related projects in the context of HFC phase-down, these would similarly follow the same procedures, with potentially specific conditions and guidelines that may be decided by the Executive Committee to define the scope of the projects. These procedures would also be applicable to either option 1 and 2, and they must operate under the following assumptions:

(a) Under option 1, activities for maintaining and/or enhancing energy efficiency will be funded under regular contribution to the MLF in addition to costs for conversion actions that would contribute to compliance (e.g., HFC phase down projects);

(b) Under option 2, the funds provided by interested donor countries (i.e., outside the MLF regular contributions) would be exclusively made available for energy efficiency activities; such funding could vary over time, thus consideration of projects under this option would be contingent upon available funds. In addition, there may be specific conditions associated with the use of such funds requested by the donor countries; the Executive Committee would need to first agree on these conditions for energy efficiency related activities using those funds.

17. If the Executive Committee decides that activities related to energy efficiency may be funded under either option 1 or option 2, these will have to be included in the three-year rolling business plans submitted by bilateral and implementing agencies. The inclusion in the business plan would allow these projects to be submitted either as a part of the KIPs or as individual projects. The projects will then follow the standard project review and approval process including fund transfers and disbursements. In addition, such projects,

when approved will also be subject to the project monitoring and reporting procedures[4] of the MLF that could include specific project monitoring parameters relating to energy efficiency and/or specific requirements that may be requested by donor countries, in the case of option 2.

18. Document UNEP/OzL.Pro/ExCom/91/63 relates to criteria for pilot projects to maintain and/or enhance energy efficiency. While these were designed specifically for prioritizing pilot projects for energy-efficiency related activities, the same elements could be used in identifying the type of activities/projects that maintain and/or enhance energy efficiency while phasing down HFCs that could be considered under both options.

19. In summary, the existing processes and procedures in the MLF provide a framework for considering projects that maintain and/or enhance energy efficiency using either funding option. To ensure sufficient funding for these projects, in the case of option 1, the Executive Committee may consider earmarking funds as part of the business plan of the MLF to enable consideration of these activities. For option 2, those donor countries interested in funding exclusively such activities under the MLF could agree to a level of funding together with the scope and the conditions of how this funding may be provided, for energy efficiency related activities while phasing down HFCs, subject to agreement by the Executive Committee.

20. For energy efficiency related projects/activities, the operational guidelines such as funding modality, priority areas for funding, processes for monitoring and reporting and levels of funding need to be defined separately and approved by the Executive Committee.

III. Overview of proposed funding modalities for energy efficiency while phasing down HFCs

21. In order to define how to fund those activities related to energy efficiency for Article 5 countries within the existing guidelines of the MLF, there is a need to consider the following aspects, noting that the projects to maintain and/or enhance energy efficiency while phasing down HFCs would be a part of KIPs and/or those submitted pursuant to decision 87/50(e):

(a) *Higher upfront costs of components required to manufacture energy-efficient equipment*. Reports by the Technology Economic Assessment Panel (TEAP) task force on energy efficiency and other technical reports have noted that the high initial upfront cost associated with manufacturing energy efficient equipment is an important barrier to the uptake of such equipment. These are often caused by lower production volume of components required to improve energy efficiency of equipment. As manufacturers, installers and users become more familiar with these new technologies and the required components, this will contribute to increasing uptake of those components which would eventually lower these costs.

(b) *Consideration of savings in energy costs to consumers.*[5] Use of energy-efficient equipment will result in savings in energy consumption to the user because of cost savings in electricity/energy use. Presently, those energy efficient equipment available in the market costs more than those that are not. In general, this additional cost to the consumer could be recovered through savings in energy use; however, the general skepticism from consumers on this pay back period[6] is because of the uncertainty of the actual savings that will accrue to consumers. While financing schemes (e.g., on-bill financing by utilities, Government

[4] This would include operational progress and financial progress monitoring and impact assessment; more details relating to this is presented in paragraphs 34 to 39 below.
[5] A general overview of these aspects is presented in paragraphs 25 to 27 of document UNEP/OzL.Pro/ExCom/89/12.
[6] As mentioned in paragraph 25 of document UNEP/OzL.Pro/ExCom/89/12, the payback would depend on usage characteristics of different users and price of electricity.

fiscal measures reducing the price of energy efficient equipment) can incentivize consumers to purchase energy efficient equipment, these are evolving and would need capacity building of financial institutions and supply chain of equipment (e.g., dealers and distributors of equipment, providers of cooling as a service) for greater adoption. Further, experience in implementing similar programmes involving subsidies on equipment procurement shows that any scheme that results in subsidies for equipment, on a temporary basis, could lose its impact once the subsidies are removed;

(c) *Additional cost to manufacturers producing energy efficient equipment*. As noted in (a) above, manufacturers often have to bear the higher cost of producing energy efficient products in the initial stages.[7] Under current funding guidelines, these additional costs for energy efficiency are not considered as incremental under the MLF and are not eligible for funding; hence if beneficiary enterprises decide to produce energy efficient equipment along with or after conversion to alternatives, these additional expenses are borne by the manufacturer and often would be passed on to the consumer. To minimise the additional cost to the consumers, a funding approach for supporting the manufacturers to reduce these initial additional costs could be designed as this would facilitate the introduction of energy efficient products at prices comparable with those that are currently available in the market.

(d) *Application of a methodology for calculating costs associated with energy efficiency improvements distinct from the traditional incremental cost calculation*. The Multilateral Fund provided funding for the incremental costs of the phase-out of substances controlled by the Montreal Protocol, to enable Article 5 countries to achieve their compliance targets. In case of energy efficiency, as these costs would not be related to the replacement of controlled substance by an alternative, they would not be considered incremental costs for achieving compliance targets. The cost of additional activities to maintain and/or enhance energy efficiency while phasing down HFCs could vary based on the overall national strategy of the country, the type of activities to be implemented, timing of implementation, and the level of ambition on target energy efficiency levels. These additional costs would typically involve technology upgrades and could decrease over time depending upon the decrease in price of components and other technical interventions. There may also be opportunities for lowering the overall costs associated with the conversion to alternatives when requirements for energy efficiency improvements are considered in a synchronised manner with the overall enterprise modification.

22. Taking note of the potential co-benefits for the phase down of HFCs, additional costs for energy efficiency improvements that include providing incentives to the suppliers of equipment for achieving targeted energy efficiency levels, support for policy and regulations for energy efficiency while phasing down HFCs, support for capacity building including training, technical assistance to installers/end-users, support for monitoring and verification of energy efficient products and support for awareness and information outreach to relevant stakeholders, could be considered. Specific policies and guidance for project funding could be decided by the Executive Committee for providing these additional funds.

23. If the project components for energy efficiency improvement are implemented with HFC phase-down projects in a synchronised manner, cost savings would be achieved through equipment design activities that takes into account both adoption of energy efficiency measures and refrigerant conversion, better leverage of available human and infrastructure resources including reduction in mobilisation cost, synchronised product development cycles, optimised civil works cost, and reduction in facility down time.[8]

[7] Overtime with higher production volumes, the costs would come down.

[8] Section 4.5 of Volume 3: Decision XXXIII/5 - Continued provision of information on energy-efficient and low-global-warming-potential technologies, May 2002.

24. Table 1 presents an example illustrating separate and synchronised implementation of activities for enhancing energy efficiency while phasing down HFCs, in terms of energy efficiency impact and costs to the enterprise manufacturing mini-split units. Additional details are provided in the Annex to this document.

Table 1: Implications of implementing activities for enhancing energy efficiency in a mini-split air-conditioner manufacturing enterprise in a synchronised manner with the refrigerant conversion

Ref.		Increase in energy efficiency impact (per cent)	Conversion cost compared to baseline (per cent)
A	Refrigerant conversion only - No energy efficiency improvement intervention	+/- 2 %	100 **(Baseline)**
A1	Refrigerant conversion and energy efficiency improvement only through technical assistance on selection and optimization of components	2 – 7 %	100
	Implementation of energy efficiency interventions with proper compressor selection, and optimized heat exchangers		
B	Refrigerant conversion and energy efficiency interventions implemented separately	7 – 15 %	~140
B1	Refrigerant conversion and energy efficiency interventions implemented in a synchronized manner	7 – 15 %	~120
	Implementation of energy efficiency interventions with variable speed compressor and heat exchanger design		
C	Refrigerant conversion and energy efficiency interventions implemented separately	15 – 25 %	~230
C1	Refrigerant conversion and energy efficiency interventions implemented in a synchronized manner	15 – 25 %	~195

25. The above example shows that, for this particular example, if implemented in a synchronised way, there would be savings in improving energy efficiency of the equipment/product during refrigerant conversion, in the context of HFC phase-down. In addition to the cost savings, synchronised implementation of energy efficiency and HFC phase-down would allow Article 5 countries to work closely with industry to develop comprehensive policies to support implementing energy efficiency measures while phasing down HFCs.

26. Based on the consultations with different funding and financial institutions, the Secretariat noted that in certain cases, non-MLF funding sources are used for financing energy efficiency related activities that would have a direct impact on RACHP applications (e.g., energy efficiency activities in sector programmes for sustainable cooling in food storage and distribution, sustainable tourism). Therefore, the project funding for energy efficiency components while phasing down HFCs should be structured to avoid duplication of funding with such non-MLF activities. The projects' financial structures should ensure that complementarity of activities is maximised, and duplication is avoided; this would also need closer coordination of relevant institutions/organisational units at national level, agency level, and at the level of the Fund Secretariats/equivalent bodies on projects that address energy efficiency in RACHP applications.

27. An overview of how to ensure complementarity of funds from these non-MLF funding sources is presented in document UNEP/OzL.Pro/ExCom/91/65.

IV. Key aspects of projects and activities related to maintaining and/or enhancing energy efficiency while phasing down HFCs in the manufacturing and servicing sector and their prioritisation

28. Activities that support the improvements in energy efficiency of equipment will involve the use of a combination of incentives to the manufacturers of equipment for achieving targeted energy efficiency levels, policy and regulations, and capacity building support including training, awareness and information outreach to stakeholders in industry and support to the consumer, which are essential to address both "supply push" and "demand pull" factors for achieving the transition to energy efficient technologies. This must also be supported by other measures, beyond the project implementation period, to ensure that the industry moves to energy efficient equipment in a sustainable manner. The projects that could be considered for maintaining and/or enhancing energy efficiency while phasing down HFCs are listed below:

Manufacturing and installation of equipment including support to SMEs

(a) Projects in the manufacturing sector including domestic refrigeration, self-contained commercial refrigeration, residential air-conditioning and commercial air-conditioning manufacturing applications, for maintaining and/or enhancing energy efficiency while phasing down HFCs; while the projects in the above sectors/applications are expected in the initial stages of KIPs/individual HFC consumption reduction projects, the other sectors like mobile air-conditioning, transport refrigeration manufacturing could be submitted depending upon specific national priorities;

(b) Technical assistance and capacity building for SMEs for product redesign, access to energy efficient technology, and development of energy efficient products, for facilitating adoption of these energy efficient technologies while phasing down HFCs;

(c) Technical assistance and capacity building for designing and installing large capacity RACHP equipment (e.g., large commercial refrigeration system, central air-conditioning systems) for maximising energy efficiency while adopting low-GWP refrigerant-based technologies;

Training and technical support for service sector[9]

(d) Technical assistance for training and certification programmes for technicians, including online programmes and regional training programmes, for maintaining energy efficiency of RACHP equipment including processes for integration with ongoing refrigeration service sector training and other capacity building programmes for HFC phase-down. These activities could build on the training and certification programmes that have already been financed under HPMPs/KIPs by including additional modules relating to basic training on repairing of electronic components which are commonly used by high energy efficient products;

(e) Demonstration projects designed for and targeted towards end users, that are replicable and scalable,[10] relating primarily to energy efficient RACHP equipment and foam products using low-GWP technologies;

[9] Findings from the desk study for the evaluation of the energy efficiency in the servicing sector contained in document UNEP/OzL.Pro/ExCom/88/10 can also be used in relevant projects.

[10] Decision 84/84 provides information on parameters that could be considered for replicability and scalability.

Minimum energy performance standards (MEPS) and labelling programmes and other measures

(f) Development/strengthening of MEPS standards and other measures (e.g., labelling programmes) for incorporating relevant provisions of the Kigali Amendment relating to controlled substances for RACHP equipment and foam products;[11] this would include processes for ensuring sustained improvement of energy efficiency and progressively reducing maximum GWP level of refrigerants over time;[12]

(g) Development of a regional approach, if appropriate, for implementation of MEPS standards and testing and verification;

(h) Capacity building for establishing energy efficiency testing and certification centres at national and regional level for RACHP equipment;

(i) Technical assistance for establishing energy efficiency standards through mutual agreements in countries for cost-effective monitoring and reporting of achievement of energy efficiency standards;

Institutional coordination with energy efficiency authorities and capacity building of NOUs

(j) Support for strengthening institutional coordination between the NOU and national energy efficiency authorities to facilitate inclusion of relevant provisions of the Kigali Amendment in activities related to energy efficiency for RACHP and foam sector;

(k) Capacity building for the NOU to develop and manage projects for maintaining and/or enhancing energy efficiency while phasing down HFCs;

(l) Capacity building of customs and enforcement bodies to control and monitor imported equipment to ensure they are in accordance with energy efficiency standards and refrigerant labelling schemes covering RACHP sectors using alternative refrigerants;

Financial support for the sustained adoption of energy efficient alternative refrigerant-based technologies

(m) Support for capacity building of funding institutions for promoting the adoption of energy efficient alternatives while phasing down HFCs;

(n) Development of financial models in close collaboration with financial institutions (e.g., national, and regional financial institutions) and other organisations financing equipment for adoption of energy efficient alternatives while phasing down HFCs;

(o) Development of fiscal incentive programmes for manufacturing, installation, and imports of energy efficient alternative refrigerant-based equipment to reduce upfront high-cost of adoption of such equipment;

[11] Country-specific needs for MEPS development/strengthening should be assessed on a case-by-case basis and would depend on baseline situation on MEPS, and the level of support available for strengthening MEPS from non-MLF resources.

[12] MEPS implementation is an important condition for designing and implementing energy efficiency measures; in the absence of MEPS, the Governments would not have any regulatory control over initiating and sustaining energy efficiency interventions in relevant applications. This is also addressed in the document Draft criteria for funding including consideration of operationalizing paragraph 24 of decision XXVIII/2 (paragraph 176 of document UNEP/OzL.Pro/ExCom/90/40 and decision 90/49(d)) (UNEP/OzL.Pro/ExCom/91/62)

Awareness and information outreach

(p) Support for development and implementation of targeted awareness and information outreach activities to maintain and/or enhance energy efficiency while phasing down HFCs, including public-private partnership models, and in collaboration with other sector specific programmes for promoting energy efficiency while adopting alternative refrigerant technologies (e.g., tourism sector, fisheries sector, real estate promoters);

Monitoring and impact assessment

(q) Technical assistance including equipment support for testing laboratories, both at national and regional levels, for measuring energy efficiency levels of RACHP equipment, including those handling flammable refrigerants;[13]

(r) Technical assistance for development and implementation of training programmes relating to energy efficient RACHP equipment using alternative refrigerants for customs and enforcement officers;[14]

Other activities

(s) District cooling/retrofit projects involving replacement of HFCs and adopting alternative refrigerants. Given the large funding needs for these projects, these would be funded through sources other than MLF. MLF funding could be limited on information outreach on good practices and technical capacity building.

29. As these project activities listed above are directly linked to HFC phase-down (e.g., conversion projects in manufacturing enterprises, capacity building of the service sector and institutions involved in monitoring and reporting), the interventions that relate to manufacturing sector, enterprises assembling/installing large commercial and industrial RACHP equipment, servicing sector, development/strengthening of MEPS and other measures, awareness and information outreach, monitoring and verification processes and institutional coordination with energy efficiency authorities and capacity building of NOUs need to be prioritised; the timing of implementation of these activities (e.g., whether one has to precede the other or should they be implemented in parallel) would be based on assessment of country needs.

30. Activities relating to consumer-level financing for sustained adoption of energy efficient alternative refrigerant technologies need to be undertaken on an ongoing basis; noting the level of funding support as well as the consumer outreach needs for this support, and experience of non-MLF funding institutions in designing and implementing such programmes through their national networks, these activities may need to be supported mainly by non-MLF funding sources.

V. Criteria for projects for maintaining and/or enhancing energy efficiency while phasing down HFCs

31. Document UNEP/OzL.Pro/ExCom/91/63 proposed criteria for pilot projects to maintain and/or enhance energy efficiency. While these were designed specifically for prioritizing pilot projects for energy-efficiency related activities, these elements are comprehensive and could be used in identifying the

[13] This would include designing a testing, certification and monitoring process for different categories of equipment, equipment support, training and capacity building of certification and monitoring authorities; the need for these facilities could be considered on a case-by-case basis.

[14] This would relate to officers who monitor enforcement of compliance with national energy efficiency regulations relating to RACHP equipment.

type of activities/projects that maintain and/or enhance energy efficiency while phasing down HFCs that could be considered under both options. These are listed below:

(a) The projects are submitted in the context of HFC phase-down of KIPs, as a part of KIPs and/or as an individual stand-alone project in the manufacturing, assembly/installation, and servicing sectors;[15]

(b) The projects should include confirmation from the Government concerned that:

(i) The country has MEPS and a mechanism to monitor and assess their implementation, for the relevant sector/application;

(ii) The NOU would coordinate with relevant energy efficiency authorities to include the GWP of the refrigerants in the energy efficiency standards for the sector and to improve the energy efficiency standards sustainably, beyond the project timeframe, in the relevant sectors/applications, where feasible;

(iii) The project would not result in duplication of MLF-funded activities with those funded from non-MLF sources, if recipient Article 5 countries have mobilized or will mobilize funding from non-MLF sources for energy efficiency components;

(iv) The project impact would be monitored based on a well-defined monitoring and reporting framework;[16]

(v) The project would have a date of completion, no later than 36 months from the date of approval by the Executive Committee and a detailed project report would be submitted to the Executive Committee, within six months from the date of completion of the project; and

(c) For countries that do not have MEPS, only those projects that would contribute to MEPS development and initial awareness and capacity building initiatives for enforcement would be considered on the understanding that the conditions referred to in subparagraphs b(ii) to b(v) above will apply.

32. In addition, the projects can be assessed based on their expected performance; the following paragraphs present a brief overview of key project performance indicators that could be considered for assessing the project performance.

(a) Defined targets for:

(i) Percentage increase in energy efficiency levels compared to baseline level, and

(ii) Total energy consumption reduction impact in kWh.

[15] The Executive Committee decided that, for countries that chose to implement individual HFC investment projects or sector plans in advance of submission of stage I of the KIPs, the approval of each project should result in a phase-out of HFCs to count against the eligible consumption identified in the KIPs and should indicate how the investment project would relate to meeting the overarching strategy for the country and when the KIPs would be submitted

[16] This can include activity/output level (e.g., number of users who replaced existing inefficient equipment with energy efficient equipment, number of training programmes conducted with number of trainees, number of testing and certification laboratories commissioned), exception reporting (e.g., no. of cases of illegal energy inefficient equipment imports) and outcome level (e.g., agreement with energy efficiency authorities on including GWP limits in energy efficiency standards for RACHP equipment)

(b) Replicability in the relevant sector/application in the country and/or beyond geographic boundaries

(c) Ratio of funding requested to estimated kWh of energy saved (US $/kWh)

33. The Secretariat also notes that the impact on energy efficiency improvement for activities that are not related to conversion in manufacturing and/or assembly/installation are difficult to assess as "cause and effect" relationship cannot be easily established. A discussion on this is presented in paragraphs 37 to 39 below. Therefore, these activities may need to be assessed based on broader parameters that are expected to drive impact (e.g., number of respondents covered in awareness programmes, number of technicians trained) and justification provided for the specific project activities proposed, particularly how these support the implementation of energy efficient technologies.

VI. Project monitoring and impact assessment

34. The monitoring and evaluation process for the energy efficiency related projects covering operational and financial progress monitoring would follow the regular project monitoring process with relevant modifications that include energy efficiency related parameters.

35. The operational progress monitoring for the energy efficiency related projects would broadly include:

(a) Status of implementation of activities (e.g., implementation of projects involving change in technology to energy efficient technology, implementation, and updates of national energy efficiency regulations and/or other regulations that include Kigali Amendment provisions appropriately [to the extent feasible])

(b) Energy efficiency impact in terms of kWh energy saved and CO_2 emission reductions based on the market shares of RACHP equipment manufactured or imported based on the new MEPs in comparison with previous MEPS levels.[17]

Manufacturing of equipment

36. In the case of projects in manufacturing of equipment, the interventions would involve conversion of equipment to energy efficient technologies (e.g., change in compressors to variable speed from fixed speed, heat-exchangers with better energy efficiency, fans and other components that are energy efficient, controls and other components for energy efficient operation of system). This would result in production of equipment with better energy efficiency than the current levels for the products covered under the conversion project and at the same time, will result in an overall improvement in the energy efficiency of the product portfolio of the beneficiary enterprise. The energy efficiency target can be defined at a level that is practical and feasible but higher than the current levels; this would be the minimum level that would need to be achieved by the projects that would be considered. Based on the energy efficiency levels achieved through conversion and the CO_2 emission levels of energy consumed in the respective markets (i.e., domestic and export), energy savings in kWh and annual CO_2 emission level reduction through these projects can also be estimated.

[17] This is a simplified assessment of impact and avoids complex models for estimating GHG emission reductions resulting from energy efficiency. It must also be recognized that the activities will slowly transform the energy efficiency levels at an aggregate level in the market as the existing stock of equipment would slowly be replaced by energy efficient ones.

Projects that are not related to manufacturing and/or conversion

37. In the case of projects that are not directly related to the conversion (e.g., awareness and information outreach on energy efficient technologies, policies, standards and labelling programmes for energy efficiency, capacity building of different stakeholders, updating training and certification programme to include energy efficiency elements, equipment support, and capacity building of training institutions), the measurement of the impact of these activities on improving energy efficiency can be challenging.[18] Table 2 presents an overview of possible activities that could be considered for maintaining and/or enhancing energy efficiency while phasing down HFCs, and the activity indicators and remarks on how this impact can be measured.

Table 2: Activities and indicators for projects that do not relate to conversion in manufacturing and/or assembly and installation

Particulars	Activity level indicators	Remarks on impact measurement
Awareness and information outreach	Activity volumes in lots, no. of target respondents reached, no. of programmes held, etc.	Difficult to measure direct impact – linked to overall activities implemented under the programme and the extent to which awareness and information outreach changes consumer behavior and promote adoption of energy efficient alternative refrigerant-based equipment
MEPS development	Development and enforcement of standards and updates in the standards	Results in minimum energy performance improvement (conservative) to an overall performance improvement of product portfolio; measurement is feasible subject to data on impact of these standards on supply and use of equipment with better energy efficiency performance in the market
Labelling programmes	Development and enforcement of labelling programmes	Difficult to measure direct impact – linked to the extent to which the labelling programme changes consumer behaviour and promote adoption of energy efficient alternative refrigerant-based equipment
Update of training and certification programme	No. of programmes updated and upgraded	Difficult to measure – linked to the extent to which the trained personnel can install, maintain and service equipment to ensure that they operate efficiently
Capacity building including training programmes* covering regulatory authorities, distribution chain	No. of programmes delivered, and no. of respondents covered	Difficult to measure – linked to extent to which the trained personnel can implement measures for facilitating adoption of energy efficient low-GWP refrigerant-based equipment and control and monitor supply of such equipment
Institutional cooperation and coordination	No. of programmes conducted, agreement on coordination and cooperation between NOU and energy efficiency authorities	Can be assessed based on actual agreements including Kigali Amendment provisions in standards

*Capacity building would include support to national institutions (e.g., dealer and distribution network, training institutions for and associations of refrigeration technicians, standards organisations, import-export control authorities, taxation authorities and decision makers) for conducting training and outreach programmes for maintaining and/or enhancing energy efficiency in the context of HFC phase-down and meetings and consultations with national authorities for increasing their knowledge on the Kigali Amendment and the importance of integrating Kigali Amendment provisions in the energy efficiency regulations.

[18] Under the ODS phase-out projects and possibly under KIP implementation, directly linking activities which are not conversion projects related to actual ODS phase-out/HFC consumption reduction impact is difficult to ascertain; however, the importance of this activity in cost-effective transition to ODS-/HFC-free alternatives was well recognised particularly in the context of the support that was needed for small-scale and informal enterprises. MLF processes have addressed this in the past by linking the impact to proportion of funding level, wherever it was not possible to link it to actual phase-out.

38. Given the challenges in measuring the impact of energy efficiency related activities for non-investment activities, activity indicators need to be clearly identified and monitored for individual activities and where feasible, specific measures such as changes in MEPS, introduction of labelling schemes for energy efficient alternative refrigerant-based technologies and implementation of arrangements for institutional coordination, should be monitored and reported.

39. Demonstration and end-user incentive projects (e.g., installation of energy efficient low-GWP refrigerant-based equipment in supermarkets) to address challenges related to market acceptance of energy efficient equipment can result in faster adoption of energy efficient technologies in the context of HFC phase-down; thus, the impact of implementing such projects could be assessed through levels of adoption of the technologies related to the projects, and policies and measures for promoting adoption of those technologies. These projects should demonstrate replicability and scalability to ensure that these projects have a sustainable impact.

VII. Conclusions

40. The analysis presented above provides an overview of the institutional aspects, projects, criteria, and other elements when considering an operational framework for how activities related to maintaining and/or enhancing energy efficiency when phasing down HFCs may be treated under the MLF in the context of options 1 and 2.

(a) There are opportunities within current MLF guidelines and processes to provide support for activities to maintain and/or enhance energy efficiency while phasing down HFCs, by decision of the Executive Committee, noting the co-benefits it will achieve through additional GHG emission reductions;

(b) The existing processes and procedures of the MLF on business planning, project review and approval, project monitoring and evaluation of completed projects are applicable for both option 1 and option 2 consistent with processes for other compliance related projects, noting that for option 2, the funding should be available with the MLF before the projects can be considered, and that donor countries may require specific conditions for the use of these additional funds;

(c) Where either or both options are selected, there is a need to define specific projects and priority areas for funding and processes for monitoring and reporting, including target performance indicators for those activities that maintain and/or enhance energy efficiency when phasing down HFCs;

(d) Given that energy efficiency does not have compliance targets for Article 5 countries, a methodology for calculating costs associated with energy efficiency improvements need to be developed distinct from the traditional incremental cost calculation, once the decision is made to fund these activities within the MLF, and based on the Executive Committee's cost guidance relating to maintaining and/or enhancing energy efficiency, while phasing down HFCs;

(e) There are opportunities for streamlining costs of the conversion of the refrigerant when requirements for energy efficiency improvements are considered in a synchronised manner with the overall enterprise HFC phase down conversion; this will also support Article 5 countries to develop comprehensive policies to support implementing energy efficiency measures while phasing down HFCs;

(f) The type of project activities would include activities relating to manufacturing and installation of equipment, as summarized in paragraph 28 above;

(g) Funding from non-MLF funding sources is available for energy efficiency related activities; this provides opportunities for scaling up results from the activities implemented with MLF funding relating to energy efficiency while phasing down HFCs; the projects' financial structure needs to be designed so that complementarity of project activities is maximised and duplication is avoided;

(h) Activities that involve supply side interventions could be prioritised as these energy efficiency related activities can be implemented in parallel with the HFC phase down projects. On an ongoing basis, strengthening of national financial institutions for financing energy efficient technologies, coordination with energy efficiency authorities for including Kigali Amendment provisions in the energy efficiency related regulations and awareness and information outreach on promoting energy efficient technologies would help in catalysing sustainable increase in demand for energy efficient products and technologies in RACHP applications while phasing down HFCs;

(i) Criteria identified in document UNEP/OzL.Pro/ExCom/91/63 (Criteria for pilot projects to maintain and/or enhance energy efficiency of replacement technologies and equipment in the context of the HFC phase-down (decision 90/50(b)(i)) could be used for considering projects under this category; and

(j) Project monitoring and impact assessment processes would vary depending upon the type of projects; while impact conversion projects and activities relating to implementation of MEPS implementation can be directly measured, measurement of project components that are not related to manufacturing/conversion may need to be assessed based on activity levels.

VIII. Recommendation

41. The Executive Committee may wish:

(a) To note the information in document UNEP/OzL.Pro/ExCom/91/64 presenting the operational framework to further elaborate on institutional aspects and projects and activities that could be undertaken by the Multilateral Fund for maintaining and/or enhancing the energy efficiency of replacement technologies and equipment in the manufacturing and servicing sectors when phasing down HFCs (decision 90/50(b)(ii));

(b) To explore whether option 1 and/or option 2 can be considered for supporting activities for maintaining and/or enhancing the energy efficiency of replacement technologies and equipment in the manufacturing and servicing sectors when phasing down HFCs; and

(c) To request the Secretariat to provide further information for the consideration of the Executive Committee at a future meeting to be decided, in line with the decision taken in sub-paragraph (b) above.

Annex

IMPLICATIONS OF IMPLEMENTING ACTIVITIES FOR ENHANCING ENERGY EFFICIENCY WHILE PHASING DOWN HFCs AND HFC PHASE-DOWN IN A MINI-SPLIT AIR-CONDITIONER MANUFACTURING ENTERPRISE IN A SYNCHRONISED MANNER

1. This annex illustrates the implications of implementing measures to maintain and/or enhance energy efficiency while phasing down HFCs and the HFC phase down activities in a synchronised manner. The example given here is a case for conversion of a mini-split air-conditioner manufacturing enterprise (ABC) producing R-410A based equipment to HFC-32 as a refrigerant. The costs given here are for illustrative purposes and indicative, and do not prejudge outcomes of cost guidelines discussions of the Executive Committee.

2. This enterprise ABC has different options for implementing measures to enhance energy efficiency while phasing down HFCs through the conversion projects. A brief description of the funding options is given below.

(a) Option 1 – Funding support to implement measures only for refrigerant conversion and no measures for energy efficiency (Option A)

(b) Option 2 – Funding support to implement measures for refrigerant conversion and with technical support improve energy efficiency of equipment through optimisation of components; implementation of both measures in a synchronised manner (Option A1)

(c) Option 3 – Funding support to implement measures for refrigerant conversion and implementation of energy efficiency interventions with proper compressor selection and optimized heat exchangers; implementation of HFC phase down and energy efficiency measures separately (Option B)

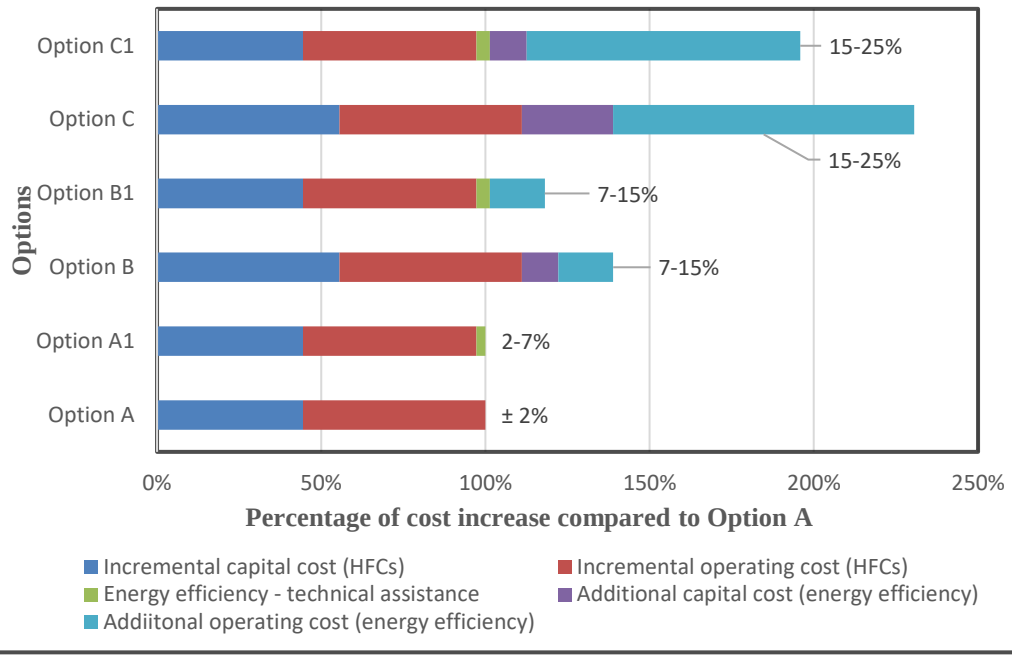
(d) Option 4 – Funding support to implement measures for refrigerant conversion and implementation of energy efficiency interventions with proper compressor selection and optimized heat exchangers; implementation of HFC phase down and energy efficiency measures in a synchronised manner (Option B1)

(e) Option 5 – Funding support to implement measures for refrigerant conversion and implementation of energy efficiency interventions with variable speed compressor and heat exchanger design; implementation of HFC phase down and energy efficiency measures separately (Option C)

(f) Option 6 – Funding support to implement measures for refrigerant conversion and implementation of energy efficiency interventions with variable speed compressor and heat exchanger design; implementation of HFC phase down and energy efficiency measures in a synchronised manner (Option C1)

3. The implications of implementation of these options is presented in Figure 1 below[1].

Figure 1 : Implications of cost and energy efficiency implications of HFC phase down and energy efficiency in a synchronised manner - an example



4. From the figure, it is shown that if implemented in a synchronised way, there would be savings in improving energy efficiency of the equipment/product during refrigerant conversion, in the context of HFC phase-down. In addition to the cost savings, synchronised implementation of energy efficiency and HFC phase-down would allow Article 5 countries to work closely with industry to develop comprehensive policies to support implementing energy efficiency measures while phasing down HFCs.

[1] These savings are related to the ABC manufacturing company and resulted in 15% cost reduction for the synchronised energy efficiency – refrigerant conversion approach compared with separate conversion. For other sectors and companies with different production volume this is likely to change.