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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Fifty-seventh Meeting
Montreal, 30 March-3 April 2009

2009 WORK PROGRAMME OF THE WORLD BANK

COMMENTS AND RECOMMENDATION OF THE FUND SECRETARIAT

1. The World Bank is requesting approval from the Executive Committee of US $700,000 for its 2009 Work Programme, plus agency support costs of US $52,500.

2. The activities proposed in World Bank's 2009 Work Programme are presented in Table 1 below:

Table 1: World Bank's Work Programme

Country	Activity/Project	Amount Requested (US $)	Amount Recommended (US $)
SECTION A: ACTIVITIES RECOMMENDED FOR BLANKET APPROVAL			
A1. Project preparation for HCFC phase-out management plan			
Indonesia	Preparation of a sector plan to reduce HCFCs in the foam sector	100,000	100,000
Sri Lanka	Preparation of a sector plan to reduce HCFCs in the refrigeration and air conditioning sector	60,000	60,000
	Subtotal for A1:	160,000	160,000
SECTION B: ACTIVITIES RECOMMENDED FOR INDIVIDUAL CONSIDERATION			
B1. Project preparation for HCFC demonstration projects:			
China	Preparation of demonstration project for phase-out of HCFC in spray foam	30,000	*
China	Preparation of demonstration project for phase-out of HCFC in foam insulation for water heaters	30,000	*
China	Preparation of demonstration project for foam system house	80,000	*
	Subtotal for B1:	140,000	
B2. Pilot projects in ODS waste management			
Indonesia	Preparation of pilot ODS disposal project	50,000	*
Mexico	Preparation of pilot ODS disposal project	50,000	*
The Philippines	Preparation of pilot ODS disposal project	50,000	*
	Subtotal for B2:	150,000	
B3. Technical Assistance			
Global	Resource mobilization for HCFC Phase-out co-benefits	250,000	*
	Subtotal for B3:	250,000	
Subtotal for sections A and B:		700,000	160,000
Agency support costs (7.5 per cent for project preparation and institutional strengthening, and for other activities over US $250,000, and 9 per cent for other activities under US $250,000):		52,500	12,000
Total:		752,500	172,000

*Project for individual consideration or pending

SECTION A: ACTIVITIES RECOMMENDED FOR BLANKET APPROVAL

A1. Project preparation for HCFC phase-out management plan

Indonesia: Preparation of a sector plan to reduce the use of HCFC consumption in the foam sector (US $100,000)

Project description

3. The World Bank submitted a request for funds to prepare a sector plan for the foam sector for which they have been designated as the responsible agency by Indonesia.

4. In support of its submission, the World Bank has indicated that the costs being requested will include a survey of the foam sector looking at both small and mid-size companies, of which it is estimated that there are 200-250, representing 30 per cent of the companies in the sector. The requested funds will also include sector consultation workshops to finalise the plan as well as other coordination meetings as required. The budget will also cover the costs of experts who will assist in the preparation of the sector plan. The document indicates that this plan, once implemented, is estimated to phase out 100-200 ODP tonnes of HCFCs, and will substantially contribute to meeting Indonesia's HCFC commitments for 2013 and 2015.

Secretariat's comments

5. The Executive Committee, in decision 56/16 decided that countries with HCFC consumption between 101 - 300 ODP tonnes in 2007 are eligible for up to a maximum of US $200,000 for additional project preparation for investment projects as part of their HCFC phase-out management plan (HPMP). Indonesia's HCFC consumption as reported under Article 7 is 286.8 ODP tonnes.

6. In reviewing this submission, the Secretariat notes that the World Bank has included basic information requested by the Secretariat to allow a better evaluation of the request. This information is summarised in paragraph 4 above. The Secretariat discussed this submission with the World Bank, in particular on whether this project preparation request covers the full foam sector and would allow the country to meet its first stage HPMP commitments. The Secretariat also sought clarification on how this sector plan will be fully integrated into the final HPMP that will be submitted for Indonesia, funding of which was already approved at the 55th Meeting. The World Bank confirmed that this activity will fully address the first stage for the foam sector, and that the projects developed as a result will be integrated into the final HPMP.

7. The Secretariat also notes that this funding request, together with the US $90,000 requested by UNDP for the refrigeration sector (document 57/18) brings the total funding requested for Indonesia to US $190,000 out of the US $200,000, which is the maximum amount eligible for the country for the investment component of the HPMP in line with decision 56/16. The remaining US $10,000 will be requested by UNIDO at a future meeting for the solvent sector.

Secretariat's recommendation

8. The Executive Committee may wish to consider the approval of the request of the World Bank for project preparation for investment projects as part of the HPMP in Indonesia at the amount of US $100,000 plus support costs of US $7,500 on the understanding that no further funding for project preparation for the foam sector to meet the 2013 and 2015 HCFC control measures would be approved by the Executive Committee.

Sri Lanka: Preparation of a sector plan to reduce the use of HCFC consumption in the refrigeration sector sector: US $60,000

Project description

9. The World Bank submitted a request for funds to prepare a sector plan for the refrigeration and air conditioning sector for which they have been designated as the responsible agency by Sri Lanka.

10. In support of its submission, the World Bank has indicated that the costs being requested will include a survey of the refrigeration and air-conditioning sector looking at both large and small enterprises that are active in this sector. The requested funds will also include sector consultation workshops to finalize the plan as well as other coordination meetings as required. The budget will also cover the costs of experts who will assist in the preparation of this sector plan. The document indicates that this sector plan, once implemented, is estimated to phase out 3 ODP tonnes of HCFCs (about 50-55 metric tonnes of HCFC-22) and will contribute largely to meeting Sri Lanka's HCFC commitments for 2013 and 2015.

Secretariat's comments

11. The Executive Committee, in decision 56/16 decided that countries with HCFC consumption up to 100 ODP tonnes in 2007 are eligible for a maximum of US $100,000 for additional project preparation for investment projects as part of their HCFC phase-out management plan (HPMP). Sri Lanka's HCFC consumption as reported under Article 7 is 15.4 ODP tonnes.

12. In reviewing this submission, the Secretariat notes that UNDP is the lead agency in Sri Lanka for the preparation of the HPMP, and that the World Bank will have to work very closely with them to prepare a comprehensive HPMP that addresses all sectors to enable compliance with the 2013 and 2015 control measures for HCFCs. It also noted that the World Bank has provided information on the sector as requested by the Secretariat to allow a better evaluation of the proposal. The World Bank also confirmed that this will fully address the first stage for the refrigeration and air conditioning sector, and that the projects developed will be integrated into the final HPMP.

13. The Secretariat also notes that this funding request, combined with the US $40,000 requested by UNDP for different sectors (document 57/18) brings the total funding requested for Sri Lanka to US $100,000, which is the maximum amount eligible for the country for the investment component of the HPMP. No further funds for the preparation of stage 1 of the HPMP in Sri Lanka will be available for any other HCFC-consuming sector.

Secretariat's recommendation

14. The Executive Committee may wish to consider approving the request of the World Bank for project preparation for investment projects as part of the HPMP in Sri Lanka for US $60,000 plus support costs of US $4,500, on the understanding that no further funding for project preparation for the refrigeration and air conditioning sector to meet the 2013 and 2015 HCFC control measures would be approved by the Executive Committee. This also constitutes the final funding for Sri Lanka for HPMP preparation to meet stage 1 of the HCFC phase-out.

SECTION B: ACTIVITIES RECOMMENDED FOR INDIVIDUAL CONSIDERATION

B1. Project preparation for HCFC demonstration projects:

(a) China: Preparation of demonstration project for phase-out of HCFC in spray foam: US $30,000

(b) China: Preparation of demonstration project for phase-out of HCFC in foam insulation for water heaters: US $30,000

(c) China: Preparation of demonstration project for phase-out of HCFC for foam system house: US $80,000

Project Descriptions

15. The World Bank submitted four requests for the preparation of demonstration projects in China for the foam sector. Information provided for the above proposals is summarized below:

(a) The use of HCFCs in the spray foam sub-sector has grown considerably during the past six years. It was estimated that around 15 percent of HCFC-141b was used in this sector in 2007. The proposed demonstration project will evaluate technical and commercial viability of using HFC-245fa or liquid carbon dioxide as an alterative to HCFC in this sector. The project will be implemented at the Haerbin Tianshuo Construction Materials Industry Co. Ltd, a manufacturing company established in 1993 located in Haerbin, Heilongjiang.

(b) Polyurethane (PU) foam is used for the insulation of water heaters and tanks in solar heating systems in China. The use of solar energy appliances has grown in the recent years, and it is estimated that there are over 500 enterprises that produce such equipment in the country. A single company may have an estimated HCFC-141b consumption for PU foams specific to this equipment of approximately 40-60 ODP tonnes. The project will demonstrate the use of hydrocarbon as an alternative for this sub-sector. It will be demonstrated in the Jiangsu Huaiyin Huihuang Solar Energy Co. Ltd located in Huaiyin, Jiangsu. This enterprise was established in 1993.

(c) While the use of polyol systems houses have proved to be a cost-effective modality for implementing CFC-11 phase-out in foam manufacture in many countries, this has not yet been tested in China. This demonstration project will test the proposed approach through one systems house and 8-10 attached foam enterprises to determine the feasibility of the use of pre-blended polyols and hydrocarbons. The project will be prepared for Guangdong Wanhua Rongwei Polyurethanes Co. Ltd., an enterprise located in Guangdong and established in 1991.

16. The World Bank indicated that the project preparation funds will be used to develop individual investment proposals that will examine the feasibility of retrofitting existing foam equipment with the selected technology, technical assistance and training for the company, trial production, and calculation of operating costs/savings from the use of the alternative technology. In the case of the demonstration project for the systems house, it will also develop and validate the process as well as explore how the foam chemical system can be optimised to meet local markets and conditions.

Secretariat's comments

17. The Secretariat notes that the information provided by the World Bank in support of the requests for project preparation for the above demonstration projects for China is consistent with the requirements of decision 56/16(i) which states, *inter alia*, that the request for preparation funds should include

specification of country, sector, brief description of the project, approximate ODP tonnes phase-out to be achieved, the enterprise(s) to be addressed, if relevant, and the date when they began operation, and to provide a compelling reason why the Executive Committee should choose this project. With regards to the request for the preparation for a project for a systems house, it does not indicate the quantity of HCFCs that may be phased out as a result of this project. Moreover, the submitted proposals do not include compelling reasons why these projects should be selected by the Executive Committee as demonstration projects consistent with the above decision.

18. The World Bank explained that these requests are in response to decision 55/43(e) where the Executive Committee, *inter alia*, invited the agencies to submit a limited number of time-specific project proposals involving interested systems houses and/or chemical suppliers for the development, optimization and validation of chemical systems for use with non-HCFC blowing agents. They are also in response to requests from the Government of China on need for projects to showcase the technology described for each application, the results of which will assist the Government of China and the foam industry to decide on which alternatives to use for the phase-out of HCFCs in these sectors.

19. The Secretariat also notes that all three identified companies started operations earlier than July 1995, and so are in line with decision 17/7 on the eligibility of enterprises established after 25 July 1995.

Secretariat's recommendations

20. The Executive Committee may wish to consider approving the requests for project preparation for three demonstration projects in China in line with decisions 55/43(e) and 56/16(i), at the amounts indicated below:

(a) Preparation of demonstration project for phase-out of HCFC in spray foam: US $30,000 plus agency support cost of US $2,250;

(b) Preparation of demonstration project for phase-out of HCFC in foam insulation for water heaters: US $30,000 plus agency support cost of US $2,250; and

(c) Preparation of demonstration project for phase-out of HCFC for foam system house: US $80,000 plus agency support cost of US $6,000

B2. Project preparation for pilot projects in ODS waste management:

Background

21. The World Bank submitted requests for the preparation of three pilot ODS disposal projects. These pilot projects are being proposed for Indonesia, the Philippines, and Mexico. The projects will be designed to capture different circumstances of unwanted ODS (i.e., sources of unwanted ODS, collection, transportation, packaging, storage, and final disposal) in the three countries.

22. According to the submission, these three pilot projects will also include a financial analysis to determine the viability of ODS disposal for different streams and for different local conditions. Actual costs of carrying out ODS disposal are expected to be covered by carbon credits from sources yet to be identified. Disposal of ODS will be carried out at existing disposal facilities that meet the destruction efficiency ratio (DRE) of at least 99.99%.

23. Expected amounts of ODS to be disposed for each of the countries are summarised in the table below. The World Bank did not specify the actual substance in their submission.

Country	ODP tonnes				
	2009	2010	2011	2012-2015	Total
Indonesia		60			60
Philippines		12			12
Mexico		100	135	540	775

Indonesia: Preparation of pilot ODS disposal project: US $50,000

Project description

24. The World Bank's submission indicates that for Indonesia, the project will address disposal of ODS from illegal imports. It will also explore feasibility of having ODS destroyed by a local disposal facility. The design of this project will build on experience of the earlier ODS disposal project financed by the Government of Japan as part of its bilateral contribution to the Multilateral Fund.

Mexico: Preparation of pilot ODS disposal project: US $50,000

Project description

25. The proposed activity for Mexico will demonstrate the employment of ODS disposal methodologies and criteria developed by the ODS disposal study being completed by the World Bank for collection of unwanted ODS from refrigerators and air-conditioners under the Mexico energy efficiency appliances programme, also being developed by the World Bank. Both CFC-12 and CFC-11 from the old units will be collected and disposed of.

The Philippines: Preparation of pilot ODS disposal project: US $50,000

Project description

26. The pilot study in the Philippines will address not only disposal of bulk CFCs but also contaminated CFCs (mix of CFC-12, HFC-134a and others). It will also explore the transport of CFCs from service shops to the recovery and recycling centre which was established under the National CFC Phase-out Plan funded by the Multilateral Fund, including packaging and final disposal.

Secretariat's comments

27. In paragraph 2 of decision XX/7, the Meeting of the Parties requested the Executive Committee to consider, as a matter of urgency, commencing pilot projects that may cover the collection, transport, storage and destruction of ozone-depleting substances. While the Executive Committee agreed to include projects for ODS destruction in the business plans of the agencies at the 51st Meeting, the Committee had not yet formulated an approach for assessing their impact, and there are presently no guidelines for developing such projects. In addition, this meeting will be the first opportunity for the Committee to consider the implications of paragraph 2 of decision XX/7 in relation to its funding operations.

28. Despite the lack of guidelines, the Secretariat sought clarification from the World Bank on the submissions presented above and inquired as to the type of activities the pilot project will demonstrate, and what the funds requested will cover. The World Bank provided a description of the activities in the pilot project, which is attached as Annex II of their submission.

29. With regard to Indonesia, the World Bank acknowledged that the Japanese ODS disposal project had resulted in the testing and validation of a cement kiln for ODS destruction. This request will build on the knowledge gained from the earlier project, and will in turn look at what other options the Government could explore when deciding how to destroy confiscated illegal CFCs. Since the Government cannot afford to have these destroyed through the local facility, other options such as the possibility of using such ODS for carbon trading will therefore be examined. The World Bank indicates that the entities which may provide carbon credits will be identified during the preparation. The Secretariat also queried whether confiscated bulk CFCs can be considered as "waste", and whether other alternatives were being examined for its disposal. It appears that current customs regulations prevent re-export of such products.

30. With regard to Mexico, the World Bank clarified that this proposal will draw upon the experiences of Mexico's energy efficiency appliance project which is being developed by the Bank and financed by a loan, and through the Clean Development Mechanism (CDM). As this project design does not include extraction and final disposal of CFCs in foam and refrigerant from the appliances, the preparation funds are requested to determine the costs related to transporting old appliances to central facilities, costs of extraction of the ODS, testing, packing, and final disposal of ODS at existing facilities that meet the destruction and removal efficiency (DRE) ratio as defined by the Fifth Meeting of the Parties to the Montreal Protocol in decision V/26. They also clarified that the construction of a destruction facility will not be part of the pilot project.

31. The funds requested for the Philippines will look into how the national recovery and recycling centre established under the National CFC phase-out plan and funded by the Multilateral Fund could collect CFCs from service shops. The Bank clarified that currently, collection has not taken place as most refrigerants collected by service shops are contaminated and cannot be reclaimed. With this pilot project, contaminated refrigerants will be brought to the central facility for testing, packaging, and may be exported to certified facilities in line with the country's regulation consistent with the Basel Convention, for final disposal. By doing so, the project will also investigate options for the disposal of those substances that cannot be recycled or reused, through certified facilities. Different options such as incineration, plasma arc, etc will be explored, however, the actual selection of the disposal option will depend on the cost.

32. In responding to a query on why these three pilot projects are being requested in their work programme, the World Bank indicated that the three ODS destruction demonstration projects will show the difference in nature of the sources of unwanted ODS, which because of their different locations would result in different costs of collection, testing, storage, destruction, and packaging.

33. The Secretariat notes that a common element of the three preparation requests from the World Bank is that these projects will seek to generate practical data and experience on management and financing modalities, and would examine opportunities to leverage possible co-financing. It also observes that while the projects for Mexico and the Philippines look at the disposal of ODS waste, the request for Indonesia is considering options for destroying unused ODS.

34. In reviewing the costs requested by the World Bank for each country, the Secretariat considers these to be well within historical levels of project preparation for these types of projects. The World Bank confirmed that that these costs will also cover the usual expert and travel costs necessary for project preparation.

35. Following the above discussions, the Secretariat also noted the possibility that full projects resulting from these preparation funds may not necessarily be funded through the Multilateral Fund, but could rather be sourced from carbon credits that the distroyed ODS may generate for the countries. While the project preparation funds could be considered as incremental costs, the Executive Committee may wish to deliberate whether it wishes to fund project preparation for projects that may result in ODS disposal consistent with the Montreal Protocol, but where its full implementation may be funded from

other sources. It may also wish to consider whether these proposals could constitute requests for exploring funding resources outside the Multilateral Fund.

Secretariat's recommendation

36. The Executive Committee may wish to take the above information into account, including the lack of guidelines for ODS destruction/disposal projects, and consider whether to fund the project preparation requests for Indonesia, Mexico and the Philippines as submitted by the World Bank.

B3. Technical Assistance

Global: Resource mobilisation for HCFC phase-out and climate co-benefits US $250,000

Project description

37. The World Bank submitted a request for a technical assistance project for mobilising resources to maximise climate benefits for HCFC phase-out, at a funding level of US $250,000. The request is accompanied by a concept note describing the objectives, activities, as well as expected results of this project.

38. According to the World Bank, the project intends to explore options for preempting an increase in the demand for HFCs or any other high GWP gases in the consumption sector as a result of HCFC phase-out in developing countries. The study will review and examine potential financing mechanisms available for financing the transition to low GWP alternatives, including a scheduled phase-down of HFCs in developing countries and countries with economies in transition. The project will also address technology limitations and the trade-off between energy efficiency gains and low GWP gases in order to maximize overall energy benefits.

39. The study will investigate: (i) costs and barriers associated with conversion of HCFC technology to low GWP alternatives; (ii) volume of HFCs and other alternatives in terms of CO_2 equivalent associated with the consumption and production of HCFCs in developing countries, including by-products of other chemical processes; (iii) potential funding sources (i.e., the Multilateral Fund, UNFCCC, Tradable Carbon Market, Carbon Partnership Funds, Clean Technology Fund, and etc.) to support adoption of better HCFC containment practice, and climate friendly technologies; and (iv) recommendation for funding methodologies such as approaches to evaluate and setting baseline consumption and production of HFCs and scheduled phase-down, etc. The project will also investigate effective modalities for implementing these activities in order to ensure synergy between the activities funded under the Multilateral Fund, and those that could potentially be funded from other funding sources.

40. The World Bank indicates that this request will initially produce a detailed terms of reference for this study to be submitted for consideration by the Executive Committee at its 58th Meeting in July 2009. The study will then take about 12 months to complete. The final report of the study will be submitted to the Executive Committee at its last meeting in 2010.

41. The table below provides a breakdown of the requested US $250,000 as requested by the World Bank:

Element	Description	US$
Potential Volume of Carbon Dioxide Equivalent Emission Reduction	Review of current HCFC applications and available non-HCFC alternatives; market analysis on penetration of various alternatives (high and low GWP) and estimates on benefits from improved energy performance (taking into account ongoing work of TEAP and OORG)	35,000
Barriers Associated with Conversion of HCFC Technology with Baseline Energy and Resource Efficiency to Low GWP Alternatives with Improved Energy and Resource Efficiency	Industrial survey in a selected number of Article 5 countries and Article 2 countries that are major technology providers for each HCFC application	50,000
Consumption and Production of HCFCs	Industrial survey focusing on chemical producers in both Article 5 and non-Article 5 countries; market analysis to project trends	10,000
Potential Funding Resources	Review of existing activities or projects funded by various funding mechanisms; review existing CDM and non-CDM methodologies; interview with prospective beneficiaries in Article 5 countries; identification of potential sources of financing; development of approaches and project model for securing such resources	55,000
Development of Funding Criteria/Standards/Methodologies	Development of tools for capturing co-financing resources outside the MLF	70,000
Stakeholder Consultation Meetings	3 consultation meetings	30,000
Total		**250,000**

Secretariat's comments

42. Decision XIX/6 paragraph 11(b) of the Nineteenth Meeting of the Parties provided guidance to the Executive Committee to give priority to, *inter alia*, "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", when looking into HCFC phase-out projects. The Executive Committee at its 54th Meeting agreed on a set of guidelines for the preparation of HCFC phase-out management plans (HPMP), and at the 55th and 56th Meeting, approved funds for 115 countries for HPMP preparation.

43. The guidelines for HPMP preparation agreed in decision 54/39 include the provision for Article 5 countries to consider financial incentives and opportunities for co-financing in their final HPMPs, which could be relevant for ensuring that HCFC phase-out results in benefits in accordance with paragraph 11(b) of decision XIX/6 as mentioned above.

44. The Secretariat notes that with the results of the study proposed by the World Bank available only in 2010, it may assist countries only by providing guidance to the agencies in the implementation of stage 1 of the HPMP and in examining their options for co-financing for the preparation of stage 2, as appropriate. In addition, it also notes that there is so far no guidance from the Executive Committee on how climate benefits of HCFC phase-out are to be cost, and whether these costs could be considered as incremental costs under the Multilateral Fund.

45. The Secretariat also notes that this is the first time that a proposal of this nature is being submitted by the implementing agencies, and that there are neither any precedents for such a submission nor guidelines for their consideration. It also notes that this project may not clearly constitute an incremental cost as defined in the Indicative List of Categories of Incremental Costs as embodied under Article 10 and agreed at the Fourth Meeting of the Parties to the Montreal Protocol, and therefore may not be eligible for funding. However, the Executive Committee may wish to examine the detailed proposal submitted by the World Bank and consider whether it merits discussion based on its possible positive contribution to the implementation of stage 1 of the HPMP and preparation of stage 2.

Secretariat's recommendation

46. The Executive Committee may wish to consider this proposal in light of the information presented above, and in the discussion of Agenda item 14, Facility for additional income from loans and other sources.

2009 WORK PROGRAM

PRESENTED TO THE 57th MEETING OF THE EXECUTIVE COMMITTEE

WORLD BANK IMPLEMENTED MONTREAL PROTOCOL OPERATIONS

February 12, 2009

WORK PROGRAM FOR WORLD BANK-IMPLEMENTED MONTREAL PROTOCOL OPERATIONS

1. This proposed work program for Bank-Implemented Montreal Protocol Operations is prepared on the basis of the World Bank 2009 business plan also being submitted to the 57th meeting of the Executive Committee. The proposed 2009 business plan consists of investment and non-investment activities to assist Article 5 countries in adhering to their freeze obligations, and meeting their 85% and 100% reduction targets for Annex A and B chemicals. The proposed 2009 business plan also include activities that are necessary to assist Article 5 countries to meet their first two HCFC reduction targets (i.e., freeze in 2013 and 10% reduction in 2015).

2. **The total amount of deliverables in the proposed 2009 World Bank business plan, including investment and non investment activities amounts to US$32.78 million, including agency support costs**. Funds will be used towards new and previously approved activities, which combined will capture an estimated 2,886 ODP tonnes in 2009.

3. **The proposed 2009 business plan includes deliverables of 16 investment activities in 8 countries, totaling roughly US$29.44 million.** These include annual work programs for 12 previously approved multi-year projects and four new HCFC phaseout demonstration projects in the foam sector.

4. The proposed 2009 business plan allocates US$23.8 million (roughly 81% of the total investment deliverables for the year) to support annual work programs of the Argentina, China, and India CFC production closure projects, and the China and India CTC production closure activities.

5. In 2009, requests to support implementation of previously approved phaseout and sector plans will include subsequent funds for: i) approved CFC phaseout plans in Antigua and Barbuda, Malaysia, Tunisia, and Thailand; ii) a commercial refrigeration sector plan for Turkey; iii) CTC phaseout plans for India, Malaysia and Thailand; iv) two process agent phaseout plans for China; and v) two methyl bromide phaseout plans in Thailand and Vietnam.

6. Other than deliverables for ongoing multi-year agreements, the proposed 2009 Business Plan includes four HCFC phaseout demonstration projects in the foam sector for China.

7. The proposed 2009 business plan includes requests to extend support for implementation of four existing institutional strengthening projects in Ecuador, Jordan, and Thailand, totalling US$0.72 million.

8. The proposed 2009 business plan also includes a request to carry out a comprehensive study on resource mobilization to maximize climate benefits from HCFC phaseout. The concept note of this proposed activity along with cost breakdown for

conducting this proposed study is included in Annex I. Detailed terms of reference for this proposed study will be submitted at the 58th Meeting of the ExCom.

9. The proposed 2009 work program, which is being submitted for consideration at the 57th Meeting of the ExCom, includes nine project preparation funding requests: four are for development of demonstration projects, two for preparation of HCFC phaseout sector plans, and the remaining three for development of pilot ODS disposal projects.

10. Descriptions of nine project preparation funding requests are included in Table 1. Justifications for four demonstration projects in the foam sector for China are summarized in Table 2.

Table 1: Project Preparation Funding Requests Submitted for Consideration of the 57th Meeting of the Executive Committee

Country	Request (US$)	Duration	Description
China	30,000	April – December 2009	Preparation of demonstration project for phaseout of HCFC in spray foam
China	30,000	April – December 2009	Preparation of demonstration project for phaseout of HCFC in foam insulation for water heaters
China	80,000	April – December 2009	Preparation of demonstration project for foam system house
Indonesia	100,000	April 2009 – December 2010	Preparation of the foam sector plan
Indonesia*	50,000	April 2009 – December 2010	Preparation of pilot ODS disposal project
Mexico*	50,000	April 2009 – December 2010	Preparation of pilot ODS disposal project
The Philippines*	50,000	April 2009 – December 2010	Preparation of pilot ODS disposal project
Sri Lanka	60,000	April 2009 – December 2010	Preparation of a refrigeration and a/c sector plan
Global	250,000	April 2009 – December 2010	Resource Mobilization for HCFC Phaseout Co-benefits (Concept Note and cost breakdown included in Annex I)
Support Cost	52,500		
Total	**752,500**		

**Refer to Annex II.*

Table 2: Detailed Descriptions and Justifications for HCFC Phaseout Demonstration Projects

Project title	Description/reason for demonstration	Prep. Funds (USD)	Estimated Project Cost (USD)	Substitute Technology	HCFC-141b (ODS tons)	Time Schedule (months)
1. Demonstration project for development of a foam system house with non-HCFC blowing agents	Using polyol system houses as project implementers has been proven as a cost effective implementation modality for phasing out of CFC-11 in many countries. This modality has not yet been used in China; China therefore wants to test the modality through a demonstration project involving one existing system house and 8-10 smaller foam enterprises. The majority of the foam enterprises in China are smaller foam enterprises. We would also like to test the feasibility of using preblended polyols and hydrocarbons. The project activities/costs consist of the following: a. development, validation process, and provision of technology transfer; b. Setup of a facility for premixing hydrocarbon and polyol. c. Modification of foam equipment and facilities for using preblended polyol at each of the participating foam companies. Level of safety measures should be identified and evaluated. d. Technical assistance/training to each of the participating foam enterprises; e. Trial production; and f. Operating costs/savings will be requested for a two year period consistent with existing ExCom guidelines for the foam sector.	80,000	1,200,000 (estimated based on existing ExCom guidelines and policies)	Hydro-carbon	80-100 T	18

Project title	Description/reason for demonstration	Prep. Funds (USD)	Estimated Project Cost (USD)	Substitute Technology	HCFC-141b (ODS tons)	Time Schedule (months)
2. Demonstration project for hydrocarbon blowing agent application in the sub-sector of solar energy appliances	PU foam is used for insulation of water heaters and tanks in solar heating systems. Use of solar energy appliances has been growing quickly in recent years. It is estimated that over 500 enterprises are involved in this sub-sector in China. The project is proposed to demonstrate the use of hydrocarbon as a substitute to HCFC-141b in solar energy appliances. An existing solar heater company with a solar panel production facility will be selected to implement this project. As a company with HCFC-141b consumption level of 40-60 ODS tons should replace HCFC-141b with hydrocarbon, it is important to demonstrate and evaluate the technology and cost. The project activities/costs will consist of the following: a. Retrofitting or replacing existing foam equipment for the use of hydrocarbon; b. Modification of the foaming facility for the use of hydrocarbon and installation of necessary safety measures; c. Installation of hydrocarbon storage tank and a premixing unit; d. Technical assistance/training; e. Trial production; f. Operating costs/savings will be requested for a two year period consistent with existing ExCom guidelines for the foam sector.	30,000	780,000 (estimated based on existing ExCom guidelines and policies)	Hydro-carbon	40-60T	18

Project title	Description/reason for demonstration	Prep. Funds (USD)	Estimated Project Cost (USD)	Substitute Technology	HCFC-141b (ODS tons)	Time Schedule (months)
3. Demon-stration project for HCFC-141b phaseout in spray foam sub-sector	Based on available data, the use of HCFCs has grown significantly during the past 6 years. It is estimated that approximately 15 percent of HCFC-141b in 2007 was used in the spray foam sub-sector. The project is proposed to demonstrate the use of a suitable substitute to HCFC-141b in this sub-sector. Substitute technology is to be selected. The following estimated cost is based on the use of HFC-245fa as substitute. An existing foam enterprise will be selected to implement this project. The project activities/costs consist of the following: a. Retrofitting of an existing foam equipment for the use of e.g. HFC substitute; b. Technical assistance/training; c. Trial production; and d. Operating costs/savings will be requested for a two year period consistent with existing ExCom guidelines for the foam sector.	30,000	300,000 (estimated based on existing ExCom guidelines and policies)	HFC-245fa or liquid CO2	20-30T	12

Annex I
CONCEPT NOTE
RESOURCE MOBILIZATION FOR
MAXIMIZING CLIMATE BENEFITS OF HCFC PHASE-OUT

BACKGROUND

The Montreal Protocol on Substances that Deplete the Ozone Layer has been considered as one of the most successful global environmental treaties as it has proven to be an effective instrument in bringing down consumption and production of the most potent ozone depleting substances (ODS) by more than 400,000 Mt within the last two decades[1]. Consumption and production of CFCs, halons, and CTC will be completely phased out in less than 12 months, except for a limited quantity for essential usages.

As most ODS are high global warming gases, phase-out of CFCs, halons, and CTC has also brought climate benefits. The Montreal Protocol in the last two decades has resulted in avoided emissions of high global warming gases equivalent to 25 billion tons of CO2 equivalent in comparison with 2 billion tons of CO2 equivalent to be achieved under the firs the commitment period of the Kyoto Protocol[2].

However, phasing out of these potent ODS has resulted in an increasing demand for high global warming gases including gases regulated under the Kyoto Protocol[3]. For example, the demand for HFC-134a, which is a primary alternative for CFC in new refrigeration and air-conditioning applications, was more than 133,000 Mt in 2002[4] and could exceed 400,000 Mt by 2015[5]. In the short term, replacing CFCs, which have significant higher global warming values than HFCs, resulted in significant climate benefits as mentioned above. With continuing growth in the demand for refrigeration and air-conditioning equipment particularly in developing countries, however, continuing dependence on HFCs could eventually pose significant burden to the climate in the long run.

The ozone and climate communities recognize the linkage between their efforts in protecting the ozone layer and the climate. Increasing efforts have been asserted in order to ensure synergy between the two associated global conventions. When the Parties of the Montreal Protocol decided in 2007 to accelerate the phase-out of HCFCs[6], it was recognized that selection of alternative technologies for HCFCs should take into consideration climate impact and benefits. However, the accelerated phase-out of

[1] 2007 Consolidated Progress Report, Multilateral Fund Secretariat, July 2008.
[2] Velder and al. 2007. The Importance of the Montreal Protocol in Protecting Climate, Vol 104. PNAS,
[3] Emissions of greenhouses regulated under the first commitment period of the Kyoto Protocol (2008-2012) are CO_2, CH_4, N_2O, HFCs, PFCs and SF_6.
[4] Consumption of HCFCs grew at an average growth rate of more than 20% a year from 1995 – 2001. Consumption continues to grow at almost the same rate from 2002 – 2007.
[5] IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System Chapter 11
[6] HCFCs are controlled by the Protocol since 1994 as "Annex C" substances. In 2007, The Parties of the Montreal Protocol negotiated an accelerated schedule of phase-out by ten years for all Parties for HCFCs. Developing countries have agreed to phase-out HCFCs by 2030.

HCFCs could result in an unintentional growth of HFC demand as it was the case for CFC phase-out; therefore, efforts should be made to ensure that more consideration be given to low GWP alternatives despite the fact that some alternatives will require higher investment capital[7].

Under the current regulatory frameworks, neither the Montreal Protocol, nor the Kyoto Protocol is systematical covering the costs associated with a transition to low GWP technologies. The Kyoto Protocol is covering the mitigation of emissions, while the concern will be at the production and consumption levels. The Montreal Protocol has proven to be an effective instrument to deal with phasing out of ODS at the production and consumption levels; however, HFCs, which is primarily replacing ODS in the air-conditioning sector are regulated under the Kyoto Protocol, a protocol that has demonstrated, through the Clean Development Mechanism, the effectiveness of market instrument to leverage funding for technology transfer in developing countries[8]. Elements from both conventions can therefore be analyze and compared to preempt the increase in the demand of HFCs or high GWP gases.

OBJECTIVES

The objective of this study is to explore options for preempting an increase in the demand of HFCs or any other high global warming gases in the consumption sector as a result of HCFC phase-out in developing countries. The study will review and examine potential financing mechanisms available for financing the transition to low GWP alternatives, including a scheduled phase-down of HFCs in developing countries and transition economies. This study will focus on direct emissions of chemical; however, it recognized that actions to reduced indirect emissions indirect emissions, such as energy efficiency improvement, can have a significantly higher impact that focusing strictly on chemical used[9]. Therefore, the proposed study will also addressed technologies limitations and tradeoff between energy efficiency gains and low GWP gases in order to maximize overall energy benefits.

HCFCS PHASE-OUT SCHEDULE OF THE MONTREAL PROTOCOL

As per Article 7 data reporting requirements under the Montreal Protocol, the total consumption of HCFCs, mainly HCFC-141b, HCFC-142b, and HCFC-22, of all developing country Parties in 2006 is approximately 352,000 ODP? MT. Consumption of other HCFCs (for example, HCFC-123) represents only a small fraction in the HCFC consumption of most developing countries. It is expected that consumption of HCFCs would continue to grow if there were no Montreal Protocol obligations as demand for

[7] Use of certain low alternative may result in higher capital due to toxicity and/or flammability of product and necessity to ensure that manufacturing facilities, production and servicing personnel are trained and equipped with necessary safety equipment.

[8] The State and Trends of the Carbon Market 2008, World Bank, 2008 reported a cumulative committed investment to CDM projects activities over 2002-2007 of about US$59 billion, for an average leverage ratio of 3.8.

[9] I IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System Chapter 11.

refrigeration and air-conditioning, and better insulation, in developing countries is growing at a rapid pace. Based on the aggregate HCFCs consumption trends of developing countries in the previous years, a growth rate of 9 - 10% per annum could be expected. By applying a 9% growth rate to the demand of each type of HCFCs, the total demand of HCFCs in developing countries could reach up-to 2.78 million tons level in 2030. The breakdown of HCFC demand in 2030 is shown in Table 1.

HCFC/Year	**2010**	**2015**	**2020**	**2025**	**2030**
HCFC-141b	171,445	242,008	372,360	572,921	881,510
HCFC-142b	45,070	63,620	97,887	150,611	231,734
HCFC-22	324,594	458,191	704,983	1,084,704	1,668,951
Total	541,108	763,818	1,175,229	1,808,236	2,782,195

Table 1. Demand of HCFCs (MT) Under Business-as-Usual Scenario in Developing Countries

Actual demand of HCFCs is expected to be much lower than the business-as-usual scenario as the Montreal Protocol requires Article 5 countries to freeze their HCFC consumption by 2013 and followed by interim reduction steps leading to a complete phase-out by 2030, except a small quantity for meeting the servicing tail up to 2040.

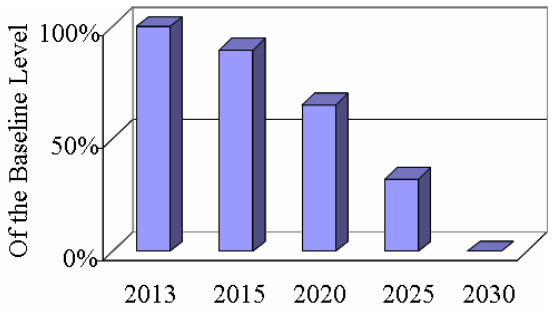

Fig. 1. HCFC Allowance Production and Consumption Schedule in Developing Countries

With the accelerated HCFC phase-out schedule of the Montreal Protocol, a total HCFC consumption of 21 million MT could be avoided during the period 2013 – 2030[10]. This avoided consumption would result in early introduction of alternatives. Climate impacts or benefits are, therefore, dependent on the choices of alternatives to be adopted by Parties of the Montreal Protocol.

[10] For illustration purposes, it is assumed that the same demand growth for the BAU scenario and the same reduction schedule are applied to each HCFC.

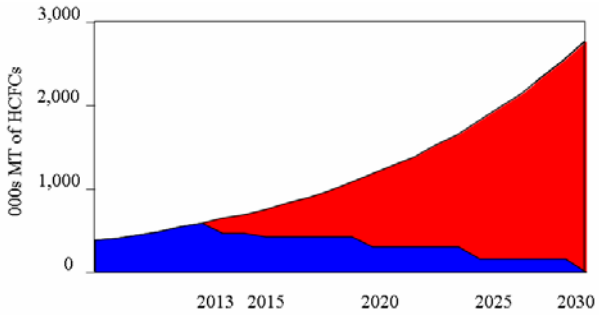

Fig. 2 Estimated consumption of HCFCs and alternatives for 2013 – 2030

If the avoided consumption (the red area in Fig. 2) is replaced by low GWP alternatives, the total climate benefits from the accelerated HCFC phase-out schedule (excluding impacts from improved or inferior energy efficiency performances) could be as high as 30.5 Gt of CO_2 equivalent by 2030[11]. As early phase-out of HCFC-22 also results in avoided production of byproduct HFC-23, the accelerated HCFC phase-out schedule contributes therefore to additional indirect emission reductions of 5.6 Gt of CO_2 equivalent associated with avoided production of HFC-23[12].

NON-HCFC ALTERNATIVES

Major applications of HCFC-22, HCFC-141b, and HCFC-142b in developing countries are in the refrigeration, air-conditioning, and foam sectors. Alternatives to these HCFC applications include HFCs, which have high global warming potential values, and hydrocarbons (HC), CO_2 and ammonia, which have lower GWP values. Currently available non-HCFC alternatives for various applications are summarized in Appendix 1.

Selection of alternatives depends on the desired product quality and safety. For example, hydrocarbons, which are flammable, may not be desirable for certain applications. Certain alternatives may also compromise product quality (such as insulation performance of insulation foam products.

Properties offered by HFCs in the air conditioning and refrigeration sectors …
can we say something explaining why these gases are in fact not so easy to replaced (this is for non MP expert) such as Thermodynamic and properties or insulation values etc…

[11] Based on an assumption that HCFCs will be replaced by low GWP alternatives. …
[12] Assuming 3% generation of byproduct HFC-23 in the HCFC-22 production, refer to HCFC Phase-out under the Montreal Protocol - Introductory Note on a Programmatic Approach, Montreal Protocol Operations, World Bank, 2008

CLIMATE IMPACT OF HCFC PHASE-OUT

The ozone depleting substances (HCFCs) are also high global warming gases, the phase-out of these chemicals presents an opportunity to maximize climate benefits, including energy efficiency gains and uses of low GWP alternatives. Alternatives currently available for replacing HCFCs consist of high global warming gases such as HFCs, low GWP gases such as hydrocarbons, CO2 and ammonia.

Selection of these substances would have to take into account a number of factors ranging from desired product qualities, flammability, toxicity, and associated costs of using such alternatives, including energy consumption and servicing aspects.

In terms of climate benefits, the selection of alternative gases, should not only focus on low GWP of alternatives, but should also cover energy efficiency benefits that could be gained over the lifetime of the equipment. This is particularly true for the foam products, air-conditioning and refrigeration equipment that are generally made with a small quantity of HCFCs, but are characterized by long product lifetime. Alternatives could be categorized according their energy efficiency potential and GWP of the products (refer to appendix 2).

ADDITIONALITY OF CLIMATE BENEFITS ASSOCIATED WITH ACCELERATED HCFC PHASEOUT

To meet the accelerated HCFC phase-out schedule stipulated by the Montreal Protocol, major policies and actions must be undertaken to minimize the current demand of HCFCs and future dependence on HFCs. Restricting manufacturing of new HCFC-based equipment is also another important measure to avoid the build-up of HCFC demand for servicing this equipment in the future. Restricting production of new HCFC-based equipment and products could be applied to existing manufacturers or manufacturing capacity by providing them with incentives for early conversion. Establishment of new manufacturing capacity based on HCFC technologies should also be prohibited.

Recovery, recycling and reuse of HCFCs, particularly HCFC-22 which represents more than 80% of the total consumption in most developing countries, would assist countries to meet their Montreal Protocol obligations. Since the Montreal Protocol defines consumption as production plus import and minus export, recycled HCFC-22 would replace the need for production and/or import of virgin HCFC-22 which in turn assists countries in meeting their consumption limit.

Replacement of HCFC-based equipment would also contribute to significant reduction in HCFC demand. Given that HCFC-based equipment or products (e.g., air-conditioning equipment, insulation foams, and etc.) have a long product life, early replacement of these items could be costly and not financially viable. Based on experience from CFC phase-out, early replacement of HCFC-based equipment or products could be viable when new products are more energy (and resource) efficient. As there have been a number of projects addressing this issue, this option will not be addressed in this proposed study.

As pointed out earlier, replacement of HCFCs in most applications could be done via both low and high GWP alternatives. In most cases, applications of low GWP technologies in the foam and refrigeration sectors could result in lower product costs. However, because of related toxicity and/or flammability issues of these low GWP alternatives, higher capital investments to ensure that manufacturing facilities, production and servicing personnel are trained and equipped with necessary safety equipment, making conversion costs prohibitive, particularly for small-and-medium scale enterprises.

The CFC phase-out experience clearly demonstrates that while cyclopentane is available as a foam blowing agent, all small-and-medium scale enterprises opt for HCFC-141b as initial investments are much lower. Hence, the preferred choice for phasing out of HCFC in the foam sector for small-and-medium scale enterprises could as well be HFCs, rather than cyclopentane. Common HFCs for foam blowing applications include HFC-134a, HFC-152a, HFC-245fa, HFC-365mc, and HFC-227ea. These chemicals have GWP many times higher than hydrocarbon alternatives (with GWP of less than 25) (Appendix 3).

Similarly, HCFC-22 refrigerant in the refrigeration and air-conditioning applications could be replaced by either low or high GWP refrigerants (i.e, hydrocarbons, ammonia, carbon dioxide, and HFCs). For developing countries in particular where the demand of residential air-conditioners is rapidly increasing, selection of appropriate alternatives to HCFC-22 refrigerant would render significant climate benefits. Currently, HFC-410A, which has a high GWP value, seems to be an alternative of choice. Extensive research and development has been put in place to improve energy efficiency of new HFC-410A residential air-conditioners. Providing that similar energy efficiency could be achieved by hydrocarbon technology, replacing HCFC-22 with hydrocarbon refrigerant could contribute additional benefits to the climate since GWP of hydrocarbon refrigerant are more than 100 times lower than HFC-410A. However, safety concerns on the flammability of hydrocarbons could prevent a large-scale adoption of this technology. Extensive training of production and servicing personnel may be required in order to employ this technology safely. More awareness for end-users is also equally important in order to educate consumers of the safe use of these products.

Recovery and recycling of HCFC-22 during servicing and maintenance of refrigeration and air-conditioning equipment is considered as an eligible activity for funding from the Multilateral Fund. Thus far, the Multilateral Fund has allocated significant resources to support establishment of recovery and recycling networks in almost all developing country Parties of the Montreal Protocol. In addition, training on better containment (reducing leak, recovery and recycling, and reuse) has also been one of the core activities funded by the Multilateral Fund.

Experience from CFC recovery and recycling, thus far, is not encouraging. Implementation of recovery and recycling practice is more desirable financially when servicing equipment with a large refrigerant charge size. For example, recovery and recycling of refrigerants in large industrial and commercial refrigeration systems and in large chillers are common. However, recovery and recycling of CFCs from mobile air-conditioning equipment and domestic refrigerators have not shown a similar success as

the price of CFCs and the quantity of CFCs that could be recovered from each unit are low.

It is expected that the economic of recovery and recycling HCFC-22 from residential air-conditioning units would probably be similar to recovery and recycling of CFCs from mobile air-conditioning equipment and domestic refrigerators. A combination of the low price of HCFC-22 and a small charge size of HCFC-22 in each piece of equipment, and high transaction costs to implement recovery and recycling HCFC-22, makes the recovery and recycling practice less financial attractive to most service technicians.

Potential climate benefits of recovery and recycling HCFC-22 warrants further consideration as it leads to a lower requirement for production of virgin HCFC-22. Excluding the direct GWP associated with HCFC-22, recovery and recycling of one MT of HCFC-22 reduces emission of 30 kg of byproduct HFC-23 from production of one MT of virgin HCFC-22 or about 420 MT of CO_2 equivalent. This significant climate benefits render opportunity to mobilize additional resources to lower high transaction costs of implementing the recovery and recycling practice experienced by service technicians.

PROPOSED STUDY

As indicated above, HCFC phase-out could result in an increased use of HFCs . In order to maximize benefits of both ozone layer protection and climate protection, a synchronized strategy for managing the use of HCFCs and phasing-down HFCs could assist Parties to the Montreal Protocol to develop a conducive environment for climate friendly technologies. This would also assist industries in developing countries to avoid two-steps conversion to low GWP technologies (from HCFC to HFC and to low GWP alternatives). To support market penetration of low GWP technologies (e.g., hydrocarbons, ammonia, carbon dioxide, and etc.), financial incentives within and outside the Multilateral Fund should be considered in order to offset higher costs, if any, of adoption of low GWP technologies. In addition, consumption and production of HFCs including those produced as byproducts of other chemical processes will also be considered.

Since all Parties to the Montreal Protocol are now in the process of developing their HCFC phase-out strategies, it is an opportune time for Parties to also consider their HFC strategy as part of their response to the call for more consideration of other environmental benefits, particularly the climate benefits, when phasing out HCFCs. Based on the business-as-usual scenario, it is obvious that the need for equipment or products (e.g., air-conditioning and insulation foam products) will continue to grow in spite of the HCFC phase-out schedule under the Montreal Protocol. Hence, to minimize the growth of HFCs the choice of technologies to be made by existing manufacturing facilities of those products currently produced with or containing HCFCs not only has to be considered, but also the choice of technologies for facilities to be established in the future in order to meet the demand of these products.

OBJECTIVES OF THE STUDY

While HCFC phase-out renders two climate benefit opportunities: (i) improved energy efficiency; and (ii) use of lower GWP chemicals, the proposed study will focus on resource mobilization to support the latter, but will addressed technologies limitations and tradeoff between energy efficiency gains and low GWP gases.

The study will focus on resource mobilization to support projects aiming at reducing use of HFCs[13] as a result of HCFCs phase-out and reducing HFCs as a byproduct from HCFC production.

SCOPE OF THE STUDY

The study will investigate: (i)costs and barriers associated with conversion of HCFC technology with to low GWP alternatives; (ii) volume of HFCs and equivalent in carbon dioxide equivalent associated with the consumption and production, in developing countries including those produced as byproducts of other chemical processes; and (iii) potential funding resources (e.g., Multilateral Fund, UNFCCC, Tradable Carbon Market, Carbon Partnership Funds, Clean Technology Fund, and etc.) to support adoption of better HCFC containment practice, and climate friendly technologies (iv) recommendation for a funding methodologies such as approaches to evaluate and setting baseline consumption and production of HFCs and scheduled phase-down, etc. In addition, the study will investigate effective modalities for implementing these activities in order to ensure seamless synergy between the MLF funded activities and activities funded by resources outside the MLF.

Based on experience from CFC phase-out, it is anticipated that HCFC phase-out will involve a large number of beneficiaries. Moreover, HCFC phase-out strategies and HFC strategies may require not only investment and technical assistance activities but also a combination of policy and investment interventions, supporting by timely availability of funding sources, to ensure cost-effective means of achieving the targets. Experiences from implementation of CFC phase-out activities in the last two decades clearly demonstrate effectiveness of sectoral or national approaches whereby policy and investment activities are carried out in chronology. Similarly, the climate community also recognizes the need to scale up its CDM activities. Recently, a program of activity approach has been adopted by the CDM Board.

There are some similarities between the sectoral or national approaches under the Multilateral Fund and the CDM program of activity approach. The study will review these different approaches and offer recommendations to synchronize implementation modalities as well as to synchronize, to the extent possible, monitoring and verification procedures that may be required by the MLF mechanism, CDM mechanism, and other potential funding mechanisms.

[13] It includes HFCs used as a result of CFC and possibly HCFC phase-out. For example, the study will explore financing opportunities for replacing HFC-134a MACs with low GWP alternatives.

STUDY APPROACH

The study will entail a desk review of the on-going study on HCFC alternatives and their climate benefits being conducted by UNEP TEAP under the auspices of the Montreal Protocol, the cost study being carried out by the Multilateral Fund, all applicable CDM methodologies, proposed approaches under the climate convention negotiations, funding mechanisms outside UNFCCC and MP such as the Clean Technology Carbon Partnership Funds, Clean Technology Fund and others. Findings of the desk review will lead to development of funding recommendations and/or methodologies for potential funding sources. The study will also include workshops to inform developing countries of findings of the study, which will lead to identification of potential pilot projects in a few developing countries.

TIMEFRAME

Detailed terms of reference for this study will be submitted for the consideration of the Executive Committee at its 58th Meeting in July 2009. The study will then take about 12 months to complete. The final report of the study will be submitted to the ExCom at its 62nd Meeting in November 2010.

Appendix 1: Non-HCFC Alternative Matrix

Sector	Sub-sector	HCFCs Currently Used	Alternative Options
Foam	XPS	HCFC 22/HCFC 142b (blends), HCFC 22, HCFC 142b	CO_2, CO_2/Ethanol, CO_2/HCs; HFC 134a
	Polyurethane Spray	HCFC 141b, minor use of HCFC 141b/HCFC 22	HFC, CO_2 (CO_2 not preferred option if superior thermal insulation performance is required.)
	Domestic refrigerators/freezers	HCFC 141b, minor use of HCFC 141b/HCFC 22	HFC, HC (Small enterprises use HFCs)
	Commercial refrigerators/freezers	HCFC 141b	HFC, HC, CO_2 (Adhesion problem with CO_2)
	Sandwitch panels - continuous	HCFC 141b	HFC, HC
	Sandwitch panels - discontinuous	HCFC 141b	HFC, HC
	Insulated pipes	HCFC 141b	HFC, HC
	Integral skin foams	HCFC 141b	HFC 134a, CO_2, HC
Refrigeration	Supermarket refrigerators	HCFC 22	R-404A, CO_2, HCs and Ammonia (R-717)
	Industrial refrigeration	HCFC 22	R-717, CO_2
	Transport refrigeration	HCFC 22	HFC 134a, R-404A, R-410A
Air-conditioning	Air-conditioning	HCFC 22	R-410A, HCs, CO_2
	Water -heating heat pumps	HCFC 22	HFC 134a, R-410A, CO_2
	Chillers	HCFC 22	HFC 134a

Source: OORG Presentations, OORG Meeting, October 2008, Washington DC
Note: R-404A and R-410A are HFC blends.

Appendix 2: Selection of HCFC's Alternatives and Climate Considerations

In terms of climate benefits, it could be described that the available alternatives in the consumption sector can be categorized according to Figure 3. These four regions represent:

- Region I – Low GWP alternatives with improved energy efficiency and/or thermal insulation property of the final products;
- Region II – High GWP alternatives with improved energy efficiency and/or thermal insulation property of the final products;
- Region III – Low GWP alternatives with inferior energy efficiency and/or thermal insulation property of the final products when compared with HCFC products;
- Region IV – High GWP alternatives with inferior energy efficiency and/or thermal insulation property of the final products when compared with HCFC products.

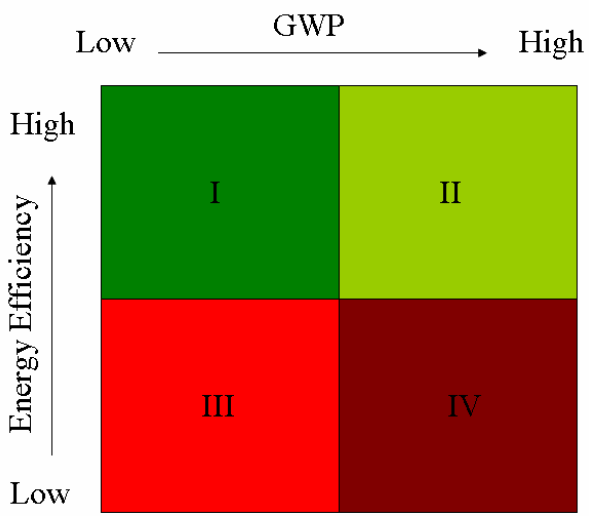

Fig. 3 Characteristics of Non-HCFC Alternatives

Foam products, air-conditioning and refrigeration equipment, are made with a small quantity of HCFCs. However, they have a long product lifetime. Therefore, any alternatives of HCFCs that fall in Regions III and IV are not desirable. For example, replacing HCFCs with low GWP alternatives (Region III) but resulting in low energy efficiency or insulation property, could result in higher energy consumption during the lifetime of these products. Emissions of carbon dioxide during the lifetime of the products normally are many times higher than the difference between the GWP values of HCFCs and alternatives used for manufacturing or maintaining these products. Alternatives in Region IV are even less desirable.

Appendix 3: GWP of HCFCs and HFC alternatives[14]

Substance	GWP
HCFC-22	1,700
HCFC-141b	630
HCFC-142b	2,000
HFC-134a	1,300
HFC-152a	140
HFC-245fa	820
HFC-365mc	840
HFC-227ea	2,900
HFC-23	14800
R-410A (HFC Blends)	2,100
R-404A (HFC Blends)	3,900
R-407C (HFC Blends)	1,800

Note: R-404A, R-407C, and R-410A are HFC blends

[14] 2006 UNEP Technical Options Committee Refrigeration, A/C and Heat Pump Assessment Report

Appendix 4: Preparation Cost Breakdown

Element	Description	US$
Potential Volume of Carbon Dioxide Equivalent Emission Reduction	Review of current HCFC applications and available non-HCFC alternatives; market analysis on penetration of various alternatives (high and low GWP) and estimates on benefits from improved energy performance (taking into account ongoing work of TEAP and OORG)	35,000
Barriers Associated with Conversion of HCFC Technology with Baseline Energy and Resource Efficiency to Low GWP Alternatives with Improved Energy and Resource Efficiency	Industrial survey in a selected number of Article 5 countries and Article 2 countries that are major technology providers for each HCFC application	50,000
Consumption and Production of HCFCs	Industrial survey focusing on chemical producers in both Article 5 and non-Article 5 countries; market analysis to project trends	10,000
Potential Funding Resources	Review of existing activities or projects funded by various funding mechanisms; review existing CDM and non-CDM methodologies; interview with prospective beneficiaries in Article 5 countries; identification of potential sources of financing; development of approaches and project model for securing such resources	55,000
Development of Funding Criteria/Standards/Methodologies	Development of tools for capturing co-financing resources outside the MLF	70,000
Stakeholder Consultation Meetings	3 consultation meetings	30,000
Total		**250,000**

Annex II
Description of Proposed Pilot ODS Disposal Projects

1. Three pilot ODS disposal projects are proposed in the 2009 World Bank Business Plan and its associated Work Program for the consideration of the 57th Meeting of the Executive Committee. These pilot projects are being proposed for Indonesia, the Philippines, and Mexico.

2. The three pilot ODS disposal projects will be designed to capture different circumstances of unwanted ODS (i.e., sources of unwanted ODS, collection, transportation, packaging, storage, and final disposal) in these three countries. The proposed activity for Mexico will demonstrate the employment of ODS disposal methodologies and criteria developed by the ODS disposal study to unwanted ODS to be collected from refrigerators and air-conditioners under the Mexico energy efficiency appliances program being developed by the World Bank. Both CFC-12 and CFC-11 from the old units will be collected and disposed of.

3. For Indonesia, the project will address disposal of ODS from illegal imports. This project will explore feasibility of having ODS eliminated by the local disposal facility. The design of this project will be built on experience of the earlier ODS disposal project financed by the Government of Japan as part of its bilateral contribution to the Multilateral Fund.

4. For the Philippines, the project will address not only disposal of bulk CFCs but also contaminated CFCs (mix of CFC-12, HFC-134a and others). For the Philippines, the project will address transportation of CFCs from service shops to the recovery and recycling center financed by the NCPP, packaging, and final disposal.

5. The three pilot projects will also include a financial analysis to determine financial viability of ODS disposal for different streams and for different local conditions. Actual costs of carrying out of ODS disposal are expected to be covered by carbon credits generated by ODS disposal. Disposal of ODS will be carried out at existing disposal facilities that meet the destruction efficiency of at least 99.99%.

6. Expected amounts of ODS to be disposed of are included in the 2009 World Bank Business Plan. For easy reference, those figures are summarized below.

Country	ODP tons				
	2009	2010	2011	2012 - 2015	Total
Indonesia		60			60
Philippines		12			12
Mexico		100	135	540	775

Note: The quantity of ODP tons for Mexico is made on the assumption that 1.2 million refrigerators and a/c will be exchanged under the energy efficiency appliance program.