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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Fifty-eighth Meeting  
Montreal, 6-10 July 2009

**WORLD BANK'S WORK PROGRAMME AMENDMENTS FOR 2009**

## COMMENTS AND RECOMMENDATION OF THE FUND SECRETARIAT

1. The World Bank is requesting approval from the Executive Committee of US \$ 794,001 for amendments to its 2009 Work Programme, plus agency support costs of US \$ 59,550.
2. The activities proposed in World Bank's Work Programme Amendments are presented in Table 1 below:

Table 1: World Bank's Work Programme Amendments

Country	Activity/Project	Amount Requested (US \$)	Amount Recommended (US \$)
<b>SECTION A: ACTIVITIES RECOMMENDED FOR BLANKET APPROVAL</b>			
<b>A1. Pilot project in ODS waste management:</b>			
Mexico	Preparation of pilot ODS disposal project	50,000	50,000
Subtotal for A1:		50,000	50,000
<b>SECTION B: ACTIVITIES RECOMMENDED FOR INDIVIDUAL CONSIDERATION</b>			
<b>B1. Renewal of institutional strengthening projects:</b>			
Jordan	Renewal of institutional strengthening project (Phase VIII)	147,333	*
Thailand	Renewal of institutional strengthening project (Phase VI)	346,668	*
Subtotal for B1:		494,001	
<b>B2. Technical Assistant:</b>			
Global	Resource mobilization to address climate co-benefits in HCFC phase-out	250,000	*
Subtotal for B2:		250,000	
Total for sections A and B		794,001	50,000
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):		59,550	3,750
<b>Total:</b>		<b>853,551</b>	<b>53,750</b>

\*Project for individual consideration or pending.

### SECTION A: ACTIVITIES RECOMMENDED FOR BLANKET APPROVAL

#### A1. Pilot Project in ODS waste management:

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

#### Project description

3. The World Bank is submitting a request for additional project preparation funds at the level of US \$50,000 for the development of a pilot project for ODS disposal in Mexico. The proposed activity for Mexico will demonstrate the use of ODS disposal methodologies and criteria developed under the ODS disposal study being done by the World Bank. This will consider how to manage unwanted ODS to be collected from refrigerators and air-conditioners under the Mexico energy efficiency appliances programme also developed by the World Bank. The expected output will be a project development document for a study on how to leverage co-funding for ODS disposal in line with the terms and conditions of relevant voluntary carbon markets. Tasks to be carried out include a field study, project development, and negotiations with relevant stakeholders in the voluntary carbon markets. It is envisaged that the resulting project will secure endorsement from the relevant markets in order to obtain revenues to support disposal of CFC-11 and CFC-12 which will be collected from old appliances.

**Secretariat's comments**

4. At the 57<sup>th</sup> Meeting, the Executive Committee decided to prioritise pilot ODS disposal projects for six countries which included Mexico. At the same meeting, funds were approved for UNIDO at the amount of US \$50,000 to prepare this pilot project for Mexico. In the discussions that ensued, there was an understanding that both the World Bank and UNIDO would collaborate on the preparation and implementation of the ODS disposal project for Mexico. It was also discussed that any funding that the World Bank may receive in addition to that already approved for UNIDO would be deducted from future funds to be approved for the project, depending on the maximum amount that might be agreed to by the Executive Committee as a limit for the funding of that ODS disposal project.

5. In discussions with the Secretariat, the World Bank confirmed that these funds will be used to develop a proposal that will leverage co-funding for ODS disposal in line with the terms and conditions of relevant voluntary carbon markets, as agreed at the 57<sup>th</sup> Meeting. It will also 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). The World Bank also provided the Secretariat with Mexico's agreement in writing that the requested funds will be deducted from any future funding that the country may receive as a result of this preparation, within funding limits imposed by the Executive Committee.

**Secretariat's recommendation**

6. The Secretariat recommends blanket approval of the requested additional funds to prepare a study to leverage co-financing for ODS disposal in Mexico at the level indicated in Table 1 above, on the understanding that these funds would be deducted from future funds to be approved for Mexico depending on the maximum amount that might be agreed to by the Executive Committee as a limit for the funding of that ODS disposal project.

**SECTION B: ACTIVITIES RECOMMENDED FOR INDIVIDUAL CONSIDERATION****B1. Renewal of institutional strengthening projects:**

Jordan (Phase VIII): US \$147,333

Thailand (Phase VI): US \$346,668

**Project description**

7. The World Bank submitted the requests for the renewal of the institutional strengthening projects for Jordan and Thailand, as listed above. The descriptions of the request for these countries are presented in Annex I to this document.

**Secretariat's comments**

8. The Fund Secretariat reviewed the IS terminal reports and action plans submitted by the World Bank on behalf of the countries to support the renewal requests and found the reports to be in order and consistent with requirements for such projects. All these countries are in full compliance with the targets of the Montreal Protocol for 2007, and data submitted under country programme reporting for 2008 shows the same compliance for this year. These submissions fully support the requests of these countries for the IS renewal for two years, as per usual practice.

9. At the 57<sup>th</sup> Meeting, the Executive Committee decided in decision 57/36(b) to, *inter alia*, "continue to fund requests for the renewal of IS projects up to the end of December 2010 at current levels pending final resolution of the matter by the Executive Committee at its 58<sup>th</sup> Meeting". The Secretariat

also notes that the re-issued paper for Funding IS beyond 2010 (UNEP/OzL.Pro/ExCom/58/48) will be discussed under agenda item 10. In view of this, the Secretariat seeks the Committee's guidance whether these requests for renewals could be funded for the full two years as per the usual practice following current funding levels, considering that the completion dates of the requested phases go beyond December 2010.

### **Secretariat's recommendation**

10. The Executive Committee may wish to consider these requests in view of decision 57/36(b). Once approved, the Executive Committee may also wish to express to the Governments of these countries the comments which appear in Annex I to this document.

### **B2. Technical Assistance**

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

#### **Project description**

11. The World Bank submitted to the 57<sup>th</sup> Meeting a request for a technical assistance project for mobilizing resources to maximize climate benefits of HCFC phase-out, at a funding level of US \$250,000. This request is being resubmitted by the World Bank for the consideration of this meeting. The proposal includes a concept note describing the objectives, activities, as well as expected results of this project.

12. 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 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.

13. 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<sub>2</sub> 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, etc.) to support adoption of better HCFC containment practice, and climate friendly technologies. It will also provide a recommendation for funding methodologies such as approaches to evaluate and baseline consumption and production of HFCs and scheduled phase-down. In addition, the project will 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.

14. 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 58<sup>th</sup> 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.

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

<b>Element</b>	<b>Description</b>	<b>US\$</b>
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
<b>Total</b>		<b>250,000</b>

### Secretariat's comments

16. 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 54<sup>th</sup> Meeting agreed on a set of guidelines for the preparation of HCFC phase-out management plans (HPMP), and at the 55<sup>th</sup> and 56<sup>th</sup> Meetings, approved funds for 115 countries for HPMP preparation. The guidelines 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.

17. The Secretariat also notes that with the results of the study proposed by the World Bank being 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 costed, and whether these costs could be considered as incremental costs under the Multilateral Fund.

18. The Executive Committee at its 57<sup>th</sup> Meeting, discussed a facility for additional income from loans and other sources (document UNEP/OzL.Pro/ExCom/57/64), and decided in decision 57/37 that the Secretariat provide further analysis of this facility for consideration of the Committee at its 58<sup>th</sup> Meeting. The Secretariat notes that the resubmission of this proposal is in anticipation of a final decision on the facility being taken at this meeting, which may enable the possibility of funding resource mobilization.

**Secretariat's recommendation**

19. The Executive Committee may wish to consider this proposal in light of the information presented above, and in the discussion of Agenda item 11, Facility for additional income from loans and other sources.

**Annex I**

**INSTITUTIONAL STRENGTHENING PROJECT PROPOSALS**

**Jordan: Renewal of institutional strengthening**

<b>Summary of the project and country profile</b>		
Implementing Agency:		WORLD BANK
Amounts previously approved for institutional strengthening (US \$):		
	Phase I: jun-92	170,000
	Phase II: may-97	113,333
	Phase III: jul-99	113,333
	Phase IV: jul-01	113,333
	Phase V: jul-03	147,333
	Phase VI: jul-05	147,320
	Phase VII: jul-07	147,333
	<b>Total</b>	<b>951,985</b>
Amount requested for renewal (Phase VIII) (US \$):		147,333
Amount recommended for approval for Phase VIII (US \$):		
Agency support costs (US \$):		
Total cost of institutional strengthening Phase VIII to the Multilateral Fund (US \$):		
Equivalent amount of CFC phase-out due to institutional strengthening Phase VIII at US \$12.1/kg (ODP tonnes):		n/a
Date of approval of country programme:		1991
ODS consumption reported in country programme (1991) (ODP tonnes):		575.3
Baseline consumption of controlled substances (ODP tonnes):		
	(a) Annex A Group I (CFCs) (Average 1995-1997)	673.3
	(b) Annex A Group II (Halons) (Average 1995-1997)	210
	(c) Annex B Group II (Carbon tetrachloride) (Average 1998-2000)	40.3
	(d) Annex B Group III (Methyl chloroform) (Average 1998-2000)	18.2
	(e) Annex E (Methyl bromide) (Average 1995-1998)	176.3
Latest reported ODS consumption (2008) (ODP tonnes) as per Article 7:		
	(a) Annex A Group I (CFCs)	6
	(b) Annex A Group II (Halons)	30.4
	(c) Annex B Group II (Carbon tetrachloride)	0.4
	(d) Annex B Group III (Methyl chloroform)	0
	(e) Annex E (Methyl bromide)	0
	(f) Annex C Group I (HCFCs)	59
	<b>Total</b>	<b>95.8</b>
Year of reported country programme implementation data:		2008
Amount approved for projects (US \$):		18,222,883
Amount disbursed (as at may 2009) (US \$):		16,663,094
ODS to be phased out (ODP tonnes):		2,223.1
ODS phased out (as at may 2009) (ODP tonnes):		1,800.9

1. Summary of activities and funds approved by the Executive Committee:

<b>Summary of activities</b>		<b>Funds approved (US \$)</b>
(a)	Investment projects:	14,733,580
(b)	Institutional strengthening:	951,985
(c)	Project preparation, technical assistance, training and other non-investment projects:	2,537,318
	<b>Total:</b>	<b>18,222,883</b>

Progress Report

2. Currently in the 7<sup>th</sup> phase of its Institutional Strengthening Project (ISP), the Government of Jordan is making significant strides in its efforts to eliminate CFC and halon consumption by 2010 while increasing its attention on HCFCs. During the period of 2007 to 2009, the National Ozone Unit (NOU) focused much of its attention on completing the phase-out of Annexes A and B substances and ensuring sustainable phase-out. This was partly accomplished by continued up-grading of Jordan's customs capacity and controlling and monitoring for illegal importation. It also hosted training courses across the country for more than 100 teachers and trainers to maintain awareness of the ODS issue and country obligations. The NOU closely works with UNIDO, the World Bank and GTZ on several ODS projects. In this capacity, the NOU headed project preparation work on CFC chiller replacement in 2007 and 2008 through consultation meetings and verification of baseline data at different chiller installations. It also ensured the phase-out of 88% of methyl bromide consumption by 2007 with the support of MLF-funded project activities and the near completion of the National ODS Phase-out Plan (slated for completion by end 2009). New HCFC work included collection of HCFC data for reporting to the Ozone Secretariat and for receiving HPMP preparation funding.

3. In addition to this work, the NOU undertook its normal annual work plan, including implementation of the quota system and management of the licensing system. Other ongoing work included, public awareness, monitoring of converted enterprises, follow-up on a labeling system for new products using ozone friendly substances and reporting to the Ozone and MLF Secretariats. Finally, the NOU fully and actively participated in the UNEP network meetings for West Asia, the 52<sup>nd</sup> through 57<sup>th</sup> Executive Committee Meetings, and the 19<sup>th</sup> and 20<sup>th</sup> Meeting of the Parties to the Montreal Protocol.

Plan of action

4. Phase 8 of Jordan's ISP will focus on the final remaining phase-out of CFC consumption in the servicing sector (including the chiller sub-sector). It will target the completion of its National ODS Phase-out Plan and the Chiller Replacement Project and ensure that all stakeholders are on board for sustained phase-out. The second year of phase 8 of the ISP will be marked by initiating HCFC-related activities, including follow-up on the preparation of the HPMP; raising public awareness on HCFCs and alternatives; and reviewing and updating HCFC legislation. The Government of Jordan would also like to pursue the possibilities for ODS destruction in this phase of the ISP given the expected unwanted ODS to be collected, among others, from the Chiller Replacement Project. Renewal of the ISP will also permit the NOU to further enhance its ability to assure compliance to the Montreal Protocol for all controlled substances. Hence, regular annual monitoring, reporting and public awareness activities are included in the action plan.

**Thailand: Renewal of institutional strengthening**

<b>Summary of the project and country profile</b>		
Implementing Agency:		WORLD BANK
Amounts previously approved for institutional strengthening (US \$):		
	Phase I: mar-93	400,000
	Phase II: jul-98	266,667
	Phase III: jul-03	346,667
	Phase IV: jul-05	346,668
	Phase V: jul-07	346,668
	Total	1,706,670



Amount requested for renewal (Phase VI) (US \$):	346,668
Amount recommended for approval for Phase VI (US \$):	
Agency support costs (US \$):	
Total cost of institutional strengthening Phase VI to the Multilateral Fund (US \$):	
Equivalent amount of CFC phase-out due to institutional strengthening Phase VI at US \$12.1/kg (ODP tonnes):	n/a
Date of approval of country programme:	1991
ODS consumption reported in country programme (1991) (ODP tonnes):	4,109
Baseline consumption of controlled substances (ODP tonnes):	
(a) Annex A Group I (CFCs) (Average 1995-1997)	6,082.1
(b) Annex A Group II (Halons) (Average 1995-1997)	271.7
(c) Annex B Group II (Carbon tetrachloride) (Average 1998-2000)	7.5
(d) Annex B Group III (Methyl chloroform) (Average 1998-2000)	54.6
(e) Annex E (Methyl bromide) (Average 1995-1998)	183
Latest reported ODS consumption (2007) (ODP tonnes) as per Article 7:	
(a) Annex A Group I (CFCs)	321.6
(b) Annex A Group II (Halons)	0
(c) Annex B Group II (Carbon tetrachloride)	0
(d) Annex B Group III (Methyl chloroform)	0
(e) Annex E (Methyl bromide)	122
(f) Annex C Group I (HCFCs)	873
Total	1,316.6
Year of reported country programme implementation data:	2008
Amount approved for projects (US \$):	52,476,037
Amount disbursed (as at may 2009 ) (US \$):	42,030,266
ODS to be phased out (ODP tonnes):	7,774.7
ODS phased out (as at may 2009) (ODP tonnes):	6,850.5

5. Summary of activities and funds approved by the Executive Committee:

Summary of activities		Funds approved (US \$)
(a)	Investment projects:	46,241,478
(b)	Institutional strengthening:	1,706,670
(c)	Project preparation, technical assistance, training and other non-investment projects:	4,527,889
	Total:	52,476,037

Progress report

6. During the reporting period, support was provided to the National Ozone Unit (NOU) to continue the successful implementation of the National CFC Phase out Plan (NCFCPP). The NOU maintained its coordinating role amongst agencies involved in the National Plan, as well as provided key regulatory support to the commitments outlined in the Plan. In particular, the NOU worked closely with the Customs Department to ensure the effective implementation of the existing import control system. The Unit worked closely with beneficiaries from the NCFCPP and with associations to follow-up and monitor the use of CFCs in the servicing sector, in order to preempt any back conversion. The NOU also continued its coordination with the Department of Agriculture (DOA) for the implementation of the very successful National Methyl Bromide Phase-out Plan (NMBPP). The NOU successfully launched the revised Halon Management project and has been working closely with essential and non-essential halon users in the ultimate conversion of non-essential users and in the development of a National Halon Strategy. Public awareness campaigns and training activities were carried out by the NOU throughout the 2007-2009 period, as planned.

Plan of action

7. The proposed institutional strengthening renewal project will support the NOU and its partner agencies in their efforts to implement a comprehensive ODS phase-out strategy in Thailand. These efforts include, but are not limited to: coordinating with other government agencies to ensure a consistent implementation of the NCF CPP; concluding the development of a Management Information System (MIS) to facilitate reporting of consumption data by all relevant agencies, and monitoring annual CFC and methyl bromide reduction targets; monitoring the final year of use and the phase out of CFCs by the servicing sector; concluding implementation of the NCF CPP; concluding implementation of the halon management project; controlling illegal trade of CFCs in cooperation with the Customs Department; coordinating with the DOA to facilitate implementation of the NMBPP; and preparing a national strategy for the phase out of HCFCs. Targeted public awareness and dissemination activities will continue to be a major part of the NOU's activities in the next two years.

## **Annex II**

### **VIEWS EXPRESSED BY THE EXECUTIVE COMMITTEE ON RENEWALS OF INSTITUTIONAL STRENGTHENING PROJECTS SUBMITTED TO THE 58<sup>th</sup> MEETING**

#### **Jordan**

1. The Executive Committee has reviewed the terminal report presented with the institutional strengthening project renewal request for the Hashemite Kingdom of Jordan and notes with appreciation that Jordan has more than achieved its phase-out targets under the Montreal Protocol and its National ODS Phase-out Plan. The Executive Committee also notes that within the framework of the institutional strengthening project, Jordan has taken significant steps to phase out ODS consumption in other areas and continues to demonstrate a proactive role. The Executive Committee encourages Jordan to continue working towards complete and sustainable phase-out of Annex A and Annex B substances in 2010 and beyond through the completion of the National ODS Phase-out Plan; its Chiller Replacement Project; its methyl bromide strategy; ongoing monitoring and public awareness raising activities; and, effective enforcement of policies to reduce risks of illegal ODS trade.

#### **Thailand**

2. The Executive Committee has reviewed the report presented with the institutional strengthening project renewal request for Thailand. The Committee notes with appreciation that Thailand has effectively and timely implemented its National CFC Phase-out Plan and its National Methyl Bromide Phase-out Plan and that it has successfully met the commitments outlined by both programmes over the past two years. The Committee acknowledges, and will continue to support, the considerable steps that have been taken by the Government of Thailand to reduce its overall ODS consumption. These actions include, among others, interagency coordination efforts to ensure national compliance with Montreal Protocol commitments, as well as training, monitoring, enforcement activities and awareness raising campaigns. The Executive Committee is hopeful that, in future, Thailand will continue its strategic approach to ODS phase-out and that it will make strides in its efforts to phase out HCFCs.

# **2009 WORK PROGRAM AMENDMENT**

**PRESENTED TO THE 58<sup>th</sup> MEETING  
OF THE EXECUTIVE COMMITTEE**

**WORLD BANK IMPLEMENTED  
MONTREAL PROTOCOL OPERATIONS**

**May 11, 2009**

**WORK PROGRAM AMENDMENT FOR  
WORLD BANK-IMPLEMENTED MONTREAL PROTOCOL OPERATIONS**

1. The World Bank 2009 – 2011 Business Plan and the 2009 Work Program were submitted for the consideration of the 57<sup>th</sup> Meeting of the Executive Committee (ExCom) in March 2009. The 2009 -2011 Business Plan includes, among others, three renewals of existing institutional strengthening projects, one global study on resource mobilization to maximize climate benefits from HCFC phase-out, four demonstration projects, and three pilot ODS disposal projects.
2. The funding requests for preparation of the global study on resource mobilization, four demonstration projects, and three pilot ODS disposal projects were made as part of the 2009 Work Program submission for the consideration of the 57<sup>th</sup> Meeting of the ExCom.
3. At the 57<sup>th</sup> Meeting of the ExCom, project preparation funds for three demonstration projects for China, and two pilot ODS disposal projects for Indonesia and the Philippines, were approved. The proposed pilot ODS disposal project for Mexico was agreed at the meeting of the Contact Group established by the ExCom, to consist of two components. The first component will be developed by UNIDO and the second component will be developed by the World Bank.
4. On the project preparation fund to develop the second component of the pilot ODS disposal project for Mexico, the Bank was advised by the Multilateral Fund Secretariat to submit this request at the 58<sup>th</sup> Meeting of the ExCom with the understanding that the project preparation fund to be approved from the Bank will be considered as part of the funding cap (\$500,000) of the pilot ODS disposal project.
5. With regard to the proposed global study on resource mobilization to maximize climate benefits from HCFC phase-out, the ExCom decided that the activity should be maintained in the World Bank 2009 – 2001 Business Plan. The funding request to prepare this study as presented in the 2009 Work Program was not approved at the 57<sup>th</sup> Meeting as this proposal should be considered along with the on-going analysis of the Multilateral Fund Secretariat on the facility for additional income from loans and other sources. The Multilateral Fund Secretariat was requested by the ExCom to submit a revised paper on this issue to the 58<sup>th</sup> Meeting of the ExCom.
6. According to the ExCom’s decision regarding the World Bank 2009 – 2011 Business Plan and decisions pertaining to pilot ODS disposal activities and the proposed global study on resource mobilization, the World Bank 2009 Work Program Amendment proposes funding requests to support the following activities: (i) renewal of existing institutional strengthening projects for Jordan and Thailand; (ii) project preparation funds for the second component of the Mexico pilot ODS disposal project; and (iii) preparation funds for conducting the global study on resource mobilization.

7. Descriptions of four work program activities are included in Table 1.

**Table 1: Project Preparation Funding Requests Submitted for Consideration of the 58<sup>th</sup> Meeting of the Executive Committee**

<b>Country</b>	<b>Request (US\$)</b>	<b>Duration</b>	<b>Description</b>
Jordan	147,333	July 2009 – June 2011	Renewal of institutional strengthening project
Thailand	346,668	July 2009 – June 2011	Renewal of institutional strengthening project
Mexico	50,000	August 2009 – December 2010	Preparation of the second component of the pilot ODS disposal project. (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.)
Global	250,000	August 2009 – December 2010	Resource Mobilization for HCFC Phase-out Co-benefits (Concept Note and cost breakdown included in Annex I)
Support Cost	59,550		
<b>Total</b>	<b>853,551</b>		

**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.<sup>1</sup> 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 uses.

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 CO<sub>2</sub>, in comparison with the 2 billion tons of CO<sub>2</sub>-equivalent to be achieved under the first commitment period of the Kyoto Protocol.<sup>2</sup>

However, phasing out of these potent ODS has resulted in increasing demand for several high global warming gases, including gases regulated under the Kyoto Protocol.<sup>3</sup> For example, the demand for HFC-134a, a primary alternative for CFC in new refrigeration and air-conditioning applications, was more than 133,000 MT in 2002<sup>4</sup> and could exceed 400,000 Mt by 2015.<sup>5</sup> 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 a 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,<sup>6</sup> it was

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<sup>1</sup> 2007 Consolidated Progress Report, Multilateral Fund Secretariat, July 2008.

<sup>2</sup> Velder and al. 2007. The Importance of the Montreal Protocol in Protecting Climate, Vol 104. PNAS,

<sup>3</sup> Emissions of greenhouses regulated under the first commitment period of the Kyoto Protocol (2008-2012) are CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub>.

<sup>4</sup> 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.

<sup>5</sup> IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System Chapter 11

<sup>6</sup> 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.

recognized that selection of alternative technologies for HCFCs should take into consideration climate impact and benefits. However, the accelerated phase-out of HCFCs could result in an unintentional growth of HFC demand as 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.<sup>7</sup>

Under the current regulatory frameworks, neither the Montreal Protocol nor the Kyoto Protocol is systematically 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 are primarily used to replace 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 instruments to leverage funding for technology transfer in developing countries.<sup>8</sup> Elements from both conventions can therefore be analyzed and compared to preempt an increase in the demand for HFCs or high GWP gases.

## **OBJECTIVES**

The objective of this study is to explore options for preempting an increase in the demand for HFCs or any other high global warming gases as a result of HCFC phase-out in developing countries. The study will review and examine potential 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 chemicals; however, it recognizes that actions to reduce indirect emissions, such as energy efficiency improvement, can have a significantly higher impact than focusing strictly on chemical use.<sup>9</sup> Therefore, the proposed study will also address technologies limitations and the 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 of all developing country Parties in 2006, mainly HCFC-141b, HCFC-142b, and HCFC-22, is approximately 352,000 MT. Consumption of other HCFCs (for example, HCFC-123) represents only a small fraction of the HCFC

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<sup>7</sup> Use of certain low alternatives may result in higher capital due to toxicity and/or flammability of product and the necessity to ensure that manufacturing facilities, production and servicing personnel are trained and equipped with appropriate safety equipment.

<sup>8</sup> 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.

<sup>9</sup> IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System Chapter 11.



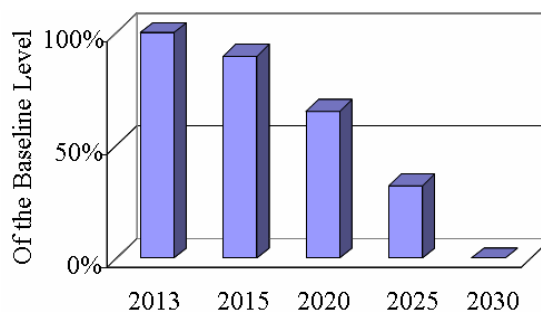
consumption of most developing countries. It is expected that consumption of HCFCs would continue to grow if there were no Montreal Protocol obligations, as demand for refrigeration and air-conditioning, and better insulation in developing countries is growing at a rapid pace. Based on the aggregate HCFCs consumption trends of developing countries in previous years, a growth rate of 9-10% per annum could be expected. By applying a 9% growth rate to the demand for each type of HCFCs, the total demand for HCFCs in developing countries could reach a level of as much as 2.78 million tons in 2030. The breakdown of projected HCFC demand in 2030 is shown in Table 1.

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

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
<b>Total</b>	<b>541,108</b>	<b>763,818</b>	<b>1,175,229</b>	<b>1,808,236</b>	<b>2,782,195</b>

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

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

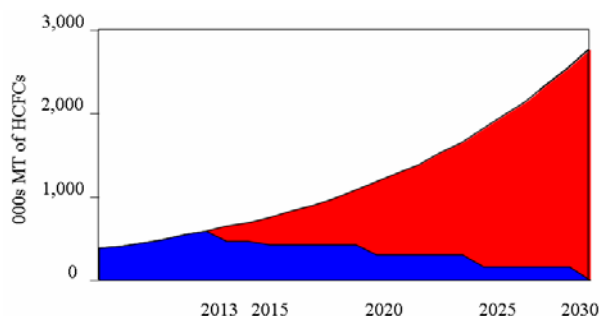


With the accelerated HCFC phase-out schedule of the Montreal Protocol, a total HCFC consumption of 21 million MT could be avoided during the period 2013-2030.<sup>10</sup> This avoided consumption would result in early introduction of alternatives. Climate impacts

<sup>10</sup> 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.

or benefits are, therefore, dependent on the choices of alternatives to be adopted by Parties to the Montreal Protocol.

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<sub>2</sub> equivalent by 2030.<sup>11</sup> 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<sub>2</sub> equivalent associated with avoided production of HFC-23.<sup>12</sup>

#### 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<sub>2</sub> 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).

<sup>11</sup> Assuming that HCFCs are replaced by only low GWP alternatives.

<sup>12</sup> Assuming 3% 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, CO<sub>2</sub> 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 are required to ensure that manufacturing facilities, production and servicing personnel are trained and equipped with necessary safety equipment. Conversion costs could be 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<sub>2</sub> 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, 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 HFCs 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 address 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<sup>13</sup> 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) review of tradeoff between energy efficiency gains and low GWP gases; (ii) costs and barriers associated with conversion of HCFC technology with to low GWP alternatives; (iii) volume of HFCs and equivalent in carbon dioxide equivalent associated with the consumption and production in developing countries and transition economies including those produced as byproducts of other chemical processes; and (iv) potential funding resources (e.g., Multilateral Fund, Carbon Market, Carbon Partnership Funds, Clean Technology Fund, and etc.) to support adoption of better HCFC containment practice, and climate friendly technologies (v) recommendations (or development of a) for a funding methodologies such as approaches to evaluate and setting the baseline consumption and production of HFCs, 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 timely investment interventions 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

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

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.

### **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 negotiations by the climate community, 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 recommendations or development of a funding 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 58<sup>th</sup> 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 62<sup>nd</sup> 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 <sub>2</sub> , CO <sub>2</sub> /Ethanol, CO <sub>2</sub> /HCs; HFC 134a
	Polyurethane Spray	HCFC 141b, minor use of HCFC 141b/HCFC 22	HFC, CO <sub>2</sub> (CO <sub>2</sub> 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 <sub>2</sub> (Adhesion problem with CO <sub>2</sub> )
	Sandwich panels - continuous	HCFC 141b	HFC, HC
	Sandwich panels - discontinuous	HCFC 141b	HFC, HC
	Insulated pipes	HCFC 141b	HFC, HC
	Integral skin foams	HCFC 141b	HFC 134a, CO <sub>2</sub> , HC
Refrigeration	Supermarket refrigerators	HCFC 22	R-404A, CO <sub>2</sub> , HCs and Ammonia (R-717)
	Industrial refrigeration	HCFC 22	R-717, CO <sub>2</sub>
	Transport refrigeration	HCFC 22	HFC 134a, R-404A, R-410A
Air-conditioning	Air-conditioning	HCFC 22	R-410A, HCs, CO <sub>2</sub>
	Water -heating heat pumps	HCFC 22	HFC 134a, R-410A, CO <sub>2</sub>
	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 and resource efficiency or thermal insulation property of the final products;
- Region II – High GWP alternatives with improved energy and resource efficiency or thermal insulation property of the final products;
- Region III – Low GWP alternatives with inferior energy and resource efficiency or thermal insulation property of the final products when compared with HCFC products;
- Region IV – High GWP alternatives with inferior energy and resource efficiency or thermal insulation property of the final products when compared with HCFC products.

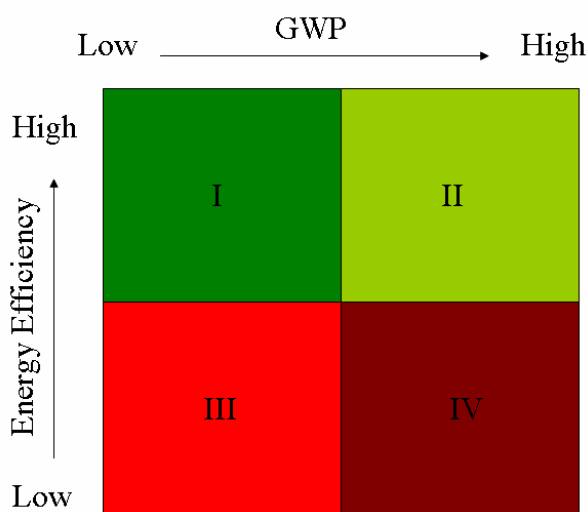


Fig. 3 Characteristics of Non-HCFC Alternatives

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**<sup>14</sup>

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*

<sup>14</sup> 2006 UNEP Technical Options Committee Refrigeration, A/C and Heat Pump Assessment Report

**Appendix 4: Preparation Cost Breakdown**

<b>Element</b>	<b>Description</b>	<b>US\$</b>
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 and resource 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
<b>Total</b>		<b>250,000</b>