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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Sixty-fourth meeting
Montreal, 25-29 July 2011

PROJECT PROPOSAL: MEXICO

This document consists of the comments and recommendation of the Fund Secretariat on the following project proposal:

Phase-out

- HCFC phase-out management plan (stage I, first tranche) UNIDO/UNDP

PROJECT DESCRIPTION

1. On behalf of the Government of Mexico UNIDO, as the lead implementing agency, has submitted to the 64th meeting of the Executive Committee stage I of the HCFC phase-out management plan (HPMP) at a total cost of US $27,385,346, consisting of US $11,508,133, plus agency support costs of US $863,110 for UNIDO, and US $13,966,607, plus agency support costs of US $1,047,496 for UNDP, as originally submitted. Implementation of the activities included in stage I of the HPMP will phase out 613.1 ODP tonnes of HCFCs. These amounts include US $520,916 plus agency support costs of US $39,069 for UNIDO for a project to phase-out 11.1 ODP tonnes of HCFCs approved at the 63rd meeting, and US $ 2,428,987, plus agency support costs of US $182,174 for UNDP for a project to phase-out 55.7 ODP tonnes of HCFCs approved at the 59th meeting. The total amount of 613.1 ODP tonnes of HCFCs to be phased out will allow the Government to meet the Montreal Protocol's compliance targets of the 10 per cent per cent reduction by 2015 and contributes towards the 35 per cent reduction in 2020.

2. The first tranche for stage I being requested at this meeting amounts to US $10,114,658, consisting of US $2,959,849, plus agency support costs of US $221,988 for UNIDO and US $6,449,136, plus agency support costs of US $483,685 for UNDP (these figures exclude the level of funding of the two HCFC phase-out projects previously approved for UNIDO and UNDP.

Background

3. Mexico, with a total population of 112.32 million inhabitants, has ratified all the amendments to the Montreal Protocol.

ODS policy and regulatory framework

4. Mexico's legal framework related to ODS consists of various laws, regulations and decrees. For the last 10 years, most ODS have been subject to a registration and quota system in Mexico. In 2008, a quota system has been established only for HCFC-22 and HCFC-141b, the two main HCFCs used in Mexico. To request an HCFC import quota from the Ozone Unit, each importer must be included in the registry of importers maintained by the General Directorate of Air Quality Management and Registry of Emissions and Transfer of Pollutants; have an environmental registry number, and comply with the requirements of the annual operation report system.

HCFC consumption

5. HCFC consumption in Mexico increased from 14,114.9 metric tonnes (mt) (1,179.3 ODP tonnes) in 2005 to 19,011.2 mt (1,424.7 ODP tonnes) in 2007 and then decreased to 14,596.7 mt (1,171.7 ODP tonnes) in 2010 as shown in Table 1. The baseline for compliance has been estimated at 1,148.8 ODP tonnes. The significant increase in HCFC-22 consumption in 2007 was associated with a 13 per cent increase in the national production and a 31 per cent reduction in the amount exported. Consequently, a large portion of the HCFC-22 demand in 2008 was supplied from the stocks available.

Table 1. HCFC consumption in Mexico (Article 7 data)

HCFCs	2005	2006	2007	2008	2009	2010
Metric tonnes						
HCFC-22	6,498.3	8,990.6	11,958.9	7,142.0	9,419.0	7,591.2
HCFC-141b	7,308.1	7,166.0	6,951.5	7,459.7	5,503.5	6,744.2
HCFC-142b	262.7	12.7	4.4	16.0	20.0	158.3
HCFC-123	45.8	48.4	50.1	13.9	54.0	92.1
HCFC-124		17.7	46.4	2.7	5.0	10.9
Total (mt)	14,114.9	16,235.6	19,011.2	14,634.3	15,001.5	14,596.7
ODP tonnes						
HCFC-22	357.4	494.5	657.7	392.8	518.0	417.5
HCFC-141b	803.9	788.3	764.7	820.6	605.4	741.9
HCFC-142b	17.1	0.8	0.3	1.0	1.3	10.3
HCFC-123	0.9	1.0	1.0	0.3	1.1	1.8
HCFC-124	-	0.4	1.0	0.1	0.1	0.2
Total (ODP tonnes)	1,179.3	1,284.9	1,424.7	1,214.8	1,125.9	1,171.7

6. The two main HCFCs consumed in Mexico are HCFC-22 and HCFC-141b, representing over 98 per cent of total consumption in the country. Measured in metric tonnes, HCFC-22 and HCFC-141b represented 52.0 per cent and 46.2 per cent respectively of the total HCFC imports in 2010, while measured in ODP tonnes, HCFC-22 and HCFC-141b represented 35.6 per cent and 63.3 per cent, respectively.

7. HCFC-22 is produced in Mexico for both the local market (60 per cent of the total production) and for export (Table 2).

Table 2. HCFC-22 production in Mexico (Article 7 data)

HCFC-22	2005	2006	2007	2008	2009	2010
Metric tonnes	8,776.0	12,506.2	14,151.0	14,022.0	12,725.0	12,618.8
ODP tonnes	482.7	687.8	778.3	771.2	699.9	694.0

8. In addition to HCFC-22, small amounts of HCFC-141b, HCFC-123 and HCFC-124 are also exported (Table 3).

Table 3. HCFCs exported by Mexico in 2008 and 2009 (Data from the HPMP)

HCFC	2008		2009	
	mt	ODP tonnes	Mt	ODP tonnes
HCFC-22	9,526.0	523.9	8,436.0	464.0
HCFC-141b	107.2	11.8	230.0	25.3
HCFC-123	-		10.8	0.2
HCFC-124	-		1.7	0.0
Total	9,633.2	8,678.5	8,678.5	489.5

9. HCFC-22 and HCFC-141b are used in the manufacturing and refrigeration servicing subsectors. The 2008 consumption in the manufacturing sector was as follows:

(a) 335.4 mt (18.4 ODP tonnes) of HCFC-22 and 3,292.1 mt (362.1 ODP tonnes) of HCFC-141b were used by nine enterprises for the manufacturing of insulation foam for commercial refrigeration equipment and water heaters (by one enterprise). A project for conversion of one of these enterprises (Mabe Mexico) to cyclopentane technology was approved at the 59th meeting, to phase out 305.5 mt (16.8 ODP tonnes) of HCFC-22 and 353.6 mt (38.9 ODP tonnes) of HCFC-141b;

(b) 1,088.6 mt (59.9 ODP tonnes) of HCFC-22 were used by five enterprises as a refrigerant for air-conditioning systems. Of this amount, 1,076.0 mt (59.2 ODP tonnes), representing approximately 99 per cent of the total consumption, were used by the only foreign-owned enterprise. An additional 7.4 mt (0.4 ODP tonnes) of HCFC-22 were used as a refrigerant by three other enterprises manufacturing commercial and industrial refrigeration equipment;

(c) 3,473.0 mt (382.0 ODP tonnes) of HCFC-141b were used by 12 systems houses for the formulation of preblended polyol systems. Of this amount, 747 mt (82.2 ODP tonnes) were exported in preblended polyol systems to Article 5 countries in the Latin American and Caribbean region;

(d) 250.0 mt (13.8 ODP tonnes) of HCFC-22 and 40.0 mt (4.4 ODP tonnes) of HCFC-141b were used for the manufacturing of extruded polystyrene foams by one enterprise;

(e) 396.6 mt (21.8 ODP tonnes) of HCFC-22 and 99.2 mt (10.9 ODP tonnes) of HCFC-141b were used by 13 locally-owned enterprises in aerosol and solvent applications. A project for conversion of one of these enterprises (Silimex) to non-HCFC technology was approved at the 63rd meeting, to phase out 60.0 mt (3.3 ODP tonnes) of HCFC-22 and 70.9 mt (7.8 ODP tonnes) of HCFC-141b. Some of these enterprises are not eligible for funding as they are owned by non-Article 5 stakeholders or were established after the 21 September 2007 cut off date.

10. In the refrigeration servicing sector, it is estimated that there are 8,824 service workshops in operation with approximately 27,335 technicians. About 42 percent of the technicians have received some formal training. It is estimated that 2,996.0 mt (164.8 ODP tonnes) of HCFC22 and 478.0 mt (52.6 ODP tonnes) of HCFC-141b (for cleaning refrigeration circuits) are used for servicing a large number of refrigeration equipment and air conditioning systems. The number of air-conditioning units imported into the country increased from 697,758 in 2008 to 1,040,808 in 2009.

HCFC phase-out strategy

11. The Government of Mexico's overarching strategy is based on accelerated phase-out in accordance with decision XIX/6 of the Parties; alternative technology choices that meet climate, safety, economic and sustainability requirements; and the phasing out of the HCFC with the highest ODP value first. The Government of Mexico is also considering a ban on HCFC-141b use by 2020. In support of these criteria, the Government is proposing the following policy interventions:

(a) Enforcing the legislation, regularly updating the quota system controlling import and export of HCFCs according to the phase-out targets; forcing, through the quota system, foreign-owned enterprises to phase out their HCFC consumption simultaneously with the locally-owned enterprises;

(b) Banning the installation of new HCFC-based production capacities and gradually limiting imports of HCFC-based refrigeration equipment; and

(c) Regularly implementing public awareness activities.

12. Accordingly, Mexico will achieve the freeze target in 2013, make considerable reductions in the consumption of HCFCs by 2015 and contribute towards the 35 per cent reduction of its baseline consumption by 2020.

Proposed phase-out activities

13. The main activities to be implemented during stage 1 of the HPMP are: regulatory actions, conversion of foam enterprises to non-HCFC based technologies, activities in the refrigeration servicing sector, and support to the project implementation and monitoring unit.

Regulatory actions

14. Non-investment activities to ensure that the achievements of the phase-out projects are not offset by the growth in HCFC-22 consumption in the servicing sector, have been included in stage I of the HPMP, at a total cost of US $521,750. These activities include:

(a) Improving the quota and licensing system to address the entire process of import, export, and sale of all HCFCs, including the re-sale and re-export of recovered and reclaimed HCFCs, at a cost of US $38,750;

(b) Adopting customs registration codes for HCFCs, two training workshops for customs officers in order to ensure that customs stakeholders and officers apply the new HCFC codes properly, and 20 ODS identification kits, at a cost of US $180,000;

(c) Standards, bans and policy control for the production and import of HCFC-based equipment and installation of new HCFC-based manufacturing capacities, at a cost of US $63,000;

(d) Public awareness activities, at a cost of US $95,000; and

(e) Monitoring HCFC-22 production, the import/export licensing and quota system, and on-site verifications by independent international experts, at a cost of US $240,000.

Phase-out activities in the foam sector

15. In order to achieve the complete phase-out of HCFC-141b in Mexico, stage I proposes to phase out a total of 4,697 mt (516.7) ODP tonnes of HCFC-141b through the implementation of the following three projects:

(a) Umbrella project for conversion from HCFC-141-b to cyclopentane insulation foam blowing technology at three refrigeration appliance manufacturing enterprises;

(b) Phase-out of HCFC-141b used in fully formulated systems for rigid and integral skin polyurethane foams at systems houses and their foam customers in Mexico; and

(c) Phase-out of HCFC-141b used as a foam blowing agent for insulation foam in the manufacturing of domestic refrigerators at Whirlpool.

Umbrella project for three enterprises manufacturing refrigeration equipment

16. The objective of the project is to replace 209 mt (23.0 ODP tonnes) of HCFC-141b used as a foam blowing agent for insulation foam by three enterprises manufacturing commercial refrigeration equipment, namely: Metalfrio, Ojeda Frigopanel, and Fersa Torrey. The three enterprises decided to introduce cyclopentane as a replacement technology, avoiding the use of any transitional substance. The decision was based on careful consideration of the ozone depletion and climate impact properties, the technical feasibility of available technologies and their cost. A brief description of the three enterprises is presented below:

(a) Metalfrio (known as Refrigeracion Nieto before it was purchased by Metalfrio, Brazil in 2007), established in 1986, produces display cabinets, bottle coolers, vertical and chest-freezers, cold rooms for meat storage and similar appliances, manufactured in four production lines. Conversion of the enterprise includes retrofitting its three high-pressure dispensers; replacing two low-pressure dispensers with one high-pressure unit; a pre-mixing system; a hydrocarbon storage system; safety-related equipment; safety audits; trials and training. In November 1997, US $353,976 was approved for Refrigeración Nieto to replace 19.1 ODP tonnes of CFC-11 with HCFC-141b and 5.5 ODP tonnes of CFC-2 to HFC-134a (the project was successfully completed in 1998);

(b) Ojeda Frigopanel, established in 2005, manufactures various types of commercial refrigeration products, display cabinets, chest freezers, and large cold rooms. The enterprise has two production facilities in two different cities. Conversion of the enterprise includes retrofitting its three high-pressure dispensers; a pre-mixing system; a hydrocarbon storage system; safety-related equipment; safety audits; trials and training. Funding for the conversion of one of the plants from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a was approved (US $601,543). However, the plant covered under this project has not received assistance from the Multilateral Fund; and

(c) Fersa Torrey, established in 1970, manufactures all types of commercial refrigerators, including modular chambers, freezers, vertical display coolers, and meat cases, in two production lines. Conversion of the enterprise includes retrofitting its two high-pressure dispensers; a pre-mixing system; a hydrocarbon storage system; safety-related equipment; safety audits; trials and training. In November 1997, US $228,195 was approved to replace 10.6 ODP tonnes of CFC-11 with HCFC-141b and 4.5 ODP tonnes of CFC-2 to HFC-134a (the project was successfully completed in June 1999).

17. The total cost of converting the three enterprises has been estimated at US $3,999,918 with a cost-effectiveness value of US $19.14, as shown in Table 4.

Table 4. Estimated cost for the conversion of the umbrella foam project

Enterprise	HCFC-141b (tonnes)		Cost (US $)		Total	CE (US$/kg)
	Metric	ODP	Capital	Operating		
Metalfrio	84.0	9.2	1,447,303	134,400	1,581,703	18.83
Frigopanel	58.4	6.4	1,330,235	93,440	1,423,675	24.38
Fersa Torrey	66.6	7.3	887,980	106,560	994,540	14.93
Total	209.0	23.0	3,665,518	334,400	3,999,918	19.14

18. Given the cost effectiveness threshold of US $9.79/kg (for rigid foam projects where a low global-warming-potential (GWP) technology is being introduced), the enterprises are requesting US $2,046,110, (with counterpart funding of US $1,953,808). The project implementation time frame is 30 months.

Phase-out of HCFC-141b in formulated systems at systems houses and their foam customers

19. The objective of this project is to phase out 2,726.0 mt (299.9 ODP tonnes) of HCFC-141b used by local foam customers in the manufacture of rigid and flexible/integral skin polyurethane foams. More than half of the HCFC-based foam enterprises purchase formulated polyol systems from 11 systems houses (seven locally-owned, one with 51 per cent local ownership, and three with foreign-ownership). These companies pre-blend all of the chemicals required into two stable system components which are sold to their customers, mainly small and medium sized enterprises (SME), and also provide technological support to their customers. Formulated systems based on HCFC-141b are also sold to large enterprises manufacturing commercial refrigeration equipment (including the three enterprises covered

under the umbrella project previously described), to foreign-owned foam enterprises, and to foam enterprises in other Article 5 countries (about 747 mt (82.2 ODP tonnes) of HCFC-141b contained in preblended polyols).

20. Given the key role of systems houses in Mexico, it has been decided to phase out HCFC-141b consumption with their assistance. Furthermore, considering that the foam enterprises can purchase formulated polyol systems from any systems house, it was considered important to seek assistance from all systems houses at the same time. This approach makes it possible to achieve conversion of a large number of SMEs within the cost-effectiveness threshold. The levels of HCFC-141b consumption by the systems houses and the consumption by their foam customers are shown in Table 5.

Table 5. HCFC consumption by systems houses and their foam customers

Systems house	HCFC-141b consumption (mt)			Foreign ownership (%)
	By systems houses	Sold to users(*)	Balance(**)	
Acsa	242.0	200.0	42.0	
Aepsa	97.0	97.0	-	
Bayer	614.0	51.0	563.0	100.0
Comsisa	116.0	116.0	-	
Dow	491.0	294.0	197.0	100.0
Eiffel	455.0	450.0	5.0	
Huntsman	268.0	210.0	58.0	100.0
Maxima	245.0	245.0	-	
Polioles	478.0	106.0	372.0	49.0
Pumex	1,199.0	844.0	355.0	
Valcom	73.0	73.0	-	
Zadro	43.0	40.0	3.0	
Total (mt)	4,321.0	2,726.0	1,595.0	
Total (ODP tonnes)	475.3	299.9	175.5	

(*) Foam customers covered under the project proposal.
(**) Sold to large enterprises, foreign-owned enterprises or exported.

21. The main products manufactured by the foam enterprises covered under the project include foam insulation for commercial refrigerators, refrigerated trucks and containers, and water heaters; sandwich panels and blocks; spray foam; pipe insulation; integral skin foams for the furniture, auto parts, and shoe-sole industries. Nearly 73.5 per cent of the enterprises consumed 19.9 per cent of the total HCFC-141b in the country; while over 67.9 per cent of the total consumption is by 41 enterprises. The distribution of the foam enterprises by estimated level of HCFC-141b consumption is presented in Table 6.

Table 6. Distribution of foam enterprises by estimated level of HCFC-141b consumption

Range (mt)	No. enterprises	% total enterprises	HCFC-141b consumption		% total consumption
			mt	ODP tonnes	
< 0.5	20	5.8%	2.7	0.3	0.1%
>0.5 < 1.0	31	8.9%	24.7	2.7	0.8%
>1.0 < 2.0	59	17.0%	93.3	10.3	3.0%
>2.0 < 5.0	145	41.8%	492.5	54.2	16.0%
>5.0 < 10.0	51	14.7%	375.9	41.3	12.2%
>10.0 < 60.0	37	10.7%	858.8	94.5	27.9%
>60.0 < 360.0	3	0.9%	667.0	73.4	21.7%
> 360.0	1	0.3%	563.5	62.0	18.3%
Total	347	100.0%	3,078.5	338.6	100.0%

22. During the preparation of the HPMP, the technical and economic aspects of all available technologies for the replacement of HCFC-141b as a foam blowing agent were discussed with all stakeholders. Based on technical and economic considerations, it was decided to introduce methyl formate for the integral skin and flexible moulded subsectors. Although systems houses agreed that methyl formate is the lowest cost technology, they noted that for some integral skin applications (i.e., shoe soles), methylal technology may be more convenient. If this proved to be the case, they would also provide methylal formulated systems to their clients at no additional cost to the Multilateral Fund.

23. The introduction of the methyl formate technology requires retrofitting the equipment at the systems houses and retrofitting the baseline equipment at the foam enterprises. At the systems houses, capital costs will be provided to retrofit the facilities, including explosion-proofing of blending tanks and pumps (US $35,000 for each tank and pump); nitrogen dispenser (US $8,000); emission monitors (US $2,500 each) and safety-related system (US $10,000); testing equipment (up to US $25,000); technology transfer (US $20,000); and contingencies (calculated at 10 per cent of the capital costs. An additional US $1,000 per customer of the systems house is included for project management. US $10,000 is also requested for the retrofit of foam equipment (owned by the systems houses) that could be rented to their foam customers that do not have equipment (i.e., hand mixing). In two of the systems houses (Polioles and Pumex) an additional US $70,000 is requested for hydrocarbon tanks for the production of hydrocarbon-based pre-blended polyol systems. No capital costs will be provided to the foreign-owned systems houses to retrofit their facilities. Given that the systems houses will be contracted to assist in the implementation of the project, payment for the services provided will be based on US $20,000 for technology transfer, U $1,000 per customer and contingency costs.

24. At the enterprise level, capital costs will be provided for retrofitting the existing equipment in the baseline: US $10,000 for each low-pressure dispenser; US $15,000 for each high-pressure dispenser; US $5,000 for each spray dispenser; and US $15,000 for a new dispenser. An additional US $3,000 for each piece of equipment in the baseline is provided for trials, testing and training. Contingencies are calculated at 10 per cent of the capital costs.

25. Operating costs have been calculated on the basis of baseline prices and formulations from systems houses and replacement formulations from technology providers, as well as the information gathered by UNDP from the methyl formate validation project. Higher densities and/or rejection rates are expected given the limited experience available with this technology in Article 5 countries. Accordingly, operating costs were estimated at US 0.15 per kilogram of formulated polyol system used.

26. The total cost for the conversion of the systems houses and their foam customers has been estimated at US $11,754,568 (i.e., US $8,280,000 capital costs and US $3,474,568 operating costs) as shown in Table 7 below. The cost-effectiveness value of the project is US $4.31/kg.

Table 7. Estimated cost for the conversion for the systems houses and their foam customers

Equipment	**Total cost (US$)**
Systems houses	
Equipment	1,424,775
Project management	346,000
Technology transfer	320,000
Contingency	209,078
Total systems houses	2,299,853
Foam enterprises	
Equipment	5,088,600
Operating costs	3,448,217
Total foam enterprises	8,536,817
Total cost	10,836,669
HCFC-141b consumption (mt)	3,288.9
Cost-effectiveness (US$/kg)	3.29

Phase-out of HCFC-141b at Whirlpool

27. Stage I of the HPMP includes a project proposal to phase-out 1,762 mt (193.8 ODP tonnes) of HCFC-141b used for the manufacturing of insulation foam for domestic refrigerators manufactured by Whirlpool. The cost for the conversion to cyclopentane technology has been estimated at US $7,095,938. A detailed project proposal will be submitted during 2014 to enable a smooth transition to stage II of the HPMP.

Activities in the servicing sector

28. Stage I of the HPMP includes training programmes for refrigeration technicians in good servicing practices in the air-conditioning and commercial refrigeration subsector, with the following objectives: the phase-out of 200.0 mt (22.0 ODP tonnes) of HCFC-141b used to clean refrigeration circuits, including recovery and management of cleaning agent; the phase-out of 18.8 mt (1.0 ODP tonne) of HCFC-22 through good management of refrigerants including recovery operations. In total, 4,000 service technicians will be trained and 350 flushing machines, nitrogen blowing systems and flushing kits will be distributed.

29. Implementation of these activities will reduce the direct emissions of HCFC-141b used for cleaning into the atmosphere; maintain the infrastructure established during the CFC phase-out plan and the momentum of the training programme for technicians; and favour the complete phase-out of HCFC-141b while enforcing the ban on the use of this substance by 2020. The total cost of the refrigeration servicing activities is US $984,600 (calculated at US $4.50/kg for a total phase-out of 200 mt of HCFC-141b and 18.8 mt of HCFC-22).

Project implementation and monitoring unit

30. Close monitoring of all activities to be implemented in stage I of the HPMP and coordination between stakeholders are essential to meet the phase-out compliance targets. Coordination meetings with relevant authorities, the industrial sector, and HCFC and HFC importers will be organized regularly in order to enact the necessary agreements and measures to carry out the investment and non-investment activities. The total cost of this component is US $242,000:

HCFC phase-out projects already approved

31. The Executive Committee has approved the following HCFC investment projects: conversion from HCFC-141b and HCFC-22 in the manufacture of polyurethane rigid insulation foam for domestic refrigerators at Mabe Mexico, for the phase-out of 55.9 ODP tonnes approved at the 59th meeting (US $2,428,987); and phase-out of 11.0 ODP tonnes of HCFC-22 and HCFC-141b in aerosol manufacturing at Silimex, approved at the 63rd meeting (US $520,916).

Total cost of stage 1 of the HPMP

32. The total cost of the activities proposed in stage 1 of the HPMP to be funded through the Multilateral Fund amounts to US $25,474,740 (excluding agency support costs). These activities will result in the phase-out of 606.9 ODP tonnes of HCFCs with an overall cost-effectiveness of US $4.99/kg. (Table 9).

Table 9. Overall cost of the HPMP of stage 1 of the HPMP for Mexico

Description	Total HCFC (ODP tonnes)	Cost (US$)	Date	
			Approval	Completion
Phase-out of HCFCs in the manufacture of insulation foam at Mabe*	55.9	2,428,987	Nov. 2009	2012
Phase-out of HCFCs in aerosol manufacturing at Silimex**	11.0	520,916	Apr. 2011	2013
Phase-out of HCFC-141b in three commercial refrigeration enterprises	23.0	2,046,110	Jul. 2011	2013
HCFC-141b phase-out in systems houses and foam customers (1st tranche)	168.0	6,449,136	Jul. 2011	2013
HCFC-141b phase-out in systems houses and foam customers (2nd tranche)	132.0	5,088,484	Jul. 2013	2016
Phase-out of HCFC-141b at Whirlpool	194.0	7,095,938	Jul. 2014	2018
Phase-out of HCFC-141b in refrigeration servicing (1st tranche)	15.0	625,761	Jul. 2011	2013
Phase-out of HCFC-141b in refrigeration servicing (2nd tranche)	8.0	360,658	Jul. 2013	2015
Updating the quota and licensing system		38,750	Jul. 2011	2014
Updating legislation		63,000	Jul. 2011	2014
Customs training		180,000	Jul. 2011	2014
Monitoring/verification of HCFC production		240,000	Jul. 2011	2015
Public awareness		95,000	Jul. 2011	2014
Coordination/monitoring		242,000	Jul. 2011	2014
Total	606.9	25,474,740		

* Approved at the 59th meeting.
** Approved at the 63rd meeting.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

33. The Secretariat reviewed the HPMP for Mexico in the context of the guidelines for the preparation of HPMPs (decision 54/39), the criteria for funding HCFC phase-out in the consumption sector agreed at the 60th meeting (decision 60/44) and subsequent decisions on HPMPs made at the 62nd and 63rd meetings.

Starting point for aggregate reduction in HCFC consumption

34. The Government of Mexico established as its starting point for aggregate reduction in HCFC consumption the HCFC consumption of 1,214.8 ODP tonnes reported under Article 7 of the Montreal Protocol in 2008, when the first HCFC phase-out project was submitted to the 59th meeting of the Executive Committee. The HCFC baseline for compliance has been estimated at 1,148.5 ODP tonnes.

Level of HCFC consumption to be phased out in stage 1

35. The total amount of HCFCs to be phased during stage 1 of the HPMP is 606.9 ODP tonnes (including the 66.9 ODP tonnes associated with the two phase-out projects already approved), equivalent to approximately 53 per cent of the HCFC baseline. Given that the Government of Mexico would only have to phase-out 114.9 ODP tonnes of HCFC (i.e., 10 per cent of the baseline) to meet the 2015 control target, and the fact that 66.9 ODP tonnes had already been funded, the Secretariat would not be able to recommend approval of all the phase-out activities included in Stage 1. UNIDO explained that the Government of Mexico originally proposed to completely phase out the consumption of HCFC-141b during Stage 1 of the HPMP; however, considering the significant level of consumption associated with the foam enterprises, the large number of small users in the aerosol sector and the extended uses by

technicians for flushing refrigeration equipment, the Government decided to move the deadline for the phase-out of all uses of HCFC-141b to 2018. UNIDO acknowledged that the amount of HCFCs to be phased out in Stage 1 of the HPMP is very high, because of consumption patterns in the country. The conversion of Whirlpool, the single largest consumer of HCFC-141b in Mexico, has been withdrawn from stage 1 of the HPMP because the enterprise has not yet fully decided on the alternative technology and the project has not yet been developed. Accordingly, a total of 412.9 ODP tonnes of HCFCs, representing 36 per cent of the HCFC baseline for compliance, will be phased out during stage I of the HPMP.

36. With regard to the phase-out of the 747 mt (82.2 ODP tonnes) of HCFC-141b contained in pre-blended polyols that are exported to other Article 5 countries (and thus ineligible for funding), and the 567 mt (62.4 ODP tonnes) associated with foreign-owned enterprises (and thus ineligible), UNIDO explained that the HCFC-141b contained in exported pre-blended polyols are, in principle, eligible for funding in the country where the downstream user is located. Over time, this consumption will disappear. Potential deductions from the starting point can be addressed when all investment projects in importing countries have been completed. As for the HCFC-141b consumption related to foreign-owned enterprises, the Government of Mexico will enter into voluntary (or forced) phase-out agreements with them but not before the systems houses project is fully implemented. The consumption associated with the foreign-owned enterprises will be deducted from the starting point once they are converted with their own resources.

37. The Executive Committee might wish to note that the issue of HPMPs that propose to address more than 10 per cent of the baseline by 2015 is presented in the document UNEP/OzL.Pro/ExCom/64/17, “Overview of issues identified during project review”.

Import controls on HCFC-141b

38. Pre-blended polyol systems based on HCFC-141b could be imported into the country and not counted as consumption under the Montreal Protocol. Also, as stated in the project proposal, several of the foam enterprises purchase polyol systems from multiple systems houses. Given this situation, an explanation was sought on: how the Government will control future HCFC-141b imports and use (including pre-blended polyol systems based on HCFC-141b). UNIDO indicated that the Government of Mexico has established a quota system that will control imports of HCFC-141b, both as a pure substance and contained in pre-blended polyols. All the foam enterprises converted through the project will sign an agreement to avoid reverting back to the use of HCFC-141b. It is also important to note that currently no HCFC-141b-based preblended polyol systems are imported into the country and no systems houses are available in neighbouring countries.

Justification for second-stage conversion enterprises

39. A number of the enterprises covered under stage 1 of the HPMP received assistance from the Multilateral Fund for conversion from CFC-11 to HCFC-141b technology. In providing the justification for considering second-stage conversion projects in stage 1 of the HPMP (as per decisions 60/44 (b) and 62/16), UNIDO and UNDP explained that the Government of Mexico is addressing the phase-out of HCFC-141b as a first priority.

40. In regard to the umbrella project for the conversion of the enterprises manufacturing commercial refrigeration equipment, two enterprises, namely Metalfrio and Fersa, had received assistance from the Multilateral Fund for converting from CFC-based technologies. These two enterprises are the second largest consumers of HCFC-141b (after Whirlpool) eligible for funding. They are well organized, and relatively easy to convert to non-HCFC technology. It will similarly be fairly easy to monitor them to ensure that they do not revert back to the use of HCFCs after conversion. Their total HCFC consumption is about 1.5 per cent of the total HCFC consumption; 2.2 per cent of the HCFC consumption in the

manufacturing sector; and 3.7 per cent of the total HCFC-141b consumption in the foam sector. It is to be noted that the reason for the low share in HCFC consumption is the large number of foreign-owned HCFC-based enterprises in the country. Furthermore, the phase-out of HCFCs in locally-owned refrigeration and air conditioning manufacturing enterprises would result in a cost-effectiveness of at least US $15/kg, while the cost-effectiveness for manufacturing enterprises in the aerosol/solvent sector would be over US $10.00/kg.

41. In regard to the systems houses project, UNDP explained that the second-stage conversion enterprises could not be excluded given that the strategy is based on conversion of all systems houses so as to avoid market distortions and simplify monitoring and compliance. Furthermore, no new equipment will be provided to second-stage conversion enterprises. The systems house project is the most cost-effective phase-out project that Mexico can undertake in the manufacturing sector (US $4.31//kg).

Technical and cost-related issues

Umbrella project for three enterprises manufacturing refrigeration equipment

42. The project for the conversion of foam enterprises through their systems houses, includes a request for the installation of blending tanks and ancillary equipment for production of hydrocarbon based pre-blended systems at two of the systems houses (Polioles and Pumex). These systems could be used by local foam enterprises or for export (the HPMP for El Salvador submitted to the 64th meeting (UNEP/OzL.Pro/ExCom/64/32) included a project for the conversion of one enterprise, Unimetal, from HCFC-141b to cyclopentane in the production of foam, where the use of hydrocarbon pre-blended systems from Mexico was considered). An explanation was sought on whether the enterprises under the umbrella project could use pre-blended hydrocarbon systems instead of pre-blending all foam components *in situ.* UNIDO indicated that, together with the Government of Mexico and the enterprises, it will assess the possibility of using pre-blended hydrocarbon systems. UNIDO is of the view that it is not yet a feasible option; however, should this be technically viable with minimum risks, economically feasible and agreeable to the enterprises and would not delay the implementation of the project, the project would be implemented accordingly. If this is not the case, the project would be implemented as originally proposed.

43. The following issues were also discussed and satisfactorily addressed: the capacity of the hydrocarbon storage tanks, which are large for the levels of consumption of the enterprises; the need for separate gas detecting system for each foaming line when, normally, alarm and monitoring systems with a number of gas sensors, depending on critical gas detecting points for the entire plant, are proposed; and the costs for nitrogen generator, day tank, pipe installation and technology transfer, training and trials. The use of higher prices for some of the chemicals used in the post-conversion systems formulations was also covered, as well as the proposed 10 per cent increase in foam density given the relative baseline densities of the foams before and after conversion and the fact that advances in hydrocarbon technology have considerably reduced the learning curve for which costs associated with density increase were used to compensate.

44. The total cost of the project was agreed at US $ 2,899,400, resulting in a cost effectiveness of US $13.87/kg. Since the cost-effectiveness threshold for rigid foam applications using a low-GWP alternative is US $9.79/kg, the enterprises have committed to cover US $853,290 from their own resources, i.e., the difference between the agreed level of funding (US $2,899,400) and the eligible funding (US $2,046,110). An additional US $15,000 has been agreed to provide technical assistance to the very small users of imported pre-blended polyols containing HCFC-141b.

Phase-out of HCFC-141b in formulated systems at systems houses and their foam customers

45. Given the economy of scale of the project, where a relatively large number of similar equipment items will be purchased and/or retrofitted and similar technical assistance, training and trials will be given

to both systems houses and foam enterprises, the Secretariat asked whether UNDP would be able to negotiate better prices from suppliers and also rationalize the proposed technical assistance, training and trials. UNDP indicated that due consideration had been given to cost reductions during the preparation of the project proposal. For instance, the current cost to retrofit a 100 kg high-pressure dispenser is US $20,000, including freight and clearance. Therefore, UNDP will need to negotiate a 25 per cent discount to cover the US $15,000 requested in the proposal. This also applies to the other equipment items required for conversion.

46. Upon a request for clarification on whether the baseline equipment in the foam enterprises covered under the proposal was purchased prior to the cut-off date of September 2007, and all the enterprises were locally owned, UNDP explained that, to the extent possible, all the equipment installed after the cut-off date was excluded; however, that information was not available in several enterprises, Additional data on the baseline equipment including date of installation and type of equipment (low/high pressure or spray dispenser), will be collected and verified as part of the initial implementation assessment. Furthermore, this information would need to be collected to assess the details of the retrofit.

47. The following issues were raised: the costs requested of the nitrogen dispensers (which vary between US $8,000 and US $10,000); the number of safety sensors requested which varies among the systems houses; and discrepancies between the number of trials and testing, and the project management amounts requested and the actual number of foam enterprises. In regard to one of the systems houses, since no information was provided on the baseline of the foam enterprises, the funding being requested could not be assessed. Noting the strong commitment of Government of Mexico to address all HCFC 141b consumption in the foam sector, the Secretariat requested UNDP to provide additional information on the enterprises otherwise this project component would have to be submitted once stage I of the HPMP has been completed.

Impact on the climate

48. The implementation of stage I of the HPMP in Mexico would avoid the emission into the atmosphere of some 2,500,999 tonnes of CO_2-equivalent associated with the conversion of the HCFC-141b-based foam enterprises as shown in Table 10. This amount is higher than that in the 2011-2014 business of 297,193.8 tonnes of CO_2-equivalent, since it is associated with a much larger amount of HCFC-141b to be phased-out during implementation of stage I of the HPMP. The proposed technical assistance activities in the servicing sector, which include the introduction of better containment of refrigerants and leakage control, and the enforcement of HCFC import controls, will reduce the amount of HCFC-22 used for refrigeration servicing. Each kilogram (kg) of HCFC-22 not emitted due to better refrigeration practices results in approximately 1.8 CO2-equivalent tonnes saved. However, at this time, the Secretariat is not in a position to quantitatively estimate the impact on the climate. The impact might be established through an assessment of implementation reports by, *inter alia*, comparing the levels of refrigerants used annually from the beginning of HPMP implementation, the reported amounts of refrigerants being recovered and recycled, the number of technicians trained and the HCFC-22-based equipment being retrofitted.

Table 10. Impact on the climate

Substance	GWP	Tonnes/year	CO2-eq (tonnes/year)
Before conversion			
HCFC-141b	725	3,497.9	2,535,978
Total			
After conversion			
Methyl formate/cyclopentane	20	1,749.0	34,979
Net impact			(2,500,999)

Co-financing and total cost of the HPMP

49. In response to decision 54/39(h) on potential financial incentives and opportunities for additional resources to maximize the environmental benefits from HPMPs pursuant to paragraph 11(b) of decision XIX/6 of the Nineteenth Meeting of the Parties, the Government of Mexico is keen to explore sources for co-financing phase-out activities to contribute to the timely and successful implementation of the HCFC phase-out programme. However, during the preparation of the HPMP no funding source were identified, given that the funding mechanism of the various programmes are different from that of the Montreal Protocol, and the time frame of accessing other funds was not compatible with the tight schedule of HCFC. At this time, the only option available was the counterpart contribution of US $1,953,808 from beneficiary enterprises for their conversion programme.

Adjusted 2011-2014 business plans

50. Table 12 shows the level of funding and amounts of HCFCs to be phased out according to the 2011-2014 business plan of the Multilateral Fund. The level of funding requested for the implementation of stage I of the HPMP of US $17,146,051 (including support costs), is higher than that in the business plan (US $9,193,450), since it is associated with a much larger amount of HCFC-141b to be phased-out during implementation of stage I of the HPMP.

Table 2. 2011-2014 business plan of the Multilateral Fund

Agency	2011	2012	2013	2014	2015	Total
Funding (US$)						
UNIDO	2,973,450	215,000	1,290,000	215,000	-	4,693,450
UNDP	1,012,500	1,012,500	1,012,500	1,012,500	450,000	4,500,000
Total	3,985,950	1,227,500	2,302,500	1,227,500	450,000	9,193,450
Phase-out (ODP tonnes)						
UNIDO	37.2	2.5	14.5	2.5	-	56.7
UNDP	12.0	12.0	12.0	12.0	5.3	53.2
Total	49.2	14.5	26.5	14.5	5.3	110.0

Overall cost of the HPMP

51. The Secretariat and UNDP are still discussing a few outstanding issues related to the costs of the foam investment project related to the systems houses. The results of the discussions will be communicated to the Executive Committee prior to the 64th Meeting.

Draft agreement

52. A draft Agreement between the Government of Mexico and the Executive Committee for HCFC phase-out is being prepared.

RECOMMENDATION

53. Pending.