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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
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**PROJECT PROPOSALS: MEXICO**

This document includes the comments and recommendations of the Fund Secretariat on the following project proposals:

Foam

- Phase-out of CFC-11 by conversion to HCFC-141b or water-blown UNDP technology in rigid polyurethane foam (spray) and to water-based formulations in integral skin foam at Comsisa

Refrigeration

- Phasing out CFC-11 with cyclopentane and CFC-12 with HFC-134a in UNIDO the manufacturing plant of commercial refrigerators of Metaplus S.A. de C.V.
- Phasing out CFC-11 with HCFC-141b and CFC-12 with HFC-134a in UNIDO the manufacturing plant of commercial refrigerators at Refrigeracion Duran S.A. de C.V.

**PROJECT EVALUATION SHEET  
MEXICO**

SECTOR: Foam ODS use in sector (1998): 390 ODP tonnes

Sub-sector cost-effectiveness thresholds: Integral Skin US \$16.86/kg  
Rigid US \$7.83/kg

**Project Titles:**

- (a) Phase-out of CFC-11 by conversion to HCFC-141b or water-blown technology in rigid polyurethane foam (spray) and to water-based formulations in integral skin foam at Comsisa

Project Data	Multiple-subsectors
	Comsisa
Enterprise consumption (ODP tonnes)	72.60
Project impact (ODP tonnes)	68.70
Project duration (months)	36
Initial amount requested (US \$)	743,787
Final project cost (US \$):	
Incremental capital cost (a)	585,500
Contingency cost (b)	58,550
Incremental operating cost (c)	242,491
Total project cost (a+b+c)	886,541
Local ownership (%)	100%
Export component (%)	0%
<b>Amount requested (US \$)</b>	743,787
Cost effectiveness (US \$/kg.)	12.24
Counterpart funding confirmed?	Yes
National coordinating agency	National Institute of Ecology
Implementing agency	UNDP

<b>Secretariat's Recommendations</b>	
Amount recommended (US \$)	
Project impact (ODP tonnes)	
Cost effectiveness (US \$/kg)	
Implementing agency support cost (US \$)	
Total cost to Multilateral Fund (US \$)	

## PROJECT DESCRIPTION

### Sector Background

- Latest available total ODS consumption (1998)	5,455	ODP tonnes
- Baseline consumption* of Annex A Group I substances (CFCs)	4,591.5	ODP tonnes
- 1998 consumption of Annex A Group I substances	3,482.9	ODP tonnes
- Baseline consumption of CFCs in foam sector	Not available	
- 1998 consumption of CFCs in foam sector	390.0	
- Funds approved for investment projects in foam sector as of March 1999	US \$ 8,261,482	
- Quantity of CFC to be phased out in foam sector as of end of 1998	1,395.6	ODP tonnes
- Quantity of CFC phased out in foam sector as of end of 1998	698.2	ODP tonnes

\*Baseline consumption of Annex A controlled substances refers to average of the consumption for the years 1995-1997 inclusive.

1. Twenty (20) small scale Mexican foam manufacturers and one medium scale manufacturer, under the guidance of their major systems supplier Comsisa, will eliminate the use of CFC-11 in sprayfoam (65% of Comsisa's production) and integral skin foam applications. The enterprises consumed a total of 72.6 tonnes of CFC-11. The individual consumption ranges from 0.3 tonnes to 6.8 tonnes. The medium scale enterprise, a rigid foam producer, consumed 13.5 tonnes. The production is to be converted to HCFC-141 as an interim technology in the sprayfoam applications, with later conversion to an ODS-free technology. For the integral skin applications, conversion is to water-based formulations. The enterprises will retrofit or replace their existing dispensers (US \$273,000), and provide low pressure dispensers to the enterprises currently handmixing (US \$112,500), with 25% company contributions already factored in. Comsisa will acquire evaluation dispensers for both sprayfoam (US \$40,000) and integral skin foam (US \$45,000) and a field K-factor tester (US \$5,000). The current blending system for sprayfoam formulations will be modified (US \$20,000), and a new blending system for integral skin formulations will be installed (US \$50,000). Other costs include trials (US \$42,000) and technology transfer (US \$31,000). Incremental operational costs amount to (US \$242,491). This is calculated using border prices stated to be US \$1.257/kg for CFC-11 and US \$2.646/kg for HCFC-141b.

### Project Impact

2. The group of small scale enterprises will phase out 57.2 tonnes of CFC-11. This will constitute 14.7% of Mexico's 1998 consumption of Annex A Group I substances in the foam sector, and 1.2% of its baseline consumption.

Justification for the Use of HCFC-141b

3. A letter advising of the Government decision to use HCFC technology has been received by the Secretariat in accordance with Executive Committee decision 27/13 and is attached to this evaluation together with the information and commitments from the enterprises.

**SECRETARIAT'S COMMENTS AND RECOMMENDATIONS**

**COMMENTS**

Comsisa – Systems House Component

1. UNDP is requesting US \$200,000 as incremental capital cost for Comsisa to act as systems provider and intermediate technology transfer agent for the group of enterprises. The US \$200,000 includes the cost of items which should be available in the baseline of a systems house operation, such as low pressure dispenser, blender for systems.

2. The Fund Secretariat advised UNDP that this component of the project may not be eligible for funding for the following reasons:

- The company does not possess the baseline equipment necessary for operation as systems house.
- As stated in the project document, international manufacturers such as ICI and Bayer supply substantial quantities of systems directly and through local companies including Comsisa, a customer of BASF.
- The very basic baseline equipment of the company, set up as recently as 1993 suggests that Comsisa may not currently be doing substantial preblending of the systems on its own but may be acting more as systems distributor for BASF, although the project states that BASF supplies only chemicals to the company.
- Systems houses do not by themselves phase out ODS and therefore eligibility of such projects should be considered on their merit.

3. The Secretariat is still discussing the eligibility of the Comsisa component of the project for funding under the Multilateral Fund with UNDP.

Participating enterprises of the Group project

4. All the enterprises in the group are eligible to receive funding for retrofit or replacement of existing machines or provision of new machines in cases of hand mixing. While the cost of replacement machines has been agreed, the cost of retrofit of existing machines is still under discussion.

5. The Government of Mexico has implemented institutional measures to restrict the supply of CFCs in the country. As a result, the actual price of CFC-11 in Mexico is about 14.70 /kg, which is much higher than the local price of HCFC-141b. As a consequence of these changes in prices, the enterprises will realise net operating savings after they have converted their production.

6. Consequently, border prices of CFC-11 and HCFC-141b stated to be US \$1.257/kg and US \$2.646/kg were used by UNDP to calculate the incremental operational cost, resulting in substantial costs of each project. The Government of Mexico has subsequently informed the Secretariat that the border price of CFC-11 is US \$2.8/kg.

7. Additionally, the Government of Mexico has requested the Fund Secretariat that, since the internal market prices are abnormally high and artificially set up, regional prices should be used in the calculation of incremental operating costs/savings.

8. Accordingly, the issue of the change in the price of chemicals in Mexico, arising from institutional measures taken by the Government, is brought for consideration of the Sub-Committee for Project Review. The projects are submitted for individual consideration.

## PROJECT EVALUATION SHEET MEXICO

SECTOR: Refrigeration ODS use in sector (1998): 2,667 ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial US \$15.21/kg

**Project Titles:**

- (a) Phasing out CFC-11 with HCFC-141b and CFC-12 with HFC-134a in the manufacturing plant of commercial refrigerators at Refrigeracion Duran S.A. de C.V.
- (b) Phasing out CFC-11 with cyclopentane and CFC-12 with HFC-134a in the manufacturing plant of commercial refrigerators of Metaplus S.A. de C.V.

Project Data	Commercial	
	Duran	Metaplus
Enterprise consumption (ODP tonnes)	16.45	20.10
Project impact (ODP tonnes)	15.05	20.10
Project duration (months)	18	24
Initial amount requested (US \$)	218,922	412,461
Final project cost (US \$):		
Incremental capital cost (a)	115,808	448,328
Contingency cost (b)	10,081	43,333
Incremental operating cost (c)	-12,904	-188,567
Total project cost (a+b+c)	112,985	303,094
Local ownership (%)	100%	100%
Export component (%)	0%	0%
<b>Amount requested (US \$)</b>	112,985	303,094
Cost effectiveness (US \$/kg.)	7.51	15.04
Counterpart funding confirmed?		
National coordinating agency	Instituto Nacional de Ecologia	Instituto Nacional de Ecologia
Implementing agency	UNIDO	UNIDO

<i>Secretariat's Recommendations</i>		
Amount recommended (US \$)		
Project impact (ODP tonnes)		
Cost effectiveness (US \$/kg)		
Implementing agency support cost (US \$)		
Total cost to Multilateral Fund (US \$)		

## PROJECT DESCRIPTION

### Sector Background

- Latest available total ODS consumption (1998)	5,455	ODP tonnes
- Baseline consumption* of Annex A Group I substances (CFCs)	4,591	ODP tonnes
- 1998 consumption of Annex A Group I substances	3,482	ODP tonnes
- Baseline consumption of CFCs in refrigeration sector	3,388	ODP tonnes
- 1998 consumption of CFCs in refrigeration sector	2,667	ODP tonnes
- Funds approved for investment projects in refrigeration sector as of July 1999	US \$ 9,835,189	
- Quantity of CFC to be phased out in refrigeration sector as of July 1999 (28 <sup>th</sup> Meeting)	1,078.7	ODP tonnes

\*Baseline consumption of Annex A controlled substances refers to average of the consumption for the years 1995-1997 inclusive.

1. Original equipment manufacturers in the domestic refrigeration sector in Mexico belong to two industrial groups (Mabe and Vitro). Four large domestic refrigeration enterprises and two compressor manufacturing facilities operating under these two industrial groups have received assistance from the Multilateral Fund to phase out a consumption of 806.0 ODP tonnes. The conversion of these enterprises is completed and the Government of Mexico has enacted a decree prohibiting the production and import of CFC-based domestic refrigeration appliances. The commercial refrigeration sub-sector in Mexico consist of a number of small and medium sized enterprises. The Multilateral Fund has assisted six small and medium-sized commercial refrigeration enterprises to phase out 135.7 ODP tonne. The Multilateral Fund also funded the retrofitting of refrigeration equipment in three supermarket chains to phase out 137 ODP tonnes. It is estimated that an additional 20 commercial refrigeration enterprises remain to be converted to non-ODS technologies.

### Project description

2. In 1998, Duran consumed 13.54 ODP tonnes of CFC-11 and 4.0 ODP tonnes of CFC-12 in the production of commercial refrigeration equipment such as commercial refrigerators, chest freezers, display cabinets and industrial coolers. About 27% of the products produced by the enterprise are equipped with compressors of capacity below 250 wt. This enterprise will convert its foam operations from CFC-11 to HCFC-141b (as the interim blowing agent, with a later conversion to an ODS-free technology) and refrigerant operations from CFC-12 to HFC-134a, resulting in a total phase out of 17.02 ODP tonnes. The enterprise possesses two Gusmer low pressure foaming machines, refrigerant charging equipment, leak detectors and vacuum pumps. The project will include incremental capital costs covering retrofitting of foam dispensers and vacuum pumps, replacement of refrigerant charging units and leak detectors, retrofitting/replacement of vacuum pumps, re-design, testing, trials, technical assistance and training. Incremental operating costs have been calculated on the basis of chemical prices prevailing in the region and requested for two years.

### Justification for the Use of HCFC-141b

3. The enterprise has selected HCFC-141b technology to replace CFC-11 in foam blowing operations. A letter advising of the Government's decision to use HCFC technology has been received by the Secretariat in accordance with Executive Committee decision 27/13 and is attached to this evaluation together with the justification and undertakings from the enterprise.

4. In 1998, Metaplus consumed 15.48 ODP tonnes of CFC-11 and 4.67 ODP tonnes of CFC-12 in the production of commercial refrigeration equipment such as commercial refrigerators, water coolers and display cabinets. The enterprise will convert its foam operations from CFC-11 to cyclopentane as the blowing agent and refrigerant operations from CFC-12 to HFC-134a, resulting in a total phase out of 20.1 ODP tonnes. The enterprise possesses four low pressure foaming machines, 10 cabinet and 2 door foaming fixtures, refrigerant charging equipment, leak detectors and vacuum pumps. The project will include incremental capital costs covering replacement of existing foam dispensers with one high pressure dispenser designed for cyclopentane application and equipped with two mixing heads. The proposal is seeking provision of cyclopentane storage, pre-mixing unit, modification of foaming fixtures and costs for the necessary safety measures such as ventilation, encapsulation, gas detection and fire protection. On the refrigerant side, the proposal requests funding replacement of refrigerant charging units and leak detectors, replacement/retrofit of vacuum pumps. Cost of re-design, testing, trials, technical assistance and training are also included in the project proposal. Incremental operating costs have been calculated using chemical prices prevailing in the region but not sought because of cost-effectiveness limitation..

5. The cost-effectiveness of the project is calculated using the 35% discounting factor for hydrocarbon safety.

## **SECRETARIAT'S COMMENTS AND RECOMMENDATIONS**

### **COMMENTS**

1. The Secretariat discussed with UNIDO the Duran project. The issue was raised regarding the boundary between the domestic and commercial refrigeration sub-sectors established by the Executive Committee in Decision 26/36 on the basis of compressor capacity. This has implications for the calculation of incremental operating costs and the eligible level of grant. Because 27% of the combined output is refrigeration units equipped with compressors of below 250 watts, incremental costs for this proportion of production must be calculated using domestic refrigeration criteria. The Secretariat also discussed the cost of retrofitting Gusmer foam dispensers. UNIDO has revised the calculations of incremental capital and operating costs, and the eligible level of the grant accordingly.

2. In regards to the Metaplus project, the Secretariat has discussed with UNIDO the implications of Decision 20/45, which stipulates that "with regard to the commercial refrigeration projects there was no need for the introduction of a discounting factor to account for the additional safety costs needed for hydrocarbon technology". Therefore, cost-effectiveness



threshold at US \$15.21/kg ODP established in commercial refrigeration sub-sector should be used for calculation of eligible grant. The proposal has been revised accordingly.

Incremental operating costs/savings

3. The projects as presented to the Executive Committee contain incremental operating savings calculated by UNIDO in accordance to the rules and policies of the Multilateral Fund. In particular, the prices used for chemicals are those prevailing in Mexico at the time of preparation of the projects.

4. The Government of Mexico has implemented institutional measures to restrict the supply of CFCs in the country. As a result, the internal market price of CFC-12 in Mexico is about \$14.30/kg, some \$6/kg more than the internal market price of HFC-134a. Similarly, the internal market price of CFC-11 is about \$14.70, some \$7/kg more than the internal market price of HCFC-141b. The latter is pending verification by Mexico Ozone Unit.

5. As a consequence of these changes in prices, the enterprises will realise net operating savings after they have converted their production.

6. However, the Government of Mexico has requested the Fund Secretariat that, since the internal market prices are abnormally high and artificially set up, regional prices should be used in the calculation of incremental operating costs/savings. This would result in incremental operating costs for the two projects, not savings.

7. Accordingly, the issue of the change in the price of chemicals in Mexico, arising from institutional measures taken by the Government, is brought for consideration of the Sub-Committee for Project Review. The projects are submitted for individual consideration.