



**United Nations
Environment
Programme**

Distr.
LIMITED



UNEP/OzL.Pro/ExCom/20/29
24 September 1996

ORIGINAL: ENGLISH

Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Twentieth Meeting
Montreal, 16-18 October 1996

PROJECT PROPOSALS: MEXICO

This document includes the Comments and Recommendations from the Fund Secretariat on the following projects:

Foam

- Conversion to CFC-free technology in the manufacture of polyurethane foam at Carmovil UNDP
- Umbrella project for conversion to CFC-free technology in the manufacture of polyurethane shoe soles UNDP

**PROJECT EVALUATION SHEET
MEXICO**

SECTOR: FOAM ODS use in sector (1989): 1,629 ODP tonnes

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

Project Titles:

- (a) Umbrella project for conversion to CFC-free technology in the manufacture of polyurethane shoes soles
- (b) Conversion to CFC-free technology in the manufacture of polyurethane foam at Carmovil

Project Data	Integral Skin	Rigid
	Umbrella	Carmovil
ODS phase-out (ODP tonnes)	95	16.2
Proposed project duration (Yrs)	1.5	1
Incremental capital cost (US\$)	768,000	120,000
Contingency (%)	10	10
Incremental operational cost (US\$)	504,790	(900)
Total project cost (US\$)	1,229,770	120,000
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US\$) { Original	1,229,770	120,000
{ Revised	1,201,590	81,400
Cost effectiveness (US\$/kg)	12.94	7.41
National Coordinating Agency	INE	INE
Implementing Agency	UNDP	UNDP
Technical review completed?	Yes	Yes

Secretariat's Recommendations		
Amount recommended (US \$)	1,201,590	80,500
Project impact (ODP tonnes)	95	14.55
Cost effectiveness (US \$/kg)	12.64	5.53
Implementing Agency support cost (US\$)	156,207	10,465
Total cost to Multilateral Fund	1,357,797	90,965

PROJECT DESCRIPTION

Molded Polyurethane Foam (Shoe Soles) Project

- (a) Umbrella project for conversion to CFC-free technology in the manufacture of polyurethane shoes soles.

1. This project has been submitted as an umbrella project in the sub-sector of manufacturing of molded polyurethane foam shoe soles. Data in the project document on CFC consumption in the foam sector indicated consumption in the integral skin and molded foam sub-sector to be 135 tonnes, of which shoe sole manufacturing accounts for 125 tonnes, i.e. 93% of the consumption in this sub-sector. Eighteen manufacturers having CFC consumption ranging from 2 to 30 tonnes have been identified. The umbrella project covers seven medium to large manufacturers (CFC consumption 7-30 tonnes) with a total consumption of 95 tonnes or 75% of the consumption of the shoe sole sub-sector.

2. Since the projects were being submitted for the first time in this sub-sector, UNDP did a study of the phase out technologies of the sector which it shared with the Fund Secretariat. The report on the study is included in the documentation for this meeting for information as document UNEP/OzL.Pro/ExCom/Info4. The study recommended the application of water-blown technology wherever possible, since it is currently available, can be used on existing equipment and produces products of acceptable quality. Other acceptable options include the use of hexane or pentane in blends or on their own and the use of HCFCs.

3. Five of the seven companies will phase out CFC-11 in their production by the use of water blown technology, while the other two, who had already done trials with hexane, will use hexane as the substitute. The enterprises converting to water-blown technology will continue to use their existing low pressure foam dispensers after conversion. However, in order to store and handle the new systems the enterprises will require jacketed temperature conditioning tanks (US \$10,000 each), mold ovens for proper mold conditioning (US \$10,000 each) and replacement of molds (US \$1,000 each) and masks (US \$150 each) to adjust for different shrinkage rates in the water-blown foam. Each of the projects will incur incremental operational cost.

4. The two enterprises using hexane will also continue to use their low pressure dispensers. Calzado Emyco operates one Sydec low pressure unit while Poliuretanos y Tecnologia operates three Elastogran VTE dispensers. The projects consist of implementing safety measures to assure proper and safe handling of the blowing agent. Thus, the items of capital cost for Calzado Emyco and Poliuretanos y Tecnologia respectively are nitrogen blanketing for tanks (US \$10,000 and two for US \$20,000); ventilation (US \$5,000 and US \$25,000), gas sensing system (US \$10,000 and US \$25,000); cooling tunnel (US \$15,000 and two for US \$30,000). In addition, the capital cost of Poliuretanos y Tecnologia includes the cost of a pre-mixer for US \$70,000.

5. Emyco will use a pre-blended hexane system which due to the nature of the blend, will require higher density shoe sole production, resulting in increased chemical usage of 8% hexane system. Hence, calculation of incremental operational cost shows that the net savings from the hexane estimated at US \$9,100 will be offset by net cost of system due to density increase estimated to be US \$11,700. Therefore, there will be incremental operational cost of US \$4,524 (NPV for 2 years), which the company is not claiming. On the other hand, Poliuretanos y Tecnologia will blend its own system and will not be affected in a similar way as Calzado Emyco. It will therefore realize incremental operational savings of US \$14,600.

4. The costs of the projects are indicated in the table below:

COMPANY	CFC USE (t)	PHASE OUT TECHN.	INCRE. CAPITAL COST US \$	INCRE. OPERAT. COST US \$	TOTAL PROJECT COST US \$	COST EFFECT US \$/kg
Calzado Emyco	7	Hexane	49,500	4,524	49,500 ⁽¹⁾	7.07
Calzado Regora	9	Water	84,000	78,300	151,740 ⁽¹⁾	16.86
Especialidades Polimericas	7	Water	73,000	62,640	118,020 ⁽¹⁾	16.86
Fastico de Leon	22	Water	112,000	104,400	216,400	9.83
Grupo Industrial Jet	30	Water	146,000	195,750	341,750	11.39
Poliuretanos y Tecnologia	8	Hexane	192,500	(14,600)	134,880 ⁽¹⁾	16.86
Suelas Italia	12	Water	111,000	78,300	189,300	15.77
TOTAL	95 t		768,000	509,314	1,201,590⁽¹⁾	12.64

⁽¹⁾ The amounts reflect the requested project costs and not the total project costs.

Rigid Foam Project

(b) Conversion to CFC-free technology in the manufacture of polyurethane foam at Carmovil

5. Carmovil manufactures insulated truck bodies, insulated ice-makers, insulated panels, insulated brine tanks, as well as spray foam applications. The company operates three types of Gusmer machines (Gusmer FF 1600, Gusmer H2000 and H-II).

6. The company will phase out CFC-11 by the use of HCFC-141b as an interim technology. Final phase out would depend on future developments but, for the spray foam this could be water-blown technology, while liquid HFCs are envisaged for the panels.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Molded Polyurethane Foam (Shoe Soles) Projects

1. The technologies as well as the items of costs were discussed between the Secretariat and UNDP. It was agreed that the replacement of the molds and masks, costing a total of US \$169,000, in the five projects using water-blown technology could be avoided, if shrinkage regulating agent were made available to the companies. It will therefore, be necessary at the time of project implementation for UNDP to explore the possibility of assisting the companies in procuring the agent.

2. The overall cost-effectiveness of the project is US \$12.64/kg. Not all the individual project costs are within the threshold cost-effectiveness value of US \$16.86/kg. Therefore, the three companies (Calzado Regora, Especialidades Polimericas and Poliuretanos y Tecnologia) whose project costs exceeded the threshold limit, requested partial funding to remain within the threshold value.

Rigid Foam Project

3. Since some of the existing high pressure machines could be retrofitted to work with the substitute blowing agent, such course of action was recommended. Thus, two of the machines would be retrofitted at US \$20,000, while the third machine will be replaced at US \$35,000. Trial and technology transfer amount to US \$19,000. The total capital cost therefore, amounted to US \$81,400 instead of US \$120,000. The incremental operational savings amount to US \$900.

Reasons for Using HCFC-141b

4. The selection of the alternative technology was governed by the following considerations:

- a) Proven and reasonably mature technology
- b) Cost effective conversion
- c) Local availability of substitute, at acceptable pricing
- d) Support from the local system suppliers, in terms of making the right formulation/blend available
- e) Critical properties to be maintained in the end product
- f) Meeting established standards (government, company, UNDP) standards on environment and safety.

5. In spray foam application, for all practical purposes, current options are restricted to HCFC-141b (high insulation requirements) and water-blown foam (low/medium insulation requirements). At this time, HCFC-141b is appropriate for the spray foam applications.

6. For the insulated panel operation, the HFC options do not currently meet the requirements on maturity and availability. Pentane isomers and water-blown formulations do not meet the company's requirements on energy efficiency, thereby eliminating these options for the insulating panels.

7. The interim technologies perform to Carmovil's standards on energy efficiency in the panel manufacturing operations. HCFC-141b provides the best option in terms of the selection criteria. Therefore, the company will apply HCFC-141b for the insulated panel operation, following conversion of spray foam applications to water-blown technology. The final step to zero ODP technology would depend on future developments.

8. The company will not request additional funding for the final stage phase out.

RECOMMENDATIONS

1. The Fund Secretariat recommends approval of the projects with associated support cost at the level of funding indicated below:

	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Umbrella project for conversion to CFC-free technology in the manufacture of polyurethane shoes soles	1,201,590	156,207	UNDP
(b) Conversion to CFC-free technology in the manufacture of polyurethane foam at Carmovil	80,500	10,465	UNDP

2. To request UNDP, during the process of project implementation, to explore the avenues for providing the shrinkage regulating agent for the shoe sole manufacturers and to make the provision of this agent the preferred option over the replacement of the molds and masks.

3. To request UNDP to report on the results of its effort to provide the required agent following the implementation of the project.