



**United Nations
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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Twentieth Meeting
Montreal, 16-18 October 1996

PROJECT PROPOSAL: EGYPT

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

Refrigeration

- Elimination of CFCs in the manufacture of commercial refrigeration equipment (two enterprises)

UNDP

PROJECT EVALUATION SHEET **EGYPT**

SECTOR: REFRIGERATION ODS use in sector (1991): 1,045 ODP tonnes

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

Project Titles:

- (a) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at El-Mohandes
- (b) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at Amiral

Project Data	Commercial Refrigeration	
	El-Mohandes	Amiral
ODS phase-out (ODP tonnes)	13.0	10.0
Proposed project duration (Yrs)	1.5	1.5
Incremental capital cost (US\$)	265,500	205,500
Contingency (%)	10	10
Incremental operational cost (US\$)	0	0
Total project cost (US\$)	265,500	205,500
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US\$) { Original	265,500	205,500
{ Revised	190,000	160,000
Cost effectiveness (US\$/kg)	14.6	16.0
National Coordinating Agency	EEAA	EEAA
Implementing Agency	UNDP	UNDP
Technical review completed?	Yes	Yes

Secretariat's Recommendations		
Amount recommended (US \$)	190,000	160,000
Project impact (ODP tonnes)	13.0	10.0
Cost effectiveness (US \$/kg)	14.6	16.0
Implementing Agency support cost (US\$)	24,700	20,800
Total cost to Multilateral Fund	214,700	180,800
Total cost of Umbrella Project	350,000	
Overall cost-effectiveness	15.21	

PROJECT DESCRIPTION

Umbrella Project on:

- (a) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at El-Mohandes, and
- (b) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at Amiral

1. There are eleven companies in the commercial refrigeration sub-sector in Egypt. Projects for nine enterprises have been approved by the Executive Committee. El-Mohandes and Amiral are the two remaining enterprises.

2. Under this umbrella project, El-Mohandes and Amiral will eliminate the use of 23 MT of CFC-11 and CFC-12 in the manufacture of refrigerators, freezers, cabinets, cold rooms, and insulation panels through formulations and procedures for foam injection based on the use of HCFC-141b as blowing agent for foam and HFC-134a as refrigerant. The phase-out of CFCs in the commercial refrigeration sub-sector will be completed in Egypt.

3. Conversion to HFC-134a refrigerant involves the replacement of refrigerant charging boards, leak detectors, refitting existing vacuum system, model redesign, testing and training.

4. Conversion to HCFC-141b entails the replacement of existing low pressure foam machines with high pressure dispensers, trials and training.

5. Fully water based systems are selected as a permanent technology. Until the commercial introduction of mature water-based systems, (which is expected in up to 2-3 years) a combination of water + HCFC-141b based systems will need to be used as an interim technology, to maintain product standards and acceptability.

6. The boiling point of HCFC-141b, being closer to that of CFC-11, makes the handling and transportation of pre-blended HCFC-141b systems manageable. The HCFC-141b based systems are technically mature and commercially viable. They also provide relatively the most acceptable insulation value and energy efficiency, and the lowest investment and operating costs vis-à-vis other options. Also no major changes in the auxiliary equipment/tooling, in the production program, such as mold redesign, are needed. No additional investments are foreseen to be needed to convert to fully water blown technology after this interim period.

7. From the available permanent technologies, the pentane based (n-, iso-, cyclo) systems require extensive safety related provisions/investments. Due to safety considerations, the use of pre-blended systems is not viable, therefore, additional expensive pre-mixing equipment would be required. El-Mohandes and Amiral are small scale users. Both enterprises decided not to use

hydrocarbon based systems. The HFC-based systems (either liquid or gaseous), though promising, are not yet reported to be commercially available or technically mature.

8. UNDP will oversee the successful implementation of this project and will provide technical assistance during project execution.

9. El-Mohandes and Amiral will absorb incremental operational costs.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven. The choice of interim HCFC technology has been fully explained.

2. UNDP and the enterprise will ensure that the low pressure machine will not be used in CFC based foam operation.

3. The Secretariat discussed with UNDP the eligibility and incrementality of all cost items. The cost of foaming equipment, leak detectors and technology transfer has been reduced. The project budget has been adjusted accordingly.

4. The overall cost-effectiveness of the umbrella project does not exceed the cost-effectiveness threshold value. Individual enterprise proposals do not exceed cost-effectiveness threshold more than 100 per cent above the established threshold.

RECOMMENDATIONS

1. The Fund Secretariat recommends approval of the umbrella project with associated support costs at the funding level shown in the table below:

	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at El-Mohandes	190,000	24,700	UNDP
(b) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at Amiral	160,000	20,800	UNDP
TOTAL	350,000	45,500	