



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

Nineteenth Meeting
Montreal, 8-10 May 1996

PROJECT PROPOSAL: PAKISTAN

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

Refrigeration

- Conversion of refrigerator manufacture from CFC-11 to cyclopentane foam blowing agent and CFC-12 to R-134a refrigerant at Domestic Appliances Ltd. World Bank

SECTOR: REFRIGERATION ODS use in sector (1994): 550 ODP tonnes

Sub-sector cost-effectiveness thresholds: Domestic refrigeration US \$13.76/kg

Conversion of refrigerator manufacture from CFC-11 to cyclopentane foam blowing agent and CFC-12 to R-134a refrigerant at Domestic Appliances Ltd.

Project Data	Domestic Refrigeration
	Domestic Appliances Ltd.
ODS phase-out (ODP tonnes) ¹	17.1
Proposed project duration (Yrs)	1.5
Incremental capital cost (US\$)	429,500
Contingency (%)	10
Incremental operational cost (US\$)	46,700
Total project cost (US\$)	515,300
Local ownership (%)	50
Export component (%)	0
Amount requested (US\$) { Original	324,850
{ Revised	257,650
Cost effectiveness (US\$/kg)	9.00
National Coordinating Agency	EUAD
Implementing Agency	World Bank
Technical review completed?	Yes

<i>Secretariat's Recommendations</i>	
Amount recommended (US \$)	257,650
Project impact (ODP tonnes)	17.1
Cost effectiveness (US \$/kg)	9.00
Implementing Agency support cost (US\$)	33,494
Total cost to Multilateral Fund	291,144

¹ Figure is an average of 1992-1994.

PROJECT DESCRIPTION

Conversion of refrigerator manufacture from CFC-11 to cyclopentane foam flowing agent and CFC-12 to R-134a refrigerant at Domestic Appliances Ltd.

1. The consumption of CFCs in the domestic refrigeration sector is estimated at 500 tonnes. There are eleven major manufacturers of refrigeration appliances in Pakistan. The Executive Committee approved two projects on phasing out of 116 tonnes of CFCs in two enterprises.
2. The current production at Domestic Appliances Ltd. is 13,700 units. All the current production is sold in Pakistan. The objective of this project is to phase out 6.1 tonnes of CFC-12 converting to HFC-134a refrigerant and 11 tonnes of CFC-11 applying cyclopentane based foaming technology.
3. Conversion to HFC-134a refrigerant involves replacement and retrofit of existing charging and evacuation equipment, provision of new leak detector. Conversion to cyclopentane requires replacement of existing two low pressure machines with one high pressure machine, installation of a cyclopentane storage and delivery system. Conversion to cyclopentane will necessitate also implementing stringent safety measures owing to the flammable nature of cyclopentane. The implementation of the project will be supported by equipment suppliers which have adequate experience in applying cyclopentane and HFC-134a based technologies.
4. Incremental capital costs are associated with new equipment, training, technology transfer and testing.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven.
2. The Secretariat discussed with the World Bank eligibility and incrementality of all cost items. Recommendations of the Fund Secretariat regarding the choice and the cost of the charging machine and the leak detector have been accepted and the project cost was adjusted accordingly. The extended life of the foaming machine was considered as technological upgrades and was accounted for in the calculation of the incremental cost project.

RECOMMENDATIONS

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

	Project Cost US \$	Support Cost US \$	Implementing Agency
Conversion of refrigerator manufacture from CFC-11 to cyclopentane foam flowing agent and CFC-12 to R-134a refrigerant at Domestic Appliances Ltd.	257,650	33,494	World Bank