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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Thirty-second Meeting
Ouagadougou, 6-8 December 2000

PROJECT PROPOSALS: PAKISTAN

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

Refrigeration:

- Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Mumtaz Engineers World Bank
- Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Pakistan Airconditioning Engineering Co. P. Ltd. (PAECO) World Bank

PROJECT EVALUATION SHEET PAKISTAN

SECTOR: Refrigeration ODS use in sector (199): ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial US \$15.21/kg
Domestic US \$13.76/kg

Project Titles:

- (a) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Pakistan Airconditioning Engineering Co. P. Ltd. (PAECO)
- (b) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Mumtaz Engineers

Project Data	Commercial	Multiple-subsectors
	PAECO	Mumtaz
Enterprise consumption (ODP tonnes)	21.00	14.68
Project impact (ODP tonnes)	19.74	13.94
Project duration (months)	36	36
Initial amount requested (US \$)	176,681	204,736
Final project cost (US \$):		
Incremental capital cost (a)	153,000	161,000
Contingency cost (b)	15,300	16,100
Incremental operating cost (c)	58,300	97,741
Total project cost (a+b+c)	226,600	274,841
Local ownership (%)	100%	100%
Export component (%)	0%	0%
Amount requested (US \$)	176,681	204,736
Cost effectiveness (US \$/kg.)	8.95	14.69
Counterpart funding confirmed?	Yes	Yes
National coordinating agency	Ministry of Environment	Ministry of Environment and Forest
Implementing agency	IBRD	IBRD

Secretariat's Recommendations		
Amount recommended (US \$)	176,681	204,736
Project impact (ODP tonnes)	19.74	13.94
Cost effectiveness (US \$/kg)	8.95	14.69
Implementing agency support cost (US \$)	22,969	26,616
Total cost to Multilateral Fund (US \$)	199,650	231,352

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1998)	1,324.00 ODP tonnes
- Baseline consumption of Annex A Group I substances (CFCs)	1,679.40 ODP tonnes
- Consumption of Annex A Group I substances for the year 1997	1,197.00 ODP tonnes
- Baseline consumption of CFCs in refrigeration sector	Not Available ODP tonnes
- Consumption of CFCs in refrigeration sector in 1999	977.00 ODP tonnes
- Funds approved for investment projects in refrigeration sector as of July 2000 (31st Meeting)	US\$5,385,604.00
- Quantity of CFC to be phased out in investment projects in refrigeration sector as of end of 1999	464.00 ODP tonnes

1. The Executive Committee has approved about US \$5,385,604 for 11 projects to phase out 464 ODP tonnes of CFC for major manufacturers of domestic and commercial refrigeration equipment in Pakistan. There are about 15 remaining medium-sized commercial refrigeration enterprises in Pakistan with total annual production of approximately 200,000 units.

Mumtaz Engineers

2. The enterprise consumed 10.8 ODP tonnes of CFC-11 and 3.88 ODP tonnes of CFC-12 in the production of commercial refrigeration equipment (visi-coolers, deep-freezers and milk chillers) in 1999. Part of Mumtaz's production is equipped with compressors below 250 wt capacity, this part of the production qualifies as domestic refrigeration sector project. The enterprise currently operates one low-pressure dispenser for foaming operations in the baseline.

3. The current project will phase-out 10.8 ODP tonnes of CFC-11 and 3.88 ODP tonnes of CFC-12 in the manufacture of domestic refrigeration equipment at Mumtaz Engineers in Pakistan by converting from CFC-11 to HCFC-141b as the foam blowing agent and from CFC-12 to HFC-134a as the refrigerant. Under the current project, the existing low-pressure foam dispenser will be replaced by a high-pressure foam dispenser (US \$90,000). The enterprise will require refrigerant charging units (US \$35,000), vacuum pumps (US \$4,000), temperature conditioning system (US \$10,000) and leak detectors (US \$2,000). Other costs include redesign, testing, trials (US \$10,000), training (US \$10,000) and technical assistance (US \$10,000). Incremental operating costs are requested by the enterprise reflecting the higher cost of chemicals and an increase in foam density.

Pakistan Airconditioning Engineering (PAECO)

4. The enterprise consumed 18 ODP tonnes of CFC-11 and 3 ODP tonnes of CFC-12 in the production of commercial refrigeration equipment (blast-freezers, cold stores and refrigerated trailers) and rigid foam for insulation sandwich panels in 1999. The enterprise currently operates one low-pressure dispenser for foaming operations.

5. The project will phase-out 18 ODP tonnes of CFC-11 and 3 ODP tonnes of CFC-12 in the manufacture of domestic refrigeration equipment at Pakistan Airconditioning. This will be achieved by converting from CFC-11 to HCFC-141b as the foam blowing agent and from CFC-12 to HFC-134a as the refrigerant. The existing low-pressure foam dispenser will be replaced by a high-pressure foam dispenser (US \$90,000). The enterprise will require refrigerant charging units (US \$20,000), vacuum pumps (US \$6,000), temperature conditioning system (US \$10,000) and leak detectors (US \$2,000). Other costs include redesign, testing, trials (US \$10,000), training (US \$10,000) and technical assistance (US \$10,000). Incremental operating costs are requested by the enterprise reflecting the higher cost of chemicals and an increase in foam density.

Justification for the use of HCFC-141b

6. The two enterprises have selected HCFC-141b technology to replace CFC-11 in their foam blowing operations. It is an interim solution until non-CFC systems (different from hydrocarbons) are commercially available. A letter advising the Government decision to use HCFC technology has been received by the Secretariat in accordance with the Executive Committee Decision 27/13 and is attached to this evaluation together with a justification from the implementing agency.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat has discussed with the World Bank the incremental operating costs in the PAECO project and the requirements of Decision 31/45 on the new sub-sector for assembly, installation and servicing. Part of the production of PAECO has been identified to be under the new sub-sector. Subsequently, part of the incremental operating costs have been recognized as ineligible.

2. The incremental capital and operating costs of the Mumtaz and PAECO projects have been agreed between the Secretariat and the World Bank

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the refrigeration projects from the World Bank with the level of funding and associated support costs as indicated below.

	Project Title	Project Funding (US\$)	Support Cost (US\$)	Implementing Agency
(a)	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Pakistan Airconditioning Engineering Co. P. Ltd. (PAECO)	176,681	22,969	IBRD
(b)	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Mumtaz Engineers	204,736	26,616	IBRD

Annex

Additional Justification for use of HCFC technology

The implementing agency expert appraised the prospective recipient enterprise, Mumtaz Engineers, prior to the preparation of this project document, during February 2000, and had detailed discussions with the technical and managerial personnel of the enterprise, regarding the choice of technology for replacing the existing CFC-based technology, under the project. The enterprise was briefed in detail about the following:

1. An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
2. The techno-economic impact of each technology on the products manufactured, and the processes and practices employed by Mumtaz Engineers.
3. The possible implication of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, fire and explosion hazards.
4. It was emphasized to Mumtaz Engineers, that HCFC technologies are interim in nature due to their residual ODP and therefore may continue to adversely affect the environment, though at a lower scale than CFCs.
5. It was further explained that HCFCs may become controlled substances under present or future international conventions and will therefore also need to be phased out at a future date, and any investments required for their phase-out and for conversion to safer technologies, may have to be borne by Mumtaz Engineers.

Mumtaz Engineers indicated their preference for selection of HCFC-141b based technology, in their manufacture of rigid polyurethane foam. The justifications offered by them are summarized as below:

1. Hydrocarbon (pentanes) technology involves fire and explosion hazards. The local laws governing the use of hydrocarbons cannot be complied with, in the existing manufacturing premises of Mumtaz Engineers, as they are located in a crowded industrial area with a factory not designed for using hazardous chemicals. Due to the sharp competition, investments on changing or relocating the factory are not commercially justified at this point. The production is labor intensive. Therefore there are a large number of workers in the factory at any given time. Hydrocarbon technology will cause a safety and security risk, due to the fire and explosion hazard.
2. HCFC-141b based formulations are commercially available, which are being successfully used by their competitors who have earlier participated in the Montreal Protocol programme. They also doubt that pentanes of the necessary grades are easily or economically available for the relatively small quantities they consume.
3. Mumtaz Engineers also feel, that the additional equipment required for using pentane-based technology would present a long term operation and maintenance challenge, in terms of additional costs and trained labor. They would rather opt for simple and rugged equipment, which is adequate for HCFC based systems.

Mumtaz Engineers indicated that HCFCs are environmentally much safer than CFCs. The changeover is cost-effective and quick as compared to other options. The technology is proven. Thus, they would prefer HCFC technology.

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No 7(1)/Env/1&O/2000
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Islamabad, 06 October 2000

Subject: **PAKISTAN MONTREAL PROTOCOL PROJECT: MUMTAZ & PAECO**

Dear Mr. Pedersen,

I am desired to refer to the World Bank's fax message of 11 September 2000 on the captioned subject and pleased to convey the concurrence of the Ministry of Environment, Local Government & Rural Development, Government of Pakistan, Islamabad for submission of the following ozone depleting substance (ODS) phase out sub-projects to the Multilateral Fund for the implementation of the Montreal Protocol.

- i. Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Mumtaz Engineers; and
- ii. Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at Pakistan Airconditioning Engineering Co. (Pvt) Ltd. (PAECO).

2. We have reviewed the conversion of enterprises mentioned above and their proposal for the use of HCFC as a substitute. The government endorses the selection of HCFC for the enterprises as agreed by respective enterprise vide para 'd' of the letter of commitment.

3. Pakistan is aware that HCFC is a transitional substance and later conversion to a non-ODS substance. Pakistan also agreed that in accordance with ExCom decisions, no further funding can be requested for the transition to a non-ODS substitute in the future.

With best regards,

Sincerely yours,

M. Ajmal
(MUHAMMAD AJMAL)
NPD

6/10/2000

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C.C.

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