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PROJECT PROPOSALS: PAKISTAN

This document consists of the comments and recommendations of the Fund Secretariat on the following projects:

Foam

•	Elimination of CFC-11 through conversion to methylene chloride/LIA technology in the manufacture of flexible polyurethane slabstock foam at United Foam Industries	World Bank
•	Elimination of CFC-11 through conversion to water-based technology in the manufacture of flexible molded polyurethane foam at Saleem Automotive Industries Ltd.	World Bank

Refrigeration

•	Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a in the manufacture of domestic refrigeration equipment at Refrigerators Manufacturing Company Pakistan Ltd.	World Bank

PROJECT EVALUATION SHEET
PAKISTAN

SECTOR: FOAM ODS use in sector (1995): 700 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible US $6.23/kg
Integral Skin US $16.86/kg

Project Titles:

(a) Elimination of CFC-11 through conversion to methylene chloride/LIA technology in the manufacture of flexible polyurethane slab stock foam at United Foam Industries

(b) Elimination of CFC-11 through conversion to water-based technology in the manufacture of flexible molded polyurethane foam at Saleem Automotive Industries Ltd.

Project Data	**Flexible**	**Integral Skin**
	United Foam	**Saleem**
ODS phase-out (ODP tonnes)	28.6	2.5
Proposed project duration (months)	24	18
Incremental capital cost (US $)	245,300	22,000
- including contingency (%)	10	10
Incremental operational cost (US $)	(22,500)	11,875
Total project cost (US $)	222,800	33,875
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US $) {Original}	178,200	33,875
{Revised}		
Cost effectiveness (US $/kg)	6.23	13.55
National Coordinating Agency	Ministry of Environment, Local Government and Rural Development	
Implementing Agency	World Bank	
Technical review completed?	Yes	

Secretariat's Recommendations:		
Amount recommended (US $)	178,200	Pending
Project impact (ODP tonnes)	28.6	
Cost effectiveness (US $/kg)	6.23	
Implementing Agency support cost (US $)	23,166	
Total cost to Multilateral Fund (US $)	201,366	

PROJECT DESCRIPTION

(a) Elimination of CFC-11 through conversion to methylene chloride/LIA technology in the manufacture of flexible polyurethane slab stock foam at United Foam Industries

(b) Elimination of CFC-11 through conversion to water-based technology in the manufacture of flexible molded polyurethane foam at Saleem Automotive Industries Ltd.

1. World Bank reports in the project document that the Pakistan Country Program indicates only three enterprises and a total ODS consumption of 250 tonnes (baseline 1994). Recent investigations, involving information received form chemical suppliers and the Pakistan Plastics Manufacturing Association (PPMA) puts the 1995 ODS use in the foam sector closer at 700 tonnes. 390 tonnes is used in rigid foam applications out of which 375 tonnes is used for thermoware production by 29 enterprises. Five projects (including one thermoware umbrella project for 19 enterprises) have been approved in the foam sector to phase out 582 tonnes.

2. The CFC consumption for 1996 was reported to be 1,671 ODP tonnes.

Flexible Slab stock Foam

(a) Elimination of CFC-11 through conversion to methylene chloride/LIA technology in the manufacture of flexible polyurethane slabstock foam at United Foam Industries

3. United Foam Industries (Pvt) Ltd. is one of the oldest and well-known manufacturers of flexible polyurethane foam in Pakistan. Most of the foam is marketed as mattresses, but the products include sofa cushions, pillows, bus seats, slab sheets, carpet underlay, wash pads, quilts, folded mattresses, baby cushions, chair cushions and sofa – cum – beds. The enterprise was founded in 1977 and is 100% Pakistani owned. The enterprise produced 1,216 tonnes of foam in 1997, with 381 tonnes of lower density foam produced with CFC-11, and 835 tonnes of foam produced using methylene chloride.

4. CFC-11 consumed in 1997 was 28.6 tonnes. The company also used approximately 90 tonnes per year of methylene chloride in its foam production. It operates two slabstock production units. A 5-year-old Cannon Viking Maxfoam unit produces the majority of the foam using methylene chloride as a blowing agent. The lower density foams are produced on the Viking 120E unit (20 years old). The lower density foams exhibit a considerable number of pinholes when produced on the maxfoam unit, but this problem is not evident on the Viking unit. Therefore, the enterprise has continued using CFCs for the production of lower density foams on the Viking dispenser. the use of this dispenser is seen as a “stop gap” measure until the problems are overcome on the maxfoam machine.

5. United Foam Industries (Pvt) Ltd. will phase out the use of the remaining CFC-11 by converting to methylene chloride/LIA technology. The project will require the retrofit of the existing inclined conveyor production unit (Viking 120E) with adequate process exhaust (US $135,000), and installation of a methylene chloride as well as a softening additive metering

stream (US $50,000). Other costs include trials (US $18,000), technology transfer and training (US $20,000), contingency (US $22,300) and incremental operating benefits for 4 years (US $22,500).

Integral Skin Foam

(b) Elimination of CFC-11 through conversion to water-based technology in the manufacture of flexible molded polyurethane foam at Saleem Automotive Industries Ltd.

6. Saleem Automotive Industries (Pvt) ltd., is a small manufacturer of seats for the transportation sector. Customers are Fiat and Massey Furgeson, Ford, and multiple retailers. The enterprise was founded in 1991, is located in Lahore, Pakistan and is 100% Pakistani owned.

7. Saleem Automotive Industries operates one low pressure, 30 kg/min dispenser made by Mechs in Lahore, Pakistan, which is in incredibly good condition. CFC-11 is preblended in an open top premixer. Saleem uses vacuum molds and foams directly onto the vinyl liner.

8. The foam system is purchased from systems suppliers and CFC-11 is added to the formulation to manipulate density and hardness. The enterprise uses about 20 tonnes per year of total chemicals. CFC-11 consumed in 1997, inclusive of evaporation related to open top premixing, was 2.5 tonnes.

9. It will phase out the use of CFC-11 in the production of flexible molded polyurethane foam by converting to all water blown technology. The project includes trials (US $10,000), contingency (US $2,000) and incremental operating costs for 2 years (US $11,875). A 40% correction factor has been applied to the calculation of the incremental operational cost to account for evaporative losses.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Flexible Slabstock

(a) United Foam Industries

1. The World Bank and the Secretariat discussed the project in the light of the company's desire to phase out the remaining CFC-11 and the problems encountered with respect to pinholes. It was acknowledged that replacement of the lay down device could eliminate the problem and agreed that the company should have the flexibility to apply the approved amount or part of it to the cost of replacement of the lay down device in order to facilitate its ODS phaseout.

Integral Skin

(b) Saleem Automotive Industries Ltd.

2. The project's incremental capital costs have been agreed. Hence the incremental operational cost and consequently the eligible grant are subject to the outcome of the discussion on this issue.

3. Since the incremental operational cost calculation includes a 40% correction factor for evaporative losses its level is subject to the outcome of the discussion on this issue.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the United Foam project with the funding level and associated support cost indicated below.

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Elimination of CFC-11 through conversion to methylene chloride/LIA technology in the manufacture of flexible polyurethane slabstock foam at United Foam Industries	178,200	23,166	World Bank
Elimination of CFC-11 through conversion to water-based technology in the manufacture of flexible molded polyurethane foam at Saleem Automotive Industries Ltd.	Pending		World Bank

PROJECT EVALUATION SHEET
PAKISTAN

SECTOR: REFRIGERATION ODS use in sector (1996): 1,615 ODP tonnes

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

Project Title:

Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a in the manufacture of domestic refrigeration equipment at Refrigerators Manufacturing Company Pakistan Limited

Project Data	**Domestic**
	Refrigerators Manufacturing Company Pakistan Limited
ODS phase-out (ODP tonnes)	30.16
Proposed project duration (months)	24
Incremental capital cost (US $)	227,700
- including contingency (%)	10
Incremental operational cost (US $)	91,811
Total project cost (US $)	319,511
Local ownership (%)	40
Export component (%)	0
Amount requested (US $) {Original}	177,042
{Revised}	127,804
Cost effectiveness (US $/kg)	4.24
National Coordinating Agency	Ministry of Environment
Implementing Agency	World Bank
Technical review completed?	Yes

Secretariat's Recommendations:	
Amount recommended (US $)	127,804
Project impact (ODP tonnes)	30.16
Cost effectiveness (US $/kg)	4.24
Implementing Agency support cost (US $)	16,614
Total cost to Multilateral Fund (US $)	144,418

PROJECT DESCRIPTION

Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a in the manufacture of domestic refrigeration equipment at Refrigerators Manufacturing Company Pakistan Limited

1. The ODS consumption in the refrigeration and air-conditioning sector in Pakistan was about 1,615 MT ODS in 1995. The sub-sector of domestic refrigeration consumed about 625 MT ODS in 1995. This sub-sector is comprised of eleven major enterprises manufacturing domestic refrigerators and freezers with a combined annual total production of about 230,000 units. The Executive Committee approved seven domestic refrigeration projects in Pakistan to phase out 389 ODP tonnes.

2. The approval of this project will help Pakistan in meeting its obligation for reduction in ODS consumption in accordance with the Montreal Protocol schedule.

3. Refrigerators Manufacturing Company Pakistan Limited is a 40% indigenously owned private enterprise. 60% of the company is held by Philips of the Netherlands. It was established in 1991 and manufactures three models of household refrigerators along with a network of service centers throughout Pakistan. The company reported a 1996 ODP consumption of 32.31 tonnes. Total refrigerator unit production in 1996 was 27,500 units. Total installed capacity is about 75,000 units/year.

4. The company proposes to convert the foaming operations to HCFC-141b and adopt HFC-134a as refrigerant.

5. The proposal includes analysis of available alternative technologies in foam operations, including cyclopentane and liquid HFC-based systems. The company has chosen HCFC-141b as an interim technology as the system is technically mature and commercially available. The product also provides the most acceptable insulation value and energy efficiency, and the lowest investment and operating costs. Any additional investments required to convert to HFC based systems will be borne by the enterprise to the extent required.

6. The conversion of the foam system to HCFC-141b requires a new pre-mixing station, a high-pressure dispenser, high pressure fittings and piping, electrical works, civil works, the use of new refrigerator inner liners, new chemicals, technical assistance, and trials.

7. The equipment requested to convert to HFC-134a technology includes new HFC-134a compressors, one new vacuum pump and the retrofitting of five others, new refrigerant charging units, changes to the refrigeration system, new leak detectors, technical assistance, training, and trials.

8. The company will dispose of any equipment that has been replaced under this project.

9. The incremental operating costs for six months are $107,106, and include the higher cost of foam blowing chemicals, plastic liners, refrigerant, compressor, evaporator, condenser, capillary, and filter dryer costs.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat discussed with the World Bank the request for funding associated with an increase in foam density. The baseline density was calculated based on the weight of foam used by the enterprise for insulation. It was proved that increase in density is not necessary for new HCFC-141b foam insulation. The incremental operating cost was adjusted accordingly.

2. The cost of the new batch pre-mixers to manage HCFC-141b foam was reduced in line with quotations available from suppliers of the equipment. The cost of technical assistance, trials and training was rationalized to reflect the industry norms.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the project with the funding level and associated support cost as indicated below.

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b and HFC-134a in the manufacture of domestic refrigeration equipment at Refrigerators Manufacturing Company Pakistan Limited	127,804	16,614	World Bank