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

Eighteenth Meeting
Vienna, 22-24 November 1995

PROJECT PROPOSALS: TURKEY

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 Rigid Polyurethane Foam Insulation Panels at Barlan Metal UNIDO
- Conversion to CFC-free Technology in the Manufacture of Rigid Polyurethane Foam Insulation Panels at Tek-iz Izolasyon ve Yapi Elemanlari Sanayii World Bank

Refrigeration

- Elimination of the use of CFCs in the manufacture of domestic refrigerators at Pekel World Bank

PROJECT EVALUATION SHEET **TURKEY**

SECTOR: FOAM ODS use in sector (1993): 1645 ODP tonnes

Sub-sector cost-effectiveness threshold: Rigid polyurethane: 7.83 US \$/kg

Project Titles:

- (a) Conversion to CFC-free technology in the manufacture of rigid polyurethane foam insulation panels at Barlan Metal
- (b) Conversion to CFC-free technology in the manufacture of rigid polyurethane foam insulation panels at Tek-Iz Izolasyon ve Yapi Elemanlari Sanayii

Project Data	Rigid Polyurethane	
	Barlan Metal*	Tek-Iz
ODS phase-out (ODP tonnes)	462	177
Proposed project duration (Yrs)	1.5	1
Incremental capital cost (US\$)	804,050	964,000
Contingency (%)	10	15
Incremental operational cost (US\$)	0	0
Total project cost (US\$)	804,050	1,108,000
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US\$) {Original	1,322,750	1,108,000
{Revised	804,050	729,650
Cost effectiveness (US\$/kg)	1.74	6.25
National Coordinating Agency	Ministry of Environment	Undersecretariat of Treasury and Foreign Trade & Ministry of Environment
Implementing Agency	UNIDO	World Bank
Technical review completed?	Yes	Yes

Secretariat's Recommendations		
Amount recommended (US \$)	804,050	729,650
Project impact (ODP tonnes)	462	155
Cost effectiveness (US \$/kg)	1.74	3.06
Implementing Agency support cost (US\$)	104,526	94,855
Total cost to Multilateral Fund (US \$)	908,576	824,505

* New proposal to 18th Meeting.

PROJECT DESCRIPTION

(a) Conversion to CFC-free Technology in the Manufacture of Rigid Polyurethane Foam Insulation Panels at Barlan Metal

1. The enterprise produces rigid polyurethane foam sandwich panels by the technique of continuous and discontinuous lamination.

2. The continuous line, which produces 2,250,000 square meter of foam, consists of a metal processing section; foaming section with preheating facility and high pressure foam machine; and a cutting section.

3. The discontinuous line, which produces 250,000 square meter of foam, consists of one multilayer double action type panel press (Makron 0Y) with four mould plates, and a high pressure foam machine.

4. The enterprise will convert to n-pentane based foam for the two lines.

5. For the continuous line, the conversion will involve provision of pentane storage facility; pentane metering unit; retrofit of high pressure machine and other foam equipment; and installation of gas detection system, ventilation and fire protection system.

6. The conversion of the discontinuous line will involve the provision of pentane primixing unit with pump and piping; retrofitting of foam machine and of mixing head; ex-proofing of Makron press; and installation of gas detection system, ventilation and fire protection system.

7. The capital costs of the two lines include cost of commissioning and start-up as well as the cost of general consultancy services and training. Ten per cent contingency is applied to capital cost of the project.

8. UNIDO reported insignificant amount of net operating savings.

(b) Conversion to CFC-free Technology in the Manufacture of Rigid Polyurethane Foam Insulation Panels at Tek-Iz

10. The enterprise is a producer of metal clad insulation panels for construction and cold storage industry with estimated 1995 production volume of 425,000 square meter. The technology currently used is the discontinuous technology.

11. The enterprise has four manual presses and one low pressure foam machine, as well as two high pressure foam machines for spray foam insulation for field application.

12. The enterprise has selected cyclopentane as the substitute for CFC-11 for the main foam operation, and HCFC-141b for the small spray foam field operation.

13. To convert to cyclopentane the enterprise has purchased two new Manni Presses and one high pressure foam machine with two mixheads and a pentane blender. In addition, pentane bulk storage equipment and piping is to be installed. The presses will be provided with hoods and sensors. Likewise, the foam machine will be enclosed in a ventilated enclosure with sensors

14. The capital costs include cost of trials, technology transfer and safety training, and commissioning and start-up.
15. Fifteen per cent contingency cost is applied to capital costs.
16. Tek-Iz is not claiming operating costs as they will be offset by operating savings.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

(a) Barlan Metal

1. The Secretariat discussed with UNIDO eligibility and incrementality of all cost items. The project budget has been accordingly adjusted.

(b) Tek-Iz

1. The high pressure foam machine and two Manni presses have been procured by Tek-Iz. The company will share 50 per cent of the cost of the presses.
2. The Secretariat discussed the cost of the project with IFC (World Bank Group) and the project budget has been adjusted accordingly.

RECOMMENDATIONS

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

	Project	Project Cost US \$	Support Cost US \$	Implementing Agency
(a)	Conversion to CFC-free technology in the manufacture of rigid polyurethane foam insulation panels at Barlan Metal	804,050	104,526	UNIDO
(b)	Conversion to CFC-free technology in the manufacture of rigid polyurethane foam insulation panels at Tek-Iz Izolasyon ve Yapi Elemanlari Sanayii	729,650	94,855	WB

2. The Fund Secretariat further recommends that project (b) be included in the Consolidated List.

PROJECT EVALUATION SHEET TURKEY

SECTOR: REFRIGERATION ODS use in sector (1993): 1,814 ODP tonnes

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

Project Title: Elimination of the use of chlorofluorocarbons in the Manufacture of Domestic Refrigerators at Pekel.

Project Data	Domestic Refrigeration
	Pekel
ODS phase-out (ODP tonnes)	100
Proposed project duration (Yrs)	0.5
Incremental capital cost (US\$)	1,430,000
Contingency (%)	1
Incremental operational cost (US\$)	384,000
Total project cost (US\$)	1,814,000
Local ownership (%)	46
Export component (%)	40
Amount requested (US\$) { Original	736,700
{ Revised	500,664
Cost effectiveness (US\$/kg)	5.00
National Coordinating Agency	TDF
Implementing Agency	WB
Technical review completed?	Yes

Secretariat's Recommendations	
Amount recommended (US \$)	500,664
Project impact (ODP tonnes)	160
Cost effectiveness (US \$/kg)	5.00
Implementing Agency support cost (US\$)	65,086
Total cost to Multilateral Fund	565,750

PROJECT DESCRIPTION

Elimination of the use of chlorofluorocarbons in the Manufacture of Domestic Refrigerators at Pekel

1. Consumption of CFCs in the domestic and commercial refrigeration sector in Turkey is 1,814 MT. There are six major domestic refrigerator and freezer manufacturers. The Executive Committee approved three CFC phase-out projects for three companies in Turkey.
2. Pekel is one of the four major producers of domestic refrigerators. The output is about 200,000 units per year. Pekel has been using 50 per cent CFC-11 reduced formulation in its foaming operations since 1992.
3. Pekel started realizing the ODS phase-out through technical assistance from a number of companies including its joint venture partner. Since 60 MT of CFC-11 and 40 MT of CFC-12 have been eliminated in early 1995 by converting to cyclopentane as a blowing agent and to HFC-134a as a refrigerant, retroactive funding is being requested for the conversion.
4. The project has been implemented through the acquisition of the new technology, the procurement and installation of new equipment and machinery, engineering assistance and training.
5. Conversion to HFC-134a refrigerant involved replacement of charging equipment, and leak detectors; replacement of a number of vacuum pumps and retrofits of others; and procurement of testing equipment.
6. Conversion to cyclopentane entailed the replacement of existing low pressure foam machines with high pressure machines, procurement and installation of new foaming fixtures and new conveyors, providing cyclopentane storage and delivery systems, and replacement of premixing stations. Conversion to cyclopentane necessitated also implementing a stringent safety programme to ensure personnel and plant safety owing to the flammable nature of cyclopentane.
7. Most of the replaced production equipment were procured as used equipment from Pekel's Italian joint-venture partner. Therefore, the company gained a substantial technological upgrade by replacing an aged production line with brand new equipment incorporating the latest technology. Eligible incremental cost has been calculated on the basis of what would have been the cost of retrofitting the existing foaming equipment, where possible, and 50 per cent company cost-sharing of testing equipment.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven.
2. The Secretariat discussed with the World Bank the eligibility and incrementality of all cost items. The project budget has been adjusted accordingly.

RECOMMENDATIONS

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

Project	Project Cost US \$	Support Cost US \$	Implementing Agency
Elimination of the use of chlorofluorocarbons in the Manufacture of Domestic Refrigerators at Pekel.	500,664	65,086	World Bank

2. The Fund Secretariat further recommends that the project be included in the Consolidated List.