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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: MACEDONIA

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

Refrigeration

- Phasing out of CFCs at the refrigerator plant of Frinko — UNIDO

PROJECT EVALUATION SHEET
MACEDONIA

SECTOR: **REFRIGERATION** ODS use in sector (1995): 172 ODP tonnes

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

Project Title:

Phasing out of CFCs at the refrigeration plant of FRINKO

Project Data	**Domestic Refrigeration**
	FRINKO
ODS phase-out (ODP tonnes)	104.0
Proposed project duration (Yrs)	1.5
Incremental capital cost (US $)	792,600
Contingency (%)	10
Incremental operational cost (US $)	421,290
Total project cost (US $)	1,213,890
Local ownership (%)	100
Export component (%)	21
Amount requested (US $) {Original}	1,213,890
{Revised}	1,081,724
Cost effectiveness (US $/kg)	10.4
National Coordinating Agency	MUCEE
Implementing Agency	UNIDO
Technical review completed?	Yes

Secretariat's Recommendations:	
Amount recommended (US $)	1,081,724
Project impact (ODP tonnes)	104.0
Cost effectiveness (US $/kg)	10.4
Implementing Agency support cost (US $)	140,624
Total cost to Multilateral Fund (US $)	1,222,348

PROJECT DESCRIPTION

Phasing out of CFCs at the refrigeration plant of FRINKO.

1. Consumption of CFCs in the refrigeration sector in Macedonia is 172 tonnes at 31% of total ODS consumption. Frinko domestic and commercial refrigerator plant is the major consumer in the sector. The installed capacity is about 300,000 units per year. Frinko manufactures about 150,000 units of domestic and commercial refrigerators and freezers, cooling display units and cold stores, rooms and chambers.

2. The company will phase out ODS completely by converting its foaming technology to HFC-134a as blowing agent and adopting the same substance as a refrigerant. It is a first project where HFC-134a is proposed as a replacement of CFC-11 in foaming operations. HFC-134a is applied in foaming process by many non-Article 5 countries.

3. HFC-134a demonstrated good foaming characteristics. The disadvantage of HFC-134a as a blowing agent is its cost. However, this disadvantage can be compensated by using 50% reduced content of blowing agent in foam formulations similar to the practice currently used by Frinko with CFC-11 systems.

4. Cyclopentane has been considered but ultimately was not chosen due to the fact that existing buildings and utility systems are not designed to operate with explosive and flammable materials and their reconstruction is technically and economically not feasible.

5. For conversion to HFC-134a blowing agent, Frinko is requesting funding to retrofit existing high pressure machines and to replace low pressure machines with high pressure machines and to purchase new pre-mixing equipment.

6. Conversion to HFC-134a entails replacement of charging equipment and leak detectors and retrofitting of existing evacuation equipment.

7. The cost of trials, testing, technology transfer and training are included in the requested budget.

8. Operating costs are requested for a 6-month duration.

9. A contractor will be appointed by UNIDO for the implementation of the major project components. The contractor will be responsible for the supply of services, equipment, installation, commissioning and on-the-job training of Frinko's staff.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven.

2. The Fund Secretariat has discussed with UNIDO the eligibility and incrementality of capital and operating costs. Adjustments in capital costs have been made regarding cost of foaming machine, cabinet jigs and testing equipment.

RECOMMENDATION

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

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Phasing out of CFCs at the refrigeration plant of FRINKO	1,081,724	140,624	UNIDO