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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 PROPOSALS: CHINA

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

Refrigeration

- Phasing out ODS at the X'ian Yuan Dong Compressor Co., Xi'an
- Conversion of manufacturing facilities from CFC11 foaming agent to cyclopentane at Huayi

UNIDO
World Bank

PROJECT EVALUATION SHEET CHINA

SECTOR: REFRIGERATION ODS use in sector (1992): 9,893 ODP tonnes

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

Project Titles:

- (a) Conversion of manufacturing facilities from CFC-11 foaming agent to cyclopentane at Huayi
 (b) Phasing out ODS at X'ian Yuan Dong Compressor Co., X'ian.

Project Data	Domestic	Compressor
	Huayi	X'ian Yuan Dong
ODS phase-out (ODP tonnes)	180	N/A
Proposed project duration (Yrs)	9 months	3
Incremental capital cost (US\$)	955,500	1,759,000
Contingency (%)	10	10
Incremental operational cost (US\$)	282,000	0
Total project cost (US\$)	1,342,000	1,759,000
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US\$) {Original	1,342,000	1,987,670
{Revised	972,490	1,599,000
Cost effectiveness (US\$/kg)	8.88	N/A
National Coordinating Agency	NEPA	
Implementing Agency	World bank	UNIDO
Technical review completed?	Yes	Yes

<i>Secretariat's Recommendations</i>		
Amount recommended (US \$)	972,490	1,599,000
Project impact (ODP tonnes)	170 (revised)	N/A
Cost effectiveness (US \$/kg)	8.88	N/A
Implementing Agency support cost (US\$)	126,424	207,870
Total cost to Multilateral Fund	1,098,914	1,806,870

PROJECT DESCRIPTION

Domestic refrigeration

- (a) Conversion of manufacturing facilities from CFC-11 foaming agent to cyclopentane at Huayi

1. There are an estimated 100 domestic refrigerator and freezer production lines with a production capacity of 15 million units per annum in China. About 60 per cent of the total number of domestic refrigeration appliances are produced by ten refrigerator manufacturers with annual output of more than 300,000 units each. The Executive Committee approved 12 projects for the largest domestic refrigerator and freezer manufacturers in China.

2. The current annual production at Huayi company is 200,000 refrigerators. All the current production is sold in China. Under the project submitted, the company will complete the conversion of its factory by eliminating 170 MT of CFC-11 by converting to cyclopentane as the blowing agent. A project for conversion of the refrigeration component was approved at US \$1,368,000 by the Executive Committee at its 13th Meeting. The Huayi conversion is included in the strategy of the Government of China for the phase-out of CFCs in the domestic refrigeration sector.

3. Conversion to cyclopentane entails the replacement of existing foaming machine with high pressure machine suitable for cyclopentane operations, retrofitting of existing high pressure machine, modifying fixtures, providing cyclopentane storage and delivery systems, and replacement of premixing stations. Conversion to cyclopentane and isobutane will necessitate also implementing a stringent safety programme to ensure personnel and plant safety owing to the flammable nature of cyclopentane.

4. Technical aspects of the conversion including safety measures associated with cyclopentane application, will be supervised by the equipment supplier. These arrangements would ensure a proper technology transfer and safe operations.

5. Incremental operational costs are associated with extra polyurethane foam due to increased density and higher cost of the blowing agent. Incremental operational costs are calculated for six months of operation.

Refrigeration compressor

- (b) Phasing out ODS at X'ian Yuan Dong Compressor Co.

6. There are 18 local compressor producers in China which satisfy the demand of the domestic refrigeration sector. Total annual output is about 6 million units. Three projects have been approved by the Executive Committee to convert three compressor manufacturing companies to non-ODS technology with total production capacity of 2.3 million units per year.

7. The current annual production at X'ian factory is 550,000 units. The project covers the conversion of production of CFC-12 based compressors to HFC-134a refrigerant. This is the second project for the conversion of compressor production to HFC-134a based compressors in China. The proposal includes: redesign, prototyping and testing, modification of existing equipment where applicable, procurement and installation of new equipment, retooling and modification of assembly lines. The proposal is included in the strategy of the Government of China for the phase out of CFCs in the domestic refrigeration sector.

8. Technical assistance of the conversion will be provided by the original technology supplier.

9. X'ian company will provide its own inputs and cost-sharing during the implementation of the project.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Domestic refrigeration

- (a) Conversion of manufacturing facilities from CFC-11 foaming agent to cyclopentane at Huayi

1. The chosen technologies are proven
2. The Secretariat discussed with the World Bank the eligibility and incrementality of capital and operating costs. Capital costs were adjusted to reflect the costs of retrofitting of existing equipment, and the current prices of replacement of equipment. Operating costs were adjusted to reflect the price of chemicals prevailing on the market.

Refrigeration compressor

- (b) Phasing out ODS at X'ian Yuan Dong Compressor Co.

3. The chosen technology is proven.
4. The Secretariat discussed with UNIDO the eligibility and incrementality of all cost items. The cost of retooling and modification of assembly lines was adjusted reflecting the equality with similar costs approved for other compressor manufacturing companies in China.

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
(a) Conversion of manufacturing facilities from CFC-11 foaming agent to cyclopentane at Huayi	972,490	126,424	World Bank
(b) Phasing out ODS at X'ian Yuan Dong Compressor Co., X'ian.	1,599,000	207,870	UNIDO