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

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Montreal, 18-20 February 1997

PROJECT PROPOSALS: INDONESIA

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

Refrigeration

- Engineering assistance for the elimination of ODS used in the production of household refrigerators at P.T. Samsung Maspion Indonesia (SMI) World Bank

Tobacco Expansion

- Conversion of tobacco expansion process from CFC-11 to carbon dioxide at P.T. Hanjaya Mandala Sampoerna World Bank
- Conversion of tobacco expansion process from CFC-11 to carbon dioxide at P.T. Djarum World Bank

**PROJECT EVALUATION SHEET
INDONESIA**

SECTOR: DOMESTIC REFRIGERATION ODS use in sector (1993): 383.9 ODP tonnes

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

Project Titles:

Engineering assistance for the elimination of ODS used in the production of household refrigerators at P.T. Samsung Maspion Indonesia (SMI)

Project Data	Refrigeration
	Samsung Maspion Indonesia (SMI)
ODS phase-out (ODP tonnes)	104.3
Proposed project duration (Yrs)	2.5
Incremental capital cost (US \$)	1,379,023
Contingency (%)	10%
Incremental operational cost (US \$)	325,441
Total project cost (US \$)	1,874,910
Local ownership (%)	50%
Export component (%)	0
Amount requested (US \$) {Original}	\$1,312,437
{Revised}	537,226
Cost effectiveness (US \$/kg)	5.15
National Coordinating Agency	Indonesia Ministry of Environment
Implementing Agency	World Bank
Technical review completed?	Yes

Secretariat's Recommendations:

Amount recommended (US \$)	537,226
Project impact (ODP tonnes)	104.3
Cost effectiveness (US \$/kg)	5.15
Implementing Agency support cost (US \$)	69,839
Total cost to Multilateral Fund (US \$)	607,065

PROJECT DESCRIPTION

Engineering assistance for the elimination of ODS used in the production of household refrigerators at P.T. Samsung Maspion Indonesia (SMI)

1. ODS consumption in the refrigeration sector is 2,096 MT. In 1993, the domestic refrigeration industry in Indonesia consumed approximately 384 MT of CFCs. The production of household refrigerators and freezers in Indonesia was approximately 520,000 units in 1993.
2. There are eight major domestic refrigerator manufacturers in Indonesia: The Executive Committee approved six projects for six companies for complete ODS phase-out.
3. Samsung Maspion will convert to HFC-134a as a refrigerant and cyclopentane as a blowing agent, thus eliminating 104.3 MT of CFCs upon implementation of the project.
4. Samsung Maspion is going to start mass production using HFC-134a refrigerant and HCFC-141b blowing agent over a one-year transition period in 1997. The enterprise will be using this period for problem analysis and purchasing cyclopentane based equipment. The production of cyclopentane foam-based appliances will start in the end of 1997.
5. Conversion to HFC-134a refrigerant involves replacement of charging equipment and leak detectors, retrofitting of existing vacuum systems, model redesign, procurement of testing equipment and training.
6. Conversion to cyclopentane entails the retrofitting of existing high pressure foam machines, providing storage for cyclopentane and delivery systems, and modifications of the premixing station and existing preheating oven. Conversion to cyclopentane will necessitate also implementing a stringent safety programme to ensure personnel and plant safety owing to the flammable nature of cyclopentane.
7. Refrigerator model redesign and the technical aspects of the conversion, including safety measures associated with cyclopentane application, will be provided through the established arrangements with their parent companies in South Korea. These arrangements would ensure a proper technology transfer and safe operations.
8. The company requests incremental operational costs associated with higher cost of components and foam formulation. Incremental operational costs are calculated for a 6-month duration.
9. Fifty per cent of Samsung Maspion is owned by Samsung Electronics Co. Ltd., South Korea.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven. The use of interim HCFC technology during transitional period by Samsung Maspion enterprise has been explained.
2. The Secretariat discussed with the World Bank the eligibility and incrementality of all cost items. Costs of testing equipment and cyclopentane storage facilities have been reduced reflecting the standard cost for this type of equipment. Cost requested for modification of foaming jigs was identified as ineligible. The project budget has been adjusted accordingly.

RECOMMENDATION

The Fund Secretariat recommends blanket approval of the Samsung Maspion project with associated support cost as shown in the table below.

<u>Project Title</u>	<u>Project Cost</u> <u>US \$</u>	<u>Support</u> <u>Cost US \$</u>	<u>Implementing</u> <u>Agency</u>
Engineering assistance for the elimination of ODS used in the production of household refrigerators at P.T. Samsung Maspion Indonesia	537,226	69,839	World Bank

SECTOR: OTHER: TOBACCO EXPANSION ODS use in sector (1995):90 ODP tonnes

Sector cost-effectiveness thresholds: N/A

Project Titles:

Conversion of tobacco expansion process from CFC-11 to carbon dioxide at:

- (a) P.T. Hanjaya Mandala Sampoerna
(b) P.T. Djarum

Project Data	Aerosols	
	Sampoerna	Djarum
ODS phase-out (ODP tonnes)	54.0	36.0
Proposed project duration (Yrs)	2	2
Incremental capital cost (US\$)	3,838,670	3,838,670
Contingency (%)	10	10
Incremental operational cost (US\$)	(201,818)	(99,698)
Total project cost (US\$)	3,636,852	3,738,972
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US\$) { Original	607,000	607,000
{ Revised		
Cost effectiveness (US\$/kg)	11.24	16.86
National Coordinating Agency	Indonesia Ministry for the Environment	Indonesia Ministry for the Environment
Implementing Agency	World Bank	World Bank
Technical review completed?	Yes	Yes

Secretariat's Recommendations:

Amount recommended (US \$)		
Project impact (ODP tonnes)		
Cost effectiveness (US \$/kg)		
Implementing Agency support cost (US \$)		
Total cost to Multilateral Fund (US \$)		

PROJECT DESCRIPTION

1. The tobacco sector was not initially included in Indonesia Country Programme. An amendment to the country programme indicating the use of controlled substances in this sector has been prepared and submitted by the Government of Indonesia.
2. There are four cigarette manufacturing companies in Indonesia: (i) Gudang Garam, (ii) P.T. Hanjaya Mandala Sampoerna, (iii) P.T. Djarum, and (iv) Bentoel. Only two companies, namely Sampoerna and Djarum, use CFC-11 to expand 2,100 tonnes of tobacco (900 tonnes at Sampoerna and 1,200 tonnes at Djarum).
3. The projects are for the replacement of CFC-11 with carbon dioxide used for tobacco expansion at P.T. Hanjaya Mandala Sampoerna, and P.T. Djarum processing plants. Approval of the two projects will lead to the elimination of 90 tonnes of CFC-11, representing the total CFC-11 consumption for tobacco expansion in the country. Carbon dioxide will be obtained from a local supplier.
4. CFC consumption rate at Sampoerna is double the consumption for Djarum even though both enterprises expand tobacco through the same patented G-13C process.
5. The carbon dioxide process, known as the Dry Ice Expanded Tobacco (DIET) process, is a patented process which requires installation of new equipment. The patent holder and distributor of the DIET process is Airco Industrial Gases (New Jersey, USA). Airco co-developed the DIET process with Philip Morris and the two companies have a cross-licensing agreement for the technology.
6. The smallest available replacement carbon dioxide expansion plant has a throughput of about 540 kg/hour, three times the production output from the current G-13C expansion process (180 kg/hour).
7. Both enterprises agreed that the G-13C expansion equipment will be destroyed once the new DIET process is installed and in operation. The cost for scrapping the old equipment has not been included in the project cost.
8. The World Bank informed the Secretariat that the enterprises are not requesting financial support for royalty fees, a major component of operating costs in tobacco expansion projects.

SECRETARIAT'S COMMENTS

1. The Executive Committee at its 20th Meeting considered a paper on draft guidelines for calculating incremental costs in the tobacco sector (UNEP/OzL.Pro/ExCom/20/64), and decided to invite the World Bank to submit a project for ODS phaseout in the tobacco sector in Indonesia, using the draft guidelines for the calculation of incremental costs and, for the purposes of comparison, calculating royalty fees as a technology transfer fee in terms of both capital and operating costs (Decision 20/44).

2. It is to be noted that the Parties to the Montreal Protocol are scheduled to take a decision on process agents which might include tobacco expansion at their 9th Meeting in 1997, and have asked the TEAP's Process Agent Task Force to undertake further investigations of the technical and economic aspects related to process agents.

3. The capital costs proposed by the World Bank for the two new DIET processes (one for each enterprise), takes into account the increase in production capacity from 180 kg/hr for the G-13C process to 540 kg/hr for the DIET process. However, the baseline costs of the current CFC-11 expansion equipment were not considered in the calculation.

4. The overall costs determined by the World Bank for the two enterprises were estimated at US \$6.77 million. However, the total funding requested is US \$1.21 million, with a cost effectiveness value of US \$13.49, similar to the Fortune tobacco expansion project in The Philippines, which was approved by the Executive Committee at its 9th Meeting in March 1993. The difference in costs is proposed to be financed by each enterprise.

5. The Fund Secretariat reviewed the project in accordance with the draft guidelines, and estimated the eligible incremental costs of the projects, without considering royalty fees, to be US \$1.52 million for Sampoerna and US \$1.59 million for Djarum (a total of US \$3.11 million), with cost effectiveness values of US \$28.08/kg and US \$44.07/kg, respectively. Thus, without considering royalty payments which were not sought in these projects, the eligible incremental cost estimated on the basis of the draft guidelines is of the same order as the threshold values set for the least cost-effective sector i.e., the solvent sector (US \$19.73/kg and US \$38.50/kg).

6. The World Bank received information from another company which has developed a tobacco expansion process also using carbon dioxide (tobacco lamina expansion), after the projects were submitted to the Fund Secretariat. The company claims that their operating costs are three times lower than those of the DIET process. The World Bank has requested additional information on this process, including cost of the production equipment.

7. While further information needs to be obtained from the developer of the tobacco lamina expansion process, it is reasonable to conclude now that even this process will not reduce costs to a level that might produce cost-effectiveness figures similar to, or lower than, the figure of US \$13.49 in the original Philippines project, without a major contribution by the enterprise as proposed by the World Bank in the projects submitted to this meeting.

8. It would normally be expected that a sector involving highly automated and mechanized production activities, and large production volumes, should be significantly more cost-effective than the refrigeration sector and be able to meet a threshold comparable to the aerosol or halon sector, at a figure between US \$2.00 and US \$5.00 per ODP kilogram phased out.

9. Therefore, the main issue for consideration in this sector becomes the need to establish a cost-effectiveness threshold. The Executive Committee might consider, initially, a figure comparable to the aerosol sector, equivalent to US \$4.40/kg, pending the decision on process agents, which might include tobacco expansion, by the next Meeting of the Parties to the Montreal Protocol.