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Cairo, 11-13 November 1998

PROJECT PROPOSALS: INDONESIA

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

Foam

• Phaseout of CFC-11 by conversion to water-based systems (FMF) and HCFC-141b (ISF) in the manufacture of polyurethane foam for automotive and furniture applications at P.T. Yoska Prima Inti	UNDP
• Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Indoklima Sarana Engineering	UNDP
• Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam (panels) at Irama Sejuk Santosa	UNDP
• Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Mentari Adi Fayar	UNDP
• Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at PT Hanaria Indah	UNDP
• Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Laksana	UNDP

• Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Trisakti	UNDP
• Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Mekar Armada Jaya	UNDP
• Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated panels at P.T. Panendra Sejati	UNDP
• Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated boxes at P.T. Polidaya Fiberindo Indah	UNDP

Refrigeration

• Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment in three enterprises (PT Bali Cool, FP Centrum Cool and PT Ever Cool)	UNDP
• Conversion from CFC-11 to HCFC-141b, CFC-12 to HFC-134a and R-502 to R-404A technology in the manufacture of commercial refrigeration equipment at PT Algron	UNDP
• Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Herry Alter's	UNDP
• Conversion from CFC-11 to HCFC-141b, CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Tesaguna Sejati	UNDP

Fumigant

• Demonstration project – alternatives to the use of methyl bromide in stored products (rice, coffee, and corn)	UNIDO

PROJECT EVALUATION SHEET
INDONESIA

SECTOR: FOAM ODS use in sector (1996): 4,000 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible US $6.23/kg
Integral Skin US $16.86/kg
Rigid US $7.83/kg

Project Titles:

(a) Phaseout of CFC-11 by conversion to water-based systems (FMF) and HCFC-141b (ISF) in the manufacture of polyurethane foam for automotive and furniture applications at P.T. Yoska Prima Inti

(b) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Indoklima Sarana Engineering

(c) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam (panels) at Irama Sejuk Santosa

(d) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Mentari Adi Fayar

(e) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at PT Hanaria Indah

Project Data	**Flexible / Integral Skin**	**Rigid**			
	Yoska	**Indoklima**	**Irama Sejuk Santosa**	**Mentari Adi Fayar**	**PT Hanaria Indah**
ODS phase-out (ODP tonnes)	63	29	7.5	24	14
Proposed project duration (months)	24	24	24	24	24
Incremental capital cost (US $)	99,000	203,500	77,000	82,500	55,000
- including contingency (%)	10	10	10	10	10
Incremental operational cost (US $)	250,000	43,400	12,000	37,500	47,740
Total project cost (US $)	349,000	246,900	89,000	120,000	102,740
Local ownership (%)	100	100	100	100	100
Export component (%)	0	0	0	0	0
Amount requested (US $) {Original}	360,000	212,200	54,800	120,000	101,352
{Revised}	349,000				
Cost effectiveness (US $/kg)	5.62	7.83	7.83	5.36	7.83
National Coordinating Agency	Indonesian Ministry of Environment (LH)				
Implementing Agency	UNDP				
Technical review completed?	Yes				

Secretariat's Recommendations:					
Amount recommended (US $)	Pending	Pending	Pending	Pending	101,352
Project impact (ODP tonnes)					12.94
Cost effectiveness (US $/kg)					7.83
Implementing Agency support cost (US $)					13,176
Total cost to Multilateral Fund (US $)					114,528

PROJECT EVALUATION SHEET
INDONESIA

SECTOR: FOAM ODS use in sector (1996): 4,000 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible US $6.23/kg
Integral Skin US $16.86/kg
Rigid US $7.83/kg

Project Titles:

(f) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Laksana

(g) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Trisakti

(h) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Mekar Armada Jaya

(i) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated panels at P.T. Panendra Sejati

(j) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated boxes at P.T. Polidaya Fiberindo Indah

Project Data	**Rigid**				
	PT Karoseri Laksana	**PT Karoseri Trisakti**	**PT Mekar Armada Jaya**	**PT Panendra Sejati**	**PT Polidaya Fiberindo Indah**
ODS phase-out (ODP tonnes)	23	12	27	21.4	10
Proposed project duration (months)	24	24	24	24	24
Incremental capital cost (US $)	33,000	33,000	44,000	187,000	60,500
- including contingency (%)	10	10	10	10	10
Incremental operational cost (US $)	89,885	47,037	105,357	1,100	14,800
Total project cost (US $)	122,885	80,037	149,357	188,100	75,300
Local ownership (%)	100	100	100	100	100
Export component (%)	0	0	0	0	0
Amount requested (US $) {Original}	122,885	80,037	149,357	156,600	72,800
{Revised}					
Cost effectiveness (US $/kg)	5.78	7.22	5.99	7.83	7.83
National Coordinating Agency	Indonesian Ministry of Environment (LH)				
Implementing Agency	UNDP				
Technical review completed?	Yes				

Secretariat's Recommendations:					
Amount recommended (US $)	122,855	80,037	149,357	Pending	Pending
Project impact (ODP tonnes)	21.26	11.08	24.94		
Cost effectiveness (US $/kg)	5.78	7.22	5.99		
Implementing Agency support cost (US $)	15,971	10,405	19,416		
Total cost to Multilateral Fund (US $)	138,826	90,442	168,773		

PROJECT DESCRIPTION

(a) (Phaseout of CFC-11 by conversion to water-based systems (FMF) and HCFC-141b (ISF) in the manufacture of polyurethane foam for automotive and furniture applications at P.T. Yoska Prima Inti

(b) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Indoklima Sarana Engineering

(c) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam (panels) at Irama Sejuk Santosa

(d) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Mentari Adi Fayar

(e) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at PT Hanaria Indah

(f) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Laksana

(g) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Trisakti

(h) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Mekar Armada Jaya

(i) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated panels at P.T. Panendra Sejati

(j) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated boxes at P.T. Polidaya Fiberindo Indah

General

1. CFC consumption in the Indonesian foam industry was 1215 MT ODP in 1992, of which about one third was CFC-12 and two thirds CFC-11. Sector consumption data from 1992 indicate that refrigeration rigid foams made up 16 %, and general PUF foams 11 % of that CFC consumption. Ten projects, nine in the rigid foam and one in the integral skin foam sectors, have been submitted to phase out 70.37 ODP tonnes CFC-11. The Government's intention is to achieve complete phase-out of CFCs in new products in 1997. Only the phase-out of CFCs in new products will provide the control needed to assure the 1999 freeze in Indonesia's usage of ODS.

2. The 10 projects are all submitted by 100 % Indonesian owned enterprises. All enterprises started production of rigid foams between the years 1974 and 1992.

3. Seven of the enterprises will replace their low-pressure machines or retrofit high pressure machines. Two companies will purchase low pressure dispensers, while one company already using a high-pressure machine, will only have to retrofit their low pressure one.

4. All the rigid foam as well as the integral skin foam production will be converted to the interim use of HCFC-141b until final ODS-free conversion technology is developed and available. The flexible molded foam production will be converted to water-blown system.

5. In five projects, a 30% correction factor has been applied to the enterprises' CFC consumption, "to account for large evaporative losses under current conditions", irrespective of whether the enterprise has a hand mixing and/or pouring operation or normal production process using the appropriate machines. These projects include Irama, Sejuk, Karoseri Trisakti, Mentari Adi Fayar and Panendra Sejati. For one company Yoska Prima, this factor is 20%.

Justification for the use of HCFC-141b

6. All the available technologies have been reviewed based on their maturity, availability, efficiency, and the ability of the companies to meet the post conversion costs involved. Following such review UNDP has stated in each project that:

> The company has chosen interim use of HCFC-141b until a permanent technology is commercially available in Indonesia. Likely permanent solutions are water based or liquid HFCs.
>
> The enterprises have been informed of the available technical options. They have also been informed that HCFC's are transitional substances, and that under present Multilateral Fund rules, they will not be able to seek additional funding from the Multilateral Fund later to convert to zero-ODP technologies.

Integral Skin Foam

(a) (Phaseout of CFC-11 by conversion to water-based systems (FMF) and HCFC-141b (ISF) in the manufacture of polyurethane foam for automotive and furniture applications at P.T. Yoska Prima Inti

7. P.T. Yoska Prima Inti produces flexible molded and integral skin PU foam for automotive and furniture applications, in addition to metal working applications. The company operates one high pressure and one low pressure machines, Elastogran PU-80 (1988) and Elastogran F20 NG (1988), respectively. It will phaseout the use of 63 tonnes CFC-11. Capital costs include the retrofit of the low-pressure dispenser at US$ 10,000, the introduction of mold ovens at US$ 40,000, and the addition of a ventilation for the de-mold system at US$ 10,000. The high-pressure machine will be reused. Technology transfer, training, trials, and safety amount to US$ 40,000. The project also includes incremental operational costs (US$ 250,000) for two years, which. includes the cost relating to 10 % increase in foam density.

Rigid Foam

(b) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Indoklima Sarana Engineering

8. Indoklima Sarana Engineering produces rigid foam panels for refrigeration applications such as walk-in freezers and reach-in refrigerators. It uses one Iwata (Japan) low pressure

machine (1993), and a locally made hydraulic press (1993). The company will phase out the use of the 29 tons per year of CFC-11. The costs will cover the replacement of the low-pressure machine by a high pressure one at US$ 110,000, and a lorry (US$ 25,000). The replaced equipment will be destroyed. Production trials, training, and technology transfer costs amount to US$ 30,000. The incremental operational costs for two years amount to US$ 43,400, including the cost related to increase in foam density.

(c) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam (panels) at Irama Sejuk Santosa

9. Irama Sejunk Santosa is a specialist in fiberglass products, specifically insulated trucks. The company has no baseline equipment. It will phaseout the use of 7.5 tonnes CFC-11. Capital costs include the purchase of a high-pressure dispenser at US$50,000. The company will share 50 % of the cost since the baseline dispenser does not include a dispenser. Training, technology transfer and trials amount to US$ 20,000. The project also includes incremental operational costs (US$ 12,000) for two years.

(d) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Mentari Adi Fayar

10. Mentari Adi Fayar produces rigid foam for upright refrigerators, cold rooms, clean rooms, fishing boats and insulated containers. The company has no baseline equipment. It will phase out the use of 22 tonnes CFC-11. Capital costs include the purchase of a low-pressure dispenser at US$ 45,000. Training, technology transfer and trials amount to US$ 20,000. The project also includes incremental operational costs (US$ 37,500) for two years.

(e) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at PT Hanaria Indah

11. PT Hanaria Indah manufactures rigid PU insulation products, such as blocks, slabs, pipes, pipe sections, etc., serving the general insulation and construction industry sectors. It currently uses one high pressure spray foam dispenser, Gusmer FF-1600 (1994), and one mini block making plant from San Kung Works Co. Taiwan (1993). It will phase out the use of 14 tonnes CFC-11. The project capital costs cover the retrofitting of all the existing baseline equipment at US$ 30,000. Training, technology transfer and trials amount to US$ 20,000. The project also includes incremental operational costs (US$ 47,740) for two years, including costs related to 10 % increase in foam density.

(f) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Laksana

(g) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Trisakti

(h) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Mekar Armada Jaya

12. The three companies produce metallic bodies for light, medium and heavy commercial vehicles, such as trucks and buses, etc. The rigid PU foam spray insulation operation is carried

out for the purpose of insulating the bodies of air-conditioned or refrigerated vehicles. Karoseri Laksana and Karoseri Trisakti each uses one 1988 Gusmer FF-1600 high pressure machine, while Mekar Armada Jaya uses two of such machines (1987 and 1991). The companies will phase out, respectively, the use of the 21 tonnes, 11 tonnes and 25 tonnes of CFC-11. The costs cover the retrofitting of the existing high-pressure machines at US$ 10,000 per machine. Technology transfer, training, and trials amount to US$ 20,000 each for Karoseri Laksana and Karoseri Trisakti. and US$ 45,000 for Mekar Armada Jaya. The incremental operational costs for two years for each company include the cost of 5% increase in foam density.

(i) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated panels at P.T. Panendra Sejati

13. P.T. Panendra Sejati manufactures insulated PU panels. The company has one low pressure machine, Cannon C-100 (1994). The company will phase out the use of the 21.4 tonnes per year of CFC-11. The costs involve the replacement of the low-pressure machine with a high-pressure dispenser at US$ 130,000. The LP machine will be destroyed. Technology transfer, training and trial costs amount to US$ 20,000. The incremental operational costs for two years amount to US$ 71,860.

(j) Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated boxes at P.T. Polidaya Fiberindo Indah

14. P.T. Polidaya Fiberindo Indah is engaged the manufacture of insulated boxes which are mounted on three-wheel bicycles for house-to-house sales of ice cream. The company has no baseline equipment. It will phase out the use of 9.3 tonnes CFC-11. Capital costs include the purchase of a low-pressure dispenser at US$ 40,000. Technology transfer training and trials amount to US$ 15,000. The project also includes incremental operational cost (US$ 14,800) for two years.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. Following discussion of the projects UNDP rectified all inadequacies relating to presentation of the project documents.

2. The incremental capital costs of all the projects have been agreed.

3. The incremental operational costs of four of the projects have been agreed, while for six others the levels of incremental operational costs will depend on the outcome of the discussion on the correction factor for evaporative losses and 7.5% additional foam (instead of 10%). The two groups of companies are listed in (a) and (b) below.

(a) The costs of the projects for which the incremental costs have been agreed are as follows:

	Incremental Capital Cost (US $)	Incremental Operating Cost (US $)
Karoseri Laksana	33,000	89,885
Karoseri Trisakti	33,000	47,037
Mekar Armada Jaya	44,000	105,357
Hanaria Indah	55,000	47,740

(b) Projects for which only incremental capital costs have been agreed are as follows:

	(US $)
Yoska Prima	99,000
Indoklima	181,500
Irama Sejuk Santosa	77,000
Polidaya Feberindo Indah	60,500
Panendra Sejati	187,000
Mentari Adi Fayar	82,500

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the four projects (Karoseri Laksana, Karoseri Trisakti, Mekar Armada Jaya and Hanaria Indah) with the levels of funding and associated support costs indicated in the table below.

2. The other six projects (Yoska Prima, Irama Sejuk Santosa, Polidaya Fiberindo Indah, Panendra Sejati, Mentari Adi Fayar and Indoklima) are submitted for individual consideration.

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Phaseout of CFC-11 by conversion to water-based systems (FMF) and HCFC-141b (ISF) in the manufacture of polyurethane foam for automotive and furniture applications at P.T. Yoska Prima Inti	Pending	-	UNDP
Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Indoklima Sarana Engineering	Pending	-	UNDP
Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam (panels) at Irama Sejuk Santosa	Pending	-	UNDP
Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of rigid polyurethane foam at Mentari Adi Fayar	Pending	-	UNDP

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at PT Hanaria Indah	101,352	13,176	UNDP
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Laksana	122,855	15,971	UNDP
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Karoseri Trisakti	80,037	10,405	UNDP
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam spray insulation at PT Mekar Armada Jaya	149,357	19,416	UNDP
Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated panels at P.T. Panendra Sejati	Pending	-	UNDP
Phaseout of CFC-11 by conversion to HCFC-141b in the manufacture of insulated boxes at P.T. Polidaya Fiberindo Indah	Pending	-	UNDP

PROJECT EVALUATION SHEET
INDONESIA

SECTOR: FUMIGANT ODS use in sector (1997): 146 ODP tonnes

Sub-sector cost-effectiveness thresholds: N/A

Project Title:

Methyl bromide post-harvested stored commodities (rice, coffee, and corn) protection

Project Data	**Methyl Bromide**
	State Ministry of Environment
ODS phase-out (ODP tonnes)	N/A
Proposed project duration (months)	24
Total incremental costs (US $)	332,200
- including contingency (%)	10
Total project cost (US $)	332,200
Local ownership (%)	100
Export component (%)	-
Amount requested (US $) {Original}	374,770
{Revised}	332,200
Cost effectiveness (US $/kg)	-
National Coordinating Agency	Ozone Secretariat, State Ministry of Environment
Implementing Agency	UNIDO
Technical review completed?	Yes

Secretariat's Recommendations:	
Amount recommended (US $)	332,200
Project impact (ODP tonnes)	N/A
Cost effectiveness (US $/kg)	N/A
Implementing Agency support cost (US $)	43,186
Total cost to Multilateral Fund (US $)	375,386

PROJECT DESCRIPTION

Methyl bromide post-harvested stored commodities (rice, coffee, and corn) protection

1. The average amount of methyl bromide imported in the country between 1993 and 1997 has been estimated at 250 metric tonnes per year. Methyl bromide is mainly used for treatment of commodities in storage, particularly rice, and for export commodities (pre-shipment), mainly coffee and wood for furniture.

2. The commodity to be treated is covered with a plastic sheet; methyl bromide gas is delivered through a dispenser at a rate of 16 to 90 g/m^3 depending on the commodity and destination of export. The duration of the treatment is generally 24 hours. Primary target pests are stored product pests, diseases, and termites for wooden products.

3. The Pesticide Commission of the Ministry of Agriculture is responsible for implementing regulations concerning methyl bromide use in the country. The Pesticide Commission must certify providers of fumigation services (names of fumigation applicators and persons dealing with methyl bromide have been made available to UNIDO).

4. The objective of the project is to demonstrate the technical and economic feasibility of the use of an Integrated Pest Management (IPM) system, in combination with proven alternative to methyl bromide, such as phosphine (in pellets or tablets), improved uses of phosphine with cylinderized liquid phosphine, the use of a Turbo Horn Generator (phosphine generator that can produce up to 88 grams of phosphine per minute), diatomaceous earth, in fumigation of stored commodities (rice, coffee and corn).

5. To implement an IPM programme for grain storage, good handling and sanitation systems should be implemented; storage facilities should be made pest proof; when possible, air circulation systems should be installed; the moisture level should be controlled to avoid development and growth of pest populations.

6. Phosphine (pellets and tablets, specifically prepared) could be used for: fumigation of bagged commodities under gas proof sheets; bag-stacked rice in sealed stacks; bulk grain in silos (after being retro-sealed); and bagged commodities in containers. Also, phosphine as a gas (in cylinder) applied with the Turbo Horn Generator could be used for fumigation of bulk grain in silos and for bagged commodities in containers.

7. The project will be implemented at two storage facilities for stacked bags of BULOG, the official commodity procurement, storage, and distribution body in the country, located in Jakarta and Surabaya. In addition, the project also proposes to carry out fumigation in silos in Jakarta, and fumigation of bagged coffee in freight containers in Surabaya.

8. The project will be implemented by UNIDO in close cooperation with the Indonesian Ozone Secretariat at the Office of the State Minister for Environment.

9. The expected results from project implementation are: (i) a practical technical and economic analysis of alternatives to methyl bromide, including phosphine in bulk grain

(corn/rice), fumigation in silos, fumigation of bagged rice in warehouses, and of bagged coffee in containers, and the use of the Turbo Horn Generator, in combination with diatomaceous earth; (ii) at least ten fumigators fully trained in the technologies implemented during the course of the demonstration project; and (iii) dissemination of the results among qualified representatives of the local and international grain storage industry.

10. A national project coordinator will be recruited for managing and supervising the demonstration project, including designing the tests, collecting, and analyzing the data, supervising field activities, and coordinating the services of project personnel.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The project concept follows the Executive Committee's guidelines. The Government of Indonesia has not yet ratified the Copenhagen Amendment. However, based on an official communication by the Government indicating its intent to complete the ratification within a period of 9 months, the Committee at its 25th Meeting approved a request for preparation of a methyl bromide demonstration project by UNIDO.

2. The Fund Secretariat raised the issue regarding discrepancies between data reported to the Ozone Secretariat (30 and zero tonnes for 1995 and 1996, respectively) and data reported in the project document (160 and 125 tonnes in 1995 and 1996, respectively). In this regard, it was indicated that during project preparation UNIDO subcontracted one of the most relevant national institutions working in the area (Centre for Tropical Fruit Studies, Bogor Agricultural University) to carry out a survey and define the amount of methyl bromide being used in the country. The report is available at UNIDO, and it has been sent to the Ozone Secretariat.

3. Based on the information collected during the preparatory assistance mission, it was found that BULOG, the selected counterpart institution has already developed an Integrated Pest Management programme in cooperation with other technical international institutions (CSIRO, Australia). However, UNIDO was informed that BULOG is facing technical difficulties in implementing the programme in the field, thus, the IPM programme proposed in the project will be linked to a grain storage system which would allow decrease in methyl bromide consumption during storage and in follow-up operations such as transportation.

4. UNIDO indicated that it has made every effort to reduce the cost and number of international consultants (as it was agreed during the review of the projects submitted to the 25th Meeting of the Executive Committee).

5. The Secretariat and UNIDO discussed issues related to the equipment requested and the use of expert services for grain silo fumigation and for phosphine fumigation. Subsequently costs of some of the equipment items were adjusted. Also, UNIDO agreed that the national co-ordinator should be on a part-time basis, resulting in total project savings of US $48,000.

RECOMMENDATION

1. Taking into consideration the above comments, 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
Methyl bromide post-harvested stored commodities (rice, coffee, and corn) protection	332,200	43,186	UNIDO

PROJECT EVALUATION SHEET
INDONESIA

SECTOR: REFRIGERATION ODS use in sector (1996): 310 ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial 15.21 US $/kg
Rigid Foam 7.83 US $/kg

Project Titles:

(a) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment in three enterprises (PT Bali Cool, FP Centrum Cool and PT Ever Cool)

(b) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Algron

(c) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Herry Alter's

(d) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Tesaguna Sejati

Project Data	**Commercial/Rigid Foam**			
	Cool	**Algron**	**Herry**	**Tesaguna**
ODS phase-out (ODP tonnes)	15.24	10.4	32.6	10.12
Proposed project duration (months)	24	24	24	24
Incremental capital cost (US $)	151,800	118,800	278,850	114,400
- including contingency (%)	10	10	10	10
Incremental operational cost (US $)	126,212	75,116	356,917	146,300
Total project cost (US $)	278,012	193,966	635,767	261,200
Local ownership (%)	100	100	100	100
Export component (%)	0	0	0	0
Amount requested (US $) {Original}	239,979	158,210	435,520	147,900
{Revised}	231,800	158,210	438,060	147,900
Cost effectiveness (US $/kg)	15.21	15.21	15.21	15.21
National Coordinating Agency	Indonesian Ministry of Environment			
Implementing Agency	UNDP			
Technical review completed?	Yes			

Secretariat's Recommendations:				
Amount recommended (US $)	231,800	158,210	438,060	147,900
Project impact (ODP tonnes)	15.24	10.4	32.6	10.12
Cost effectiveness (US $/kg)	15.21	15.21	15.21/8.73	15.21
Implementing Agency support cost (US $)	30,134	20,567	56,948	19,227
Total cost to Multilateral Fund (US $)	261,934	178,777	495,008	167,127

PROJECT DESCRIPTION

(a) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment in three enterprises (PT Bali Cool, FP Centrum Cool and PT Ever Cool)

(b) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Algron

(c) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Herry Alter's

(d) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Tesaguna Sejati

Background for commercial refrigeration sub-sector in Indonesia

1. The refrigeration and air-conditioning Sector consumed 2,096 tonnes in 1992, as reported in the country programme. This represents about 32% of the total ODS consumed by the country. Domestic and commercial appliances account for 700 tonnes of CFC-12 as refrigerant and CFC-11 as a blowing agent. ODS consumption in the commercial refrigeration subsector is estimated to be about 310 tonnes. The Executive Committee previously approved nine commercial refrigeration projects, phasing out 239 ODP tonnes. The four proposals target the phaseout of 60.8 ODP tonnes.

2. The phaseout of CFCs in new products contained in this sector is stated to provide the Government with the control needed to assure the 1999 freeze in Indonesia's usage of ODS.

(a) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment in three enterprises (PT Bali Cool, FP Centrum Cool and PT Ever Cool)

3. The three enterprises are all private, Indonesian-owned manufacturers of commercial refrigeration equipment such as chest coolers/freezers, display refrigerators and freezers. PT Bali Cool was established in 1993, PT Centrum Cool in 1994, and PT Ever Cool in 1992. The enterprises collectively consumed about 10.2 MT of CFC-11 as a polyurethane foam blowing agent and 5.9 MT CFC-12 as refrigerant in 1997. Total units produced by the three companies was 9,000 units in 1997. The three companies propose to replace CFC use with HFC-134a as a refrigerant and HCFC-141b as an interim foam blowing agent. It is stated that this project will eliminate the use of 15.24 ODP tonnes in the first year after implementation.

4. The foam process at the enterprises does not currently use an automatic foam dispenser; the chemicals are hand-mixed. Half of the cost of a new high pressure foaming machine is requested for each company to reflect the technological upgrade. Training, trials, and technical assistance is also requested for each project.

5. The refrigeration system changes involve the replacement of CFC-12 leak detectors with HFC-134a leak detectors. New charging units are requested for each company, as the existing refrigerant charging units are not suitable for use with HCF-134a. Trials, redesign, technical assistance, and training costs are also requested.

6. The incremental operating cost requested for two years is $143,164 and include the foam blowing chemicals, refrigerant, compressor, evaporator, condenser, capillary, and filter dryer costs.

(b) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Algron

7. PT Algron is an Indonesian-owned company that was established in 1993. It has two major production lines: manufacturing refrigerated display cabinets and bottle coolers with CFC-12 and hermetic compressors and custom-built refrigeration units with R-502 and CFC-12 and semi-hermetic compressors. The company consumed about 6.6 tonnes of CFC-11 as a blowing agent, 3.8 tonnes of CFC-12, and 2.4 tonnes of R-502 as refrigerants in the preceding 12 months of operation.

8. The company proposes to phase-out CFC use with HFC-134a, and R-404A replacing CFC-12 and R-502 as refrigerants, and HCFC-141b replacing CFC-11 in a foam production process.

9. One high pressure foaming unit with two mix-heads is requested to replace two locally made low pressure dispensers, along with the cost of trials, technology transfer and training.

10. The refrigeration system changes involve the replacement of three locally made charging units with three HFC-134a charging units, and replacement of three leak detectors. Funds are also requested for prototype testing and trials, as well as technology transfer and training.

11. The incremental operating cost requested for two years is $84,000; it includes foam blowing chemicals, refrigerant, compressors, capillary, and filter dryer costs.

(c) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Herry Alter's

12. In 1997 PT Herry Alter's consumed about 31.34 MT of CFC-11 as a foam blowing agent and 3.53 MT CFC-12 in the manufacture of 4,025 units of commercial refrigeration equipment such as refrigerated cabinets, water dispensers, walk-in coolers, and freezers. The company proposes to replace CFC use with HFC-134a as a refrigerant and HCFC-141b as an interim foam blowing agent.

13. Two high pressure foaming units are requested, one for refrigerated cabinets/water dispenser production, and one for panel production, to replace two existing low-pressure units. Training, trials, and technical assistance is also requested for the refrigerated cabinets/water dispenser production and panel production lines.

14. The refrigeration system changes involve the replacement of two CFC-12 leak detectors with HFC-134a leak detectors. Two new charging units are requested, along with one new vacuum pump and the cost of retrofitting eight others. Trials, redesign and testing, technical assistance and training costs are also requested.

15. The incremental operating cost requested for two years is $410,087; it includes foam blowing chemicals, refrigerant, compressors, evaporator, condenser, capillary, and filter dryer costs.

(d) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Tesaguna Sejati

16. PT Tesaguna Sejati is an Indonesian-owned company that was established in 1993. It produces mostly cool/hot water dispensers, manufacturing 12,150 water dispensers in the preceding year. The company consumed about 5.2 tonnes of CFC-11 as a blowing agent and 4.92 tonnes of CFC-12 as a refrigerant in the preceding 12 months of operation. The company proposes to replace CFC use with HFC-134a as a refrigerant and HCFC-141b in the foam production process.

17. One high pressure foaming unit is requested, along with the cost of trials, technology transfer and training.

18. The refrigeration system changes involve the replacement of five CFC-12 charging units, five vacuum pumps and four leak detectors. Funds are also requested for technology transfer and training.

General for the four projects

19. The four project proposals contain a section on justification for selection of alternative technology with analysis of available technological alternatives including hydrocarbon technologies. The companies have chosen HCFC-141b as an interim technology as the system is technically mature and commercially available. The product also provides relatively the most acceptable insulation value and energy efficiency, and the lowest investment and operating costs. Pentane based systems require extensive investment for safely, due to its flammability, and the molded densities and insulation values of the foam are inferior to HCFC-141b blown foams. Other technologies are reviewed. This interim technology will be used until the commercial introduction of HFCs or water-based systems. Additional investments required to convert to CFC-free systems will be borne by the enterprise.

20. The equipment disposal list is provided in each project and includes scrapping the replaced equipment.

21. The grants requested in the four projects correspond to the maximum funding allowed under the threshold, the companies will provide funding for the difference in the cost as the project costs exceed the maximum allowable grant.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat discussed with UNDP the request for funding associated with increase in density in two proposals. The baseline density was calculated based on the weight of foam used by enterprises for insulation of appliances produced. It was proved that increase in density is not necessary for new HCFC-141b foam. Incremental operating cost was adjusted accordingly.

2. The Secretariat discussed with UNDP the request for replacement of vacuum pumps along with replacement of existing charging units with new HFC-134a charging boards equipped with relevant vacuum pumps. Funding new charging boards makes the request for three vacuum pumps ineligible. The Secretariat recommended also to reduce the cost of new R-404A refrigerant according to the weight replacement ratio R502/R404a.

3. For low pressure machines nearing the end of their useful life-time, the incremental cost for replacement with new high-pressure dispensers were reduced in accordance with Decision 25/48.

RECOMMENDATION

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
Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment in three enterprises (PT Bali Cool, FP Centrum Cool and PT Ever Cool)	231,800	30,134	UNDP
Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Algron	158,210	20,567	UNDP
Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Herry Alter's	438,060	56,948	UNDP
Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of commercial refrigeration equipment at PT Tesaguna Sejati	147,900	19,227	UNDP