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Executive Committee of
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Implementation of the Montreal Protocol

Twentieth Meeting
Montreal, 16-18 October 1996

PROJECT PROPOSALS: INDONESIA

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

Foam

- | | |
|---|------------|
| • Elimination of CFC-12 in the manufacture of extruded polyethylene foam sheet at PT. Toha Kencana Mas | World Bank |
| • Conversion to CFC free technology in the manufacture of integral skin molded polyurethane foam at PT. Dithon Urethane | UNDP |
| • Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT. Alpine Cool | UNDP |
| • Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT. Mentari Metal Pratama | UNDP |

Refrigeration

- | | |
|---|------------|
| • Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT. Lippo Melco Mfg. | World Bank |
| • Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT. Goldstar Astra Electronics (GSA) | World Bank |

Solvent

- | | |
|---|------------|
| • Conversion of correction fluid manufacturing process from 1,1,1 TCA to non-ODS solvent at PT. Cahaya Biru Sakti | World Bank |
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PROJECT EVALUATION SHEET **INDONESIA**

SECTOR: FOAM ODS use in sector (199): ODP tonnes

Sub-sector cost-effectiveness thresholds: Extruded Polyethylene Foam US \$8.22/kg
 Integral Skin PU Foam US \$16.86/kg
 Rigid PU Foam US \$7.83/kg

Project Titles:

- (a) Elimination of CFC-12 in the manufacture of extruded polyethylene foam sheet at PT. Toha Kencana Mas
- (b) Conversion to CFC free technology in the manufacture of integral skin molded polyurethane foam at PT. Dithon Urethane
- (c) Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT Alpine Cool
- (d) Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT Mentari Metal Pratama

Project Data	EPE	Integral Skin	Rigid	
	Toha Kencana	Dithon	Alpine Cool	Mentari Metal
ODS phase-out (ODP tonnes)	40	16.5	15	9.5
Proposed project duration (Yrs)	1.0	1.0	1.0	1.0
Incremental capital cost (US\$)	264,500	198,000	72,000	33,000
Contingency (%)	15	10	10	10
Incremental operational cost (US\$)	(74,000)	(14,000)	18,000	14,000
Total project cost (US\$)	190,500	184,000	90,000	47,000
Local ownership (%)	100	100	100	100
Export component (%)	0	0	10	10
Amount requested (US\$) {Original	190,500	184,000	90,000	47,000
{Revised	109,930		84,000	
Cost effectiveness (US\$/kg)	4.76	11.15	6.5	5.35
National Coordinating Agency	Ministry of Environment			
Implementing Agency	WB	UNDP	UNDP	UNDP
Technical review completed?	Yes	Yes	Yes	Yes

<i>Secretariat's Recommendations</i>				
Amount recommended (US \$)	109,930	184,000	84,000	47,000
Project impact (ODP tonnes)	40	16.5	13.845	8.785
Cost effectiveness (US \$/kg)	2.74	11.15	6.07	5.35
Implementing Agency support cost (US\$)	14,291	23,920	10,920	6,110
Total cost to Multilateral Fund	124,221	207,920	94,920	53,110

PROJECT DESCRIPTION

Extruded Polyethylene Foam Project

- (a) Elimination of CFC-12 in the manufacture of extruded polyethylene foam sheet at P.T. Toha Kencana Mas

1. P.T. Toha Kencana Mas produces polyethylene sheets for packaging for mostly electronic products and furniture, utilizing 40 tonnes of CFC-12. The company will convert its production to the use of LPG as substitute blowing agent.

2. The capital cost of conversion includes the cost of retrofitting the existing extruder and relocating it to a larger room to improve safety of operation (US \$80,000), as well as introduction of occupational safety and fire protection measures (US \$70,000) resulting from the use of LPG, technology transfer, trials and training (US \$10,000). The project will have some incremental operational savings as a result of the use of a cheaper blowing agent.

Integral Skin Foam Project

- (b) Conversion to CFC free technology in the manufacture of integral skin molded polyurethane foam at PT. Dithon Urethane

3. P.T. Dithon Urethane manufactures integral skin molded polyurethane foam parts for use in office furniture and automotive applications, operating two low pressure foaming machines. Considerable quantity of methylene chloride is used solely for cleaning.

4. The company will convert its operations to the use of all-water blown system. However, in view of commercial non-availability in Indonesia of the selected technological option currently, the company will in the interim use HCFC-141b. The capital cost of conversion includes replacement of the two low pressure machines (US \$160,000), technology transfer, training and production trials (US \$20,000). The project will result in incremental operational savings.

Rigid Polyurethane Foam Projects

- (c) Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT Alpine Cool
- (d) Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT Mentari Metal Pratama

5. PT Alpine Cool and PT Mentari Metal Pratama are two relatively small ODS consumers manufacturing rigid polyurethane insulated foam sandwich panels. Alpine Cool currently applies a hand mix and pour technique while Mentari Metal Pratama operates a high pressure machine. Both enterprises will convert to the use of all-water blown technology with interim use of a

combination of HCFC-141b and water due to current difficulties in applying the all-water blown technology.

6. The conversion of Alpine Cool will involve the acquisition of a high pressure machine, while the conversion of Mentari Metal Pratama will involve some dispenser modifications (US \$5,000). The capital cost will also include trials, technology transfer and training at US \$20,000 each. The two projects will each incur incremental operational cost.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Extruded Polyethylene Foam Project

1. The project was discussed with the World Bank, the implementing agency of the project and the calculation of the incremental operational savings brought in line with the approach adopted in similar projects for the 20th Executive Committee Meeting. The project costs were accordingly revised by the World Bank and agreed.

Integral Skin and Rigid Polyurethane Foam Projects

2. The projects were discussed with UNDP's foam experts and the costs of the projects were agreed. The cost of the high pressure machine provided to Alpine Cool was equivalent to the cost of a high pressure machine less that of an equivalent new low pressure machine, in view of the fact that Alpine Cool did not operate any foam dispenser.

Reasons for Using HCFCs

3. The implementing agency listed the range of available technologies and advised that fully water-based systems are proposed as the permanent technology. However, until the commercial introduction of mature water-based systems, (which is expected in up to 2-3 years) a combination of water and HCFC-141b based systems will need to be used to maintain product standards and acceptability. No additional investments are foreseen to be needed to convert to fully water-blown technology after this interim period. In regards to the interim use of HCFC-141b, the implementing agencies advised that it met the following requirements:

- Proven and reasonably mature technology.
- Cost effective conversion.
- Easy availability of pre-blended systems at favorable pricing.
- Enables critical properties to be obtained in the end product (thermal conductivity, dimensional stability, closed cell content, surface properties and strength).
- Facilitates compliance with (local and international) standards on safety and environment.
- Provide the most acceptable insulation value and energy efficiency, and the lowest investment and operating costs vis-à-vis other options.
- No major changes in the auxiliary equipment/tooling, such as mold redesign are needed.

The agency noted that pentane based systems require extensive safety related provisions/investments that may only be justified for large scale users.

4. UNDP's attention was drawn to the decision of the Executive Committee requiring undertaking from the beneficiary enterprises to be responsible for the second stage of conversion. It is understood that the enterprises using HCFC-141b will not request for additional funding for the second stage conversion.

RECOMMENDATIONS

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

	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Elimination of CFC-12 in the manufacture of extruded polyethylene foam sheet at PT. Toha Kencana Mas	109,930	14,291	World Bank
(b) Conversion to CFC free technology in the manufacture of integral skin molded polyurethane foam at PT. Dithon Urethane	184,000	23,920	UNDP
(c) Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT Alpine Cool	84,000	10,920	UNDP
(d) Elimination of CFCs in the manufacture of rigid PU foam sandwich panels at PT Mentari Metal Pratama	47,000	6,110	UNDP

PROJECT EVALUATION SHEET INDONESIA

SECTOR: **REFRIGERATION** ODS use in sector (1992): 2,096 ODP tonnes

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

Project Titles:

- (a) Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT.Lippo Melco Mfg.
- (b) Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT.Goldstar Astra Electronics (GSA)

Project Data	Domestic Refrigeration	
	PT.Lippo Melco	PT.Goldstar Astra
ODS phase-out (ODP tonnes)	33.83	38.15
Proposed project duration (Yrs)	2	2.5
Incremental capital cost (US \$)	693,000	1,009,629
Contingency (%)	10	10
Incremental operational cost (US \$)	49,000	437,835
Total project cost (US \$)	742,000	1,559,032
Local ownership (%)	52.73	49.0
Export component (%)	0	0
Amount requested (US \$) {Original}	264,720	524,924
{Revised}	264,720	1,529,760
Cost effectiveness (US \$/kg)	13.76	13.88
National Coordinating Agency	IME	IME
Implementing Agency	World Bank	World Bank
Technical review completed?	Yes	Yes

<i>Secretariat's Recommendations:</i>		
Amount recommended (US \$)	264,720	512,730
Project impact (ODP tonnes)	33.83	38.15
Cost effectiveness (US \$/kg)	13.76	13.43
Implementing Agency support cost (US \$)	34,413	66,655
Total cost to Multilateral Fund (US \$)	299,133	579,384

PROJECT DESCRIPTION

- (a) Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT.Lippo Melco Mfg.
- (b) Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT.Goldstar Astra Electronics (GSA).

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 four projects for four companies for complete ODS phase-out. One project was approved for the refrigeration part for PT.Lippo Melco. The foam part conversion is submitted for this meeting.

3. PT.Goldstar Astra will convert to HFC-134a as a refrigerant and cyclopentane as a blowing agent, PT. Lippo Melco will convert its foam operations to cyclopentane (conversion of refrigerant part was approved at the 15th Meeting). Totally, 176.3 MT of CFCs will be eliminated after submitted projects are implemented.

4. In September 1996, Gold Star Astra enterprise is going to start mass production using HFC-134a refrigerant and HCFC-141b blowing agent over a transition period from 1996 to 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 and retrofitting of existing vacuum systems, model redesign, procurement of testing equipment and training.

6. Conversion to cyclopentane entails the replacement of existing low pressure foam machines with high pressure machines, retrofitting existing high pressure machines, where possible, providing storage for cyclopentane and delivery systems, and replacing premixing stations. 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 and Japan. These arrangements would ensure a proper technology transfer and safe operations.

8. The companies request incremental operational costs associated with higher cost of components and foam formulation. Incremental operational costs are calculated for a 6-month duration.

9. Forty-nine per cent of Gold Star Astra enterprise is owned by Gold Star 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 Astra enterprise has been explained.
2. The Secretariat discussed with implementing agencies the eligibility and incrementality of all cost items. Cost of testing equipment, cyclopentane storage facilities, modification of jigs and leak detectors has been reduced reflecting the standard cost for this type of equipment. The project budgets have been adjusted accordingly.
3. Gold Star Astra is partly owned by transnational corporations based in South Korea. The 7th Meeting of the Executive Committee decided that "partial funding should be considered on a case-by-case basis to finance the local share ownership of any given enterprise partly owned by a transnational corporation. In such case, funding could be provided as a percentage of project incremental cost proportionate to the local share ownership of the enterprise with the transnational corporation responsible for the rest." (UNEP/OzL.Pro/ExCom/7/30, para 88). On this basis, the Secretariat calculated the eligible portion of incremental cost for this enterprise.
4. The World Bank has proposed funding for Gold Star Astra on the basis of the full eligible incremental cost, without any deductions due to foreign ownership, since South Korea has been reclassified to be an Article 5 country.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the Lippo Melco project with associated support cost as shown in the table below.
2. The Fund Secretariat recommends approval of the projects for Gold Star enterprise with associated support costs at the funding level shown in the table below, subject to the clarification of the issue mentioned in paras 3 and 4 above.

<u>Project Title</u>		<u>Project Cost</u> US \$	<u>Support</u> <u>Cost US \$</u>	<u>Implementing</u> <u>Agency</u>
(a)	Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT.Lippo Melco Mfg.	264,720	34,413	World Bank
(b)	Engineering assistance for the elimination of ODS used in the production of household refrigerators at PT.Goldstar Astra Electronics (GSA)	512,730	66,655	World Bank

**PROJECT EVALUATION SHEET
(INDONESIA)**

SECTOR: **SOLVENT** ODS use in sector (1993): 474 ODP tonnes

Sub-sector cost-effectiveness thresholds: 1,1,1-trichloroethane 38.5 US \$/kg

Project Title:

Conversion of correction fluid manufacturing process from 1,1,1-trichloroethane to non-ODS solvent at Pt. Cahaya Biru Sakti

Project Data	TCA
	Pt. Cahaya Biru Sakti
ODS phase-out (ODP tonnes)	18.2
Proposed project duration (Yrs)	1
Incremental capital cost (US \$)	1,032,000
Contingency (%)	--
Incremental operational cost (US \$)	333,504
Total project cost (US \$)	1,365,504
Local ownership (%)	100
Export component (%)	--
Amount requested (US \$)	700,700
{Original}	
{Revised}	700,700
Cost effectiveness (US \$/kg)	38.5
National Coordinating Agency	Indonesian Ministry for the Environment
Implementing Agency	World Bank
Technical review completed?	Yes

<i>Secretariat's Recommendations:</i>	
Amount recommended (US \$)	490,062
Project impact (ODP tonnes)	18.2
Cost effectiveness (US \$/kg)	26.93
Implementing Agency support cost (US \$)	63,708
Total cost to Multilateral Fund (US \$)	553,770

PROJECT DESCRIPTION

1. This project will enable Cahaya to phase out the consumption of 18.2 ODP tonnes of 1,1,1-TCA presently used as a solvent in the production of correction fluids. The enterprise will convert to a hydrocarbon-based formulation that has zero ODP but which is highly flammable. Because of the flammability of the new formulation, modification of existing equipment to prevent explosion is required. Additionally, underground storage for the bulk solvent is needed, together with a non-halon, fixed fire protection system.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The enterprise is proposing to modify all existing equipment for safe operation with flammable products. No additional equipment is being acquired apart from underground storage tanks for the solvent (the 1,1,1-TCA is currently stored in the production area). The Fund Secretariat compared the enterprise's current arrangements and proposed modifications with previous projects to convert production of correction fluids and requested the implementing agency to review the following items: equipment modification (costs); storage tank (costs); building modification (eligibility); ventilation (double counting); fire protection (costs), and; license and technology transfer fees. Following review, the World Bank proposed a new capital cost structure with significantly lower overall cost for which issues of eligibility and double counting had been resolved. In regard to license fees and technology transfer, the Secretariat pointed out that since the basic solvent proposed for use is not proprietary and there is no technology transfer associated with equipment or process (since these remain unchanged), the cost of US \$560,000 claimed were probably not eligible. The request was revised to US \$100,000, for license fees. The overall request for capital costs was revised to US \$350,000 from the original level of US \$1,032,000.

2. The Fund Secretariat drew attention to the discrepancy between chemical prices in this project and the previous projects. Operating costs were recalculated to use consistent chemical prices. However, since capital costs had been reduced to below the threshold funding limit, the implementing agency requested that incremental operating costs be reinstated, to bring the funding request back up to the threshold limit (US \$700,700). This change raises the issue of substituting operating costs for capital costs found to be ineligible. The Fund Secretariat has raised this issue for consideration by the Sub-Committee on Project Review. In the meantime, the Secretariat's recommendations are based on the lower level of operating costs as originally submitted and adjusted for chemical prices. They will be recalculated should the Executive Committee so decide.

RECOMMENDATION

1. The Fund Secretariat recommends approval of the project with associated support costs at the funding level 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>
Conversion of correction fluid manufacturing process from 1,1,1-trichloroethane to non-ODS solvent at Pt. Cahaya Biru Sakti	490,062	63,708	World Bank