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

Eighteenth Meeting
Vienna, 22-24 November 1995

PROJECT PROPOSALS: INDIA

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

Foam

- | | |
|--|------------|
| • Phase-out of CFCs in the manufacture of rigid PUF insulated thermoware at Asian Advertisers | UNDP |
| • Phase-out of CFCs in the manufacture of cold cured and integral skin PUF moldings at Amit Polyseats Ltd. | UNDP |
| • Phase-out of CFCs in the manufacture of rigid PUF spray insulation at Beardsell Ltd. | UNDP |
| • Phase-out of CFCs in the manufacture of rigid PUF products at lloyd Insulations Ltd. | UNDP |
| • Phase-out of CFCs in the manufacture of cold cured PUF moldings at Meenakshi Polymers Pvt. Ltd. | UNDP |
| • Phase-out of CFCs in the manufacture of cold cured PUF moldings at Punjab Scooters Ltd. | UNDP |
| • Phase-out of CFC-11 in the manufacture of rigid PUF products at Polyproducts | World Bank |
| • Phase-out of CFCs in the manufacture of molded PUF automotive seat cushions at Roloforms Polymer Ltd. | World Bank |
| • Phase-out of CFCs in the manufacture of Extruded Polyethylene Foam at Shroff Textiles Ltd. | World Bank |
| • Phase-out of CFC-11 in the manufacture of rigid PUF for insulated thermoware at Arihant Thermoware Ltd. | World Bank |
| • Phase-out of CFC-11 in the manufacture of rigid PUF insulated | World Bank |

- thermoware at Cello Plast
- Phase-out of CFC-11 in the manufacture of rigid PUF insulated thermoware at Cello Thermoware Ltd. World Bank
- Phase-out of CFC-11 in the manufacture of rigid PUF insulated thermoware at Wimco Pen Co. World Bank

Halon

- Conversion from Halon 1211 to ABC Dry Chemical Power (ABC-DCP) and Carbon Dioxide (CO₂) in portable extinguishers at Real Value Appliances Ltd. World Bank

Refrigeration

- Elimination of CFCs in the manufacture of commercial refrigeration equipment at Meghdoot Refrigeration Industries World Bank
- Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna & Co. World Bank
- Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna Engineers P. Ltd. World Bank
- Elimination of CFCs in the manufacture of commercial refrigeration equipment at Friz-Tech P. Ltd. World Bank

Solvents

- Conversion of electronic cleaning processes from ODS solvents to no-clean and hydrocarbon cleaning technologies at ERL - Bangalore UNIDO
- Conversion of electronic cleaning processes from ODS solvents to no-clean and aqueous photoresist developing and stripping technologies at ITI Palakkad UNIDO

PROJECT EVALUATION SHEET

INDIA

SECTOR: FOAM

ODS use in sector (1991):

1,577 ODP tonnes

Sub-sector cost-effectiveness thresholds:

Rigid foam

US \$7.83/kg

Extruded Polystyrene/polyethylene Foam

US \$8.22/kg

Project Titles:

- (a) Phaseout of CFC-11 in the manufacture of rigid polyurethane foam insulated thermoware at Arihant Thermoware, Asian Advertisers, Cello Plast, Cello Thermoware and Wimco Pen *
- (b) Phaseout of CFC-11 in the manufacture of rigid polyurethane foam at Lloyd Insulations and Polyproducts *
- (c) Phaseout of CFC-11 in the manufacture of rigid polyurethane foam spray at Beardsell *
- (d) Phase out of CFCs in the manufacture of extruded polyethylene foam at Shroff Textiles *

Project Data	Rigid Foam								Extruded Polyethylene
	Arihant Thermoware	Asian Advertisers	Beardsell Ltd.	Cello Plast	Cello Thermoware	Lloyd Insulation (	Polyproducts	Wimco Pen Co.	Shroff Textiles Ltd.
ODS (CFC-11) phase out (ODP tonnes)	26	21	23	23	19	83	20	20	25
Proposed project duration (Yrs)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Incremental capital cost (US\$)	110,000	105,000	110,000	110,000	115,500	435,000	125,400	104,500	203,500
Contingency (%)	10	10	10	10	10	10.13	10.03	10	10
Incremental operational cost (US\$)	36,450	17,500	19,000	31,320	13,920	65,000	14,790	14,790	(6,300)
Total project cost (US\$)	146,450	122,500	129,000	141,320	129,420	500,000	140,190	119,290	197,200
Local ownership (%)	100	100	100	100	100	100	100	100	100
Export component (%)	0	0	0	0	0	0	0	0	0
Amount requested (US\$) {Original	151,000	122,500	129,000	146,000	133,000	500,000	156,000	142,000	203,000
{ Revised	151,000	122,500	129,000	146,000	133,000	500,000	144,000	122,870	203,000
Cost effectiveness (US\$/kg.)	5.81	6.31	6.07	6.34	7.37	6.51	7.57	7.09	7.89
National Coordinating Agency	Ministry of Environment and Forests								
Implementing Agency	WB	UNDP	UNDP	WB	WB	UNDP	WB	WB	WB
Technical review completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secretariat's Recommendations									
Amount recommended (US \$)	146,450	122,500	129,000	141,320	129,420	500,000	140,190	119,290	197,200
Project Impact (ODP tonnes)	23.7	19.41	21.24	21.02	17.35	76.73	18.515	18.515	25
Cost effectiveness (US \$/kg)	6.18	6.31	6.07	6.72	7.37	6.51	7.57	6.44	7.89
Implementing Agency support cost (US\$)	19,040	15,925	16,770	18,370	16,825	65,000	18,475	15,510	25,640
Total cost to Multilateral Fund	165,490	138,425	145,770	159,690	146,245	565,000	158,665	134,800	222,840

* New proposals to 18th Meeting

**PROJECT EVALUATION SHEET
INDIA**

SECTOR: FOAM ODS use in sector (1991): 1,577 ODP tonnes

Sub-sector cost-effectiveness thresholds: Integral Skin Foam US \$16.86/kg

Project Titles:

- (e) Phaseout of CFCs in the manufacture of cold cured polyurethane foam moldings at Meenakshi Polymers and Punjab Scooters*
- (f) Phaseout of CFCs in the manufacture of cold cured and integral skin polyurethane foam at Amit Polyseats*
- (g) Phaseout of CFCs in the manufacture of molded automotive seat cushions at Roloforms*

Project Data	Amit Polyseats Ltd.	Meenakshi Polymers Pvt Ltd.	Punjab Scooters Ltd.	Roloforms Polymer Ltd.
ODS phase-out (ODP tonnes)	20	15	39	26
Proposed project duration (Yrs)	1.5	1.5	1.5	1.5
Incremental capital cost (US\$)	215,000	112,000	260,000	198,000
Contingency (%)	10.3	9.72	7.5	10
Incremental operational cost (US\$)	28,000	22,000	52,200	34,800
Total project cost (US\$)	243,000	214,000	312,200	232,800
Local ownership (%)	100	100	100	70
Export component (%)	0	0	0	0
Amount requested (US\$) {Original	243,000	214,000	312,200	168,000
{Revised	243,000	214,000	312,200	168,000
Cost effectiveness (US\$/kg)	12.15	14.27	8.0	6.46
National Coordinating Agency	Ministry of Environment and Forests (MOEF)			
Implementing Agency	UNDP	UNDP	UNDP	WB
Technical review completed?	Yes	Yes	Yes	Yes

Secretariat's Recommendations				
Amount recommended (US \$)	243,000	214,000	312,200	162,400
Project impact (tonnes ODP)	19.3	15	39	26
Cost effectiveness (US \$/kg)	12.53	14.26	8.0	6.25
Implementing Agency support cost (US \$)	31,590	27,820	40,590	21,110
Total cost to Multilateral Fund	274,590	241,820	352,790	183,510

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New proposals to 18th Meeting

PROJECT DESCRIPTION

Rigid Foam Projects

1. Right rigid foam enterprises are included in this group of projects. Five enterprises (Arihant Thermoware, Asian Advertisers, Cello Plast, Cello Thermoware and Wimco Pen) manufacture a range of insulated thermoware for domestic use such as flasks, casseroles, jugs, containers, etc. Two of the enterprises (Lloyd Insulation and Polyproducts) produce rigid polyurethane foam for insulation applications such as metal faced sandwich panels, pre-formed pipe sections, boardstock, slabs, etc. They also have spray foam applications. Lloyd has large on-site spray foam operations using eight low pressure machines. One enterprise (Beardsell) is involved in spray foam insulation such as insulation of large pipelines, tanks, etc.

2. The enterprises or their rigid foam manufacturing components are either fairly new, ranging from four years to seven years old. Except for Lloyd which has high pressure machines for its block insulation foam production and Beardsell which uses a fixed ratio high pressure machine for its spray foam production, the enterprises currently operate low pressure foaming units of different makes. They include various Cannon and Gussmer models, as well as Desma and Elastogran models.

3. The enterprises will phase out CFC-11 consumption in the production of rigid polyurethane foams by converting their foam operations to CFC-free systems, with HCFC-141b based formulations as an interim step. The projects will require the replacement of existing low pressure foaming units by equivalent high pressure units. Beardsell will, however, require modification of its high pressure machine for handling variable ratios. Beardsell and Lloyd will also require closed system premix stations. The project costs also include trials, technology transfer, training and provision for increased operating costs, due to the higher costs of the new formulations.

Justification of the use of HCFC-141b.

4. All the enterprises consider that the ultimate use of water blown foam technology coupled with the use of HCFC-141b for an interim period constitutes the best option for the companies to phase out CFC-11, when considered in the context of local market circumstances. For the thermoware producers particularly, it was argued that preblended HCFC-141b systems were available at reasonable prices and being closer to CFC-11 systems made their handling and transportation manageable. Furthermore, no changes in the production programme was needed and the changeover to the ultimate technology would incur minimal or no additional cost.

Extruded Polyethylene Project

5. Shroff Textiles Ltd. manufactures extruded polyethylene sheets in a wide range of thicknesses, strengths and densities used extensively in packaging, anticondensation insulation, floor coverings for automobiles, as well as special jute-covered and bituminized extruded polyethylene foam sheet for water-proofing applications. The company uses a mixture of CFC-12 and CFC-11 in equal proportions in its manufacturing operations.

6. Shroff Textiles Ltd., will substitute the use of CFC-11 and CFC-12 in their manufacturing operations with butane. In India, a butane blend is available as LPG, which will require deodorizing. The capital cost of the project includes extruder modifications/retrofitting for use with LPG, installation of deodorizer and buffer dosing unit and storage and handling systems for LPG, extensive fire safety and alarm systems, ventilation, safety and process training.

7. The project will have a marginal incremental operational savings due to the lower price of the substitute.

Integral Skin Foam Projects

8. All the four enterprises (Amit Polyseats Ltd., Meenakshi Polymers Ltd., Punjab Scooters Ltd. and Roloforms Polymer Ltd.) in this sub-sector manufacture molded seat cushions and seat assemblies for automotive companies and for the replacement/retail market. In addition, Amit Polyseats manufactures integral skin moldings such as armrests for the furniture industry and steering wheels.

9. Amit Polyseats has one OMS low pressure machine in addition to two high pressure machines, Punjab Scooters also has one Elastogran low pressure machine in addition to two high pressure machines, while Meenakshi Polymers has only one Cannon low pressure machine. Roloforms Polymer has a high pressure machine with two mixing heads whose operating pressures (650 psi) will not meet the recommended pressure of the system supplier (about 1,500 psi).

10. These projects will phase out CFC-11 consumption, in the production of cold-cured and integral skin polyurethane foam moldings, by converting foam operations to all-water blown systems. The enterprises will require replacement of existing low pressure foaming units by high pressure units, replacement of epoxy molds, water heating systems, provision for trials, technology transfer and training.

11. For Roloforms there will be the need to replace the mixing heads of the existing high pressure machine. Capital costs of the projects relate to these items.

12. All the projects will incur incremental operational costs due to increase in consumption of MDI with the water-based formulations.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Rigid Polyurethane Foam Projects

1. The Fund Secretariat and the sector experts of the two implementing agencies (UNDP and the World bank) discussed all issues relating to the projects. These include their use of HCFC-141b as a blowing agent, the need to make the interim period for the use of HCFC-141b as short as possible and calculation of the incremental operational costs of the projects, which took account of the residual ODP in spite of the interim nature of the use of HCFC-141b technology.
2. All costs were agreed upon as recommended. All the projects are below the cost-effectiveness threshold for rigid foam sub-sector of US \$7.83/kg.
3. Generically, some of the projects raise the need for the implementing agencies to study the feasibility of using, especially new low pressure foaming machines to work with HCFC-141b formulations.

Extruded Polyethylene Foam Project

4. The project did not raise any issues. Its cost-effectiveness is below the cost effectiveness threshold for polystyrene/polyethylene foam sub-sector of US \$8.22/kg.

Integral Skin and Cured Molded Polyurethane Foams

5. All four projects meet the cost-effectiveness threshold for the sub-sector of US \$16.86/kg. and do not raise any policy issues.

RECOMMENDATIONS

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

Project	Project Cost US \$	Support Cost US \$	Implementing Agency
<u>Rigid Foam</u>			
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam insulated thermoware at Asian Advertisers	122,500	15,925	UNDP
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam spray at Beardsell	129,000	16,770	UNDP
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam at Lloyd Insulations	500,000	65,000	UNDP
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam insulated thermoware at Arihant Thermoware	146,450	19,040	World Bank

Project	Project Cost US \$	Support Cost US \$	Implementing Agency
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam insulated thermoware at Cello Plast	141,320	18,370	World Bank
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam insulated thermoware at Cello thermoware	129,420	16,825	World Bank
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam at Polyproducts	140,190	18,475	World Bank
Phaseout of CFC-11 in the manufacture of rigid polyurethane foam insulated thermoware at Wimco Pen	119,290	15,510	World Bank
<u>Extruded Polystyrene/polyethylene</u>			
Phase out of CFCs in the manufacture of extruded polyethylene foam at Shroff Textiles	197,200	25,640	World Bank
<u>Integral Skin Foam</u>			
Phaseout of CFCs in the manufacture of cold cured and integral skin polyurethane foam at Amit Polyseats	243,000	31,590	UNDP
Phaseout of CFCs in the manufacture of cold cured polyurethane foam moldings at Meenakshi Polymers	214,000	27,820	UNDP
Phaseout of CFCs in the manufacture of cold cured polyurethane foam moldings at Punjab Scooters	312,200	40,590	UNDP
Phaseout of CFCs in the manufacture of molded automotive seat cushions at Roloforms	162,400	21,110	World Bank

2. To request the implementing agencies to study the feasibility of using low pressure machines with HCFC-141b formulations in the manufacture of rigid foams.

PROJECT EVALUATION SHEET INDIA

SECTOR: **HALON** ODS use in sector (1991): 3,785 ODP tonnes

Sub-sector cost-effectiveness thresholds: US 1.48\$/kg

Project Title: Conversion from Halon 1211 to ABC Dry Chemical Powder (ABC-DCP) and Carbon Dioxide(CO₂) in portable extinguishers at Real Value Appliances Limited

Project Data	
	Real Value Appliances Limited
ODS phase-out (ODP tonnes)	462
Proposed project duration (Yrs)	1.5
Incremental capital cost (US\$)	765,000
Contingency (%)	10
Incremental operational cost (US\$)	1,670,000
Total project cost (US\$)	683,800
Local ownership (%)	100
Export component (%)	0
Amount requested (US\$)	683,800
☐ Original	683,800
☐ Revised	
Cost effectiveness (US\$/kg)	1.48
National Coordinating Agency	Ministry of Environment and Forests
Implementing Agency	World Bank
Technical review completed?	Yes

Secretariat's Recommendations	
Amount recommended (US \$)	251,736
Project impact (ODP tonnes)	462
Cost effectiveness (US \$/kg)	0.54
Implementing Agency support cost (US\$)	32,726
Total cost to Multilateral Fund	284,462

PROJECT DESCRIPTION

1. This project will phase out Halon-1211 consumption in the production of portable extinguishers at Real Value by converting the single production line to ABC-DCP powder (80 per cent) and CO₂ (20 per cent). This project is for retroactive financing for the ABC powder component while CO₂ operations are planned to begin in 1998. This project was first submitted to the Twelfth Meeting of the Executive Committee.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The guidelines require a conversion on the basis of a sub-sectoral phase-out or groups of companies that compete for the same market. The Government of India is currently preparing a strategy for the halon sector. Real Value Appliances Limited was a leading manufacturer of halon fire extinguishers prior to its conversion to ABC powder in 1994.

2. The Secretariat reviewed all of the halon fire extinguisher conversion projects submitted to the Eighteenth Meeting together to provide a consistent approach in line with the existing guidelines and other pertinent decisions of the Executive Committee to determine the incremental costs in this sub-sector. Several technical experts were consulted to determine if the equipment requests are unique to the conversion technologies or if the requested equipment represents equipment in the baseline condition. Allocations were made for some modifications to existing equipment and the provision of new filling equipment. Allocations were also made for testing equipment, technical assistance, installation, and new product approval.

3. The requested capital costs for filling plants for an ABC powder and CO₂ production lines were allocated as requested. Unspecified miscellaneous costs for the production lines were estimated based on discussions with technical experts.

4. Operational savings were assessed on the basis of the savings provided in the project document for the conversion to ABC powder. A materials balance approach which indicates both the baseline and with-project components of operational costs/savings analyses would facilitate the assessment of operational savings.

RECOMMENDATIONS

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

<u>Project</u>	<u>Project Cost</u> <u>US \$</u>	<u>Support Cost</u> <u>US \$</u>	<u>Implementing</u> <u>Agency</u>
Conversion from Halon 1211 to ABC Dry Chemical Powder (ABC-DCP) and Carbon Dioxide(CO ₂) in portable extinguishers at Real Value Appliances Limited	251,736	32,726	World Bank

2. To request implementing agencies to provide an itemization of all miscellaneous costs for capital costs and utilize a materials balance approach to the calculation of incremental operating costs/savings in the halon fire extinguisher sub-sector and to specify the after conversion product line in terms of the sizes of fire extinguishers to be produced through the conversion.

3. The Fund Secretariat further recommends that the project be included in the Consolidated List.

PROJECT EVALUATION SHEET INDIA

SECTOR: REFRIGERATION

ODS use in sector (1994): 1,572 ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial refrigeration US \$15.21/kg.

Project Titles:

- (a) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Friz-Tech P. Ltd.*
- (b) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Meghdoot Refrigeration Industries *
- (c) Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna & Co. *
- (d) Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna Engineers P. Ltd. *

Project Data	Domestic Refrigeration			
	Friz-Tek	Meghdoot	V. Krishna & Co.	V. Krishna Eng.
ODS phase-out (ODP tonnes)	11.5	18	14.8	17
Proposed project duration (Yrs)	1.5	1.5	1.5	1.5
Incremental capital cost (US\$)	81,070	86,460	81,070	121,860
Contingency (%)	10	10	10	10
Incremental operational cost (US\$)	51,850	78,130	65,950	80,910
Total project cost (US\$)	132,920	164,590	147,020	202,790
Local ownership (%)	100	100	100	100
Export component (%)	0	0	0	0
Amount requested (US\$) {Original	175,220	253,236	213,673	265,800
{Revised	132,020	164,590	147,020	202,790
Cost effectiveness (US\$/kg)	11.56	9.14	9.93	11.93
National Coordinating Agency	MOEF	MOEF	MOEF	MOEF
Implementing Agency	WB	WB	WB	WB
Technical review completed?	Yes	Yes	Yes	Yes

Secretariat's Recommendations				
Amount recommended (US \$)	132,920	164,590	147,020	202,790
Project impact (ODP tonnes)	11.5	18	14.8	17
Cost effectiveness (US \$/kg)	11.56	9.14	9.93	11.93
Implementing Agency support cost (US\$)	17,280	21,397	19,113	26,363
Total cost to Multilateral Fund	150,200	185,987	166,133	229,153

* New proposals to the 18th Meeting.

PROJECT DESCRIPTION

- (a) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Friz-Tech P. Ltd.
- (b) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Meghdoot Refrigeration Industries
- (c) Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna & Co.
- (d) Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna Engineers P. Ltd.

1. ODS consumption in the commercial refrigeration sector is estimated at 1,088 MT. The sector comprises a large number of small/medium enterprises and even tiny/unorganized enterprises.

2. The four projects submitted cover four medium size enterprises which manufacture a wide range of commercial refrigeration equipment such as chest freezers/coolers, reach-in freezers/coolers, horizontal/upright display cabinets, bottle coolers, etc.

3. Conversion to HFC-134a refrigerant entails replacement of existing leak detectors and evacuation/charging systems with new equipment, suitable for HFC-134a refrigerant as well as redesign and modification of refrigeration systems.

4. The conversion to water/HCFC-141b based foam formulation involves the replacement of low pressure foaming machines, which cannot be retrofitted, with high pressure dispensers. New foam equipment will enable implementation of emerging ODS-free technologies.

5. The companies recognize the transitional nature of HCFC foam technologies. They prefer to switch to a combination of water/HCFC-141b based technology at this stage, and to eventually implement ODS-free (water-blown) conversion when the fully water-blown technology becomes technologically mature and commercially viable. This can be done with little/no additional investments.

6. The companies request incremental operational cost associated with higher cost of components and foam formulation.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven. The choice of interim HCFC technologies is justified.
2. The Secretariat discussed with the World Bank the eligibility and incrementality of all cost items. The project budget has been adjusted accordingly.

RECOMMENDATIONS

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

Project	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Friz-Tech P. Ltd.	132,920	17,280	WB
(b) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Meghdoot Refrigeration Industries	164,590	21,397	WB
(c) Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna & Co	147,020	19,113	WB
(d) Elimination of CFCs in the manufacture of commercial refrigeration equipment at V. Krishna Engineers P. Ltd.	202,790	26,363	WB

PROJECT EVALUATION SHEET INDIA

SECTOR: **SOLVENT** ODS use in sector (1991) 4,876 ODP tonnes

Sub-sector cost-effectiveness thresholds: CFC-113 US \$19.73/kg
 TCA (methyl chloroform) US \$38.50/kg
 Mixed N/A

Project Titles:

- (a) Conversion of electronic cleaning processes from ODS solvents to no-clean and hydrocarbon cleaning technologies at ERL - Bangalore
- (b) Conversion of electronic cleaning processes from ODS solvents to no-clean and aqueous photo-resist developing and stripping technologies at ITI Palakkad

Project Data	Mixed	
	ERL	ITI Palakkad
ODS phase-out (ODP tonnes)	16.35	15.0
Proposed Project Duration (Yrs)	1.5	1.5
Incremental capital cost (US \$)	572,000	462,000
Contingency (%)	10	10
Incremental operational cost (US \$)	(379,579)	(226,256)
Total project cost (US \$)	192,421	235,744
Local Ownership (%)	100	100
Export component (%)	3	-
Amount requested (US \$) {Original	392,042	351,100
{Revised	192,421	235,744
Cost Effectiveness (US \$/kg)	23.97	15.72
National Coordinating Agency	Ministry of Environment and Forests	Ministry of Environment and Forests
Implementing Agency	UNIDO	UNIDO
Technical Review Completed?	Yes	Yes

<i>Secretariat's Recommendations</i>		
Amount recommended (US \$)	192,421	235,744
Project Impact (ODP tonnes)	16.35	15.0
Cost effectiveness (US \$/kg)	11.77	15.77
Impl. Agency Support Cost (US \$)	25,015	30,647
Total Cost to Multilateral Fund	217,436	266,391

PROJECT DESCRIPTION

(a) ERL - BANGALORE

1. This project will phase-out the use of 12.0 ODP tonnes of CFC-113 and 4.35 ODP tonnes of TCA in cleaning operations at Electronic Research Ltd., (ERL) Bangalore. The processes are flux removal from electronic assemblies after soldering operations, precision cleaning of the components of flyback transformers and electronic tuner assemblies, and cleaning of epoxy resin applicators. The project will employ commercially available technologies in one of India's largest ODS consuming sectors. Cleaning of circuit boards will be avoided by changing to no-clean soldering. The other ODS processes will be replaced using A-3 non-chlorinated hydrocarbon solvents. The cleaning machines are "closed-loop" with solvent distillation and offer substantial savings in solvent costs.

(b) ITI - PALAKKAD

2. This project will phase-out the use of 12.0 ODP tonnes of CFC-113 and 3.0 ODP tonnes of TCA in cleaning operations at the Palakkad factory of Indian Telephone Industries Ltd. ODS solvents are currently used for cleaning printed circuit boards after soldering, and in the photographic manufacture of printed circuit boards. The technology change includes the replacement of methylene chloride in photo-resist stripping. As methylene chloride is not an ODS, the cost of the replacement equipment is being borne by the enterprise. The currently used solvent-based cleaning methods are being replaced with three different processes, no-clean soldering and water-based photoresist development and stripping. The project will employ commercially available technologies in one of India's largest ODS consuming sectors.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. Several costs and eligibility issues were discussed with the implementing agency, including operating savings associated with no-clean soldering technology (less solder and flux are used). Agreement was reached on adjustments to costs for each project.

2. The cost-effectiveness of the grant for each project is below the “weighted average” threshold for each project calculated on the basis of the proportion of CFC-113 and TCA being phased out.

RECOMMENDATIONS

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

Project	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Conversion of electronic cleaning processes from ODS solvents to no-clean and hydrocarbon cleaning technologies at ERL - Bangalore	192,421	25,015	UNIDO
(b) Conversion of electronic cleaning processes from ODS solvents to no-clean and aqueous photo-resist developing and stripping technologies at ITI Palakkad	235,744	30,647	UNIDO

2. The Fund Secretariat further recommends that the projects be included in the Consolidated List.