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

Nineteenth Meeting
Montreal, 8-10 May 1996

PROJECT PROPOSALS: INDIA

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

Foam

- | | |
|---|------|
| • Phase out of the CFCs in the manufacture of cold cured molded and integral skin PUF products at Preto Foams | UNDP |
| • Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Mahavir Enterprises | UNDP |
| • Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Kaygee Foams P., Ltd. | UNDP |
| • Phase out of CFCs in the manufacture of rigid PUF products at Omkar PUF Insulation | UNDP |
| • Phase out of CFCs in the manufacture of rigid PUF products in Inalsa Ltd. | UNDP |
| • Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Bharat Plastic Products | UNDP |
| • Phase out of CFCs in the manufacture of cold cured molded PUF products at Autofit P., Ltd. | UNDP |

Refrigeration

- | | |
|---|------------|
| • Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rabi-Run Refrigeration P., Ltd. | World Bank |
| • Elimination of CFCs in the manufacture of commercial refrigeration equipment at Seepra Refrigeration P., Ltd. | World Bank |
| • Elimination of CFCs in the manufacture of commercial refrigeration equipment at Shakti Fabricators | World Bank |
| • Elimination of CFCs in the manufacture of commercial refrigeration equipment at Chandra Frig Co. P., Ltd. | World Bank |
| • Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rockwell Devices P., Ltd. | World Bank |
| • Elimination of CFCs in the manufacture of commercial refrigeration equipment at Sethia Appliances P., Ltd. | World Bank |
| • Conversion of refrigerator manufacture to cyclopentane foam blowing agent at Godrej-GE Appliances Ltd. (GGEAL) | World Bank |

Solvent

- | | |
|--|-------|
| • Conversion of electronic cleaning processes from ODS solvents to semi-aqueous cleaning and no-clean soldering technologies at ITI, Bangalore | UNIDO |
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PROJECT EVALUATION SHEET **INDIA**

SECTOR: FOAM ODS use in sector (1991): 1,571 ODP tonnes
 Sub-sector cost-effectiveness thresholds: Rigid foam US \$7.83/kg
 Integral skin US \$16.00/kg

Project Titles:

- (a) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Bharat Plastic Products
- (b) Phase out of CFCs in the manufacture of rigid PUF products in Inalsa Ltd.
- (c) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Mahavir Enterprises
- (d) Phase out of CFCs in the manufacture of rigid PUF products at Omkar PUF Insulation
- (e) Phase out of CFCs in the manufacture of cold cured molded PUF products at Autofit P., Ltd.
- (f) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Kaygee Foams P., Ltd.
- (g) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Preto Foams

Project Data	Rigid				Integral skin & Molded		
	Bharat	Inalsa	Mahavir	Omkar	Autofit	Kaygee Foams	Preto Foams
ODS (CFC-11) phase out (ODP tonnes)	27	31.3	21	11.5	20	34.5	12
Proposed project duration (Yrs)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Incremental capital cost (US\$)	105,000	192,000	105,000	60,500	109,000	239,000	175,000
Contingency (%)	10.6	9.7	10.6	10	10.4	9.9	10.1
Incremental operational cost (US\$)	19,000	24,000	17,500	9,500	22,000	33,000	8,700
Total project cost (US\$)	124,000	216,000	122,500	70,000	131,000	272,000	183,700
Local ownership (%)	100	100	100	100	100	100	100
Export component (%)	0	0	0	0	0	0	0
Amount requested (US\$) {Original	124,000	216,000	122,500	70,000	131,000	272,000	183,700
{Revised							
Cost effectiveness (US\$/kg.)	4.97	7.48	6.31	6.59	6.55	8.25	16.04
National Coordinating Agency	Ministry of Environment and Forests						
Implementing Agency	UNDP	UNDP	UNDP	UNDP	UNDP	UNDP	UNDP
Technical review completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secretariat's Recommendations							
Amount recommended (US \$)	74,500	123,000	73,000	59,000	77,000	217,250	167,100
Project Impact (ODP tonnes)	24.97	28.88	19.41	10.62	20	32.96	11.45
Cost effectiveness (US \$/kg)	2.98	4.26	3.76	5.56	3.85	6.59	14.59
Implementing Agency support cost (US\$)	9,685	15,990	9,490	7,670	10,010	28,243	21,723
Total cost to Multilateral Fund	84,185	138,990	82,490	66,670	87,010	245,493	188,823

PROJECT DESCRIPTION

Rigid Polyurethane Foam Projects

- (a) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Bharat Plastic Products
- (b) Phase out of CFCs in the manufacture of rigid PUF products in Inalsa Ltd.
- (c) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Mahavir Enterprises
- (d) Phase out of CFCs in the manufacture of rigid PUF products at Omkar PUF Insulation

1. Bharat and Mahavir manufacture insulated thermoware products such as flasks, casseroles, jugs, water bottles, lunch boxes, etc. Inalsa manufactures insulated boxes supplied to UNICEF for transportation of vaccines, and Omkar manufactures insulation products such as preformed pipe sections, slabs, metal faced sandwich panels, insulated doors, etc.

2. All the enterprises use preblended polyol systems in their production process. Bharat operates one low output (12 kg./min) low pressure machine, Mahavir operates one low output (6 kg./min) low pressure dispenser and one low output high pressure (Gussmer FF 1600) dispenser, while Omkar operates a locally fabricated stirrer-cum-pouring device and Inalsa operates two low pressure dispensers (12kg./min and 25kg./min output).

3. The consumption of CFC-11 of the enterprises are: Bharat: 27 tonnes, Inalsa: 31 tonnes, Mahavir: 21 tonnes and Omkar: 11.5 tonnes. All the enterprises will phase out the use of CFC-11 through the use of HCFC-141b as auxiliary blowing agent.

4. The main items of capital cost in the project relate to replacement of existing machines with high pressure machines at US \$80,000 each, except for Omkar, where US \$40,000 is provided. (In the case of Inalsa, a total of US \$160,000 is provided for two high pressure machines.) Other items of capital cost are technology transfer and training, trials and contingency varying from 9.7 per cent - 10.6 per cent.

5. Each project incurs incremental operating cost ranging from US \$9,500 for the lowest CFC-11 consumer to US \$24,000 for the highest consumer, due to the higher cost of the new formulations.

Justification for use of HCFC-141b

6. The considerations that influenced the choice of technology were:
- (a) Proven and reasonably mature technology;
 - (b) Cost effective conversion;
 - (c) Easy availability of substitute blowing agent, at favourable prices;

- (d) Support from local system suppliers in terms of making the right formulation/blend available;
- (e) Critical properties that have to be obtained in the end production; and
- (f) Operational safety.

7. The enterprises opted for a combination of water and HCFC-141b based formulations as an interim step. Pentanes (high costs & safety considerations) and HCFC-22 (low boiling point, causing problems in transportation of preblended systems) were the other options considered, but were found unsuitable. The enterprises will eventually implement ODS-free conversion when such technology becomes mature and commercially viable. This can be implemented with little/no additional investments.

Integral Skin and Cold Cured Molded Foam Projects

- (e) Phase out of CFCs in the manufacture of cold cured molded PUF products at Autofit P., Ltd.
- (f) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Kaygee Foams P., Ltd.
- (g) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Preto Foams

8. Autofit manufactures cold cured molded polyurethane foam seat cushions and seat assemblies for the automobile industry, while Kaygee Foams and Preto Foams manufacture cold cured molded seat cushions and integral skin polyurethane foam components such as steering wheels for the automobile industry, as well as integral skin polyurethane foam products for the furniture industry.

9. Consumptions of CFC-11 by Autofit, Kaygee Foams and Preto Foams are 20 tonnes, 12 tonnes and 34.5 tonnes respectively.

10. The following are the main equipment components of the enterprises:

Autofit	One high pressure foam dispenser, 8 fiberglass molds and 15 alloy molds
Kaygee Foams	Three high pressure and one medium pressure (60-80 bar) foam dispensers, 78 fiberglass molds and 76 aluminum alloy/steel/electro-formed nickel molds with built-in water heating lines
Preto Foams	One high pressure and one low pressure foam dispensers and 39 fiberglass molds

11. The phase-out of CFC-11 in the manufacture of cold cured molded foams will be through a switch to water blown systems , while in the manufacture of integral skin foam, it will be by substitution with HCFC-141b.

12. Investment in equipment will be as follows:

Autofit	Replacement of mixing head, replacement of the 8 fiberglass and 15 aluminum alloy molds with metallic molds.
Kaygee Foams	Replacement of the medium pressure foam dispenser with a high pressure dispenser. Replacement of 78 fiberglass molds with metallic molds.
Preto Foams	Replacement of low pressure foam dispenser with high pressure dispenser and 39 fiberglass molds with metallic molds.

13. The projects will incur incremental operating costs due to higher cost of the new formulations.

Justification for the use of HCFC-141b

14. The justification given for the use of HCFC-141b in the rigid foam projects also apply to these projects.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Rigid Polyurethane Foam Projects

- (a) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Bharat Plastic Products
- (b) Phase out of CFCs in the manufacture of rigid PUF products in Inalsa Ltd.
- (c) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Mahavir Enterprises
- (d) Phase out of CFCs in the manufacture of rigid PUF products at Omkar PUF Insulation

1. The Fund Secretariat and the foam sector expert of UNDP discussed the issues relating to the projects. These included the use of HCFC-141b formulations and related equipment requirements, the incrementality of capital costs relative to the current level of operations of the enterprises, and availability on the market of lower output high pressure foaming machines. Following the discussions, the following costs were agreed:

- Trials and technology transfer costs remain the same
- Equipment will be provided as follows:

Bharat Plastic Productions: One high pressure foam dispenser (14 kg./min): US \$40,000

Inalsa Ltd: One high pressure foam dispenser (40 kg./min): US \$75,000

Mahavir: One high pressure foam dispenser (14 kg./min): US \$40,000

Omkar: One high pressure foam dispenser (9 kg./min): US \$30,000

2. The incremental capital costs will therefore be as follows:

	Bharat	Inalsa	Mahavir	Omkar
	(US \$)			
Foam Dispenser	40,000	75,000	40,000	30,000
Technology transfer and training	10,000	10,000	10,000	10,000
Trials	5,000	5,000	5,000	5,000
10% Contingency	5,500	9,000	5,500	4,500
TOTAL	60,500	99,000	60,500	49,500

Integral skin foam projects

- (e) Phase out of CFCs in the manufacture of cold cured molded PUF products at Autofit P., Ltd.
- (f) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Kaygee Foams P., Ltd.
- (g) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Preto Foams

3. Issues of importance relating to these projects were:

Autofit:

- (i) The need for replacement of the mixing head of the high pressure dispenser. It was claimed that the mixing head would need to be modified/replaced to effectively handle the new mixing ratios. Quite apart from the high cost of the mixing head which was remarked upon by the Technical Reviewer, developments in polyurethane systems and the time it takes to take projects implemented appear to put in doubt the need to replace the mixing head. It was therefore recommended to provide a quarter of the amount required (US \$10,000) for any possible modifications.
- (ii) The need to replace the aluminum alloy molds: in view of the metallic properties of the aluminum alloy, unlike fiberglass, replacement was not considered an eligible cost. Hence, the cost of replacement of molds will be US \$10,000 instead of US \$28,750.

Kaygee Foams:

The need to replace the medium pressure (60-80 bar) foam dispenser with high pressure dispenser. The reason for requesting for replacement was given as the conversion to water-based and HCFC-141b systems resulting in changed mixing ratios and increased viscosity of the formulations. Considering again developments in the polyurethane foam industry, it was recommended to provide only a portion of the amount requested (US \$40,000) for any possible modifications.

Preto Foams:

The amount of US \$75,000 was recommended as the cost of the high pressure foam dispenser, in line with projects before this meeting from the region.

4. No changes were made to the cost of mold ovens, trials and technology transfer/training. Consequently, the incremental capital costs will be Autofit: US \$55,000, Kaygee Foams: US \$184,250, and Preto US \$158,400.

RECOMMENDATIONS

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

	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Bharat Plastic Products	74,500	9,685	UNDP
(a) Phase out of CFCs in the manufacture of rigid PUF products in Inalsa Ltd.	123,000	15,990	UNDP
(c) Phase out of CFCs in the manufacture of rigid PUF insulated thermoware at Mahavir Enterprises	73,000	9,490	UNDP
(b) Phase out of CFCs in the manufacture of rigid PUF products at Omkar PUF Insulation	59,000	7,670	UNDP
(e) Phase out of CFCs in the manufacture of cold cured molded PUF products at Autofit P., Ltd.	77,000	10,010	UNDP
(g) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Kaygee Foams P., Ltd.	217,250	28,243	UNDP
(f) Phase out of CFCs in the manufacture of cold cured molded and integral skin PUF products at Preto Foams	167,100	21,723	UNDP

PROJECT EVALUATION SHEET **INDIA**

SECTOR: REFRIGERATION ODS use in sector (1994): 3,437 ODP tonnes
 Sub-sector cost-effectiveness thresholds: Commercial refrigeration US \$15.21/kg

Project Titles:

- (a) Elimination of CFC in the manufacture of commercial refrigeration equipment at Chandra Frig Co. P., Ltd.
- (b) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Shakti Fabricators
- (c) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rockwell Devices P. Ltd.
- (d) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Seepra Refrigeration P., Ltd.
- (e) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rabi-Run Refrigeration P., Ltd.
- (f) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Sethia Appliances P., Ltd.

Project Data	Commercial					
	Chandra	Shakti	Rockwell	Seepra	Rabi-Run	Sethia
ODS (CFC-11) phase out (ODP tonnes)	9.4	12.8	17	14.2	13.2	15.2
Proposed project duration (Yrs)	1.5	1.5	1.5	1.5	1.5	1.5
Incremental capital cost (US\$)	84,700	89,980	84,260	114,730	82,940	83,600
Contingency (%)	10	10	10	10	10	10
Incremental operational cost (US\$)	46,284	69,250	96,744	57,180	59,682	89,784
Total project cost (US\$)	130,984	159,230	181,004	171,910	142,622	173,384
Local ownership (%)	100	100	100	100	100	100
Export component (%)	0	0	0	0	0	0
Amount requested (US\$) {Original}	130,984	159,230	181,004	171,910	142,622	173,384
{Revised}						
Cost effectiveness (US\$/kg.)	13.98	12.43	10.60	12.12	10.83	11.38
National Coordinating Agency	MOEF	MOEF	MOEF	MOEF	MOEF	MOEF
Implementing Agency	World Bank					
Technical review completed?	Yes	Yes	Yes	Yes	Yes	Yes
Secretariat's Recommendations						
Amount recommended (US \$)	130,984	159,230	181,004	171,910	142,622	173,384
Project Impact (ODP tonnes)	9.9	13.5	18	15	14	16
Cost effectiveness (US \$/kg)	13.98	12.43	10.6	12.12	10.83	11.38
Implementing Agency support cost (US\$)	17,028	20,700	23,531	22,348	18,541	22,540
Total cost to Multilateral Fund	148,012	179,930	204,535	194,258	161,163	195,924

PROJECT DESCRIPTION

- (a) Elimination of CFC in the manufacture of commercial refrigeration equipment at Chandra Frig Co. P., Ltd.
- (b) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Shakti Fabricators
- (c) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rockwell Devices P. Ltd.
- (d) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Seepa Refrigeration P., Ltd.
- (e) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rabi-Run Refrigeration P., Ltd.
- (f) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Sethia Appliances P., Ltd.

1. ODS consumption in the commercial refrigeration sub-sector is estimated at 1,710 MT. The sector comprises a large number of small/medium enterprises and even tiny/unorganized enterprises. The Executive Committee approved four projects in the commercial refrigeration sector phasing out 61.3 tonnes.

2. The six projects submitted cover another group of six 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. The implementation of these projects will result in phasing out of 81.8 ODP tonnes.

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 chemicals for 2 years' duration.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven. The choice of interim HCFC technologies is justified.

RECOMMENDATIONS

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

	Project Cost US \$	Support Cost US \$	Implementing Agency
(a) Elimination of CFC in the manufacture of commercial refrigeration equipment at Chandra Frig Co. P., Ltd.	130,984	17,028	World Bank
(b) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Shakti Fabricators	159,230	20,700	World Bank
(c) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rockwell Devices P. Ltd.	181,004	23,531	World Bank
(d) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Seepa Refrigeration P., Ltd.	171,910	22,348	World Bank
(e) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Rabi-Run Refrigeration P., Ltd.	142,622	18,541	World Bank
(f) Elimination of CFCs in the manufacture of commercial refrigeration equipment at Sethia Appliances P., Ltd.	173,384	22,540	World Bank

PROJECT EVALUATION SHEET INDIA

SECTOR: REFRIGERATION ODS use in sector (1994): 3,437 ODP tonnes

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

Project Titles:

Conversion of refrigerator manufacture to cyclopentane foam blowing agent at Godrej-GE Appliances Ltd. (GGEAL)

Project Data	Domestic
	Godrej-GE
ODS phase-out (ODP tonnes)	568
Proposed project duration (Yrs)	2
Incremental capital cost (US\$)	14,126,500
Contingency (%)	10
Incremental operational cost (US\$)	1,635,000
Total project cost (US\$)	14,761,500
Local ownership (%)	60
Export component (%)	0
Amount requested (US\$) { Original	8,108,600
{ Revised	
Cost effectiveness (US\$/kg)	10.25
National Coordinating Agency	MOEF
Implementing Agency	World Bank
Technical review completed?	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	

PROJECT DESCRIPTION

Conversion of refrigerator manufacture to cyclopentane foam blowing agent at Godrej-GE Appliances Ltd. (GGEAL)

1. ODS consumption in the refrigeration sector in 1991 was reported in the country programme to be 1980 MT. The updated 1994 figure provided in the project document is 3437 MT. It is estimated that ODS consumption in the domestic refrigeration sub-sector was 535 MT in 1994.
2. GGEAL is the largest manufacturer of domestic refrigerator appliances in India with output of about 800,000 units per year. GGEAL has two plants with a cabinet and door carousel foaming lines per each plant.
3. The company has chosen cyclopentane as a substitute for CFC-11 blowing agent and isobutane as a refrigerant to replace CFC-12. The project covers only conversion of the foam operations of the enterprise to replace CFC-12. The refrigerant conversion component will be formulated and submitted at a future date.
4. The proposed conversion involves the replacement of existing carousel type of foaming fixtures system with the static fixtures and associated conveyors and loading/unloading equipment, the replacement of four existing high pressure machines and four mixing heads with eight new foaming machines equipped with 16 mixing heads, the replacement of four pre-mixing units with eight new units, and the installation of two cyclopentane storage and distribution systems. Safety requirements will be met by installation of gas monitoring and ventilation systems.
5. The extended life of four foaming machines was recognized as technological upgrades and was calculated at US \$1,247,100. This was deducted when calculating the capital incremental cost as a company contribution to the project.
6. Incremental operating costs are requested for 6 months duration.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat raised several issues while discussing the project with the World Bank. These issues are applicability of the cost-effectiveness threshold which was approved for the domestic refrigeration as a whole to projects covering the foam part conversion only:

- the actual consumption of CFCs by the enterprise, and
- the calculation of incremental costs on the basis of total replacements of the manufacturing facilities with more advanced facilities.

RECOMMENDATIONS

1. The Secretariat is still discussing the project with the implementing agency. The results of the discussion will be reported to the Sub-Committee on Project Review.

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 Title:

Conversion of electronic cleaning processes from ODS solvents to semi-aqueous cleaning and no-clean soldering technologies at ITI, Bangalore

Project Data	
	ITI - Bangalore
ODS phase-out (ODP tonnes)	6.97
Proposed project duration (Yrs)	1.5
Incremental capital cost (US\$)	337,335
Contingency (%)	10
Incremental operational cost (US\$)	(229,381)
Total project cost (US\$)	107,954
Local ownership (%)	100
Export component (%)	0
Amount requested (US\$) {Original}	170,014
{Revised}	107,954
Cost effectiveness (US\$/kg)	15.48
National Coordinating Agency	Ministry of Environment & Forests
Implementing Agency	UNIDO
Technical review completed?	Yes

<i>Secretariat's Recommendations:</i>	
Amount recommended (US \$)	107,954
Project impact (ODP tonnes)	6.972
Cost effectiveness (US \$/kg)	15.48
Implementing Agency support cost (US \$)	14,034
Total cost to Multilateral Fund (US \$)	121,988

PROJECT DESCRIPTION

1. This project will phase-out the use of 21.72 MT of 1,1,1-trichloroethanol (MCF) and 6.0 MT of CFC-113 in cleaning operations at ITI-Bangalore in the removal of flux from electronic assemblies after the soldering operations. The phase-out of ODS will be accomplished by replacing the currently used solvent-based cleaning methods with no-clean soldering and water-soluble flux technology for manufacture of electronic assemblies and semi-aqueous cleaning of PCBs. The project will employ commercially available technologies in one of India's largest ODS consuming sectors. The India Country programme for the elimination of ODS has also identified the sector as a high priority area.

2. One section of the project involves retroactive funding for ODS eliminated in 1993, when a wave soldering machine with associated cleaning equipment was replaced with a new machine using water soluble flux and an aqueous cleaning unit.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The retroactive portion of the project was discussed with the implementing agency to establish the validity of consumption figures and the baseline configuration. Additionally, the project was amended to reduce engineering and training costs from US \$10,000 to US \$5,000 as similar technology and training has been funded in two other plants operated by ITI. The technical reviewer commented on the "very high cost" of no-clean flux. After further consideration the implementing agency reduced the cost from US \$18 to US \$15 per litre. The cost-effectiveness of the grant is below the "weighted average" threshold for the project calculated on the basis of the proportion of CFC-113 and TCA being phased out.

RECOMMENDATION

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

	Project Cost US \$	Support Cost US \$	Implementing Agency
Conversion of electronic cleaning processes from ODS solvents to semi-aqueous cleaning and no-clean soldering technologies at ITI, Bangalore	107,954	14,034	UNIDO