

Distr.
LIMITED

UNEP/OzL.Pro/ExCom/18/24
31 October 1995

ORIGINAL: ENGLISH

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

Eighteenth Meeting
Vienna, 22-24 November 1995

PROJECT PROPOSALS: EGYPT

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

Foam

- Conversion to CFC-free technology in the Manufacture of Flexible Molded PUF and Integral Skin Foam at El Shabrawi UNDP

Refrigeration

- Elimination of CFCs 11 and 12 in the Manufacture of Commercial Refrigeration Equipment at United Investment Corp. Inc. UNDP
- Elimination of CFCs 11 and 12 in the Manufacture of Commercial Refrigeration Equipment at REFCAT Co. Inc. UNDP

Solvents

- | | |
|--|-------|
| • Conversion of electronic cleaning processes from ODS solvents to non-ODS cleaning at three electronic companies (Benha Co. for Electronics Industry, A.I.O. Electronics Factory, Sakr Factory) | UNIDO |
| • Conversion of cleaning processes from CFC-113 and 1,1,1-Trichloroethane to Semi-Aqueous cleaning at Arab International Optronics | UNIDO |
| • Conversion of cleaning processes from CFC-113 to Aqueous Cleaning at Optica | UNIDO |
| • Conversion of cleaning processes from 1,1,1 -Trichloroethane to Cleaning in Perchloroethylene at Abbasol | UNIDO |
| • Conversion of cleaning processes from 1,1,1-Trichloroethane to aqueous cleaning at Siltal | UNIDO |
| • Conversion of cleaning processes from 1,1,1 - Trichloroethane to Aqueous Cleaning at Technopol | UNIDO |

**PROJECT EVALUATION SHEET
EGYPT**

SECTOR: FOAM ODS use in sector (1991): 722 ODP tonnes

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

Project Title: Conversion to CFC-free technology in the manufacture of flexible molded polyurethane foam and integral skin foam at El Shabrawi

Project Data	Integral Skin Foam
	El Shabrawi
ODS phase-out (ODP tonnes)	16
Proposed project duration (Yrs)	1.5
Incremental capital cost (US\$)	250,000
Contingency (%)	4.17
Incremental operational cost (US\$)	0
Total project cost (US\$)	250,000
Local ownership (%)	100
Export component (%)	0
Amount requested (US\$) { Original	250,000
{ Revised	250,000
Cost effectiveness (US\$/kg)	15.62
National Coordinating Agency	EEAA
Implementing Agency	UNDP
Technical review completed?	Yes

Secretariat's Recommendations	
Amount recommended (US \$)	143,000
Project impact (ODP tonnes)	15.78
Cost effectiveness (US \$/kg)	9.06
Implementing Agency support cost (US\$)	18,590
Total cost to Multilateral Fund	161,590

PROJECT DESCRIPTION

Conversion to CFC-free technology in the manufacture of flexible molded polyurethane foam and integral skin foam at El Shabrawi

1. El Shabrawi manufactures flexible molded foams and molded integral skin for the automotive and furniture industries. It operates two low pressure Cannon foam dispensers of 80 kg./min. and 15 kg./min. outputs. El Shabrawi will eliminate the use of about 16 tonnes of CFC-11 per year by switching to CFC-free all water blown high resilient systems in the molding of seating foams and to HCFC-141b for the production of integral skin. Project inputs include procurement of two high pressure foam dispensing machines each of 80 kg./min. in output for the two production lines, an oven for preheating drums of chemicals, technology transfer and production trials. The incremental operational cost was determined to be negligible and is not being requested. This project is expected to complete the CFC phase-out in the flexible molded polyurethane foams sub-sector at factories consuming over 10 tonnes of ODS per year in Egypt.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The provision of two foam dispensers of equal capacity (i.e. 80 kg./min. each) will result in excessive capacity expansion. The eligible incremental cost of the foaming equipment at the capacity requested was assessed to be 60 per cent of the estimated cost. Based on the price of US \$100,000 per machine, the eligible cost was estimated to be US \$120,000.

1. The cost of the oven for preconditioning of chemicals in drums was not considered to be an incremental cost. Consequently, the eligible incremental capital cost including trials, technology transfer and training (US \$10,000) and 10 per cent contingency would be US \$143,000. Since incremental operational cost is not being requested, the total project cost would be US \$143,000.

RECOMMENDATIONS

2. The Fund Secretariat recommends approval of the project with associated support cost at the funding levels shown in the table below:

Project	Project Cost US \$	Support Cost US \$	Implementin g Agency
Conversion to CFC-free technology in the manufacture of flexible molded polyurethane foam and integral skin foam at El Shabrawi	143,000	18,590	UNDP

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

3. It also recommends that UNDP and the Government of Egypt be requested to provide updated information on the ODS consumption in the foam sector including the list of any remaining small scale foam producing companies operating before 25 July 1995. Further approvals in this sector should be subject to provision of this information.

**PROJECT EVALUATION SHEET
EGYPT**

SECTOR: REFRIGERATION ODS use in sector (1991): 1,045 ODP tonnes

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

Project Titles:

- (a) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at United Investment Corp. Inc.
- (b) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at Refcat Company Ind.

Project Data	Commercial Refrigeration	
	United Investment	Refcat
ODS phase-out (ODP tonnes)	49.03	26.91
Proposed project duration (Yrs)	1.5	1.5
Incremental capital cost (US\$)	493,350	447,700
Contingency (%)	10	10
Incremental operational cost (US\$)	0	0
Total project cost (US\$)	493,350	447,700
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US\$) { Original	594,500	709,500
{ Revised	493,350	447,700
Cost effectiveness (US\$/kg)	10.06	16.6
National Coordinating Agency	EEAA	EEAA
Implementing Agency	UNDP	UNDP
Technical review completed?	Yes	Yes

Secretariat's Recommendations		
Amount recommended (US \$)	493,350	409,000
Project impact (ODP tonnes)	49.03	26.91
Cost effectiveness (US \$/kg)	10.06	15.19
Implementing Agency support cost (US\$)	64,135	53,100
Total cost to Multilateral Fund	557,485	462,100

PROJECT DESCRIPTION

- (a) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at United Investment Corp. Inc.
- (b) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at Refcat Company Ind.

1. There are nine companies in the commercial refrigeration sub-sector in Egypt. Projects for seven enterprises have been approved by the Executive Committee. United Investment and Refcat are the two remaining enterprises.

2. Under this project, United Investment and Refcat will eliminate the use of 75.94 MT of CFC-11 and CFC-12 in the manufacture of refrigerators, freezers, display cases, cold rooms, refrigerated trucks and insulation panels through formulations and procedures for foam injection based on the use of cyclopentane as blowing agent for foam and HFC-134a as refrigerant.

3. Conversion to HFC-134a refrigerant involves the replacement of refrigerant charging boards, leak detectors, refitting existing vacuum system, model redesign and testing.

4. Conversion to cyclopentane entails the replacement of existing low pressure foam machines with high pressure machines, providing storage for cyclopentane and delivery systems, and replacing premixing station. Conversion to cyclopentane will necessitate also implementing a stringent safety programme to ensure personnel and plant safety owing to the flammable nature of cyclopentane and isobutane.

5. Both companies will be provided with CFC-12 recovery/recycling equipment which will be used for on-site maintenance and service operations.

6. UNDP will oversee the successful implementation of this project and will provide technical assistance during project execution.

7. United Investment and Refcat will absorb incremental operational costs.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The chosen technologies are proven.
2. The cost of the high pressure foam machine for United Investment was adjusted to reflect the salvage value of the existing new low pressure machine. UNDP and the enterprize will ensure that the low pressure machine will not be used in CFC based foam operation.
3. Refcat will partially fund the project.
4. The Secretariat discussed with UNDP the eligibility and incrementality of all cost items. The project budget has been adjusted accordingly.
5. Recovery/recycling equipment have been provided to commercial refrigeration companies in all projects approved by the Executive Committee.

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) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at United Investment Corp. Inc.	493,350	64,135	UNDP
(b) Elimination of CFC-11 and 12 in the manufacture of commercial refrigeration equipment at Refcat Company Ind.	409,000	53,170	UNDP

2. The Fund Secretariat further recommends that the project be included in the Consolidated List.
3. The Fund Secretariat also recommends that provision of recovery/recycling equipment to commercial refrigeration companies be considered in projects related to servicing and recovery/recycling in the refrigeration sector in the future.

**PROJECT EVALUATION SHEET
EGYPT**

SECTOR: **SOLVENT** ODS use in sector (1991) 114 ODP tonnes

Sub-sector cost-effectiveness thresholds: CFC-113 US \$19.73/kg
 TCA (methyl chloroform) US \$/38.5/kg
 Mixed N/A

Project Titles:

- (a) Conversion of cleaning processes from CFC-113 to aqueous cleaning at Optica
- (b) Conversion of cleaning processes from 1,1,1-trichloroethane (TCA) to cleaning in perchloroethylene at Abbasol*
- (c) Conversion of cleaning processes from 1,1,1-trichloroethane to aqueous cleaning at Siltal*
- (d) Conversion of cleaning processes from 1,1,1-trichloroethane (TCA) to aqueous cleaning at Technopol*
- (e) Conversion of cleaning processes from CFC-113 and 1,1,1-trichloroethane (TCA) to semi-aqueous cleaning at Arab International Optronics
- (f) Conversion of electronic cleaning processes from ODS solvents to non-ODS cleaning at three electronic companies (Benha Co., A.O.I Electronics, Sakr)

Project Data	CFC-113	TCA			Mixed	
	Optica	Abbasol	Siltal	Technopol	Arab Int. Optronics	Three Companies
ODS phase-out (ODP tonnes)	0.9	8.0	2.0	6.0	2.1	13.68
Proposed Project Duration (Yrs)	0.67	1	.67	1	1	1
Incremental capital cost (US\$)	26,500	250,250	124,300	192,500	111,400	313,500
Contingency (%)	10	10	10	10	10	10
Incremental operational cost (US \$)	(14,457)	(95,706)	(47,466)	(67,251)	(8,665)	(86,297)
Total project cost (US \$)	12,043	154,544	76,834	125,249	105,735	227,203
Local Ownership (%)	100	100	100	100	51	100
Export component (%)	-	-	5	-	20	-
Amount requested (US \$) {Original	18,543	246,944	76,834	203,899	48,808	288,910
{Revised	12,043	154,544	76,834	125,249	48,533	227,203
Cost Effectiveness (US \$/kg)	12.54	19.32	38.42	20.87	23.11	16.6
National Coordinating Agency	EEAA	EEAA	EEAA	EEAA	EEAA	EEAA
Implementing Agency	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO	UNIDO
Technical Review Completed?	Yes	Yes	Yes	Yes	Yes	

Secretariat's Recommendations

Amount recommended (US \$)	12,043	154,544	12,806	125,249	48,533	227,203
Project Impact (ODP tonnes)	0.4	8.0	2.0	6.0	2.1	13.68
Cost effectiveness (US \$/kg)	12.54	19.32	60.4	20.87	23.11	16.6
Impl. Agency Support Cost (US \$)	1,566	20,091	1,665	16,282	6,309	29,536
Total Cost to Multilateral Fund (US \$)	13,608	174,634	14,471	141,531	54,842	256,739

* New proposal to the 18th Meeting

PROJECT DESCRIPTION

(a) OPTICA

1. This project will phase out the use of 0.96 ODP tonnes of CFC-113 at the Optica company. The cleaning process with CFC-113 is used for cleaning celluloid acetate plastic frames for glasses. The ODS solvent is utilized as a degreasing agent in the vapour degreaser and as a cleaning agent before the varnishing operation. Considering the cleaning requirement of the Optica company, a selection has been made in favour of an aqueous cleaning process with ultrasonics in four major stages i.e., washing with surfactants, tap water rinsing, rinsing with DI water and drying. A batch operation immersion type ultrasonic cleaning machine controlled by a microprocessor-based system will be purchased. The project will employ commercially available technology in the optical industry in Egypt.

(b) ABBASOL

2. This project will phase out the use of 8.0 ODP tonnes of 1,1,1-trichloroethane at the Abbasol company. The cleaning process with 1,1,1-trichloroethane is used for the production of polyurethane shoe soles. The ODS solvent is utilized as a degreasing agent in a vapour degreaser in order to remove all traces of silicon release agent on the sole surface after molding so that varnish will adhere to the soles. Considering the cleaning requirements of the Abbasol company, a selection has been made in favour of an alternative cleaning process using super-stabilized perchloroethylene with spraying in four major stages i.e., washing in hot solvent, rinsing in cold solvent, soles drying and solvent distillation. A batch operation cleaning machine with a microprocessor-based control system will be purchased. The project will employ commercially available technologies in the plastics industry in Egypt.

(c) SILTAL

3. This project will phase out the use of 2.0 ODP tonnes of TCA at the Siltal company. The cleaning process with TCA is used for the production of metal wire shelves for refrigerators. The ODS solvent is utilized as a degreasing agent in the vapour degreaser and as a cleaning agent for the primer before the plastification operation with PVC powder. Considering the cleaning requirements of the Siltal company, a selection has been made in favour of an alternative aqueous cleaning process with ultrasonics in four major stages i.e., washing with surfactants, tap water rinsing, rinsing with DI water and drying. A batch operation immersion type ultrasonic cleaning machine with a programmable transport system controlled by microprocessor which will be purchased within the frame of this project. The project will employ commercially available technologies in the refrigerator industry in Egypt.

(d) TECHNOPOL

4. This project will phase out the use of 6.0 ODP tonnes of TCA at the Technopol company. The cleaning process with 1,1,1-trichloroethane is used for the production of polyurethane products for the automotive and furniture industries. The ODS solvent is utilized as a degreasing agent in the vapour degreaser in order to remove all the traces of the wax release agent on the surfaces of the parts after molding to enable varnish to adhere to the surfaces of the cleaned parts. Considering the cleaning requirements of the Technopol company, a selection has been made in favour of an alternative aqueous cleaning process using a synthetic detergent with ultrasonics in three major stages i.e., washing in hot water, rinsing in cold water and drying. A batch operation aqueous cleaning machine with a microprocessor-based control system will be purchased. The project will employ commercially available technologies in the plastic industry in Egypt.

(e) ARAB INTERNATIONAL OPTRONICS

5. This project will phase out the use of 1.6 ODP tonnes of CFC-113 and 0.5 ODP tonnes of TCA at Arab International Optronics. CFC-113 and 1,1,1-trichloroethane are currently used for cleaning metal components to remove grease, oil and swarf, glass components to remove wax, pitch and grease, and PCBs to remove flux residues. The ODS solvents are utilized as degreasing agents in vapour degreasers. Considering the cleaning requirements of the Optronics company, a selection has been made in favour of an alternative semi-aqueous cleaning process with ultrasonics in four major stages i.e., washing with mixed hydrocarbons, tap water rinsing, rinsing with DI water and drying. Four batch operation immersion type ultrasonic cleaning machines controlled by a microprocessor-based system will be purchased. The project will employ commercially available technologies in the optical industry in Egypt.

(f) THREE COMPANIES (BENHA, A.O.I., SAKR)

6. This project will phase out the use of 12.88 ODP tonnes of CFC-113 in the removal of flux from electronic assemblies at three Egyptian companies i.e., Benha Co. for Electronics Industry, A.O.I. Electronics Factory and Sakr Factory and 1.0 ODP tonnes of 1,1,1 Trichloroethane at the Sakr Factory. All these companies are involved in manufacturing various types of military electronic equipment and produce printed circuit boards, hybrid circuits, metal and plastic parts, etc. which are used in the electronic assemblies. The phasing out of ozone depleting substances will be accomplished by replacing the currently used ODS solvent-based cleaning methods with new processes using A3 hydrocarbon solvents. Fully automatic cleaning with vapour rinsing and vacuum drying will be used for flux removal from electronic assemblies. Immersion cleaning with ultrasonics, vapour rinsing and vacuum drying will be used for cleaning metal parts. The project will employ commercially available technologies in the electronics industry in Egypt.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

(c) SILTAL

1. A project to convert refrigeration and foaming production facilities at Siltal was approved at the 15th Meeting at a value of US \$866,633. This included US \$112,636 for commissioning and start-up costs and US \$70,267 for contingency. At the time, the enterprise did not disclose that it used ODS in other parts of refrigerator production and did not include solvent in the ODS consumption.

2. The enterprise now seeks a further US \$76,835 specifically for solvent replacement, to clean metal refrigerator shelves prior to plastic coating. The production level is extremely low at only 120,000 shelves per year, or 58 shelves per hour. The cleaning machine proposed has approximately six times the production capacity required. That is, the entire annual requirement of shelves could be produced in two months, freeing up the machine for other work for the remainder of the year. In addition, the new cleaning machine is microprocessor controlled and will provide a substantial technological upgrade. The implementing agency has advised that lower cost machines are not large enough to accept the shelves.

3. On this basis, the Fund Secretariat considers that the enterprise should meet 5/6 of the project cost, the remaining 1/6 being an eligible incremental cost to be met by the Fund. The grant amount included in the recommendations below reflects this position.

All Projects

4. Various other cost and eligibility issues were discussed with the implementing agency in relation to all the other four projects and agreement reached on adjustments to total project costs.

5. A 10 per cent contingency allowance on capital costs was added to projects (e) Arab International Optronics and (f) Three Electronic Companies, which were submitted with no contingency allowance.

6. The cost-effectiveness of the grant for projects (e) Arab International Optronics and (f) Three Electronic Companies, are below the "weighted average" threshold for each project calculated on the basis of the proportions 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 cleaning processes from CFC-113 to aqueous cleaning at Optica	12,043	1,566	UNIDO
(b) Conversion of cleaning processes from 1,1,1-trichloroethane (TCA) to cleaning in perchloroethylene at Abbasol	154,544	20,091	UNIDO
(c) Conversion of cleaning processes from 1,1,1-trichloroethane to aqueous cleaning at Siltal	12,806	1,665	UNIDO
(d) Conversion of cleaning processes from 1,1,1-trichloroethane (TCA) to aqueous cleaning at Technopol	125,249	16,282	UNIDO
(e) Conversion of cleaning processes from CFC-113 and 1,1,1-trichloroethane (TCA) to semi-aqueous cleaning at Arab International Optronics	48,533	6,309	UNIDO
(f) Conversion of electronic cleaning processes from ODS solvents to non-ODS cleaning at three electronic companies (Benha Co., A.O.I Electronics, Sakr)	227,203	29,536	UNIDO

2. The Fund Secretariat further recommends that projects (a), (e) and (f) be included in the Consolidated List.