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PROJECT PROPOSALS: SYRIA

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

Aerosol

- Phasing out CFCs at Al-Fajer Company UNIDO

Foam

- Phasing out CFC-11 in the manufacturing of flexible PU slabstock foam through the use of methylene chloride as blowing agent at Chaar Bros Co. UNIDO
- Phasing out CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO2 blowing technology at National Polyurethane Company (N.P.C.) UNIDO

Foam/Refrigeration

- Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic & commercial refrigeration equipment and rigid polyurethane foam sandwich panels at Ahmad Al-Hafez Al-Waha Refrigerator Co. UNDP

Refrigeration

- Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at Ammar Industrial Establishment UNDP
- Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at El-Effendi Refrigerator Plant UNDP

PROJECT EVALUATION SHEET SYRIA

SECTOR: AEROSOL ODS use in sector (1996): 814 ODP tonnes

Sub-sector cost-effectiveness thresholds: Hydrocarbons 4.40 US \$/kg

Project Title:

Phasing out CFCs at Al-Fajer Co.

Project Data	Hydrocarbons
	Al-Fajer Co.
ODS phase-out (ODP tonnes)	44
Proposed project duration (months)	16
Incremental capital cost (US \$)	223,500
- including contingency (%)	10
Incremental operational cost (US \$)	(53,515)
Total project cost (US \$)	169,985
Local ownership (%)	100
Export component (%)	-
Amount requested (US \$) {Original}	169,985
Cost effectiveness (US \$/kg)	3.87
National Coordinating Agency	General Commission for Environmental Affairs
Implementing Agency	UNIDO
Technical review completed?	Yes
Secretariat's Recommendations:	
Amount recommended (US \$)	169,985
Project impact (ODP tonnes)	44
Cost effectiveness (US \$/kg)	3.87
Implementing Agency support cost (US \$)	22,098
Total cost to Multilateral Fund (US \$)	192,083

PROJECT DESCRIPTION

Phasing out CFCs at Al-Fajer Co.

1. In 1996, the total consumption of CFCs in the aerosol sector in Syria amounted to 814 tonnes. The Executive Committee has approved eight investment projects for the phase out of 768 tonnes of CFCs in this sector. The Government of Syria is submitting one additional project which would lead to elimination of 44.0 tonnes of CFCs.
2. In total, 812 tonnes of CFCs would be eliminated once all the projects become operational. The Government of Syria is intending to meet the 1999 freeze-target by giving priority to the elimination of CFCs in the sector, which constitute about 46% of the country's CFC consumption.
3. The project under consideration is for the replacement of CFCs with hydrocarbon propellant used in manufacturing different types and sizes of deodorant, hair spray, mousse, and air freshener (450,000 cans /year).
4. The aerosol filling process under operation utilizes two semi-automatic filling machines manufactured by Coster.
5. The enterprise will convert to HAPs technology. Conversion entails installation of a semi-automatic gas filling machine to be located in open air filling rooms including a propellant handling system, manual water bath for testing filled cans, HAP storage and purification system, gas detectors and fire control system. A conveyor system, explosion-proof lighting and ventilation systems are also requested.
6. Technical assistance will be provided for performance and supervision of engineering designs, equipment installation and commissioning of the plant. Training in production, quality control and safety procedures will also be provided.
7. The existing plant is located in an urban area, where it is not possible to use LPG as a propellant. Thus, the company will transfer the production facility to a new plant where it will be possible to fill HAP-based products.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Government of Syria has already identified the ten-remaining small-sized companies in the aerosol sector using CFC propellant. An umbrella project covering these enterprises might be submitted to a future meeting of the Executive Committee.
2. The capital cost of the project is US \$223,500 and the operational savings (NPV) for four years is US \$53,515.

3. The project document reports that the enterprise managers agreed to destroy the CFC propellant-filling head and CFC storage tanks as soon as the necessary equipment is made available, and the enterprise is able to operate using LPG propellant.

4. The enterprise will finance other unclaimed costs (US \$620,000). The Fund Secretariat has not reviewed these costs, some of which would not be eligible.

RECOMMENDATION

1. The Fund Secretariat recommends blanket approval of the project with associated support cost at the funding levels indicated below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Phasing out CFCs at Al-Fajer Co.	169,985	22,098	UNIDO

PROJECT EVALUATION SHEET SYRIA

SECTOR: FOAM ODS use in sector (1995): 710 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible Slabstock US \$6.23/kg

Project Titles:

- (a) Phasing out CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO₂ blowing technology at Chaar Bros. Co.
- (b) Phasing out CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO₂ blowing technology at National Polyurethane Company (N.P.C.)

Project Data	Flexible Slabstock	
	Chaar Bros.	N.P.C.
ODS phase-out (ODP tonnes)	50	96
Proposed project duration (months)	16	18
Incremental capital cost (US \$)	115,200	638,500
- including contingency (%)	7.7	9
Incremental operational cost (US \$)	(16,952)	(94,582)
Total project cost (US \$)	98,248	543,918
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US \$) {Original}	98,248	543,918
{Revised}		
Cost effectiveness (US \$/kg)	1.96	5.67
National Coordinating Agency	Ministry of Environment	
Implementing Agency	UNIDO	
Technical review completed?	Yes	

Secretariat's Recommendations:		
Amount recommended (US \$)	98,248	543,918
Project impact (ODP tonnes)	50	96
Cost effectiveness (US \$/kg)	1.96	5.67
Implementing Agency support cost (US \$)	12,772	70,709
Total cost to Multilateral Fund (US \$)	111,020	614,627

PROJECT DESCRIPTION

- (a) Phasing out CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO₂ blowing technology at Chaar Bros. Co.**
- (b) Phasing out CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO₂ blowing technology at National Polyurethane Company (N.P.C.)**

Flexible Slabstock Foam

1. The updated Country Programme of Syria indicates the total ODS to be phased out in the foam sector as 710 tonnes per year by ten enterprises. Five projects have been approved to phase out 310 tonnes of CFC-11. It is expected that 210 tonnes will be phased out by December 1998.
2. Two more projects, N.P.C. and Chaar Bros., are being submitted to the 26th Meeting. These two companies consume 146 ODP tonnes of CFC-11.
3. It is stated that the two projects will phaseout 20% of the CFC-11 consumption in Syria and will therefore help the country achieve its 2005 CFC reduction schedule.

(a) Chaar Bros. Co.

4. Chaar Bros. Co. produces foam mainly for the production of soft furniture, upholstery, mattresses and the clothing industry. It operates one low pressure boxfoam machine, Laader Berg Type F8 (1989). The company will phase out the use of CFC-11 through the conversion to methylene chloride technology. For this conversion it is proposed to install a methylene chloride metering system and enclosures and ventilation system for a total of US\$ 92,000. Technology transfer, training and trial costs amount to US\$ 15,000. There are incremental operating savings of US\$ 16,952.

(b) National Polyurethane Company (N.P.C.)

5. The National Polyurethane Company (N.P.C.) produces flexible PU slabstock foam used in the production of foam interiors for mattresses, furniture, cushions, sponges, etc. It uses one foaming machine, Hyma FP (1980). The company will phase out the use of the 96 tonnes of CFC-11 by converting to liquefied carbon dioxide (LCD) technology. The costs will cover the installation of new equipment and modification of the existing production facilities at US\$ 495,000. Other costs include license fee, training, and consultancy services at US\$ 90,000. There are incremental operating savings of US\$ 94,502.

SECRETARIATS COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The projects were discussed with UNIDO and inadequacies relating to their presentation addressed.
2. The costs of the two projects have been agreed between UNIDO and the Fund Secretariat.

RECOMMENDATION

1. The Fund Secretariat recommends approval of the Chaar and N.P.C. projects with the funding levels and associated support costs indicated in the table below.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Phasing out CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO ₂ blowing technology at Chaar Bros. Co.	98,248	12,772	UNIDO
Phasing out CFC-11 in manufacturing of flexible PU slabstock foam through the use of CO ₂ blowing technology at National Polyurethane Company (N.P.C.)	543,918	70,709	UNIDO

PROJECT EVALUATION SHEET SYRIA

SECTOR: FOAM / REFRIGERATION ODS use in sector (1997): 479.4 ODP tonnes

Sub-sector cost-effectiveness thresholds:

Commercial	US \$15.21/kg
Domestic	US \$13.76/kg
Rigid Foam	US \$7.83/kg

Project Titles:

- (a) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at Ammar Industrial Establishment
- (b) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at El-Effendi Refrigerator Plant
- (c) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic & commercial refrigeration equipment and rigid polyurethane foam sandwich panels at Ahmad Al-Hafez Al-Waha Refrigerator Co.

Project Data	Domestic		Domestic/Commercial/ Rigid Foam
	Ammar	El-Effendi	Al-Hafez
ODS phase-out (ODP tonnes)	55.99	13.29	28.16
Proposed project duration (months)	24	24	24
Incremental capital cost (US \$)	206,800	152,350	344,300
- including contingency (%)	10	10	10
Incremental operational cost (US \$)	124,280	30,930	98,165
Total project cost (US \$)	331,080	182,802	442,465
Local ownership (%)	100	100	100
Export component (%)	0	0	0
Amount requested (US \$) {Original}	389,927	238,027	334,499
{Revised}	331,080	182,802	330,486
Cost effectiveness (US \$/kg)	5.88	13.76	13.76 and 15.21
National Coordinating Agency		MSEA	
Implementing Agency		UNDP	
Technical review completed?		Yes	

Secretariat's Recommendations:			
Amount recommended (US \$)	331,080	182,802	330,486
Project impact (ODP tonnes)	55.99	13.29	28.16
Cost effectiveness (US \$/kg)	5.88	13.76	13.76 and 15.21
Implementing Agency support cost (US \$)	43,040	23,764	42,963
Total cost to Multilateral Fund (US \$)	374,120	206,566	373,449

PROJECT DESCRIPTION

- (a) Conversion from CFC-11 To HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at Ammar Industrial Establishment**
- (b) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at El-Effendi Refrigerator Plant**
- (c) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment and rigid polyurethane foam sandwich panels at Ahmad Al-Hafez Al-Waha Refrigerator Co.**

1. ODS consumption in Syria was about 479.4 MT ODP in the refrigeration and air-conditioning sector, and in the foam sector 593.4 MT ODP in 1997. These two sectors accounted for approximately 43% of the total Syrian ODS consumption in 1997.

2. The domestic and commercial refrigeration sub-sectors consist of four larger enterprises, representing about 20% of ODS consumption, several medium sized enterprises, and over 100 smaller operations. The Executive Committee approved four investment projects for Syria in the refrigeration sector to phase-out 387 ODP tonnes.

3. The approval of the three proposed projects will help Syria in meeting its Montreal Protocol obligations, including the 1999 freeze.

- (a) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at Ammar Industrial Establishment**

4. Ammar Industrial Establishment is one of the established enterprises in the domestic refrigeration sub-sector in Syria; founded in 1987, it commenced commercial operation in 1988. This 100% Syrian-owned company manufactures domestic refrigerators and freezers of various sizes and claims a local market share of about 20%. The company produced 30,575 domestic refrigerators from August 1977 to July 1998. The ODP use from mid-1997 to mid-1998 at Ammar Industrial Establishment was 60.11 MT. The project impact is 55.99 MT ODP phaseout.

5. The company proposes to convert the foaming operations from CFC-11 to HCFC-141b and adopt HFC-134a as refrigerant, replacing CFC-12.

6. Foaming baseline equipment includes a low-pressure foam dispenser (1988) and an open-top batch premixer (1988). These will both be scrapped when they are replaced. The two CFC-12 charging units, ten vacuum pumps, and two leak detectors are baseline refrigeration equipment.

7. The conversion of the foam system to HCFC-141b requires a new pre-mixing station, a high-pressure dispenser, as well as technical assistance, trials, and training.

8. The HFC-134a system requires two charging units, one new and nine retrofitted vacuum pumps, two production leak detectors, as well as technical assistance, training, and trials.

9. Six months of incremental operating costs are requested, based on the cost of chemicals and components needed for the conversion.

(b) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at El-Effendi Refrigerator Plant

10. El-Effendi Refrigerator Plant is one of the oldest enterprises in the domestic refrigeration sub-sector in Syria; it commenced commercial operation in 1979. This 100% Syrian-owned company manufactures domestic refrigerators and freezers of various sizes and has a market share less than 5%. The company produced 7,240 domestic refrigerators from August 1977 to July 1998. The ODP use at El-Effendi Refrigerator Plant from mid-1997 to mid-1998 was 14.25 MT. The project impact is 13.29 MT ODP phase-out.

11. The company proposes to convert the foaming operations from CFC-11 to HCFC-141b and adopt HFC-134a as refrigerant, replacing CFC-12.

12. The foaming baseline equipment listed is a low-pressure foam dispenser (1982) that will be scrapped once it is replaced. A CFC-12 charging unit and a leak detector are the baseline refrigeration equipment to be scrapped when replaced.

13. The conversion of the foam system to HCFC-141b requires a new pre-mixing station, a high-pressure dispenser, as well as technical assistance, trials, and training.

14. The HFC-134a system requires one new charging unit and one production leak detector, as well as technical assistance, training, and trials.

15. Incremental operating costs are requested for six months, based on the cost of new components and chemicals.

16. The grant requested corresponds to the maximum funding allowed under the threshold. The company will provide funding for the difference in cost, as the project cost exceeds the maximum allowable grant.

(c) Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment and rigid polyurethane foam sandwich panels at Ahmad Al-Hafez Al-Waha Refrigerator Co.

17. Ahmad Al-Hafez Al-Waha Refrigerator Co. manufactures domestic and commercial refrigerators, prefabricated cold storages, industrial refrigeration products, and foam sandwich panels. This 100% Syrian-owned company was established in 1991. The company produced 10,006 domestic refrigerators and 2,549 commercial refrigerators from August 1977 to July 1998. The company also produced 12,860 square meters of rigid polyurethane sandwich panels of standard 100 mm thickness for use in construction of cold stores. 16.85 ODP tonnes were used to produce domestic refrigerators, 3.87 ODP tonnes were used for commercial refrigerator production, and 9.45 ODP tonnes were used to produce sandwich panels. The project impact is 28.16 MT ODP phase-out.

18. The company proposes to convert the foaming operations from CFC-11 to HCFC-141b and adopt HFC-134a as refrigerant, replacing CFC-12.
19. The foaming baseline equipment consists of two low pressure foam dispensers, one of which is from 1985. Both low pressure machines will be scrapped once replaced. Two open-top batch-type mechanical mixers are currently used and are also earmarked for scrap. A 6 m long hydraulic press is used for panel production. Various jigs are used for panel, cabinet, and door foaming.
20. Three evacuation-cum-charging CFC-12 units and two leak detectors are the baseline refrigeration equipment to be scrapped when replaced.
21. The conversion of the foam system to HCFC-141b requires two new, closed pre-mixing stations, two high-pressure dispensers, as well as technical assistance, trials, and training.
22. The HFC-134a system requires two new HFC-134a charging units and two production leak detectors, as well as technical assistance, training, and trials.
23. Six months of incremental operating costs are requested for the domestic refrigeration part and two years for the commercial refrigeration and the sandwich panel production.
24. The cost effectiveness ratio for the three parts of this project exceeds the established thresholds. The grant funding requested is therefore based on the maximum allowed level applying the respective cost-effectiveness thresholds.
25. The three companies have chosen HCFC-141b as an interim technology as the system is technically mature and commercially available. The product also provides relatively the most acceptable insulation value and energy efficiency, and the lowest investment and operating costs. Pentane systems require extensive safety measures, water systems produce unsatisfactory products, gaseous HFCs are not widely applied, however, liquid HFCs are promising as a future permanent alternative. Any additional investments required to convert to HFC-based systems, when they become commercially available, will be borne by the enterprise to the extent required.
26. Each project includes a letter from the enterprise indicating its commitment to provide funding to meet any counterpart funding required, to phase out the use of CFCs, to use HCFCs only to the required extent and to agree to destroy any replaced equipment.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

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

2. For low pressure foam machines nearing the end of their useful lifetime (one in each enterprise), the incremental cost for replacement with new high-pressure dispensers were reduced in accordance with Decision 25/48. The cost of new batch pre-mixers to handle HCFC-141b foam was reduced in line with quotations available from suppliers of the equipment. The cost of technical assistance, trials and training was rationalised to reflect industry norms.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the projects with the funding level and associated support cost as indicated below.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at Ammar Industrial Establishment	331,080	43,040	UNDP
Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic refrigerators at El-Effendi Refrigerator Plant	182,802	23,764	UNDP
Conversion from CFC-11 to HCFC-141b and CFC-12 to HFC-134a technology in the manufacture of domestic & commercial refrigeration equipment and rigid polyurethane foam sandwich panels at Ahmad Al-Hafez Al-Waha Refrigerator Co.	330,486	42,963	UNDP