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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Thirty-first Meeting
Geneva, 5-7 July 2000

PROJECT PROPOSALS: SYRIA

This document consists of the comments and recommendations from the Fund Secretariat on the following project proposals:

Foam

•	Conversion from CFC-11 to cyclopentane in the production of rigid foam panels at National Polyurethane Company (N.P.C.)	UNIDO

Refrigeration

•	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Al-Wattar Home Appliances Co.	UNDP
•	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Alfa Refrigerators Co.	UNDP
•	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Assalam Refrigerator Co.	UNDP
•	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Dolphin Refrigerators	UNDP

PROJECT EVALUATION SHEET
SYRIA

SECTOR: Foam ODS use in sector (1999): 254.7 ODP tonnes

Sub-sector cost-effectiveness thresholds: Rigid US $7.83/kg

Project Titles:
(a) Conversion from CFC-11 to cyclopentane in the production of rigid foam panels at National Polyurethane Company (N.P.C.)

Project Data	**Rigid**
	N.P.C.
Enterprise consumption (ODP tonnes)	61.10
Project impact (ODP tonnes)	61.10
Project duration (months)	24
Initial amount requested (US $)	499,640
Final project cost (US $):	
Incremental capital cost (a)	400,580
Contingency cost (b)	37,558
Incremental operating cost (c)	-12,034
Total project cost (a+b+c)	426,104
Local ownership (%)	100%
Export component (%)	0%
Amount requested (US $)	426,104
Cost effectiveness (US $/kg.)	6.98
Counterpart funding confirmed?	Yes
National coordinating agency	Ministry of Environment
Implementing agency	UNIDO

Secretariat's Recommendations	
Amount recommended (US $)	426,104
Project impact (ODP tonnes)	61.10
Cost effectiveness (US $/kg)	6.98
Implementing agency support cost (US $)	55,394
Total cost to Multilateral Fund (US $)	481,498

PROJECT DESCRIPTION

- Latest available total ODS consumption (1999)	1,808.79 ODP tonnes
- Baseline consumption of Annex A Group I substances (CFCs)	11,050.90 ODP tonnes
- Consumption of Annex A Group I substances for the year 1999	1,280.66 ODP tonnes
- Baseline consumption of CFCs in foam sector	2,337.00 ODP tonnes
- Consumption of CFCs in foam sector in 1999	254.7 ODP tonnes
- Funds approved for investment projects in foam sector as of end of 1999	US $2,138,133.00
- Quantity of CFC to be phased out in investment projects in foam sector as of end of 1999	429.40 ODP tonnes
- Quantity of CFC phased out in investment projects in foam sector as of end of 1999	1,154.10 ODP tonnes
- Quantity of CFC to be phased out in investment projects in foam sector approved in 1999	0 ODP tonnes
- Funds approved for investment projects in the foam sector in 1999	US $15,000.00

National Polyurethane Company (NPC)

1. National Polyurethane Company (NPC) was established in 1980. The company produces rigid polyurethane metal faced foam panels for construction of cold storage rooms. It also produces flexible slabstock polyurethane foam for which a project was approved in Novermber 1998 to phase out 96 ODP tonnes using liquid carbon dioxide technology.

2. The company currently operates an 80 kg/min OMS low pressure foam dispenser commissioned in 1991. Its consumption of CFC-11 in 1999 was 61 ODP tonnes.

3. The production will be converted to the use of cyclopentane as blowing agent. The cost of conversion includes installation of cyclopentane storage tank and delivery system (US $22,000), premixing unit (US $90,000), high pressure injection unit (US $90,000), ventilation and exhaust system (US $45,000), gas sensors and alarm system (US $35,000), modification of the press (US $12,500), tirals, start-up and commissioning, insurance, etc (US $23,520). Incremental operating cost amounting to US $127,568 for six months is requested

Impact of the project

4. When implemented 96 ODP tonnes of CFC-11 will be phased out. This will eliminated 7.5% of Syria's consumption of Annex A Group substances.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Fund Secretariat and UNIDO discussed the technology. UNIDO indicated that since the sandwich panels would be used for cold storage the use of cyclopentane was preferable. The prices of the chemicals were also discussed and agreed.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the National Polyurethane Company project with the level of funding and associated support cost indicated below.

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Conversion from CFC-11 to cyclopentane in the production of rigid foam panels at National Polyurethane Company (N.P.C.)	426,104	55,394	UNIDO

PROJECT EVALUATION SHEET
SYRIA

SECTOR: Refrigeration ODS use in sector (1999): 740 ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial US $15.21/kg
Domestic US $13.76/kg

Project Titles:

(a) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Al-Wattar Home Appliances Co.
(b) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Alfa Refrigerators Co.
(c) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Assalam Refrigerator Co.
(d) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Dolphin Refrigerators

Project Data	**Commercial/Domestic**			
	Al-Wattar	**Alfa**	**Assalam**	**Dolphin**
Enterprise consumption (ODP tonnes)	18.86	8.81	10.79	8.35
Project impact (ODP tonnes)	17.81	8.22	10.19	7.97
Project duration (months)	36	36	36	36
Initial amount requested (US $)	249,754	114,461	144,309	113,045
Final project cost (US $):				
Incremental capital cost (a)	164,000	104,500	135,500	97,500
Contingency cost (b)	16,400	10,450	13,550	9,750
Incremental operating cost (c)	67,514	27,502	45,136	48,844
Total project cost (a+b+c)	247,914	142,452	194,186	156,094
Local ownership (%)	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%
Amount requested (US $)	235,860	114,461	144,309	113,045
Cost effectiveness (US $/kg.)	13.25	13.92	14.16	14.19
Counterpart funding confirmed?	Yes	Yes	Yes	Yes
National coordinating agency	Ministry of State for Environmental Affairs			
Implementing agency	UNDP			

Secretariat's Recommendations				
Amount recommended (US $)	235,860	114,461	144,309	113,045
Project impact (ODP tonnes)	17.81	8.22	10.19	7.97
Cost effectiveness (US $/kg)	13.25	13.92	14.16	14.19
Implementing agency support cost (US $)	30,662	14,880	18,760	14,696
Total cost to Multilateral Fund (US $)	266,522	129,341	163,069	127,741

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1999)	ODP tonnes
- Baseline consumption of Annex A Group I substances (CFCs)	2,224.00 ODP tonnes
- Consumption of Annex A Group I substances for the year 1999	1,280.60 ODP tonnes
- Baseline consumption of CFCs in refrigeration sector	776.80 ODP tonnes
- Consumption of CFCs in refrigeration sector in 1999	740.00 ODP tonnes
- Funds approved for investment projects in refrigeration sector as of March 2000 (30th Meeting)	US$9,353,085
- Quantity of CFC to be phased out in investment projects in refrigeration sector as of March 2000 (30th Meeting)	617.60 ODP tonnes

1. The refrigeration sector in Syria consists of four large enterprises (all have received assistance from the Multilateral Fund) with a consumption of about 174 ODP tonnes. The sector is also comprised of several medium-sized enterprises, three of which have received assistance from the Multilateral Fund. Additionally, there are estimated to be more than 70 small-sized commercial refrigeration enterprises. The total 1999 consumption in the refrigeration sector (740 ODP tonnes) is sub-divided into 307.6 ODP used for manufacturing of new refrigeration equipment and 432.3 ODP for servicing.

2. The Executive Committee has approved about US $9.4 million for fourteen projects to phase out 617.6 ODP tonnes of CFC in the refrigeration sector.

(a) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Al-Wattar Home Appliances Co.

(b) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Alfa Refrigerators Co.

(c) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Assalam Refrigerator Co.

(d) Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Dolphin Refrigerators

3. These projects cover four domestic/commercial refrigeration enterprises in Syria. In 1999, these companies (Al-Wattar, Alfa, Assalam and Dolphin) consumed 46.81 ODP tonnes of CFC in manufacturing of household refrigerators and chest freezers of different sizes. The projects will phase out 33.34 ODP tonnes of CFC-11 and 13.37 ODP tonnes of CFC-12 annually. This will be achieved by a conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology. All companies use low-pressure dispensers in the baseline in foam

operations, as well as CFC-12 charging equipment (manual, semi-automatic and automatic), evacuation and leak detection equipment in refrigerant operations.

4. Under the current projects, the existing low-pressure dispensers will be replaced with high-pressure dispensers for the foaming applications. For the refrigeration operation, charging units and leak detectors will be replaced, while vacuum pumps will be replaced/retrofitted. The projects will also include re-design, testing, trials, training and technical assistance. Incremental operating costs are claimed by each enterprise to cover the higher cost of chemicals including an increase in foam density and components. Savings on account of more efficient handling of chemicals due to the introduction of new high pressure dispensers are estimated to be about 5% with respect to the existing low pressure dispensers. The savings have been subtracted from incremental operating costs. Cost-effectiveness thresholds established in domestic and commercial refrigeration sectors were used in determining the level of eligible grant.

5. The duration of all four projects is proposed to be 36 months.

Justification for the use of HCFC-141b

6. The enterprises have selected HCFC-141b technology to replace CFC-11 in foam blowing operations. A letter advising the Government decision to use HCFC technology has been received by the Secretariat in accordance with Executive Committee Decision 27/13 and is attached to this evaluation together with the justification from UNDP.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat has raised the issue of the duration of project implementation (3 years) in four small- and medium-sized companies and relevant milestones. The duration of implementation in these projects appears to the Secretariat to be too long given the size of the enterprises and the volume of work involved by the agency. UNDP explained that the project duration (36 months) has been standardized taking into account the variation in various factors affecting the duration such as phase-in period for the new technology and time for depleting inventories of raw materials and components.

2. The Secretariat has discussed with UNDP the issue of equivalent replacement of existing refrigerant charging and foaming equipment as well as cost of compressors and chemicals used in the calculation of incremental operating costs. All the issues have been resolved and the budgets have been revised accordingly.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the four projects from UNDP with the funding levels and associated support costs as indicated below.

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Al-Wattar Home Appliances Co.	235,860	30,662	UNDP
(b)	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Alfa Refrigerators Co.	114,461	14,880	UNDP
(c)	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Assalam Refrigerator Co.	144,309	18,760	UNDP
(d)	Conversion from CFC-11 to HCFC-141b and from CFC-12 to HFC-134a technology in the manufacture of domestic and commercial refrigeration equipment at Dolphin Refrigerators	113,045	14,696	UNDP

ANNEX I

Additional Justification for Use of HCFC Technology

The implementing agency expert appraised the prospective recipient enterprise, Assalam Refrigerator Co., prior to the preparation of this project document, during April 2000 and had detailed discussions with the technical and managerial personnel of the enterprise, regarding the choice of technology for replacing the existing CFC-based technology, under the project. The enterprise was briefed in detail about the following:

1. An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.

2. The techno-economic impact of each technology on the products manufactured, and the processes and practices employed by Assalam Refrigerator Co.

3. The possible implication of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, fire and explosion hazards.

4. It was emphasized to Assalam Refrigerator Co., that HCFC technologies are interim in nature due to their residual ODP and therefore may continue to adversely affect the environment, though at a lower scale than CFCs.

5. It was further explained that HCFCs may become controlled substances under present or future international conventions and will therefore also need to be phased out at a future date, and any investments required for their phase-out and for conversion to safer technologies, may have to be borne by Assalam Refrigerator Co.

Assalam Refrigerator Co. preferred selection of HCFC-141b based technology, in their manufacture of commercial refrigeration equipment offering the following reasons:

a) The fire, explosion and security hazard involved in the implementation of hydrocarbon technology (pentanes) requires extensive and stringent safety precautions & investments and compliance with local safety regulations, in view of their flammability. The present manufacturing facilities of the enterprise are unsuitable for ensuring safe operation with hydrocarbon based technology.

b) Assalam Refrigerator Co. has reservations regarding the availability and convenience of procurement of the required grades of pentanes at acceptable prices.

c) Assalam Refrigerator Co. have selected HCFC-141b based systems as the conversion technology, as this technology would ensure phase-out of substantial ODP cost-effectively, with no safety hazard, while maintaining the product and processing characteristics at acceptable levels.

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SYRIAN ARAB REPUBLIC

MINISTRY OF ENVIRONMENT

الجمهورية العربية السورية

وزارة الدولة لشؤون البيئة

Re: HCFC-141B JUSTIFICATION

Dear Sir,

Please be advised thatthe Government of Syria recognises that the technology chosen is HCFC-141B even though this alternative is considered to be an interim one, for the following projects:

Alfa
Al-Wattar
Assalam
Dolphin

At the time being we have no other choice due to many national and global factors prevailing the technology selection, among them are;
-Commercial availability of HCFC-141B
- Low conversion costs comparing the other alternatives
- High Safety costs of hydrocarbon technology

The counterparts have abknowledged that they would convert to ODS free technology if regulations request them to do so and this is understood and endorsed by the Government of Syria.

This justification complies with ExCom's Decision 27/13.

Thank you and best regards.

Minister of State for Environment
Dr. Farouk Adli

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