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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: JORDAN

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

Aerosol

•	Substitution of CFC-12 for HAPs at the aerosol plant of Abu Shakra Factory for perfumes and cosmetics	World Bank
•	Substitution of CFC-12 for HAPs at the aerosol plant of Arab Chemical Industries	World Bank

Refrigeration

•	Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration equipment at Fourth Group of small size of Jordanian commercial refrigerator manufacturers	UNIDO
•	Replacement of CFC-11 and CFC-12 with HCFC-141b and HFC-134a in production commercial refrigeration equipment at the medium size commercial refrigerator manufacturers (Jordan Catering Supplies, El-Shami, and Nedal Raja Al-Dwaik companies) in Jordan	UNIDO

PROJECT EVALUATION SHEET
JORDAN

SECTOR: Aerosol ODS use in sector (1997): 288 ODP tonnes

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

Project Titles:
(a) Substitution of CFC-12 for HAPs at the aerosol plant of Abu Shakra Factory for perfumes and cosmetics
(b) Substitution of CFC-12 for HAPs at the aerosol plant of Arab Chemical Industries

Project Data	**Filling plant**	**Filling plant**
	Abu Shakra	**Arab Chemical**
Enterprise consumption (ODP tonnes)		
Project impact (ODP tonnes)	18.00	13.00
Project duration (months)	30	30
Initial amount requested (US $)	78,807	57,000
Final project cost (US $):		
Incremental capital cost (a)	77,400	55,000
Contingency cost (b)	7,740	5,500
Incremental operating cost (c)	-8,464	-10,961
Total project cost (a+b+c)	76,676	49,539
Local ownership (%)	100%	100%
Export component (%)	0%	0%
Amount requested (US $)	76,676	49,539
Cost effectiveness (US $/kg.)	4.26	3.81
Counterpart funding confirmed?		
National coordinating agency	Project Implementation Unit	
Implementing agency	IBRD	

Secretariat's Recommendations		
Amount recommended (US $)	76,676	49,539
Project impact (ODP tonnes)	18.00	13.00
Cost effectiveness (US $/kg)	4.26	3.81
Implementing agency support cost (US $)	9,968	6,440
Total cost to Multilateral Fund (US $)	86,644	55,979

PROJECT DESCRIPTION

(a) Substitution of CFC-12 for HAPs at the aerosol plant of Abu Shakra Factory for perfumes and cosmetics
(b) Substitution of CFC-12 for HAPs at the aerosol plant of Arab Chemical Industries

1. In 1999, the total ODS consumption in the aerosol sector was 40 tonnes as reported in the Progress of Implementation of Country Programme (24 April 2000). The Executive Committee has already approved five investment projects for the phase out of 294 tonnes of CFCs used in the manufacturing of aerosol products and has allocated about US $756,900 for their implementation. In addition, the Committee approved at its 7th Meeting a project proposal for LPG purification to be used in aerosol products and allocated US $700,000 to the World Bank for its implementation.

2. The Government of Jordan is submitting two project proposals in the aerosol sector for Arab Chemical Industries and Abu Shakra Factory, which would lead to elimination of 31 tonnes of CFC-12.

3. The two enterprises produce different sized presentations of hair spray, air freshener, deodorant and shaving cream, with the following annual production: Arab Chemical, 130,000 cans; and Abu Shakra 27,000 cans.

4. The two enterprises will convert to hydrocarbon aerosol grade propellant (HAP) technology. Conversion entails installation of a semi-automatic gas filling machine with propellant handling system and portable gas detectors at Arab Chemical Industries; retrofit of the existing Pamasol unit, a manual water bath for testing filled cans, construction of an open air filling room and portable gas detectors at Abu Shakra.

5. Technical assistance will be provided for performance and supervision of engineering designs, installation of equipment and commissioning of the plant and training.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The project proposals state that there are 10 aerosol companies in the country with a total production of 3.79 million cans/year and a total consumption of CFCs of over 300 tonnes. Five of them have already been converted to HAPs technology and two additional ones were submitted to the 31st Meeting. Thus only three companies will continue using CFCs propellant. The World Bank informed the Secretariat that at least one aerosol company is operating with a consumption larger than 9 tonnes of CFCs and that there could also be some companies manufacturing specialized industrial and pharmaceutical aerosol products using CFC-12 propellant that have not yet been identified.

2. The Secretariat pointed out that benefits realized from the LPG purification project (approved at the 7th Meeting) were not included in the calculation of the eligible incremental costs of the two projects, as was done for the aerosol projects submitted and approved at the 20th Meeting. The World Bank agreed to take into consideration the LPG purification project in the calculation of incremental operating savings. Thus, operating savings (NPV for four years) were estimated at US $10,960 for Arab Chemical Industries and US $8,465 for Abu Shakra Factory.

RECOMMENDATIONS

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

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Substitution of CFC-12 for HAPs at the aerosol plant of Abu Shakra Factory for perfumes and cosmetics	76,676	9,968	IBRD
(b)	Substitution of CFC-12 for HAPs at the aerosol plant of Arab Chemical Industries	49,539	6,440	IBRD

PROJECT EVALUATION SHEET
JORDAN

SECTOR: Refrigeration ODS use in sector (1999): 239 ODP tonnes

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

Project Titles:

(a) Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration equipment at Fourth Group of small size of Jordanian commercial refrigerator manufacturers

(b) Replacement of CFC-11 and CFC-12 with HCFC-141b and HFC-134a in production commercial refrigeration equipment at the medium size commercial refrigerator manufacturers (Jordan Catering Supplies, El-Shami, and Nedal Raja Al-Dwaik companies) in Jordan

Project Data	**Commercial**	**Commercial**
	Fourth Group	**Medium size**
Enterprise consumption (ODP tonnes)	23.78	37.88
Project impact (ODP tonnes)	23.07	35.21
Project duration (months)	30	36
Initial amount requested (US $)	282,614	494,150
Final project cost (US $):		
Incremental capital cost (a)	188,730	328,250
Contingency cost (b)	8,430	23,225
Incremental operating cost (c)	72,874	118,050
Total project cost (a+b+c)	270,034	469,525
Local ownership (%)	100%	100%
Export component (%)	0%	0%
Amount requested (US $)	270,034	469,525
Cost effectiveness (US $/kg.)	11.70	13.33
Counterpart funding confirmed?	Yes	Yes
National coordinating agency	Ministry of Municipal, Rural Affairs and Environment	
Implementing agency	UNIDO	

Secretariat's Recommendations		
Amount recommended (US $)	270,034	469,525
Project impact (ODP tonnes)	23.07	35.21
Cost effectiveness (US $/kg)	11.70	13.33
Implementing agency support cost (US $)	35,104	61,038
Total cost to Multilateral Fund (US $)	305,138	530,563

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1999)	ODP tonnes
- Baseline consumption of Annex A Group I substances (CFCs)	673.30 ODP tonnes
- Consumption of Annex A Group I substances for the year 1999	ODP tonnes
- Baseline consumption of CFCs in refrigeration sector	131.60 ODP tonnes
- Consumption of CFCs in refrigeration sector in 1998	239.00 ODP tonnes
- Funds approved for investment projects in refrigeration sector as of March 2000 (30th Meeting)	US$4,554,587.00
- Quantity of CFC to be phased out in investment projects in refrigeration sector as of March 2000 (30th Meeting)	ODP tonnes

1. Three manufacturers of domestic refrigeration equipment in Jordan with a total consumption of 52.1 ODP tonnes have received assistance from the Multilateral Fund. The remainder of the original equipment manufacturers in the refrigeration sector is comprised of 42 small and medium sized commercial refrigeration enterprises. The Multilateral Fund assisted Jordan in converting 22 commercial refrigeration company's to non-ODS technologies. In regard to repairs and servicing in the sector, a refrigeration management plan, including a refrigerant recovery and recycling project was approved by the Executive Committee at its 28th Meeting. The World Bank, as an agency responsible for implementation of the insitutional strengthening project in Jordan, has reported in May 2000 that 1999 consumption in the refrigeration sector was 239 ODP tonnes, which is 107 ODP tonnes higher than the average 1995-1997 figure (131.60 ODP tonnes).

(a) Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration equipment at Fourth Group of small size of Jordanian commercial refrigerator manufacturers

2. The proposal submitted by UNIDO covers six small commercial refrigeration companies in Jordan (Batriq Workshop, Al-Mokhtar Workshop, Shahbah Workshop, Al-Awadi Workshop, Al-Ghods Workshop, Mousa Afaneh Workshop). All the companies under this proposal are producing similar equipment (chest freezers, commercial refrigerators and water coolers) using similar manufacturing techniques. The combined average annual ODS consumption for the years 1996-1999 is 13.726 ODP tonnes of CFC-11 and 10.056 ODP tonnes of CFC-12. All of the enterprises will convert their foam operations from CFC-11 to HCFC-141b technology and their refrigerant operations from CFC-12 to HFC-134a. Polystyrene insulation will be used for insulation of water coolers. The total impact of this project will be 23.07 ODP tonnes.

3. All six companies have portable refrigerant charging machines, hand held leak detectors, and vacuum pumps in the baseline for refrigerant operations. Shahbah's workshop is using a hermetic compressor for evacuation of refrigeration systems before charging with refrigerant.

4. The project will include incremental capital costs covering refrigerant evacuation and charging equipment, vacuum pumps and portable chargers. The project also includes re-design, testing, trials, technical assistance and training. Incremental operating costs are proposed for twelve months to cover the higher cost of chemicals and an increase in foam density.

5. The duration of the project is 36 months.

(b) Replacement of CFC-11 and CFC-12 with HCFC-141b and HFC-134a in production commercial refrigeration equipment at the medium size commercial refrigerator manufacturers (Jordan Catering Supplies, El-Shami, and Nedal Raja Al-Dwaik companies) in Jordan

6. The proposal submitted by UNIDO covers three medium-sized commercial refrigeration companies (Jordan Catering Supplies (JCS), El-Shami and Nedal Raja Al-Dwaik). All the companies under this proposal are producing similar equipment (chest freezers, commercial refrigerators and water coolers) using similar manufacturing techniques. The combined average annual ODS consumption for the years 1997-1999 is 22.031 ODP tonnes of CFC-11 and 15.848 ODP tonnes of CFC-12. All of the enterprises will convert their foam operations from CFC-11 to HCFC-141b technology and their refrigerant operations from CFC-12 to HFC-134a. Polystyrene insulation will be used in the production of water coolers. The total impact of this project will be 35.213 ODP tonnes.

7. All three companies have manual refrigerant charging machines, leak detectors, and vacuum pumps in the baseline for refrigerant operations. Two companies are using locally made foaming machines for foam operations. JCS is using manual mixers and pouring polyurethane systems manually into molds and jigs. The project will include incremental capital costs covering provision of high pressure foaming machines for El-Shami and Nedal Raja , refrigerant evacuation and charging equipment, vacuum pumps and portable chargers. The project also includes re-design, testing, trials, technical assistance and training. The cost of converting foaming machines to use HCFC-141b will be covered by the counterpart enterprises. Incremental operating costs are proposed for twelve months to cover the higher cost of chemicals and an increase in foam density.

8. The duration of the project is 36 months.

<u>Justification for the use of HCFC-141b</u>

9. All 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 the implementing agency.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat has raised the issue of the duration of project implementation (3 years) in six small-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. UNIDO explained that the project milestones are in line with UNIDO's latest experience in the relevant countries and take into consideration the latest criteria of the Executive Committee regarding project completion. UNIDO will do its best to reduce the implementation timeframe as much as possible.

2. The Secretariat has requested from UNIDO additional information regarding reported high production rate in companies using manual operations. The Secretariat has discussed the issue of equivalent replacement of existing refrigerant charging and foaming equipment as well as cost of compressors and chemicals use 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 commercial refrigeration projects from UNIDO with the funding levels and associated support costs as indicated below.

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration equipment at Fourth Group of small size of Jordanian commercial refrigerator manufacturers	270,034	35,104	UNIDO
(b)	Replacement of CFC-11 and CFC-12 with HCFC-141b and HFC-134a in production commercial refrigeration equipment at the medium size commercial refrigerator manufacturers (Jordan Catering Supplies, El-Shami, and Nedal Raja Al-Dwaik companies) in Jordan	469,525	61,038	UNIDO

ANNEX I

Justification for Selection of Alternative Technologies

Although it is suitable for domestic refrigerator production, the use of cyclopentane blowing technology is less common in commercial equipment. Almost all US and some European and Asian manufacturers still use HCFC–141b, though it is a transitional substance under the terms of the Montreal Protocol.

Cyclopentane is a suitable foaming agent to replace CFC-11 for certain companies, despite its flammability. The use of this substance would require considerable investment in new foaming equipment. Rigorous training in handling this flammable substance has to be carried out to ensure that its introduction in a factory, where no dangerous substances have hitherto been used, does not give rise to a tragic accident.

Since the factories of the companies are suited in a populated area, the local authorities are reluctant to issue license for storage and application of cyclopentane. Furthermore the size of the operations would not justify the additional investment cost under the prevailing MLFMP guidelines. Thus the companies have decided to avoid cyclopentane technology and to adopt HCFC-141b as replacement for foam blowing. The companies were informed that no further assistance will be made available by the MFMP for the phase out of the transitional HCFC-141b at a later phase.

Table 3 shows the CFC-11 alternatives for foam blowing and their ozone depleting potentials.

Table 3. Alternative blowing agents to replace CFC-11

Foaming Agent	Ozone Depleting Potential (ODP)
HCFC -141b	0.11
HCFC -142b	0.065
HCFC -142b + HCFC 22	0.06
HFC 134a	0.00
Cyclopentane	0

.Subject : Commitment letter of projects involving HCFCs

In line with the decision 27/13 of the Executive Committee and in recognition of Article
2f of the Montreal Protocol , the Government of U. K. Jordan

a) Verifies that it had reviewed the specific situation at the enterprises (name (s) of company(ies) Mohammad Ahmed Shami Sons Co.

as well as its HCFC commitment under the article 2F;

)b) States that based on the prevailing circumstances at (name(s) of company (ies) Mohammed Ahmed Shami Sons Co.

At the present time the conversion of the (se) enterprise (s) requires the use of HCF - 141b for ther interim period as stipulated in the Montreal protocol;

c) Confirms that the Government and the recipient enterprise (s) understands that no funding would be available from the Fund for future conversion from HCFCs For the said company (ies) whenever such a conversio to other alternatives will be required

Ozone Office Manager

Name : Ghazi ODAT

Signature :

Date : 7-3-2000