



**United Nations
Environment
Programme**



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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: LEBANON

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

Refrigeration

- Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration at the second group of Lebanese commercial refrigerator manufacturers UNIDO
- Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration at the third group of Lebanese commercial refrigerator manufacturers UNIDO

**PROJECT EVALUATION SHEET
LEBANON**

SECTOR: Refrigeration ODS use in sector (1999): 296.58 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 at the second group of Lebanese commercial refrigerator manufacturers
- (b) Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration at the third group of Lebanese commercial refrigerator manufacturers

Project Data	Commercial	
	Second group	Third group
Enterprise consumption (ODP tonnes)	15.61	15.83
Project impact (ODP tonnes)	15.04	15.22
Project duration (months)	30	30
Initial amount requested (US \$)	220,130	219,130
Final project cost (US \$):		
Incremental capital cost (a)	133,300	120,800
Contingency cost (b)	4,530	5,530
Incremental operating cost (c)	90,361	82,168
Total project cost (a+b+c)	228,191	208,498
Local ownership (%)	100%	100%
Export component (%)	0%	0%
Amount requested (US \$)	203,191	208,498
Cost effectiveness (US \$/kg.)	13.51	13.70
Counterpart funding confirmed?		
National coordinating agency	Ministry of Environment	
Implementing agency	UNIDO	

<i>Secretariat's Recommendations</i>		
Amount recommended (US \$)	203,191	208,498
Project impact (ODP tonnes)	15.04	15.22
Cost effectiveness (US \$/kg)	13.51	13.70
Implementing agency support cost (US \$)	26,415	27,105
Total cost to Multilateral Fund (US \$)	229,606	235,603

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1999)	620.00 ODP tonnes
- Baseline consumption of Annex A Group I substances (CFCs)	725.00 ODP tonnes
- Consumption of Annex A Group I substances for the year 1999	496.00 ODP tonnes
- Baseline consumption of CFCs in refrigeration sector	359.80 ODP tonnes
- Consumption of CFCs in refrigeration sector in 1999	296.58 ODP tonnes
- Funds approved for investment projects in refrigeration sector as of March 2000 (30th Meeting)	US\$2,363,067.00
- Quantity of CFC to be phased out in investment projects in refrigeration sector as of end of 1999	246.10 ODP tonnes

Project description

1. Original equipment manufacturers in the refrigeration sector in Lebanon are comprised of one manufacturer of domestic refrigeration appliances which has received assistance from the Multilateral Fund with consumption of 135 ODP tonnes and about 50 small and medium sized commercial refrigeration enterprises, 22 of which with a consumption of about 49 ODP tonnes, have received assistance from the Multilateral Fund. The Executive Committee has also approved a recovery/recycling project as part of bilateral cooperation of France to assist Lebanon in phasing out 62 ODP tonnes in the servicing sector.

(a) Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration at the second group of Lebanese commercial refrigerator manufacturers

2. The proposal submitted by UNIDO covers six small commercial refrigeration companies in Lebanon (Frigo Alaska, Adam Est. For Refrigeration, Engineering Enterprises, Frigo Khankan, SAC Industrial Trading Co., and Al-Asria General Trading Co). All the companies under this proposal are producing similar equipment (display cabinets, upright freezers and water coolers) using similar manufacturing techniques. The combined annual ODS consumption is 4.757 ODP tonnes of CFC-11 and 10.862 ODP tonnes of CFC-12 on average for the years 1996-1998. Two enterprises (Engineering Enterprises and Frigo Alaska) will convert their foam operations from CFC-11 to HCFC-141b technology. The remaining four enterprises will continue using polystyrene panels for insulation. All six companies will convert their refrigerant operations from CFC-12 to HFC-134a. The total impact of this project will be 15.0 ODP tonnes.

3. All six companies have refrigerant charging machines, hand held leak detectors, and vacuum pumps in the baseline for refrigerant operations. The project will include incremental capital costs covering replacement of refrigerant charging equipment and leak detectors. The projects also include re-design, testing, trials, technical assistance and training. The companies are utilizing low pressure foaming machines (Engineering Enterprises and Frigo Alaska) have not requested replacement of the existing equipment. These companies will make the necessary

little modifications to foaming jigs at their own expense. Incremental operating costs are proposed for seven to fifteen months to cover the higher cost of chemicals and components, and an increase in foam density.

(b) Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration at the third group of Lebanese commercial refrigerator manufacturers

4. The proposal submitted by UNIDO covers six small commercial refrigeration companies in Lebanon (Ets. Fadi Attieh, Shams Ets, Addada Freezers, Frigo Azzi, LIFCO and Ossamco Addada). All the companies under this proposal are producing similar equipment (display cabinets, chest and upright freezers and water coolers) using similar manufacturing techniques. The combined annual ODS consumption is 5.105 ODP tonnes of CFC-11 and 10.732 ODP tonnes of CFC-12 on average for the years 1996-1998. Three enterprises (Ets. Fadi Attieh, Shams Ets, and Addada Freezers) will convert their foam operations from CFC-11 to HCFC-141b technology. The companies (Frigo Azzi and Ossamco Addada) are using polystyrene insulation panels. LIFCO imports complete insulated panels from Syria. All six companies will convert their refrigerant operations from CFC-12 to HFC-134a. The total impact of this project will be 15.22 ODP tonnes.

5. All six companies have refrigerant charging machines, hand held leak detectors, and vacuum pumps in the baseline for refrigerant operations. The project will include incremental capital costs covering provision of portable refrigerant charging equipment and leak detectors. The project also includes re-design, testing, trials, technical assistance and training. The companies are utilizing low pressure foaming machines (Ets. Fadi Attieh, Shams Ets, and Addada Freezers) have not requested replacement of the existing equipment. These companies will make the necessary little modifications in foaming jigs at their own expense. Incremental operating costs are proposed for seven to fifteen months to cover the higher cost of chemicals and components and an increase in foam density.

6. The proposed duration for both projects is 36 months.

Justification for the use of HCFC-141b

7. All 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 the two Lebanese projects covering twelve 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. 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 discussed with UNIDO the issue of equivalent replacement of two existing manual refrigerant charging boards with an automatic charging station in Ets. Fadia 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

3. 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 at the second group of Lebanese commercial refrigerator manufacturers	203,191	26,415	UNIDO
(b)	Phasing out of CFC-11 by conversion to HCFC-141b and CFC-12 to HFC-134a in manufacture of commercial refrigeration at the third group of Lebanese commercial refrigerator manufacturers	208,498	27,105	UNIDO

ANNEX I

Justification for the Use of Alternative Technologies - Foam Operation

The use of HCFC-141b as an alternative blowing agent for the foaming operation will result in the following:

- a) New formulations suitable for HCFC-141b will be required. These will be available from existing chemical suppliers. No investments are foreseen for handling chemicals.
- b) The use of new formulations will lead to a change in mixing ratios and increased viscosity, leading to reduced flow characteristics of the chemical mixture. The foaming reaction parameters will change. HCFC-141b based foam will have an increased thermal conductivity compared to foam produced with CFC-11.
- c) The HCFC-141b based foam will have an increased molded density compared to the CFC-11 based foam, resulting in increased requirement of chemicals.
- d) Technical assistance from external process experts and from chemical and equipment suppliers will need to be acquired, to implement the new formulations and to ensure smooth transition to the new technology.
- e) Trials will be needed for the new equipment, process and products. This will cover the cost of chemicals, raw materials, consumables & utilities required during trials/commissioning.
- f) The production personnel in the enterprise needs to be trained to be able to work with the new formulations and process.

Cost is included in the project budget, to cover the incremental costs of these changes. These changes will also result in incremental operating costs, for which provision has been made in the project budget. These incremental costs originate from the Increased cost of the formulations and increased foam density resulting in increased consumption of polyurethane chemicals. Currently CFC-11 is purchased in pre-mixed form with polyol. HCFC-141b can be purchased and used in the same way, however equipment modification is required. Since the boiling temperature of HCFC-141b is higher than CFC-11, the jigs will require to be heated to ensure an adequate rise time. This involves the addition of simple electric heaters to the existing jigs and can be achieved with a little expense. All the necessary changes required for the conversion of the foam system will be carried out and paid for by the companies due to the limitations of the cost effectiveness threshold figure.



Date: 21-01-2000

**MESSRS
UNIDO-VIENNA
Fax: (431) 2606 6804**

Attention : Dr. A. Malayeri

Subject : Commitment Letters of Projects Involving HCFCs-Lebanon

Dear Dr.Malayeri,

In line with the decision 27/13 of the Executive Committee and in recognition of Article 2F of the Montreal Protocol, the Government of Lebanon:

a) Verifies that it had reviewed the specific situation at the enterprises:

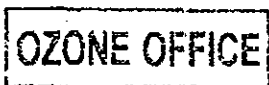
1- Frigo Alaska 2- Atamian Bros. 3- Engineering Enterprises
4- SAC for Trading 5- Al-Asria General Trading 6- Frigo Khankan

As well as its HCFC commitments under the article 2F.

b) States that based on the prevailing circumstances at the present time the conversion of these enterprises requires the use of HCFC-141b for the interim period as stipulated in the Montreal Protocol.

c) Confirms that the government and the recipient enterprises understood that no funding would be available from the Fund for the future conversion from HCFCs for the said companies whenever such a conversion to other alternatives will be required.

Ozone Office Manager



Name: Mazen K. Hussein

Signature: 

Date: 21 / 01 / 2000



REPUBLIC OF LEBANON
MINISTRY OF ENVIRONMENT

undp
OZONE OFFICE

Date: 03/05/2000

MESSRS
UNIDO-VIENNA
Fax: (431) 2606 6804

Attention : Dr. A. Malayeri

Subject : Commitment Letters of Projects Involving HCFCs-Lebanon

Dear Dr. Malayeri,

In line with the decision 27/13 of the Executive Committee and in recognition of Article 2F of the Montréal Protocol, the Government of Lebanon:

a) Verifies that it had reviewed the specific situation of the enterprises:

- 1- Fadi Attieh Est. for Trading & Industry
- 2- Shami Est. for Trading & Industry
- 3- Addada Freezers Est.
- 4- LIFCO
- 5- Frigo Azzi
- 6- Cussamco Addada Est.

As well as its HCFC commitments under the article 2F.

b) States that based on the prevailing circumstances at the present time the conversion of these enterprises requires the use of HCFC-141b for the interim period as stipulated in the Montréal Protocol.

c) Confirms that the government and the recipient enterprises understood that no funding would be available from the Fund for the future conversion of from HCFCs for the said companies whenever such a conversion to other alternatives will be required.

Ozone Office Manager

Name: Mazen K. Hussein

Signature: 

Date: 31/05/2000