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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
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PROJECT PROPOSALS: TUNISIA

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

Foam:

• Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe Nouvelle de Coupe Industrielle (SNCI) by conversion to a combination of water +HCFC-141b based systems	World Bank
• Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Soften by conversion to a combination of water +HCFC-141b based systems	World Bank
• Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Bafes by conversion to a combination of water +HCFC-141b based systems	World Bank
• Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe de Construction Industrialisee (SCI) by conversion to a combination of water +HCFC-141b based systems	World Bank
• Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Coldeq by conversion to a combination of water +HCFC-141b based systems	World Bank

PROJECT EVALUATION SHEET
TUNISIA

SECTOR: Foam ODS use in sector (1998): 371 ODP tonnes

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

Project Titles:

(a) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Bafes by conversion to a combination of water +HCFC-141b based systems
(b) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Coldeq by conversion to a combination of water +HCFC-141b based systems
(c) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe de Construction Industrialisee (SCI) by conversion to a combination of water +HCFC-141b based systems
(d) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe Nouvelle de Coupe Industrielle (SNCI) by conversion to a combination of water +HCFC-141b based systems
(e) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Soften by conversion to a combination of water +HCFC-141b based systems

Project Data	**Rigid**	**Rigid**	**Rigid**	**Rigid**	**Rigid**
	Bafes	**Coldeq**	**SCI**	**SNCI**	**Soften**
Enterprise consumption (ODP tonnes)	12.70	9.60	9.00	22.10	8.20
Project impact (ODP tonnes)	11.70	8.80	8.30	20.30	7.50
Project duration (months)	36	36	36	36	36
Initial amount requested (US $)	91,477	68,917	64,700	159,123	59,079
Final project cost (US $):					
Incremental capital cost (a)	80,000	80,000	100,000	100,000	80,000
Contingency cost (b)	8,000	8,000	10,000	10,000	8,000
Incremental operating cost (c)	24,329	18,543	17,520	46,235	15,991
Total project cost (a+b+c)	112,329	106,543	127,520	156,235	103,991
Local ownership (%)	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%
Amount requested (US $)	91,477	68,917	64,700	156,235	59,079
Cost effectiveness (US $/kg.)	7.83	7.83	7.83	7.78	7.83
Counterpart funding confirmed?	Yes	Yes	Yes	Yes	Yes
National coordinating agency	ANPE	ANPE	ANPE	ANPE	ANPE
Implementing agency	IBRD	IBRD	IBRD	IBRD	IBRD

Secretariat's Recommendations					
Amount recommended (US $)	91,477	68,917	64,700	156,235	59,079
Project impact (ODP tonnes)	11.70	8.80	8.30	20.30	7.50
Cost effectiveness (US $/kg)	7.83	7.83	7.70	7.78	7.83
Implementing agency support cost (US $)	11,892	8,959	8,411	20,311	7,680
Total cost to Multilateral Fund (US $)	103,369	77,876	73,111	176,546	66,759

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1998)	739.50	ODP tonnes
- Baseline consumption (average 1995-1997) of Annex A Group I substances (CFCs)	870.10	ODP tonnes
- Consumption of Annex A Group I substances for the year 1999	716.00	ODP tonnes
- Baseline consumption of CFCs in foam sector	463.33	ODP tonnes
- Consumption of CFCs in foam sector in 1999	366.00	ODP tonnes
- Funds approved for investment projects in foam sector as of end of 1999	US $2,354,190	
- Quantity of CFC to be phased out in foam sector as of end of 1999	478.80	ODP tonnes
- Quantity of CFCs phased out from investment projects in the foam sector as of end of 1999	188.00	ODP tonnes
- Funds approved for investment projects in the foam sector in the year 2000	US $0	
- Quantity of CFC to be phased out in foam projects approved in the year 2000	0	ODP tonnes

1. Based on data reported by Tunisia to the Ozone Secretariat, the country is in compliance with both the CFC freeze and the 50% CFC reduction by 2005. These accomplishments demonstrate that the country is in good position to achieve the complete phase out of CFC by 2010.

(a) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Bafes by conversion to a combination of water +HCFC-141b based systems

(b) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Coldeq by conversion to a combination of water +HCFC-141b based systems

(c) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe de Construction Industrialisee (SCI) by conversion to a combination of water +HCFC-141b based systems

(d) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe Nouvelle de Coupe Industrielle (SNCI) by conversion to a combination of water +HCFC-141b based systems

(e) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Soften by conversion to a combination of water +HCFC-141b based systems

Rigid Foam

1. Five companies listed in Table 1 below manufacture rigid polyurethane foam panels for insulation of storage and cold rooms and truck bodies. All the companies use low pressure

machines. Their production will be converted to the use of combination of water and HCFC-141b systems. The cost of conversion relates to the replacement of the existing low pressure machines with equivalent high pressure machines at US $70,000-US $90,000; trials, technology transfer and training at US $10,000 each. Incremental operating costs as listed in table 1 are expected to be incurred by each company.

Table 1: Profile of the rigid foam producing enterprises

Name of Enterprise	Date Established	ODS Consumption OPD tonnes	ODS Phase out ODP tonnes	Baseline Equipment[1]	Year*	ICC** US $	IOC*** US $
Bafes	1993	12.7	11.7	TeeMac LPD 60 kg/min	1993	88,000	24,329
Coldeq	1983	9.6	8.8	OMS LPD 80 kg/min	1982	88,000	18,543
S.C.I.	1980	9.0	8.3	Cosmec LPD 100 kg/min	1990	110,000	17,520
S.N.C.I.	1990	22.1	20.3	Cosmec LPD 100 kg/min	1994	115,500	46,235
Soften	1984	8.2	7.5	Cannon C-60 LPD 60 kg/min	1986	88,000	15,991

***Year – year of purchase and/or installation of equipment**

**ICC – incremental capital cost
***IOC – incremental operating cost
[1] LPD – Low pressure dispenser

Justification for the use of HCFC-141b

2. Justification for the use of HCFC-141b by all five companies has been provided in each project document and as annexes to the document, including projected "techno-economic impact of zero ODP technologies as well as estimated cost of conversion to zero ODP technology. The Government of Tunisia has also provided a letter endorsing the use of HCFC-141b by the companies.

3. A sample of the justification (additional justification) annexed to the projects and a copy of the letter of the Government of Tunisia supporting the choice of HCFC-141b are attached to this evaluation.

Impact of the projects

4. A total of 56.6 ODP tonnes will be phased out from the five foam projects. This will eliminate 7.9% of Tunisia's 1999 baseline consumption of Annex A Group I substances. There will be residual ODS consumption of 5 ODP tonnes as a result of the conversion to HCFC-141b technology.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The five projects and their associated costs have been discussed between the Secretariat and the World Bank and agreed.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the Bafes, Coldeq, SCI, SNCI and Soften projects with the funding levels and associated support costs indicated in the table below.

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Bafes by conversion to a combination of water +HCFC-141b based systems	91,477	11,892	IBRD
(b)	Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Coldeq by conversion to a combination of water +HCFC-141b based systems	68,917	8,959	IBRD
(c)	Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe de Construction Industrialisee (SCI) by conversion to a combination of water +HCFC-141b based systems	64,700	8,411	IBRD
(d)	Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Societe Nouvelle de Coupe Industrielle (SNCI) by conversion to a combination of water +HCFC-141b based systems	156,235	20,311	IBRD
(e)	Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Soften by conversion to a combination of water +HCFC-141b based systems	59,079	7,680	IBRD

Annex

Additional Justification for Using HCFC-141b Technology

The World Bank technical expert appraised the enterprise in June 2000, prior to the preparation of this project document, and had discussions with the company's representatives about the choice of technology for replacing the existing CFC-based technology. The enterprise was briefed in detail about the following:

(a) An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
(b) The "techno-economic impact" of each technology on the products manufactured, and the processes and practices employed.
(c) Possible implications of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, etc.
(d) It was emphasized to the enterprise that HCFC technologies are interim technologies due to their residual ODP and therefore may continue to adversely affect the environment, although at a lower rate than CFCs.
(e) 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 a permanent technology will have to be borne by the enterprise themselves.

The main conclusions reached by the enterprise through discussions with technical expert were:

1. HCFC-141b will maintain the insulation properties required by the enterprise's customers.

2. All Water based formulations do not provide sufficient insulation properties for the application and would require a significant cost increase to the enterprise.

3. Hydrocarbon technology was seen as not a feasible option due to the layout of the plant operations. The use of hydrocarbons in this environment would be risky and very expensive.

In view of the above, the technology selected is HCFC-141b based systems in the interim, until permanent technology (either water based of HFC-based systems) is available and can provide the required physical properties.

Projected Techno-economic Impact of Zero-ODP Technologies

The projected impact of applying various zero-ODP technologies with respect to the selected technology (HCFC-141b) in this project is summarized as below:

Water based technologies are not sufficiently developed to meet the needs of this application (insulated truck bodies) which has stringent insulation/thickness requirements. Therefore, they can not be considered.

HFC-134a based systems are not offered in the applicable regional area and are not a feasible zero-ODP option.

Hydrocarbons cannot be used for safety reasons related to the plant layout.

Thus, the selection of HCFC-141b based systems, as the preferred conversion technology, is justified taking into account all the technical, commercial and cost factors.

Estimated Cost of Future Conversion to Zero-ODP Technology

At the present time, there are no zero-ODP technology options, which can be applied cost-effectively for this project.

The following possibilities exist for a future conversion to zero-ODP technology, based on information available presently:

- Water based systems
- HFC based systems

If and when liquid HFC or water-based systems become technically mature and commercially available, the capital investments required to apply this technology are expected to be negligible. The equipment installed/retrofit under this project will be suitable for processing either of these systems. Future costs are expected to be in the area of incremental operating costs, related to higher isocyanate usage (in the case of water based) or higher costs of the HFCs. It is assumed that by the time water-based systems become available, no further density increase will be required.

Before:	6,9 t HCFC-141b	@ US$ 3,10	= 21 496
After:	11,5 t MDI increase	@ US$ 2,50	= 28 750
Incremental Operating Costs/y			7 254

It is unknown what the price would be of the HFCs in the future; therefore, IOCs related to a potential conversion to HFC technology are not quantifiable at this point.

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et de l'Aménagement du Territoire
AGENCE NATIONALE DE
PROTECTION DE L'ENVIRONNEMENT

ANPE

الجمهورية التونسية
وزارة البيئة و التهيئة الترابية
الوكالة الوطنية
لحماية المحيط

05 OCT. 2000

Nous gouvernement Tunisien, avons revue la conversion des 5 entreprises Tunisiennes a savoir, COLDEQ, SCI, BAFES, SNCI et SOFTEN et leur proposition d'utiliser les HCFC comme substitution du CFC-11, le gouvernement est d'accord sur le choix du HCFC pour cette application spécifique.

La Tunisie est consciente que le HCFC est une substance de transition et qu'une conversion ultérieure aux substances sans ODS sera nécessaire. La Tunisie est d'accord que conformément aux décisions actuelles du comité exécutif, aucun financement ne sera demandé pour une conversion aux substances sans ODS dans l'avenir.

Le Directeur du Contrôle
et de l'Unité Ozone

Hassen Hannachi