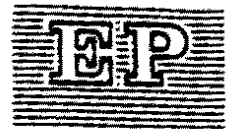




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Executive Committee of the
Interim Multilateral Fund for the
Implementation of the Montreal Protocol

Seventh Meeting
Montreal, 23-26 June 1992

Addendum

PROJECT PROPOSAL: TUNISIA

MONTREAL PROTOCOL
DRAFT EXECUTIVE PROJECT SUMMARY
TUNISIA - OZONE DEPLETING SUBSTANCE PHASEOUT PROJECT

Country: Tunisia

Project Name: Ozone Layer Protection Through the Reduction of Consumption of Ozone Depleting Substances

Grant amount: U.S.\$2.20 million (from the Ozone Trust Fund)

Beneficiary: Government of Tunisia for transfer to subproject beneficiary

Associated Bank Project: None. Stand-alone project.

Tentative Appraisal Date: July/August 1992

Tentative Approval Date: October 1992

Proposed Peer Reviewers: Messrs. Waltz (ENVGC), Fares (EM2CI)

Technical Reviewers: Messrs./Mmes. King (ENVPR), L. Kuijpers (OORG Expert)

1. Project Purpose. This project has been developed for the purpose of implementing Tunisia's Action Plan for the phaseout of regulated ozone depleting substances. As a signatory of the Montreal Protocol, Tunisia has committed to phaseout ODS and this project outlines the strategy which it wishes to adopt.

2. ODS Sector Background. Tunisia's consumption of regulated Ozone Depleting Substances (ODS) in 1991 has been estimated at 1073 metric tons, which amounts to a per-capita consumption of 0.12 kg. All regulated ODS are imported into Tunisia as there are no production facilities in the country. The bulk of the ODS demand is in the industries that manufacture and service domestic refrigerators (approximately 1 million refrigerators are presently in use while the annual production is over 300,000 units, mostly for export markets) and in the foam and aerosol sectors. The 1991 consumption profile for chlorofluorocarbon (CFC) substances was as follows: 410 tonnes of chlorofluorocarbon 12 (CFC-12) and 11 (CFC-11) in the refrigeration industry (used as refrigerant and in rigid foam blowing), 400 tonnes of CFC-11 in the flexible foam industry and 230 tonnes in aerosol applications. Usage of Annex A Group II substances (Halon 1211 and Halon 1301) and Annex B Group II & III substances (carbon tetrachloride and 1,1,1-trichloroethane) was negligible. The use of transitional substances such as HCFC-22 (used mainly in air conditioning applications) has been increasing, with 1991 consumption standing at 140 tonnes. Detailed consumption profile is presented in Annex B.

3. Other Country-Specific Background Information. Tunisia ratified the Montreal Protocol on Substances that Deplete the Ozone Layer (the Protocol) on 25 September 1989. Given that Tunisia has been classified as a developing country

for the purpose of the Protocol and that its per capita consumption of ODS is less than 0.3 kg, it qualifies under paragraph 1 of Article 5 of the Protocol for assistance from the Interim Multilateral Fund for the Implementation of the Montreal Protocol (the Fund). As a prerequisite for obtaining assistance from the Fund, Tunisia has undertaken the preparation of its Country Program for the Phaseout of Ozone Depleting Substances (the Country Program) with the assistance of the World Bank. The Country Program, which will be presented to the Executive Committee (EC) of the Fund at its Fall 1992 meeting, is Tunisia's proposed Action Plan which would lead to the complete phaseout of ODSs. The Action Plan outlines the policies, implementation actions and initial investment proposals which are needed to ensure compliance with the Protocol requirements. The technical support and investment projects which are proposed meet the Implementation Guidelines and Criteria for Project Selection which were approved by the EC at its third meeting in April 1991. A key finding of the country Program is that a prompt and timely phaseout of ODS will significantly reduce the total net incremental cost on the Tunisian economy from \$99 million under the allowable phaseout scenario (phaseout by 2010) to less than \$27 million under the accelerated phaseout scenario. This investment project also allows for Tunisia to adopt the scenario which will minimize the consumption of ODS over the phaseout period (1992-2000) whereas the lowest cost scenario would lead to slightly higher emissions.

4. Project Objectives. The principal objective of this project is to provide Tunisia with the necessary resources to fully carry out its Action Plan in a cost effective manner, and in accordance with its commitment to the Montreal Protocol. The implementation of this project will also contribute to the reduction of the net incremental cost to the Tunisian economy.

5. Project Strategy. The Ozone Layer Protection Project ("the Project") has been designed and will be implemented in such a way to utilize the institutional strengths of the agencies and ministries involved in the ODS phaseout and build upon these any additional capacities required to deal with new administrative and regulatory requirements. The strategy adopted in the implementation of this project will allow for an early phaseout of ODS in those applications where the technology already exists (such as in the aerosols and flexible foam sectors) and is well established and where the incremental costs are relatively low. Projects which are technically complex (such as the introduction of a new refrigerant in a refrigerator manufacturing operation) and which require a comprehensive engineering effort will be undertaken early enough to allow for complete phaseout by 1996. Provisions have been made for those applications where the technology is in transition (such as in rigid foam applications and Halons) and which conversion will take place at a later date. The availability of technology is an important driver of the implementation schedule.

6. Project Description. The overall Project for the phaseout of ODS has been developed on the basis of the key recommendations of the Country Program which is the final stages of preparation. The project consists of five distinct sub-components. The first four sub-components concern technology transfer and technical support while the fifth component concerns policy and monitoring measures. The proposed project sub-components have been separated into sectoral interventions (refrigeration, foam, aerosols). Project sub-components which can

be implemented early and at a relatively low cost have been identified as Early ODS Phaseout projects. These project sub-components will not await the full implementation of the institutional strengthening activities. They will proceed early in the project implementation phase. Projects which consist of new leading edge technologies have been identified as New Technology Projects.

A. Refrigeration sector

7. Several Project sub-components have been identified in the refrigeration sector to deal with the important volumes of ODS which are utilized both in the manufacture of new equipments and in the maintenance of a growing national inventory of refrigeration equipment (residential, commercial and industrial). The purpose of these projects is to reduce the usage of ODS in new equipment (which would result in ODS consumption throughout the lifetime of the equipment) and to introduce conservation and recycling of ODS which will be used in the maintenance of existing equipment. Activities are proposed in the two most important refrigeration sub-sectors: production of domestic refrigerators and maintenance of domestic, commercial and industrial refrigerators.

- Production of Domestic Refrigerators

- (a) A New Technology Investment Project with Tabrid, the largest domestic refrigerator manufacturer (annual capacity of over 300,000 units), to provide engineering assistance and training for the design, testing and introduction of a new refrigerant (such as HFC-134a) to replace CFC-12 in the refrigeration system. The new refrigeration technologies are presently evolving at a very fast pace. New compressors and cooling systems are now available on the market. The introduction of these new technologies will require extensive product testing and the development of numerous prototypes to verify product reliability with the new type of compressor and oil. The first year of this project would involve design and testing of new refrigeration systems with plant conversions being undertaken in 1994.
- (b) An Early ODS Phaseout Investment Project to reduce the use of CFC-11 in the rigid foam insulation used in the refrigerator cavity. This will typically involve the introduction of high-pressure foam blowing technology. The rigid foam insulation typically consumes four to five times the amount of ODS that is used in the refrigeration loop. The technology is readily available and can be implemented without any significant changes in plant configuration or production line changes.

- Maintenance of domestic, commercial and industrial refrigerators

The purpose of this sub-component is to improve the servicing procedures for domestic refrigerators through recycling and adoption of alternative substances for flushing and purging of compressors during maintenance. The objectives of this project will be accomplished through the following components:

- (c) A Comprehensive Study describing in detail the service sector and analysis of alternatives to determine the optimum option for recycling. Comprehensive recycling of ODS in the domestic refrigerator sector is presently not viable given the small volumes of refrigerant which would be recovered and the present low cost of CFC-12 on the Tunisian market. As the availability of CFC-12 decreases and its price increases, recycling will become more attractive. This study will analyse in more detail the servicing sector and propose a recycling strategy which can be implemented starting in 1994-1995. Initial focus will be on commercial and industrial facilities where the quantities of ODS are more important and where the cost of capital replacement is more significant.
- (d) An Early ODS Phaseout Training Program consisting in the training of a number of local instructors in the "hands-on" ODS handling skills, coupled with the introduction of an ODS license/accreditation system. These training programs will be incorporated into the curriculum of the courses presently dispensed in the Refrigeration Technician program and the planned refrigeration course to be dispensed at l'Ecole Nationale des Pêches in Sfax. This program will initially focus on service shops and be extended to the field servicing sectors.

B. Projects in foam sector

8. The purpose of this Project sub-component is to introduce ODS-free foam blowing technologies in the flexible and rigid foam sectors. The objectives of the project will be achieved through technical assistance, production demonstration efforts and in some cases with minor manufacturing equipment retrofits. Regulatory support will be provided to initiate and maintain the phaseout efforts. The following project subcomponent is planned:

- (e) An Early ODS Phaseout Technical Support Program to the 4 or 5 flexible foam manufacturers (located in major Tunisian cities) and 2 to 3 rigid foam manufacturers (mainly in the refrigerated transport and small refrigeration equipments sub-sectors) in the form of individual consultations by foam specialists in ODS-free foam formulations and test production runs at each manufacturing site. Recent attempts at the introduction of alternative blowing agents have resulted in very poor product quality (such as cracks in the foam bun) and potentially hazardous working condition (potentially high concentrations of the alternative blowing agent). Formulations now exist on the market to produce low density flexible foam (as low as 18 kg/m³) using only water as a blowing agent. An alternative blowing agents which requires little equipment modifications and which is widely used is methylene chloride. This sub-component can be implemented immediately as technology is widely available. Regulatory measures might be required to force an early phaseout given the present low-cost product dumping which is taking place. It is also common practice to reduce the CFC in rigid foam formulations by an initial 50%.

C. Projects in the Aerosol Sector

9. The purpose of this Project sub-component is to guide aerosol manufacturers to select and implement the most appropriate ODS-free technologies. This will be achieved through technical support. This aerosol-sector project comprises the following element:

- (f) Early ODS Phaseout Technical Support consisting in comprehensive seminars on ODS-free technologies for the aerosol industry, with follow-up individual consultations on appropriate technologies for specific applications. This project sub-component will have a wide geographical coverage (with potential projects in Bizerte, Sousse, Gabes and Kairouan) given that there are a number of small aerosol manufacturers (15 to 20) located throughout the country. This sub-component will also comprise in-depth safety audits for manufacturers which have adopted Liquid Petroleum Gas (LPG) as replacement. A source of aerosol grade LPG was established in mid-1991 and is capable of supplying the Tunisian market which is only a few hundred tones per year. The feasibility of extending the distribution network to more rural areas must be investigated.

D. Policy and Monitoring Measures

10. The policy and monitoring measures that are proposed will require that certain agencies and institutions involved in the ODS phaseout develop or expand their management systems. The main agencies which would be concerned with new policy and monitoring measures include: (a) the Ministère de l'Environnement (including l'Agence Nationale de Protection de l'Environnement (ANPE) as key executing agency); (b) the Ministère de l'Economie Nationale; (c) the Direction Générale des Douanes; (d) l'Institut National des Statistiques and possibly others. The capacities of these agencies will be strengthened in order to properly implement the following key actions:

- (g) Reestablish an ODS Phaseout Committee under the Union Tunisienne des Industries and the ANPE, of government and industry representatives in order to guide the ODS phaseout activities and assist the private sector, through the Union Tunisienne des Industries in conducting feasibility studies for the identification, installation and operation of ODS-free technologies;
- (h) Develop and Set-up an Efficient Monitoring System to track the consumption and uses of ODS;
- (i) Study, Develop and, When Appropriate, Adopt Regulatory Measures which could include bans, identification of optimal levels for taxes on certain ODS applications, and determination of quality standards for recycled ODS. Of particular importance is the zoning issue for those aerosol manufacturers which opt for LPG as the alternative propellant;

- (j) Establish a licensing system for ODS users and accreditation of refrigeration technicians;
- (k) Establish an Information Dissemination / Public Awareness Program in order to familiarize Tunisian industry with ODS-free technologies, handling procedures, cost implications, and to enhance public awareness of the ozone issue and the importance of conservation practices. Conduct technical clearinghouse activities on new and emerging ODS-free technologies;
- (l) Establish Procedures, Guidelines and Financial Flow Mechanism for the funds which are to be provided by the Interim Multilateral Fund for the projects and line-of-grant;

11. Project Costs and Financing Arrangements. It is proposed that the cost of the Project be funded as a grant to Tunisia and passed to the enterprises and institutions also on a grant basis through a financial intermediary or an existing trust fund which will have the required management infrastructure to administer the funds which would be provided from the Ozone Trust Fund. Total project cost is \$2.20 million. The individual component costs and expected benefits from the phaseout activities are summarized in Annex A. The overall cost effectiveness of the proposed project sub-components is also very good (approximately \$1 of net incremental cost per kg of ODS phaseout).

12. Project Implementation. The Ministry of the Environment through the Agence Nationale de Protection de l'Environnement would have overall responsibility for the implementation of the Action Plan for the phaseout of ODSs, which includes policy, monitoring and public awareness components in addition to the investment projects. An ODS Phaseout Committee consisting of public and private institutions will be established under the guidance of the ANPE and the Union Tunisienne des Industries, to direct, guide and monitor phaseout activities. Several Project sub-components have been identified as Early ODS Phaseout projects and should proceed as soon as the funds become available. The most appropriate financial flow mechanism from the Ozone Trust Fund will be identified during project appraisal.

13. Project Sustainability. The funds will be passed on to the Government of Tunisia on a grant basis with the clear objective of also disbursing the money on a grant basis in order to cover net incremental costs of ODS phaseout activities. The long term financing of the operation is therefore non-sustainable. On the technical front, the Project, which is part of a comprehensive Action Plan, is expected to be sustainable and will initiate additional phaseout activities as the market forces to substitute increase. The technical sustainability should be further enhanced by the introduction of:

- a) policy measures through the imposition of levies
- b) monitoring system through regulating import/export of CFC
- c) licensing program and monitoring CFC users

14. Rationale for Montreal Protocol Financing. As per the Implementation Guidelines and Criteria for Project Selection established by the Executive Committee of the Montreal Protocol during its third meeting in April 1991, all technical assistance, demonstration projects, pre-investment and investment activities which lead to reductions in ODS emissions are eligible for financing. The proposed projects are an important part of the Action Plan developed in the preparation of the Country Program.

15. Issues. Formal Government approval must be obtained prior to Project appraisal. An appropriate financial flow mechanism will need to be identified, evaluated and organized in order to quickly make the funds available to the private sector companies. The availability of a qualified intermediary is an issue to be addressed during appraisal.

16. Environmental Aspects. All components of the project are environmentally sound and will effectively reduce the emission of ODS into the environment. It will be the responsibility of the Ministère de l'Environnement to ensure that companies being provided assistance under the Montreal Protocol comply with applicable environmental regulations in accordance with Tunisian law and the World Bank guidelines. The project will be classified in accordance with the Bank's OD 4.01.

17. Project Benefits. The project's major benefit is to assist Tunisia to achieve its objective of completely phasing out the use of ozone depleting substances as soon as technically feasible while reducing the net incremental costs on its economy, and while maintaining export markets for products that will be required to be ODS-free within a few years. This proposed project is an integral part of the optimum phaseout strategy which will be adopted by Tunisia and will reduce emissions of ODSs 70% by the end of 1995 and 90% by 2000. The Early Phaseout sub-components would allow for a 50% reduction in consumption in the first year of project implementation. The cumulative effect of the optimum phaseout strategy will prevent the emission of over 27,000 tons of ODSs by the year 2010, had there been unconstrained supply/demand of ODS. In addition to the reduction in ODS emissions to the environment, the proposed Action Plan, when fully implemented, will minimize the net incremental cost of the complete ODS phaseout on the Tunisian economy.

18. Project Risks and Mitigation. The project risks are considered to be small to medium. There is little risk in the aerosol and foam sectors as the proposed technical aspects will rely on well proven technologies and processes. Policy and regulatory aspects should provide the required support to mitigate market distortions which otherwise could impede transition to substitutes. The introduction of alternative refrigerant technologies, which is presently a technically complex undertaking, must be done in accordance with the latest developments and in association with the new technology suppliers (especially for refrigerator compressors).

19. Staff Review Arrangements. The following staff is responsible for the Project and for the review:

Task Manager:	TBD
Division Chief:	Amir Al-Khafaji (MN1IN)
CD Director:	Pieter Bottelier (MN1DR)
Bank Technical Advisor:	Ken King (ENVPR)
OORG Technical Reviewer:	Mr. Lambert Kuijpers (Philips)

20. Project Review and Next Steps. The following steps are planned for processing the project:

- 1) A follow-up mission to Tunisia for Project Review: May 1992
- 2) After receiving government approval, presentation of the project proposal to the Executive Committee (EC) of the IMLF at their June 1992 meeting.
- 3) Presentation of Country Program by the Government of Tunisia to the IMLF;
- 4) Following EC approval, project appraisal in July/August 1992.
- 5) Project and Grant approval: Fall 1992

ANNEX A

PROJECT COSTS AND ODS PHASEOUT OBJECTIVES

SECTORAL ODS PHASEOUT PROJECT						
Project Sub-Components	Year (Project Duration)	Annual Reduction in ODS Consumption in tons (Based on 1991 consumption)	ODS Reduction Over Allowable Phaseout Period in tons (estimated)	Project Cost	Total Incremental ^{3/} Cost of Phaseout for entire sector (NPV in 1992 \$)	Approximate Cost ^{6/} per kg of ODS phasedout
A. Refrigeration Sector	1993-95	60	<u>4,865^{4/}</u>	\$360,000	20,500,000	4.1
(a) ¹ Engineering assistance for design, testing and introduction of HFC-134a technology						
(b) ² <u>Introduction of low-CFC and no-CFC rigid foam</u>	1992-93	175	<u>4,460</u>	\$300,000	3,200,000	0.7
(c) Study on service sector and potential for recycling				\$100,000		
(d) Maintenance of domestic, commercial and industrial refrigeration systems	1993-97	140	<u>1,680</u>	\$510,000	400,000	0.25
B. Foam Sector (flexible)	1992-93	400	<u>11,900</u>	\$100,000	2,300,000	0.2
(e) <u>Technical support and individual consultations</u>						
C. Aerosol Sector	1992-94	100	<u>4,000</u>	\$400,000	500,000	0.13
(f) <u>Technical assistance</u>						
		Total: 875	<u>Total: 27,000</u>	Total: 1,770,000	Total: 26,900,000	1.00

POLICY AND MONITORING MEASURES

<u>Component</u>	<u>Year (Project Duration)</u>	<u>Cost</u>
D. Policy and Monitoring Measures		
(g) Creation of ODS Reduction Committee	1992	\$60,000
(h) Monitoring System	1993	\$30,000
(i) Regulatory Measures	1993-94	\$200,000
(j) ODS Licences/accreditation of technicians	1993-95	\$40,000
(k) Information Dissemination	1993-95	\$50,000
(l) Financial Flow Mechanism	1992-93	\$50,000
		=====
	Sub-total	\$430,000
	TOTAL:	2,200,000

- 1/ Projects identified as in EPS text
- 2/ Items underlined are early phaseout project (components b,c,f)
- 3/ These incremental costs are preliminary and will be undergoing review
- 4/ Includes all ODS which are saved in maintenance
- 5/ Total incremental cost of phaseout divided by ODS Reduction over allowable phaseout period

Table 2.2. Development in ODS Use in Tunisia, 1986-91 (in metric tons)

	1986	1987	1988	1989	1990	1991
Refrigerants						
CFC-12	120	145	130	120	175	230
CFC-115 in CFC-502	-	-	-	-	-	10
HCFC-22	70	125	135	105	130	140
Total CFC Refrig.	120	145	130	120	175	240
Total HCFC-22 Refrig.	70	125	135	105	130	140
Foam						
CFC-11	335	360	375	320	420	575
CFC-12	-	-	-	-	-	10
Total CFC Foam	335	360	375	320	420	585
Aerosols						
CFC-11	125	130	130	135	140	110
CFC-12	130	135	140	145	145	120
CFC-114	< 5	< 5	< 5	< 5	< 5	-
Total CFC Aerosols	260	270	275	285	290	230
Solvents						
CFC-113	-	-	-	-	-	< 5
CTC	-	-	-	-	-	1
MCF	-	-	-	-	-	10
Total CFC solvents	0	0	0	0	0	< 5
Halons						
Halon 1211	1	2	2	4	1	-
Halon 1301	-	-	-	-	-	2
Total Halons	1	2	2	4	1	2
Total CFCs						
CFC-11	460	490	505	455	560	685
CFC-12	250	280	265	265	320	360
CFC-113	-	-	-	-	-	< 5
CFC-114	< 5	< 5	< 5	< 5	< 5	-
CFC-115	-	-	-	-	-	10
Annex A, Group 1 Total CFCs	715	775	780	725	885	1,060
Annex A, Group 2 Total Halons	1	2	2	4	1	2
Annex B, Group 2 Total CTC	-	-	-	-	-	1
Annex B, Group 3 Total MCF	-	-	-	-	-	10
Annex C Total HCFCs	70	125	135	105	130	140

Sources: 1986-90: World Bank Mission Report, March 1991, revised as follows: CFC refrigerants decreased by 30%; CFC foams increased by a factor 2.2.
1991: Mission estimate 1992.