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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
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Montreal, 17-19 July 2002

PROJECT PROPOSALS: YEMEN

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

Refrigeration

- Implementation of the refrigerant management plan: national recovery and recycling programme for refrigerants in the commercial and MAC sectors UNDP
- Implementation of the refrigerant management plan: monitoring UNEP
- Implementation of the refrigerant management plan: establish regulations and legislation UNEP
- Implementation of the refrigerant management plan: training programme for customs officers UNEP
- Implementation of the refrigerant management plan: training programme on good practices in refrigeration UNEP

PROJECT EVALUATION SHEET YEMEN

SECTOR: Refrigeration ODS use in sector (2000): 860 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

Project Titles:

- (a) Implementation of the refrigerant management plan: national recovery and recycling programme for refrigerants in the commercial and MAC sectors
- (b) Implementation of the refrigerant management plan: monitoring
- (c) Implementation of the refrigerant management plan: establish regulations and legislation
- (d) Implementation of the refrigerant management plan: training programme for customs officers
- (e) Implementation of the refrigerant management plan: training programme on good practices in refrigeration

Project Data	Refrigerant management plan				
	R&R	Monitoring	Regulations	Training custom	Training ref
Enterprise consumption (ODP tonnes)					
Project impact (ODP tonnes)	220.00				
Project duration (months)	36	36	18	24	36
Initial amount requested (US \$)	2,470,000	68,250	50,000	121,750	210,500
Final project cost (US \$):					
Incremental capital cost (a)					
Contingency cost (b)					
Incremental operating cost (c)					
Total project cost (a+b+c)	1,472,730	57,750	25,000	91,825	189,500
Local ownership (%)	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%
Amount requested (US \$)	1,472,730	57,750	25,000	91,825	189,500
Cost effectiveness (US \$/kg.)	6.69				
Counterpart funding confirmed?					
National coordinating agency	Environment Protection Authority/NOU				
Implementing agency	UNDP	UNEP	UNEP	UNEP	UNEP

<i>Secretariat's Recommendations</i>					
Amount recommended (US \$)	1,472,730	57,750	25,000	91,825	189,500
Project impact (ODP tonnes)	220.00				
Cost effectiveness (US \$/kg)	6.69				
Implementing agency support cost (US \$)	172,000	7,508	3,250	11,937	24,635
Total cost to Multilateral Fund (US \$)	1,644,730	65,258	28,250	103,762	214,135

PROJECT DESCRIPTION

Sector background

1. In 2000, more than 790 ODP tonnes of CFC-12 were used in the country for servicing refrigeration equipment; an additional 24.2 ODP tonnes of CFC-12 and 45.6 ODP tonnes of CFC-11 were used in the manufacturing of refrigeration equipment. A small amount of CFC-11 (7.9 ODP tonnes) was also used for cleaning the systems prior to charging them with refrigerant (either CFC-12 or HCFC-22).
2. There are currently 3 million CFC-12-based domestic refrigerators, 216,000 commercial refrigeration units and 480,000 cars with a MAC unit in Yemen. Since 1998, most of the MAC units in new car models are HFC-134a based (320,000 units). There are also some new domestic and commercial units charged with ODS alternatives (i.e., HFC-134a, R-717). As a result of the lower price of CFC-12 refrigerant compared with HFC-134a (US \$2.00 for CFC-12; US \$3.20 for HCFC-22 and US \$9.40 for HFC-134a), up to one third of the equipment is serviced with CFC-12 refrigerant.
3. There are about 1,140 small, medium and large size workshops in the country servicing refrigeration equipment, employing over 3,500 technicians (an average of 2, 3 and 6 technicians in each of the small, medium and large workshops, respectively). There are five training institutes which provide courses on refrigeration and air-conditioning.

ODS regulations

4. A Decree was issued by the Chief of the Cabinet Ministers banning the importation of CFC-based equipment. Since the institutional strengthening project was approved, the country has attempted to ban the use of CFCs in new refrigeration equipment; however, the date for banning the use of virgin CFC in the servicing sector has not yet been decided.

Sub-projects in the RMP

5. The RMP identified the following sub-projects:
 - (a) Establishment of a regulation and legislation on ODSs (US \$50,000): to establish a quota and licensing system; ban import of ODS-based equipment; register all major users of ODSs and ban the use of CFC-11 for cleaning refrigeration equipment;
 - (b) Training programme for refrigeration technicians (US \$210,500): to improve service quality during maintenance, training and certification of 2,000 refrigeration and air-conditioning technicians;
 - (c) Training programme for customs officers (US \$121,750): to improve monitoring and control of imports/exports of ODS and ODS-based equipment, and establish a reliable data reporting system;

- (d) Establishment of recovery and recycling system (US \$1,838,000): to recover and recycle CFC-12 refrigerant through 500 recovery machines and 20 recycling centres;
- (e) Public awareness programme (US \$118,000): to raise the awareness regarding ODS phase out, and promote the use of non-ODS based equipment;
- (f) Investment project for the conversion of CFC-based equipment to non-CFC technology (US \$195,295);
- (g) Retrofit the existing CFC-based chillers or replacement of existing chillers based on energy saving (cost to be determined): to eliminate the use of CFCs in the industrial refrigeration and air-conditioning sub-sectors, reduce the energy consumption;
- (h) Conversion of cold rooms (costs to be determined): to install new CFC-free cold stores;
- (i) Monitoring the sub-projects identified in the RMP (US \$68,250): to ensure the implementation of the RMP projects.

6. The Ozone Unit, under the supervision of the Ministry of Tourism and Environment will be responsible for the monitoring, co-ordination and implementation of proposed phase-out activities in the RMP.

7. The Yemen RMP project was submitted with an official letter from the Chairman of the Environmental Protection Authority of the Ministry of Tourism and Environment, stating the Government's commitment to achieve, without further assistance from the Multilateral Fund, the 50 per cent reduction in consumption of CFCs used in the refrigeration servicing sector by 2005 (equivalent to 396 ODP tonnes) and 85 per cent reduction step by 2007 (an additional 277 ODP tonnes). It is also indicated that the current and expected future CFC consumption of all sub-sectors, including the informal sector, small and medium-sized enterprises and the MAC, have been assessed.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

8. The Yemen CFC baseline for compliance calculated by the Ozone Secretariat is 349 ODP tonnes, and the CFC baseline reported in the RMP is 1,796 ODP tonnes. The ODS consumption levels reported by the Government to the Ozone Secretariat for 1999 and 2000 are over 1,000 tonnes. Based on the different baselines reported, the Fund Secretariat sought a clarification from the Ozone Secretariat, who indicated that pursuant to Decision XIII/15, the Government of Yemen submitted to the Implementation Committee at its 27th Meeting, revised ODS consumption data and a request to change its baseline (UNEP/OzL.Pro/ImpCom/27/4). The

Ozone Secretariat also informed that the Government of Yemen has reported ODS consumption of over 1,000 ODP tonnes for both 1999 and 2000, which correspond to the consumption data reported in the RMP project.

9. As reported in the RMP project proposal, in 2000, the total CFC consumption in Yemen was 1,038.9 ODP tonnes as shown in the following table.

Sector	CFC-11	CFC-12	CFC-113	CFC-114	CFC-115	Total CFC
Aerosol	45.4	121.3		8.3		175.0
Foam	-	-				-
Refrigeration manufacturing	45.6	24.2				69.9
Refrigeration servicing	7.9	775.9			8.4	792.1
Solvent			1.9			1.9
Total	98.9	921.4	1.9	8.3	8.4	1,038.9

10. Regarding the aerosol sector, at its 34th Meeting, the Executive Committee approved two investment projects for the phase out of 179 ODP tonnes of CFCs, representing the entire CFC consumption in the aerosol sector in the country. In the refrigeration manufacturing sub-sector, the Executive Committee approved, at its 35th Meeting, two investment projects for the phase out of 13.3 ODP tonnes of CFCs. The Government of Yemen submitted the RMP project proposal with the commitment to achieve 85 per cent reduction in the amount of CFCs used in the servicing sector (i.e., a phase out of 673 ODP tonnes) by 2007. This would leave a CFC consumption of 177.3 ODP tonnes. This remaining consumption is distributed as follows: 56.6 ODP tonnes used for the manufacturing of refrigeration equipment, 118.8 ODP tonnes used in the refrigeration servicing sub-sector, and 1.9 ODP tonnes of CFC-113 used as a solvent.

11. The Secretariat discussed with UNDP and UNEP on the reliability of the consumption data reported in the RMP taking into consideration that the main users obtain their ODS requirements directly from the importers; records of sales are not properly kept; and the Custom Authority does not monitor imports of refrigerants. In this regard, the Secretariat was informed that four survey teams were constituted and trained to collect ODS data in the country. Data collection activities were undertaken from July 1999 to March 2001. During this period most of the target groups were visited (ODS importers and distributors, survey of ODS-based refrigeration equipment in the country; service workshops; Governmental agencies including Custom Authority, Central Statistical Organisation, Ministry of Industry, Ministry of Supply and Trading, Ministry of Fishing and Chamber of Commerce). All the information collected by the different teams was analysed and compared to each other in order to obtain a final result. The final results were analysed and evaluated carefully before being sent to the Fund and Ozone Secretariats.

12. The Secretariat also pointed out that due to the misuse and mishandling of domestic refrigeration equipment, approximately one million units are serviced once or twice a year with an average charge of 0.5 kg per annum. For this and other reasons, the reported CFC consumption in the domestic refrigeration sector is 416 tonnes (or 52 per cent of the total

consumption). UNEP responded that the RMP was prepared for raising awareness among the people and improving the prevailing techniques and expertise of the service technicians. The training in good practices will have four train the trainers in the four main cities of the country in order to build local capacity and provide training equipment to each of these points. During its second phase, the project will provide training to at least 1,000 technicians. Awareness raising activities will complement the training as users will avoid improper use and will request adequate service to the units.

13. The Secretariat discussed the sustainability of the RMP taking into consideration the very low price of CFC-12 compared to other non-CFC refrigerants (US \$2.00/kg of CFC-12; US \$3.20/kg of HCFC-22 and US \$9.40/kg of HFC-134a) and that the Government of Yemen has no intention to decrease or increase the tax on ODS or its alternatives. In this regard, UNDP and UNEP advised that CFC-12 is available freely and in excess to the existing demand in the country; therefore, its cost is very low. The Government of Yemen is not in a position to impose any change in the price of refrigerants because the country is committed to internal and regional regulations and tax agreements. However, it is expected that the price of CFC-12 will increase when the legislation will be in place, in particular the quota and import/export licensing system.

14. The Secretariat and UNDP discussed the size of the proposed recovery and recycling sub-project, taking into consideration the current practice of servicing non-CFC based equipment with CFCs, the very low price of CFC-12 compared to non-CFC refrigerants, and the distribution of CFCs in the servicing sector (over 50 per cent of the consumption is for servicing domestic refrigerators), the recovery and recycling project cannot be justified at this time. In this regard, UNDP agreed to reduce the size of the project (number of recovery and recycling machines) according to the number of the CFC-based refrigeration equipment in the country (excluding the non-CFC based equipment being serviced with CFCs).

15. The Secretariat and the implementing agencies also discussed issues related to the cost of some of the equipment items requested in the recovery and recycling sub-project and cost of logistical arrangements of training programmes which were higher than the price of the same items in similar projects so far approved. The cost of the sub-projects were revised accordingly (as shown in the evaluation sheet).

RECOMMENDATIONS

16. Taking into account that through the implementation of the RMP a total of 673 ODP tonnes of CFCs will be phased by 2007 (representing 85 per cent of the CFC consumption used in the refrigeration servicing sector), and that the remaining CFC consumption that would need to be phased out with the assistance from the Multilateral Fund, if eligible, is 177.3 ODP tonnes, the Fund Secretariat recommends blanket approval of the projects at the funding level indicated in the table below:

	Project Title	Project Funding (US\$)	Support Cost (US\$)	Implementing Agency
(a)	Implementation of the refrigerant management plan: national recovery and recycling programme for refrigerants in the commercial and MAC sectors	1,472,730	172,000	UNDP
(b)	Implementation of the refrigerant management plan: monitoring	57,750	7,508	UNEP
(c)	Implementation of the refrigerant management plan: establish regulations and legislation	25,000	3,250	UNEP
(d)	Implementation of the refrigerant management plan: training programme for customs officers	91,825	11,937	UNEP
(e)	Implementation of the refrigerant management plan: training programme on good practices in refrigeration	189,500	24,635	UNEP
