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THE MULTILATERAL FUND FOR THE  
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**PROJECT PROPOSAL: GHANA**

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

Refrigeration

- Implementation of the RMP: mobile air conditioning (MAC) recovery and UNDP recycling of CFC-12
- Implementation of the RMP: Monitoring of the activities UNDP
- Incentive programme for the commercial/industrial refrigeration end-user sector UNDP
- Implementation of the RMP: customs training programme UNEP

## PROJECT EVALUATION SHEET GHANA

SECTOR: Refrigeration ODS use in sector (1999): 43.60 ODP tonnes

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

**Project Titles:**

- (a) Implementation of the RMP: mobile air conditioning (MAC) recovery and recycling of CFC-12
- (b) Implementation of the RMP: Monitoring of the activities
- (c) Incentive programme for the commercial/industrial refrigeration end-user sector
- (d) Implementation of the RMP: customs training programme

Project Data	RMP	RMP	RMP	RMP
	(a)	(b)	(c)	(d)
Enterprise consumption (ODP tonnes)				
Project impact (ODP tonnes)	11.70		4.00	
Project duration (months)	36	24	72	24
Initial amount requested (US \$)	98,902	15,455	198,000	97,000
Final project cost (US \$):				
Incremental capital cost (a)	91,184	14,050	198,000	
Contingency cost (b)	7,718	1,405		
Incremental operating cost (c)				
Total project cost (a+b+c)	98,902	15,455	198,000	
Local ownership (%)	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%
<b>Amount requested (US \$)</b>	98,902	15,455	198,000	81,000
Cost effectiveness (US \$/kg.)	8.50			
Counterpart funding confirmed?				
National coordinating agency		Ozone Office		
Implementing agency		UNDP		UNEP

<b>Secretariat's Recommendations</b>				
Amount recommended (US \$)	98,902	15,455	Issue	81,000
Project impact (ODP tonnes)	11.70			
Cost effectiveness (US \$/kg)	8.50			
Implementing agency support cost (US \$)	12,857	2,009		10,530
Total cost to Multilateral Fund (US \$)	111,759	17,464		91,530

## PROJECT DESCRIPTION

- (a) Incentive programme for the commercial/industrial refrigeration end-user sector
- (b) Implementation of the RMP: mobile air conditioning (MAC) recovery and recycling of CFC-12
- (c) Implementation of the RMP: Monitoring of the activities
- (d) Implementation of the RMP: customs training programme

### *Background*

1. In 1991, total CFC consumption in the refrigeration sector in the country was estimated at 73 tonnes used for servicing domestic, commercial and industrial refrigeration equipment and MAC units. In 1999, CFC consumption was estimated at 43.6 tonnes. CFC reduction has been supported by introduction of a licensing system to control imports of ODS and implementation of investment projects and training programmes in the refrigeration sector. However, additional activities are needed in order to achieve the 2005 and 2007 reduction measures stipulated in the Montreal Protocol.

### *Policy and legislation*

2. The Government of Ghana has already developed legislative measures to control import of ODS and ODS-based equipment. Since 1994, an ODS import permit is in place which requires that importers must obtain a clearance from the Environmental Protection Agency before importing ODS-based equipment into the country. While no controls on quotas are applied, the Ozone Office uses moral judgement to reduce the amounts of ODS imported.

3. Under the Environmental Assessment Regulation LI-1652 of 1999, an Environmental Impact Assessment of new cold stores is required prior to their instalment. The Ozone Office plays a key role in the review process, ensuring that only ozone-friendly refrigerants are used.

4. The Government of Ghana has identified the need for development of new legislation to control the amounts of ODS and used CFC-12-based refrigeration equipment that can be imported into the country (about one million second-hand refrigerators are in operation in Ghana).

### *Projects already approved in the refrigeration sector*

5. The Government of Ghana has implemented the following projects in the refrigeration servicing sector:

- (a) Improved servicing and maintenance practices in the refrigeration sector (US \$328,000, under UNDP implementation);
- (b) Implementation of a train the trainers programme for refrigeration technicians

(US \$99,000, under UNEP implementation); and

- (c) Technical assistance in air conditioning (US \$31,500 as bilateral cooperation by the Government of France).

6. Through these projects, maintenance and servicing procedures and refrigerant recovery/recycling operations of service technicians have been improved; and 37 recovery/recycling machines have been distributed. While these projects were successfully implemented, they were not sufficient to assist all service technicians in the country, specially those in the informal sector. With the eventual phase out of CFC-12 and the increased imports of refrigeration equipment based on non-ODS refrigerants, additional training is required.

*Sub-projects contained in the RMP*

7. The RMP project aims to reduce the consumption of CFCs in the country in order to achieve Montreal Protocol obligations. The RMP includes a training programmes for customs officers and other government staff involved in the monitoring of ODS and ODS-based equipment. This project aims at training customs officers to increase their knowledge on ozone depletion issues; get acquainted with ODS import/export licensing system and other regulations related to the phase-out of ODS; identify ODS and ODS-based refrigeration (CFC-detection equipment will be provided in all major customs entry points in the country); and development of a database on ODS imports at the Department of Customs, Excise and Preventive Services.

8. Through a survey carried out in 2000, it was found that of the total 30,000 vehicles with a CFC-12 MAC unit in the country, 18,500 units are serviced every year (by more than 300 technicians in 100 workshops) using more than 18.5 tonnes of CFC-12. To address the management of CFCs used in this sub-sector, the RMP includes a request for the establishment of a recovery and recycling network for 16 recovery/recycling machines for servicing MAC units, at a total cost of US \$98,902. This sub-project also provides for training workshops for service technicians on practical demonstrations for recovery and recycling operations.

9. A recent survey of cold stores and fishing vessels was conducted in Ghana with assistance from the Institut de Génie Thermique of Switzerland. In total, 67 cold stores (of a total 900 identified in the country) and 76 fishing vessel companies were surveyed. According to the survey, it was found that:

- (a) while some installations are well maintained, and conversion to zero-/low-ODP refrigerants would require minor changes, other installations would need to be completely re-built or replaced;
- (b) retrofit of newer facilities (installed after 1995) to zero/low-ODP refrigerants will be relatively easy to perform, since they were designed for either CFC or HFC refrigerants;
- (c) in general, the design and electrical installations of the facilities preclude simple retrofit to a flammable hydrocarbon refrigerant (which would involve major

equipment re-design, and upgrading of the electrical installation).

10. Based on the results of the survey, the RMP includes a project to, be implemented over a period of 5 years for establishing an incentive programme to encourage refrigeration end-users to replace, or permanently retrofit their existing ODS based equipment (fisheries, meat-processing plants, breweries, hospitals, hotels, restaurants, supermarkets), to zero/low-ODP refrigerants (the total ODS consumption in this sub-sector is 7.1 ODP tonnes). During the period 2001-2006, any end-user (established prior to 25 July 1995) can apply to receive an incentive payment towards the cost of replacement/retrofit of their CFC-based equipment. Incentive payments (between US \$500 and US \$15,000) will be based on CFC consumption when equipment is replaced, or the cost for a permanent retrofit. The incentive project also includes a component for information dissemination and monitoring (advertisements in newspapers, information brochures for end-users and relevant industry associations, and workshops and annual meetings to report on progress of the programme). Following completion of the conversion, the end-user enterprise must provide invoices to confirm the total costs incurred during the conversion. The level of payment will be reviewed by the Ozone Office and UNDP (40 per cent of the incentive amount will be paid upon receipt of an application and the balance after conversion has been completed and a certification that the replaced equipment has been destroyed/rendered unusable has been issued).

11. The RMP project also includes a request for engaging a local consultant to collect data on CFCs recovered and recycled from the service workshops that are included in the recovery and recycling project (at US \$15,455); and a request for US \$137,000 for other projects related to the refrigeration servicing sector (possibly additional training programmes) which will be submitted at a later meeting of the Executive Committee.

## **SECRETARIAT'S COMMENTS AND RECOMMENDATIONS**

### **COMMENTS**

1. The Government of Ghana submitted the RMP to the Fund Secretariat with an official letter of transmittal stating its commitment, responsibilities and the financial implications associated with decision 31/48 (i.e., 50 per cent reduction of CFC baseline by 2005 and 85 per cent reduction by 2007; that all refrigeration sub-sectors have been carefully assessed; and a system for monitoring and reporting on progress for delivering the phase out targets has been established).

2. During the preparation of the RMP, the current and future forecast consumption of CFCs in relation to the 50 per cent reduction by 2005 and 85 per cent by 2007 were taken into account. The activities proposed in the RMP including legislative measures, would reduce CFC consumption to negligible levels from the year 2006 onwards.

3. The Secretariat and UNEP also discussed cost issues related to logistical arrangements and training material for the custom training programme. Subsequently, it was agreed to adjust the costs for the programme accordingly (as indicated in Table 1 above).

4. The Fund Secretariat also requested an explanation for the request for assessment and coordination of technical and policy issues (US \$10,000) included in the training programme. UNEP informed the Secretariat that the request for assistance and coordination of policy and technical issues represents UNEP's substantive management work (which is not covered under the agency's support cost), which includes: detailed definition of responsibilities of each stakeholder; definition of characteristics of the products and deliverables; guidance to local governments and experts on the work carried out at national level; review and comments on products and deliverables; preparation and delivery of targeted presentations at the workshops; follow-up and assistance on activities to be implemented after the workshop.

5. Regarding the incentive programme for commercial and industrial end-user refrigeration, the Secretariat pointed out that this activity appeared premature at the present time for the following reasons:

- (a) The leakage rate of installed commercial refrigeration equipment is high (ranging from 10 per cent to over 300 per cent in the equipment surveyed);
- (b) While the price of CFC-12 has increased in the last 10 months (from US \$3.00 to US \$5.50 per kg) it is still cheaper than HCF-134a (US \$6.60/kg);
- (c) The total amount of CFCs estimated to be phased out from this programme is 4 tonnes over the period 2001 – 2006. Even if the end-user project was successful in phasing out all 7 tonnes and through the proposed MAC recovery and recycling project additional 11.7 ODP tonnes were recovered and recycled, Ghana will still not be able to achieve the 50% reduction by 2005 (calculated at 17.8 tonnes);

6. UNDP informed the Secretariat that the project aims, through the innovative mechanism, to apply the limited funding available as widely as possible amongst end-users in the commercial and industrial refrigeration sector. UNDP also felt that most requests for an incentive would come from end-users who must change their refrigeration system (i.e., age, innovation of business), and would be willing to select a non-CFC technology. Even if the number of end-users coming forward for an incentive is low at the beginning (i.e., during the first one or two years), it will increase as CFC prices continue to evolve. The incentive programme must start now so that the direct impact of at least 3 tonnes/year can be achieved in 2003-2004.

7. UNDP also pointed out that the annual CFC used by the surveyed enterprises is a realistic figure; not all of the consumption is for topping-up the systems due to leaks. Whilst there may be potential to reduce this by improvements in servicing techniques this is no more certain than the potential to reduce overall consumption by the proposed incentive programme. In Ghana, the difference in price between CFC 12 and HFC 134a is negligible (a difference of US \$0.80/kg). The commercial and industrial refrigeration end-user sector needs to be addressed now

8. UNDP considered that all requirements under decisions 28/44 and 31/48 have been met. Regarding the issue of utilizing all the funds available without meeting the phase-out objectives of the RMP, UNDP is convinced that neither service technician training nor recovery and recycling projects will give any better guarantee (it is to be noted that UNDP is including a MAC recovery and recycling project within the RMP). The incentive programme has the potential to start the process of elimination by conversion. Remaining consumption will be decreased through legislative measures, quota systems and market forces.

9. Upon a request by the Secretariat regarding the responsibilities of the implementing agencies in the overall implementation of the RMP, UNDP indicated that, as bound by its agreement with the Committee, it will facilitate compliance with the provisos of the Montreal Protocol by Article 5 countries through execution of the individual projects within the RMP project. UNDP considers that ODS phaseout resulting from legislative measures and through implementation of activities stipulated in the RMP, are the final responsibility of the country for which the implementing agency could not be held responsible.

## RECOMMENDATION

1. The Fund Secretariat recommends approval of MAC recovery and recycling, RMP monitoring, and customs training programme components with associated support costs at the funding level shown in the table below (items (a), (b), (d)).

2. The Executive Committee may wish to consider the incentive programme for the commercial/industrial refrigeration end-user sector in light of the above comments and observations.

3. The Executive Committee may wish to consider the RMP as a whole in the light of its conclusion on the incentive programme.

	<b>Project Title</b>	<b>Project Funding (US\$)</b>	<b>Support Cost (US\$)</b>	<b>Implementing Agency</b>
(a)	Implementation of the RMP: mobile air conditioning (MAC) recovery and recycling of CFC-12	98,902	12,857	UNDP
(b)	Implementation of the RMP: Monitoring of the activities	14,455	2,009	UNDP
(c)	Incentive programme for the commercial/industrial refrigeration end-user sector	Issue		UNDP
(d)	Implementation of the RMP: customs training programme	81,000	10,530	UNEP