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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Thirtieth Meeting
Montreal, 29-31 March 2000

PROJECT PROPOSALS: SENEGAL

Refrigeration

- Refrigerant Management Plan: Assistance with adoption of legislation UNEP
- Refrigerant Management Plan: Recovery and recycling Scheme UNIDO
- Refrigerant Management Plan: Demonstration Retrofit France
- Refrigerant Management Plan: Hydrocarbon Retrofit Switzerland

**PROJECT EVALUATION SHEET
SENEGAL**

SECTOR: RMP ODS use in sector (1997): 134 ODP tonnes

Sub-sector cost-effectiveness thresholds: US \$ kg

Project Title:

(a) Refrigerant Management Plan: Assistance with adoption of legislation

(b) Refrigerant Management Plan: Recovery and recycling Scheme

(c) Refrigerant Management Plan: Demonstration Retrofit

(d) Refrigerant Management Plan: Hydrocarbon Retrofit

Project Data	(a)	(b)	(c)	(d)
Enterprise consumption (ODP tonnes)				
Project impact (ODP tonnes)		24	1.14	
Project duration (months)	12	12	12	18
Initial amount requested (US \$)	19,210	461,600	42,765	83,930
Final project cost (US \$):				
Incremental capital cost (a)		461,600		
Contingency cost (b)		0		
Incremental operating cost (c)		0		
Total project cost (a+b+c)	19,210	461,600	42,765	83,930
Local ownership (%)				
Export component (%)				
Amount requested (US \$)	19,210	461,600	42,765	83,930
Cost effectiveness (US \$/kg.)				
Counterpart funding confirmed?				
National coordinating agency	Ministere de l'environnement et de la nature			
Implementing agency	UNEP	UNIDO	France	Switzerland
<i>Secretariat's Recommendations</i>				
Amount recommended (US \$)	Pending	Pending	Pending	Pending
Project impact (ODP tonnes)				
Cost effectiveness (US \$/kg)				
Implementing agency support cost (US \$)				
Total cost to Multilateral Fund (US \$)				

PROJECT DESCRIPTION

- (a) Refrigerant Management Plan: Assistance with adoption of legislation
- (b) Refrigerant Management Plan: Recovery and recycling scheme
- (c) Refrigerant Management Plan: Demonstration Retrofit
- (d) Refrigerant Management Plan: Hydrocarbon Retrofit

1. At its 30th Meeting a request for the implementation of a refrigerant management plan project with an estimated total cost of US \$607,505 is being presented. The project consists of the following four components, which will be implemented by the Governments of France, Switzerland (bilateral cooperation) and by UNEP and UNIDO:

- (a) Assistance for adoption of legislation (UNEP): an international and a local expert will be engaged to reconsider the existing draft legislation, recommend inclusion of licensing and assist the Ozone Office in getting the legislation adopted by the Government. The cost of this project component is US \$19,210.
- (b) A refrigerant recovery and recycling scheme (UNIDO): to provide additional recovery and recycling equipment (150 recovery machines and 13 recycling machines) which were not supplied through the original project approved at the 22nd Meeting. The cost of this project component is US \$461,600.
- (c) Demonstration project to retrofit five commercial and industrial refrigeration installations (Government of France): to convince owners of industrial and commercial refrigeration plants to use a refrigerant that is currently more expensive than the CFC-12 that they use (ownership of a plant using CFC-12 will be a liability as producers close down and prices rise). The cost of this project component is US \$42,765, out of which US \$10,960 is for the fees of consultants (national and international) and travel and the remaining for purchasing retrofit refrigerant, lubricant, filter and labour.
- (d) A demonstration project to retrofit domestic refrigerators with hydrocarbon (Government of Switzerland): specifically to test domestic refrigeration equipment over a period of 4 months to determine the performance of hydrocarbons as a refrigerant and its effect on the equipment. The cost of this project component is US \$83,930, of which US \$47,320 is for the fees of consultants (national and international) and travel, and US \$36,610 for purchasing CFC-based domestic refrigerators, monitoring equipment, rental of premises, stationary, testing (wear analysis, spectrograph). The project also provides for a one-week training course in the UK for Senegalese experts given by a consultant specialised in hydrocarbon retrofit, followed by a visit to Cuba where the participants will be able to study local retrofit techniques and judge for themselves whether the Cuban claims on successful hydrocarbon retrofit of domestic refrigerators are well founded.

Refrigeration servicing sector

2. In 1998, the annual consumption of CFCs in the refrigeration servicing subsector was estimated at 130 tonnes (86.6 tonnes for servicing domestic refrigerators, 26.5 tonnes for commercial and industrial units, 17 tonnes for MAC units and 2.5 tonnes of CFC-11 for flushing operations).
3. Domestic refrigerators (500,000 units), small commercial equipment and MAC units (20,200 units) are serviced by 1,800 technicians working in 300 small workshops. Other refrigeration equipment is serviced by a small number of specialist contractors. Information related to the characteristics of the refrigeration servicing workshops in the country such as the number of services provided per year by type of equipment serviced, their average consumption of CFCs, and the number and size of commercial and industrial refrigerators in operation was not included in the project proposal.
4. The import of second-hand CFC-based refrigerators has increased in recent years and is presenting a major problem for the control of ODS imports.
5. The current price of CFC-12 imported by registered companies is US \$9.00/kg and by the informal sector is US \$6.90/kg. Due to this difference in price, the amount of refrigerant imported via the "informal" sector has increased abruptly in the last two years.
6. In 1998, the Ozone Unit developed a draft ministerial decree to control CFC imports into the country through the use of ODS import quotas and permits for importers of refrigeration equipment. However, the decree remains unsigned by the relevant minister.

Projects approved in the refrigeration servicing sector in Senegal

7. The Executive Committee has approved the following activities related to the refrigeration servicing sector in Senegal:
 - (a) Training and upgrading for repair technicians ("train the trainers") at a cost of US \$58,000 under UNEP's work programme (11th Meeting). In total, 250 technicians benefited from the training programme which was completed in 1994.
 - (b) Complementary training of technicians in domestic refrigeration and air conditioning systems (US \$16,500) as a bilateral assistance from the Government of France (21st Meeting), to introduce good servicing practices at the training centres, implementing regulations on good servicing practices and developing a system for reporting CFCs consumption in the servicing sector.
 - (c) Expansion and upgrading of statistics networks for customs officers, at a cost of US \$26,000 under UNEP's work programme (11th Meeting), to upgrade the statistics for customs network and the Department of Statistics; develop statistics on ODS consumption and ODS-based products and equipment; and control imports of ODSs and ODS-based products.

- (d) Project preparation for projects in the hotel and fisheries industries and recycling (US \$10,000) as a bilateral assistance from the Government of France (19th Meeting).
- (e) Refrigerant recovery and recycling scheme at a cost of US \$136,250 under UNIDO's implementation (22nd Meeting). The project was approved by the Committee taking into account the statement by UNIDO that the accompanying measures necessary for successful implementation were already or would be in place before implementation began and that the project had been prepared on the basis of in-depth discussions with the national authorities and trade associations. The project was completed in June 1999; only 40 recovery machines, 45 refrigeration servicing kits and 7 recycling machines were delivered instead of 145 recovery machines, 100 service kits and 12 recycling machines, provided in the approved project. UNIDO has advised that the difference was due to higher unit prices of recovery and recycling machines and the need to implement a training programme which was not foreseen in the original proposal.
- (f) Development of refrigerant management plan (project preparation) at a cost of US \$30,000 under UNEP's implementation (24th Meeting).

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat reviewed the project proposal in the context of the projects on the refrigeration servicing sector so far approved by the Executive Committee and the profile of CFC consumption in the country.

Servicing sector

2. In spite of the activities so far approved at a total cost of US \$276,750, the characteristics of the refrigeration servicing workshops (e.g., number of services provided per year by type of equipment serviced, average consumption of CFCs; number and size of commercial and industrial refrigerators) cannot yet be described in detail. While the consumption in the commercial and industrial refrigeration subsectors accounts for only 20 per cent of the total CFC consumption in the country, these sectors have the greatest potential for recovery and eventual recycling of CFC refrigerants. UNEP, however, is of the opinion that the refrigerant used in the commercial/industrial sector represents a fairly small portion of what can be recovered in a recovery/recycling scheme. This has not been the case in any other recovery and recycling project so far approved by the Committee.

ODS legislation

3. UNEP's completion report on the expansion and upgrading of statistical networks for the customs officers programme stated that as a follow-up of the activity, in 1997 Senegal drafted a ministerial decree to establish a system to control imports of CFC and CFC-based equipment. However, the draft decree remains unsigned by the relevant minister possibly due to more pressing socio-economic problems in the country which have given ozone depletion a low priority at ministerial level. The Secretariat requested UNEP to provide a justification as to how

an international and local consultants would assist in convincing the Government to sign the decree regulating refrigerant imports, bearing in mind that the Government is not yet convinced about regulating imports of ODSs and ODS-based equipment.

4. In this regard UNEP indicated that it has proved beyond the best efforts of the Ozone Unit to get the drafted legislation adopted by the Government. Unless external help is provided, it is unlikely that ODS legislation will ever be approved. UNEP has suggested that legal assistance will be helpful in reviewing the draft to make sure it is complete and up to date and can help persuade the Government to adopt the law. UNEP considers that an international consultant with appropriate legal and government expertise should help in getting the legislation adopted. However, no guarantee can be given that this will solve the problem.

Training of refrigeration servicing technicians

5. So far, only 250 technicians (of a total of 1,800) have received training in good refrigeration practices through the training programme approved at the 11th Meeting; a further 100 technicians will be trained over the next three years, for a total of 350 technicians over a 10-year period. In this regard, the Secretariat requested UNEP for clarification on the following: (i) steps proposed to monitor technician performance after training is provided, (ii) the impact of the programme on other activities planned under the RMP; (iii) means of incorporating lessons learnt from previous programmes into any future similar activities.

6. In this regard UNEP stated that the number of technicians trained is likely to be larger as training of the remaining technicians is expected to be done on the job in the workshops by their peers. UNEP also indicated that reduction in CFC consumption from 174 tonnes in 1996 to 130 tonnes in 1998 could be attributable to an increase in imports of non-CFC-based refrigerators and MAC units and the training programme; a legal requirement for service technicians to provide returns on refrigerant used would enable an estimation of the portion due to training. No ODS law is currently in force and thus no such requirement can legally be made of workshops.

Recovery and recycling

7. The Secretariat questioned the request for additional recovery and recycling equipment in the light of the original recovery and recycling project. Taking into consideration the scarce information available on the commercial and industrial servicing sub-sectors; that about 66.5 per cent of the total CFC consumption is for servicing domestic refrigerators which do not require recovery equipment; and that a recovery machine is provided to workshops servicing commercial and/or industrial refrigeration equipment with a minimum annual consumption of 250 kg of CFCs, the request of US \$461,600 for additional recovery and recycling units and ancillary equipment cannot be justified.

8. The project completion report for the project approved at the 22nd Meeting was received by the Secretariat in late February 2000. The report stated that “the number of equipment to be supplied should be based on accurate data and information in order to avoid waste of time, delays or equipment shortfalls”. It also indicated that during project preparation and implementation there is a need for close cooperation, active participation and full involvement of

local authorities; thorough involvement of the Ozone Office; and tight project management and monitoring. The project completion report, however, did not raise the issue for the need for additional recovery and recycling equipment.

9. The Ozone Office has prepared a list with names of workshops which could make good use of recovery equipment. However, no information on the amount of CFCs used by the workshops and the service provided by type of equipment was detailed.

Demonstration retrofit project

10. Regarding the demonstration project to retrofit commercial and industrial refrigeration equipment, the Secretariat considers that the project may not be justifiable at the present time, even for demonstration purposes. Only about 30 per cent of the service technicians have received training in good practices; the proposed retrofit refrigerant is considerably more expensive than CFC-12 (at US \$13/kg in Western Europe and even higher in Senegal where little is used) and thus, there are not yet economic incentives for the sector to convert. Additionally, CFCs used in the commercial/industrial refrigeration sector amount only to about 20 per cent of the total CFC consumption; thus, Senegal may be able to achieve the 2005 compliance without retrofitting.

11. In this regard, UNEP indicated that there is a strong commercial argument in favour of converting a commercial plant to another fluid. In the case of a commercial plant, a business can be threatened if refrigerant is not available. UNEP also stated that the economic incentive is the danger to a business of running a plant depending on CFC-12 when availability lessens and prices soar, as is likely between now and 2005. UNEP considers that waiting for the CFC price to go up, may not be seen as the best economic option nor would it benefit end-users and the environment generally.

Retrofit of domestic refrigerators with hydrocarbon

12. Regarding the demonstration project to retrofit domestic refrigeration equipment with hydrocarbon, the Secretariat notes that as submitted the proposal appears to be principally a development project in which domestic refrigeration equipment will be tested, over a short period of time (4 months) to determine the performance of hydrocarbons as a refrigerant and its effect on the equipment. On this basis its eligibility is questionable since the Multilateral Fund does not support projects to develop technologies.

13. The Secretariat also expressed reservations about the maturity of hydrocarbon retrofit technology for domestic refrigeration. The MLF-funded UNEP Study on the Potential for Hydrocarbon Replacements in Existing Domestic and Small Commercial Refrigeration Appliances released in January 1999 concludes that "Although there are indications that HCs could be a promising option for certain applications, there remain some outstanding technical issues related to whether HC retrofit technology is generally proven and these need to be further pursued." In view especially of the safety implications, the Secretariat is uncertain that the technology choice is consistent with the requirement for technologies supported by the Multilateral Fund to be proven.

14. The Government of Switzerland said that the purpose of the project is to adapt to tropical conditions a safe and practical methodology for retrofitting the equipment. The testing aspects involved are simply to validate work done elsewhere and to convince a local audience of technicians that this technology works well and can be adapted safely to local conditions. The project should not be considered any more as a development project but as a demonstration project for the country, knowing that the dissemination of this technology at the end of the project will be self sustained because it is economically attractive.

15. The Government of Switzerland advised that the extent of research and development work already done in the field in India, Indonesia, Cuba (several 100,000 appliances) and Australia (MAC units) shows that further development work is not necessary. Further, the international commercial availability of the necessary components and technical manuals to support safe retrofits and subsequent servicing demonstrated that the technology was available.

16. The Government of Switzerland also considered that the implementation of this project could be planned in a way which will ensure that the economic and commercial conditions in Senegal will make the retrofit option attractive. Thus the technology transfer activities (training etc.) would not be lost due to a long delay before effective large scale implementation.

RECOMMENDATION

1. The Executive Committee may wish to consider the project proposal in light of the comments provided by the Fund Secretariat.