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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
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**PROJECT PROPOSALS: SENEGAL**

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

Refrigerant management plan

- Implementation of the RMP: activities for supporting and monitoring the RMP UNEP
- Implementation of the RMP: refrigerant recovery and recycling scheme UNIDO
- Implementation of the RMP: demonstration project to retrofit domestic refrigerators for the use of hydrocarbon refrigerant Switzerland

## PROJECT EVALUATION SHEET SENEGAL

SECTOR: Refrigeration ODS use in sector (1999): 123.94 ODP tonnes

Sub-sector cost-effectiveness thresholds: n/a

**Project Titles:**

- (a) Implementation of the RMP: activities for supporting and monitoring the RMP
- (b) Implementation of the RMP: refrigerant recovery and recycling scheme
- (c) Implementation of the RMP: demonstration project to retrofit domestic refrigerators for the use of hydrocarbon refrigerant

| Project Data                        | Refrigerant management plan |         |             |
|-------------------------------------|-----------------------------|---------|-------------|
|                                     | (a)                         | (b)     | (c)         |
| Enterprise consumption (ODP tonnes) |                             |         |             |
| Project impact (ODP tonnes)         |                             |         |             |
| Project duration (months)           | 24                          | 12      | 8           |
| Initial amount requested (US \$)    | 49,500                      | 461,600 | 81,230      |
| Final project cost (US \$):         |                             |         |             |
| Incremental capital cost (a)        |                             |         |             |
| Contingency cost (b)                |                             |         |             |
| Incremental operating cost (c)      |                             |         |             |
| Total project cost (a+b+c)          |                             |         |             |
| Local ownership (%)                 | 100%                        | 100%    | 100%        |
| Export component (%)                | 0%                          | 0%      | 0%          |
| <b>Amount requested (US \$)</b>     | 44,500                      | 85,000  | 71,230      |
| Cost effectiveness (US \$/kg.)      |                             |         |             |
| Counterpart funding confirmed?      |                             |         |             |
| National coordinating agency        |                             |         |             |
| Implementing agency                 | UNEP                        | UNIDO   | Switzerland |

| <b>Secretariat's Recommendations</b>     |        |        |  |
|--|--------|--------|--|
| Amount recommended (US \$)               | 44,500 | 85,000 |  |
| Project impact (ODP tonnes)              |        |        |  |
| Cost effectiveness (US \$/kg)            |        |        |  |
| Implementing agency support cost (US \$) | 5,785  | 11,050 |  |
| Total cost to Multilateral Fund (US \$)  | 50,285 | 96,050 |  |

## PROJECT DESCRIPTION

- (a) Implementation of the RMP: activities for supporting and monitoring the RMP
- (b) Implementation of the RMP: refrigerant recovery and recycling scheme
- (c) Implementation of the RMP: demonstration project to retrofit domestic refrigerators for the use of hydrocarbon refrigerant

### Background

1. In 1999, the annual consumption of CFC-12 in the refrigeration servicing sector was estimated at 123.4 ODP tonnes with the following distribution: 83.9 tonnes for servicing domestic refrigerators, 23 tonnes for commercial and industrial units, 15 tonnes for MAC units and 1.5 tonnes of CFC-11 for flushing operations. An additional 2.7 tonnes of CFC-115 were used for servicing commercial and industrial units.

2. Domestic refrigerators (517,000 units in 1998), small commercial equipment, and MAC units (20,240 units) are serviced by 1,800 technicians working in 300 small workshops. Other refrigeration equipment is serviced by a small number of specialist contractors. 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.

3. The current price of CFC-12 imported by registered companies is US \$10.00/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 is about 50 per cent of the total amount imported into the country.

4. In 1997, 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. A sub-project within the RMP addresses this issue and provides a concrete action plan to implement the proposed legislation.

### Projects so far approved in the refrigeration servicing sector in Senegal

5. 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 (11<sup>th</sup> Meeting).
- (b) Complementary training of technicians in domestic refrigeration and air conditioning systems (US \$16,500) as a bilateral assistance from the Government of France (21<sup>st</sup> Meeting).
- (c) Expansion and upgrading of statistics networks for customs officers, at a cost of US \$26,000 under UNEP's work programme (11<sup>th</sup> Meeting).

- (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 (19<sup>th</sup> Meeting).
- (e) Refrigerant recovery and recycling scheme at a cost of US \$136,250 under UNIDO's implementation (22<sup>nd</sup> Meeting). 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 (24<sup>th</sup> Meeting).

Sub-projects within the RMP

6. The RMP includes the following sub-projects, which will be implemented by the Governments of France and Switzerland (bilateral cooperation) and by UNEP and UNIDO:

- (a) Activities for supporting and monitoring the RMP (UNEP). The Ozone Unit will provide the necessary framework to ensure the achievements of the objectives of the RMP and the schedule of reductions in consumption. It will be accomplished through specific assistance in establishing legislation, awareness and training to stakeholders, and monitoring of the results. Once the legislation is adopted, a local consultant will be in charge of monitoring the effective implementation of the proposed legislation. The sub-project also proposes training of 100 customs officers and distribution of 10 ODS identification kits. The cost of this project component is US \$49,500.
- (b) A refrigerant recovery and recycling scheme (UNIDO), to provide additional recovery and recycling equipment (150 recovery machines, 13 recycling machines and one refrigerant reclaim centre). The cost of this project component is US \$461,600.
- (c) A demonstration project to retrofit domestic refrigerators for the use of hydrocarbon refrigerant (Government of Switzerland): This project will adapt to local conditions a safe and practical methodology for the retrofit of domestic refrigerators, using a hydrocarbon refrigerant developed in Cuba, India and other countries. It also includes a training course in the UK and a visit to Cuba where participants will study local retrofit techniques and assess whether the claims on successful hydrocarbon retrofit are well founded. The cost of this sub-project is US \$81,230.
- (d) Conversion of commercial refrigeration equipment. The Government of Senegal

in co-operation with the Government of France is currently preparing a project for the conversion to non-ODS refrigerant of commercial refrigeration equipment. This project will be implemented once the proposed legislation is in place and suitable technical and financial conditions are attained. The total estimated cost of the project is US \$250,000.

### Monitoring

7. The sub-projects included in the RMP will increase the workload of the Ozone Unit; however, the existing infrastructure will not require any modifications. The Ozone Committee will actively participate in the organisation and implementation of the recovery and recycling and the retrofit programmes. Additional support will be provided within the institutional strengthening budget to allow these activities to be properly monitored and supervised.

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

### **COMMENTS**

8. The Secretariat reviewed the project proposal in the context of the projects on the refrigeration servicing sector so far approved by the Executive Committee, the profile of CFC consumption in the country and in light of decisions 31/48 and 32/27.

9. The RMP project was first submitted for the consideration of the Committee at its 30<sup>th</sup> Meeting, which decided to defer it to a subsequent meeting (decision 30/49).

### Compliance with decisions 31/48 and 32/27

10. The Government of Senegal developed a ODS phase-out strategy in the refrigeration sector which will achieve, without further funding from the Multilateral Fund, the 50 per cent reduction in CFC consumption in 2005 and the 85 per cent reduction in 2007. The proposed strategy includes enactment of regulations and legislation to support the CFC phase out activities, including controls on imports. For each activity identified, the strategy estimates the level of funding required for its implementation and means of funding, including national financing.

11. The RMP project also describes the proposed monitoring and evaluation activities. The Ozone Office will provide the necessary elements to ensure the sustainability of the RMP.

12. Senegal ratified the Montreal Amendment to the Montreal Protocol on 12 August 1999.

### Level of funding

13. The Secretariat and UNEP discussed the level of funding for the Senegal RMP project. The Secretariat notes that, using decision 31/48 as a guide (i.e., no more than 50 per cent of the

total funds approved for the original RMP project, or for a new RMP an increase of 50 per cent of the total project cost compared to the level of funding typically approved to date) and the level of funds granted to similar projects in other LVCs, the total funding for the RMP project for Senegal might be around US \$200,000.

#### ODS legislation

14. The ministerial decree that was drafted in 1997 to establish a system to control imports of CFC and CFC-based equipment remains unsigned by the relevant minister due to more pressing socio-economic problems in the country. To address this issue, UNEP advised that it is proposed to review the draft decree, to recommend incorporation of additional elements such as requirements for service workshops to employ at least one technician trained through the training programmes, to review the methodology for presentation to and approval by the Government, and to produce a handbook on national ODS regulations and import/export licensing systems.

#### Recovery and recycling

15. The Secretariat questioned the request for additional recovery and recycling equipment in the light of the original recovery and recycling project. Taking into consideration 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 usually provided to workshops servicing commercial/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 is not consistent with the assistance provided to other countries and the cannot be justified.

16. The Ozone Unit of Senegal informed UNEP that the recovery/recycling equipment was delivered a number of years after the refrigeration technicians received training in good service practice including refrigerant recovery operations. The improvement in service practice among refrigeration technicians and the use of recovery/recycling machines (since 1999), among other reasons, have resulted in a decrease in CFC consumption from 178 tonnes in 1996 to 121 tonnes in 1999. A greater reduction in CFC consumption could be achieved if the refrigeration technicians received adequate tools, including vacuum pumps and recovery machines.

17. Subsequently, UNEP and UNIDO reviewed the size of the recovery and recycling project and agreed not to request a refrigerant reclaim system and to reduce the number of recycling machines and ancillary equipment (for a total cost of US \$80,000).

#### Retrofit of domestic refrigerators with hydrocarbon

18. Regarding the demonstration project to retrofit domestic refrigeration equipment with hydrocarbon, the Secretariat expressed reservations on the technical feasibility and long-term sustainability of the project as well as the maturity of hydrocarbon retrofit technology for domestic refrigeration. World-wide experience on retrofitting CFC-12 based domestic refrigerators with hydrocarbons is limited to a few countries. The project does not provide any indication on the long-term sustainability of the project such as distribution/commercialisation of the new refrigerant in the country and its cost; modalities for the transfer of the technology

among service technicians; additional training for service technicians in the use of the new refrigerant; and safety-related issues associated with handling hydrocarbons.

19. Furthermore, the UNEP Study on the Potential for Hydrocarbon Replacements in Existing Domestic and Small Commercial Refrigeration Appliances (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. The Secretariat also pointed out that some of the items included in the proposal were not incremental (refrigeration equipment and refrigerants).

20. The Government of Switzerland and UNEP noted that the technical feasibility of the project is expected to be at least as successful as the conversion performed in Cuba. According to the "Study on hydrocarbon replacements" by UNEP, 112,000 refrigerators were converted in Cuba between 1992 and July 1997. This study presents this experience in detail and similar tests conducted in Indonesia. The information presented in this study as well as additional data addressing the remaining outstanding issues, are currently being gathered (an interim report will be available in the near future). A technical manual for the safe conversion and servicing of domestic and commercial refrigeration units to hydrocarbon technology has been published and translated into various languages.

21. The long-term sustainability of the project will depend mainly on the price and availability of CFC-12. Logistical arrangements for the supply of the new refrigerant in Senegal are necessary for the project, but it cannot be established before this project is approved. This issue will be addressed during the implementation of the RMP. In order to disseminate the know-how in the use of the new technology, a module of retrofitting domestic refrigerators with hydrocarbons will be introduced in the training curricula already established in the refrigeration institutes.

22. The Government of Switzerland and UNEP informed the Secretariat that the safety-related issues associated with handling hydrocarbons will be addressed through a special training programme based on the training manual prepared by Cool Concerns (UK), in collaboration with Indian Institute of Technology and Infrac (this manual is available in English and Spanish and will be translated into French).

23. The Government of Switzerland and UNEP agreed to adjust the cost of the project (US \$71,230).

#### Demonstration retrofit project

24. The Secretariat indicated that the demonstration project to retrofit commercial refrigeration equipment should be prepared within the level of funding allowed under decision 31/48. UNEP advised the Secretariat that the Governments of France and Senegal will secure financial resources outside the Multilateral Fund for implementation of this project

**RECOMMENDATION**

1. The Fund Secretariat, having taken into consideration the commitment by the Government of Senegal that through the RMP project the country will be able to achieve the 50 per cent reduction of the CFC baseline by 2005 and 85 per cent reduction by 2007 without further assistance from the Multilateral Fund; recommends blanket approval of the following projects at the funding level indicated below:

|     | <b>Project Title</b>   | <b>Project Funding (US\$)</b> | <b>Support Cost (US\$)</b> | <b>Implementing Agency</b> |
|-----|--|-------------------------------|----------------------------|----------------------------|
| (a) | Implementation of the RMP: Assistance with adoption of legislation | 44,500                        | 5,785                      | UNEP                       |
| (b) | Implementation of the RMP: Recovery and recycling scheme           | 85,000                        | 11,050                     | UNIDO                      |

2. The Executive Committee may wish to consider the project proposal on the retrofit of domestic refrigerators for the use of hydrocarbon refrigerant in light of the comments provided by the Fund Secretariat.

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