



**United Nations
Environment
Programme**

Distr.
GENERAL

UNEP/OzL.Pro/ExCom/74/10
27 April 2015



ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Seventy-fourth Meeting
Montreal, 18-22 May 2015

**TERMS OF REFERENCE FOR THE DESK STUDIES ON: THE HCFC PHASE-OUT
PROJECTS IN THE REFRIGERATION AND AIR-CONDITIONING MANUFACTURING
SECTOR AND ON PILOT DEMONSTRATION PROJECTS ON ODS DISPOSAL AND
DESTRUCTION (DECISION 73/7(B))**

1. At its 73rd meeting, the Executive Committee approved the 2015 monitoring and evaluation work programme (decision 73/7(c)), and requested the Senior Monitoring and Evaluation Officer (SMEO) to submit the terms of reference for the studies on the HCFC phase-out projects in the refrigeration and air-conditioning (RAC) manufacturing sector, and on pilot demonstration projects on ODS disposal and destruction (decision 73/7(b)).
2. In response to decision 73/7(b), the SMEO has submitted the terms of reference for the two desk studies to the 74th meeting. Annex I to the present document contains the terms of reference for the desk study on the HCFC phase-out projects in the RAC manufacturing sector while Annex II contains the terms of reference for the desk study on pilot demonstration projects on ODS disposal and destruction.

Recommendation

3. The Executive Committee may wish:
 - (a) To note the document on the terms of reference for the desk studies on: the HCFC phase-out projects in the refrigeration and air-conditioning manufacturing sector and on pilot demonstration projects on ODS disposal and destruction (decision 73/7(b)) contained in document UNEP/OzL.Pro/ExCom/74/10;
 - (b) To approve the terms of reference for the desk study on the HCFC phase-out projects in the refrigeration and air-conditioning manufacturing sector as contained in Annex I to the present document; and
 - (c) To approve the terms of reference for the desk study on pilot demonstration projects on ODS disposal and destruction as contained in Annex II to the present document.

Annex I

TERMS OF REFERENCE FOR THE DESK STUDY OF THE EVALUATION OF REFRIGERATION AND AIR-CONDITIONING (RAC) MANUFACTURING PROJECTS

Background

1. At its 54th meeting, the Executive Committee approved guidelines for the preparation of HCFC phase-out management plans (HPMPs) and released funding in advance to the implementing agencies (IAs) to begin HPMP preparations¹. The guidelines adopted a staged approach that allows for updates as new technologies are developed. Subsequently, at its 55th meeting the Executive Committee invited bilateral and IAs to prepare and submit proposals for demonstration projects for the conversion of HCFC in the RAC manufacturing sub-sectors to low-global warming potential (GWP) technologies to identify all the steps required and to assess their associated costs². Following decision 55/43, four demonstration projects were implemented in various subsectors in China³. In addition, about fourteen countries submitted stand-alone investment projects and projects included in their HPMP to phase out HCFC-22 in several subsectors and applications in the RAC sector. Due to complicated technical issues involved, some of the investment projects also include technical assistance components.

Objective and scope

2. The evaluation will analyze the progress made in the phasing-out of HCFC in the RAC manufacturing sector, and will focus on the challenges encountered during project implementation. It will examine projects in various RAC sub-sectors, namely: room air conditioning (e.g., Argentina, China, Islamic Republic of Iran, and Thailand); commercial refrigeration (e.g., Indonesia); industrial refrigeration and air-conditioning (ICR) (e.g., China).

3. The lessons learned from this evaluation will be useful for the implementation of RAC projects associated with stage II of HPMP in several Article 5 countries.

4. The evaluation will focus on the following:

Policy, legal and regulatory frameworks

5. The guidelines for preparing HPMPs encourage countries to revise their licensing systems to accommodate the adjustments required by the phasing-out of HCFCs, and to include a monitoring and control system. The following issues will be addressed:

- (a) Were existing policies reviewed to facilitate the phase-out of HCFCs in RAC sector and in the introduction of HCFC-free RAC technology?
- (b) What actions were taken in the area of legislation and regulations?
- (c) Were there new enforcement procedures and monitoring tools developed to control HCFC use in the sector as well as HCFC-based equipment imports?

¹ Decision 54/39.

² Decision 55/43.

³ Conversion from HCFC-22 to ammonia/CO₂ technology in the manufacture of two-stage refrigeration system; conversion of room air-conditioning compressor manufacturing from HCFC-22 to propane; conversion from HCFC-22 technology to HFC-32 technology in the manufacture of commercial air-source chillers/heat pumps; and conversion from HCFC-22 to propane.

- (d) Are the import/export legislations concerning the HCFC and HCFC-based equipment effective?
- (e) What are the relations of energy efficiency regulations with the manufacturing of RAC equipment?
- (f) Were there implementation delays in adopting legislation?

Technology-related issues

6. Using HCFC-free technology implies overcoming various barriers related to identifying the best technological equipment; solving the problems related to intellectual property; and building a local capacity for adopting appropriate RAC alternative technology. The following issues will be addressed:

- (a) To what extent are delays in project implementation caused by the difficulties in adapting selected technologies? Were there issues related to intellectual property?
- (b) What was the role of demonstration projects in testing alternative technologies and facilitating the collection of accurate data on costs and application of the technologies and on the conditions the alternative technology could be introduced in the country on a larger scale?
- (c) While alternative technologies are not using ozone-depleting substances, there may be other challenges for their introduction, e.g., related to safety and flammability, high GWP and toxicity. The evaluation will analyze and compare how projects dealt with such issues.
- (d) What were the challenges in purchasing and installing the alternative technology? Were there problems with bidding procedures and experiences with supplier companies? What were the issues with the availability of various components, including compressors? What were the requirements for additional investments on fire safety equipment and systems? Were there installation issues?
- (e) Are there inspections and certification infrastructure, standardized technical testing, and enforceable technical standards for the alternative technology?
- (f) What was the role of international companies in introducing the alternative technology? Were they a trigger in adopting new technology or created obstacles for small and medium enterprises (SMEs)? How did SMEs cope with the challenges of phase-out?
- (g) What happens after project completion? Will SMEs be able to sustain the project gain in the use of new technology? Is there a sustainability policy on this matter?
- (h) Were the manufacturing plant equipment destroyed, and if not why?
- (i) What was the role of professional refrigeration associations in helping with and disseminating information about the new technology?

Technical assistance and awareness

7. Many project documents mention the need of improving the technical capacities of the RAC manufacturing enterprises in using alternative technology and in applying appropriate safety and security measures. The evaluation will assess the availability and use of updated information on technically and

economically feasible alternative technologies that can be applied by local RAC manufacturers. It will examine the capacity building activities implemented by the project.

8. In some countries the users are not aware of the availability and benefits of the energy efficient variety of RAC technology. The evaluation will examine how technical assistance projects addressed awareness-related challenge. What awareness-raising strategy was used and what were the results? How did the RAC community changed following these activities?

Cost-related issues

9. The evaluation will examine the information related to the incremental capital cost (ICC) including safety costs and the incremental operational costs (IOC).

Co-financing

10. One of the recurrent issues raised by enterprises is that of finding adequate funding to achieve the conversion to new technology. In addition, the financial institutions still consider energy efficiency projects as high risk ventures and therefore may be reluctant to lend money for such endeavour. The evaluation will analyse the problems enterprises had to overcome funding or co-funding the introduction of new alternatives.

Post-sale servicing

11. The evaluation will tackle issues related to *inter alia* training, availability and affordability of spare parts (including compressors) and refrigerants, and post-sale costs issues.

Methodology and schedule of submission

12. A consultant will be recruited to carry out the evaluation. The desk study will include an in-depth review of the existing documentation as well as the information gathered from interviews and discussions with members of the Secretariat, bilateral and IAs.

13. The findings from the desk study, as well as lessons learned and recommendations, will be presented to the Executive Committee for consideration at the 75th meeting. Further data collection and analysis may be needed which will require field visits in a number of selected countries during a second stage of the evaluation.

14. A budget of US \$12,000 was approved for this evaluation at the 73rd meeting⁴

⁴ Decision 73/7(c), UNEP/OzL.Pro/ExCom/73/62.

Annex II

TERMS OF REFERENCE FOR THE DESK STUDY OF THE EVALUATION OF PILOT DEMONSTRATION PROJECTS ON ODS DISPOSAL AND DESTRUCTION

Background

1. At their twentieth meeting the Parties acknowledged the importance of acquiring more information on mitigating ODS emissions and on destroying ODS banks, and requested the Executive Committee to consider pilot projects that focused on assembled stocks of ODS with high net global warming potential (GWP). Executive Committee approved projects should address issues related to the collection, transport, storage and destruction of ODS. The result should be lessons learned, generating experience about management and financing modalities; achieving climate benefits; and leverage co-financing in the disposal and destruction of ODS.⁵

2. At its 57th meeting, in the context of the 2009-2011 consolidated business plan of the Multilateral Fund, the Executive Committee requested the Secretariat to prepare a document containing criteria and guidelines for the selection of ODS disposal projects, taking into account decision XX/7 and the contact group discussions on this matter held at the 57th meeting⁶. At its 58th meeting, the Executive Committee approved the guidelines⁷ and funding for an array of pilot demonstration projects in the disposal and destructions of ODS.

3. At the 64th and 70th meetings, the Secretariat presented reports summarizing the experience gained in the implementation of the ODS disposal projects⁸. Both reports pointed out various challenges encountered in, *inter alia*, data collection, technology selection, national policy and regulatory infrastructure. The report presented at the 70th meeting reflected agencies' experiences with various components of projects implementation process, i.e. collection, training and awareness raising, storage and destruction. Remarks were made also about the utility of the guidelines in the preparation and implementation of projects. The issues raised in this report set the basis for the evaluation.

Evaluation objectives and main issues

4. The evaluation will assess to what extent the demonstration and pilot projects generated practical data and experience on management and financing modalities for ODS disposal. It will summarize lessons learned that could be used for similar projects in the future. More specifically, the following issues will be addressed:

Project preparation and implementation

- (a) What type and amount of ODS was destroyed. Was it more or less than in the approved proposal and if there are differences, what was the cause?
- (b) What challenges were encountered in gathering information? Was there an organised institutional national collection system in place for ODS? What was the methodology for

⁵ Decision XX/7.

⁶ Decision 57/6.

⁷ Decision 58/19. The guidelines *inter alia* define the terms of collection, transport, storage and destruction and the conditions for operating destruction facilities; recommend the funding levels (limited to a maximum of US \$13.2/kg of ODS to be destroyed for non-low-volume-consuming (LVC) countries and no funding for the collection of ODS); request bilateral and IAs to report on progress and experiences gained in demonstration projects.

⁸ UNEP/OzL.Pro/ExCom/64/49, UNEP/OzL.Pro/ExCom/70/54.

determining the ODS waste to be destroyed as part of the project? Was there data collection, survey or data estimation?

- (c) Was there an existing national hazardous and industrial waste management capacity in the country? Were there existing national facilities that could be adapted, or was the ODS exported? What modifications were required to allow sustained ODS destruction?
- (d) What were the transport modalities and what challenges were encountered in transportation? What were the storage modalities and what challenges were encountered?
- (e) Were there synergies with similar projects and initiatives, or projects dealing with other organic pollutants destruction? Was there any collaboration between similar projects (e.g., funded by the Green Energy Fund) and, if so, what were the impacts?
- (f) Was there a need to train or enforce capacity in the storage, transportation or destruction areas, and if so, how was this done?
- (g) Was the foreseen management and financial set-up in the approved project achieved in implementation? If not, why?

Policies and regulations

- (a) Was the existing national policy and regulatory infrastructure sufficient for the implementation of the ODS destruction projects or some changes and accommodations were needed? Did countries implement standards to control toxic emissions?
- (b) In the case of exporting ODS for destruction, was there a legal framework allowing or prohibiting such activity? What motivated the Government to decide to export waste instead of destroying it and what were the problems encountered? Was this decision in agreement with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal?

Selection of technology

- (a) How was the selection of destruction technology? Were there various options for destroying ODS waste considered? What was the process of validation of the technological, economic and environmental effectiveness of these?
- (b) How was the appropriate technology identified? Were there any technical barriers for the destruction of the substances in various facilities?
- (c) What were the challenges in adapting existing infrastructure, e.g., cement kilns, chemical incinerators etc.? What was the participation of stakeholders in this process? Were there preliminary discussions with or monitoring of potential suppliers?
- (d) What was the result of the technology used for destruction in terms of emissions, cost-effectiveness, etc.?

Monitoring and verification of the destruction

- (a) How is the destruction of ODS waste properly accounted for? Was there a process of close monitoring or it had to be specifically created?
- (b) Is there a system of data recording or a reporting system to provide conclusive evidence

of ODS destruction?

- (c) Is it possible to trace dismantled ODS equipment?
- (d) When ODS were extracted from end-of-life equipment, did the model include recovery and recycling or disposal of residual materials? Was any cost or revenue generated from this?

Technical assistance

- (a) What were the needs in technical assistance of various countries and how were these met?

Financial aspects

- (a) Was funding for the demonstration projects adequate?
- (b) What specific opportunities were found for leveraging co-financing for a self-sustained ODS destruction system? What challenges were encountered in securing co-financing? What co-financing modalities were successful?
- (c) Description of the financial model established for additional ODS management and disposal/destruction addressing:
 - i. Type of ODS included;
 - ii. Expected amounts of ODS to be collected for a successful operation; and
 - iii. Funding sources mobilized and included into the model (i.e., link to carbon credits in voluntary markets; national regulation incentives; suppliers co-financing for end-of-life collection of equipment, etc.).

Communication and dissemination

- (a) Were the results of the project shared within the countries or with other countries?
- (b) What were the communication mechanisms (e.g., workshops, seminars)?
- (c) What has been the political and industrial response towards such projects?

Sustainability

- (a) Are projects easily replicable? What were the solutions of self-funding for sustainability?
- (b) What were the strategic options for LVCs countries? How did regional projects contribute to help destruction of ODS?
- (c) What are the main lessons from the implementation of destruction projects and how can they be applied to improve project implementation in the future?

Methodology and schedule of submission

5. A consultant will be recruited to prepare the desk study. The desk study will include an in-depth review of the existing documentation as well as the information gathered from interviews and discussions with members of the Secretariat, bilateral and IAs.
6. The findings from the desk study, as well as lessons learned and recommendations, will be submitted to the 75th meeting.
7. A budget of US \$12,000 was approved for this evaluation at the 73rd meeting⁹

⁹ Decision 73/7(c), UNEP/OzL.Pro/ExCom/73/62.