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

1. The desk study on the evaluation of the pilot demonstration projects on ODS disposal and destruction has the objective of providing information on the progress made in this sector. The following text summarizes the main findings of the desk study covering a total of 15 projects approved for 12 countries, two regions and one global project, according to the type of issues defined in the corresponding terms of reference[1] contained in Annex I to the present document.

Main findings

Delays in project submission

2. It took between 18 to 24 months on average for the projects to be submitted for review by the Secretariat, instead of 12, as initially expected. Some of the reasons for the delays were: priority given to completing HCFC phase-out management plans (HPMPs) needed for compliance with HCFC control measures; delays in signing agreement with the country on the approach for ODS disposal; survey on ODS that took longer than expected in non-low-volume consuming (non-LVC) countries and; difficulties in identifying co-financing for the project as required by decision 58/19. Several projects explored carbon markets as co-financing options and the downturn in these markets made it more difficult than originally anticipated.

Challenges in project implementation

3. Challenges in project implementation can be summarized as follows:

[1] UNEP/OzL.Pro/ExCom/74/10 and as amended by document UNEP/OzL.Pro/ExCom/74/10/Corr.1.

(a) Locating, quantifying and collecting ODS waste is a challenge in some countries;

(b) Non-LVC countries have a major challenge in collecting ODS waste due to the dispersion of waste across the country (e.g., Brazil and Nigeria);

(c) In China the consideration of ODS waste varies from province to province, with some provinces referring to it as hazardous waste and some not; in this context, obtaining trans-provincial transport permits is a challenging task;

(d) Ghana's ODS waste transportation to Poland took time and considerable joint efforts to get the consent of the importing authority, due to the complex nature of the waste (polychlorinated biphenyl or PCBs, pesticides and ODS), as well as a specific context related to negative public opinion at the destination country; and

(e) Analysis and validation of test burn results have taken more time than anticipated in some countries such as Colombia and Cuba.

Synergies and collaboration between similar projects and initiatives

4. Some countries, like Georgia and Ghana, were able to undertake cost-effective measures by co-disposing of ODS waste with persistent organic pollutants (POP) waste. All other countries advise that there are synergies between ODS waste disposal and other initiatives being taken in the country, which will be studied for future ODS waste disposal activities. In Colombia for example, the ODS destruction project is being implemented in parallel of a Global Environment Facility (GEF) PCB stockpiles project.

Management and financial set-up

5. For most countries, the management and financial set-up in the approved project appears to be achievable in implementation; In some countries the status of voluntary carbon markets means that no carbon revenue can be obtained, regardless of the amount of ODS waste to be disposed of. Therefore, the implementation plan is looking into the most cost-efficient way of managing the ODS waste collected.

Policies and regulations

6. Changes were required in the existing national policy and regulatory infrastructure for the implementation of the ODS waste disposal projects. This primarily concerned the revision of the legal framework related to ODS waste management. China is a special case, as the current legislative framework per se does not represent a barrier for trans-provincial co-operation in the context of this project. As mentioned above, the challenge lies in obtaining trans-provincial transport permits because of the different ways in which provinces characterize the waste. Thus, it is quite possible that the guidelines and results of this pilot project will be used to set up separate ODS collection and destruction facilities for each province. In Colombia, waste ODS is classified as hazardous waste and there is a national regulation for the management and transportation of hazardous goods by road.

7. All countries exporting their ODS waste are signatories to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. This allows for exports once the receiving country gives its approval. These countries chose to export their waste primarily because there was no national infrastructure for ODS waste destruction.

Selection of technology

8. There were only two main approaches selected, namely domestic destruction through local facilities and export of the ODS waste abroad. Local facilities/technologies were selected on the basis of what existed and what could be used with some modifications, such as rotary kilns and plasma incineration facilities, to keep capital costs down and allow for future sustainability of the installations. Algeria and Cuba have opted to modify existing cement kilns to destroy ODS waste. In Colombia, the Ministry of Environment is also working on the qualification of direct processing of domestic refrigerator cabinets and doors, with a domestic electric arc steel maker undertaking trials on material containing CFC-11-based foam.

Training

9. Training appears to be of minimal concern for these projects. There is some basic training in the monitoring of ODS destruction activities, the appropriate use of gas chromatograph, and the shipment of ODS waste. Additionally, standard Basel Convention documentation has been provided on prior consent, on information for the operators of collection points for refrigerators, and on how to recover the ODS/refrigerants safely.

Monitoring and verification

10. In all countries, a database and a monitoring plan has been/will be implemented for all monitoring, operation and reporting activities associated with the ODS destruction project. Once the pilot projects are completed it is expected that the database and monitoring process will be institutionalized and improved upon sustain the subsequent ODS destruction activities. In all cases, conclusive evidence of ODS destruction will be provided by the destruction facility, and backed up by the registry held in the destruction facilities. This will have to match that of the central storage facilities, which will, in addition, be backed up by the certificates provided to the enterprises from which ODS have been picked up.

11. Countries will also provide information on the origin of the ODS waste destroyed (i.e., type of equipment it was obtained from rather than identifying each piece of equipment).

Technical assistance

12. Technical assistance includes legal and regulatory institutional assistance for technology transfer, training of national experts, environmental audits of the facilities, and current environmental management plans required under national regulations. Several countries need assistance in the national aggregation process, such as local transportation, stock transfer, laboratory training, risk assessment and management training for the stakeholders, and procurement and provision of equipment and tools to the national stakeholders.

Funding and sustainability

13. Project funding is considered adequate for most projects. Much of the funding needs are for waste aggregation, i.e., storage and transportation (collection of ODS waste is not covered by the Fund). Some country projects were based on the sale of carbon credits for co-financing, either in the short term or in the medium and long term for sustainability. Since the carbon market is currently quite unstable, other sources of funding are being studied by these countries. China, for example, is studying the possibility of using a producer’s fund and/or a revolving fund to support collection activities. Sale of scrap by recycling centres is another strategy being considered by a few countries.

14. The financial model for additional ODS management and disposal/destruction has not yet been established by most countries, since projects are still under implementation. Georgia has proposed a draft financing scheme to ensure the financial sustainability of the ODS waste destruction process consisting of three scenarios, elaborated upon below.

Introduction

15. At their XX 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 GWP (decision XX/7).

16. At its 58th meeting, the Executive Committee approved the guidelines and funding for pilot demonstration projects in the disposal and destructions of ODS (decision 58/19). At the 64th2 and 70th3 meetings, the Secretariat presented reports summarizing the experience gained in the implementation of the ODS disposal projects. 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 the agencies' experiences with various components of the project implementation process, (i.e., collection, storage and destruction of ODS, and training and awareness raising). Remarks were made about the utility of the guidelines in the preparation and implementation of projects. The issues raised in that report set the basis for the evaluation.

17. As mentioned in the report submitted to the 70th meeting4, the Secretariat applied the interim guidelines in decision 58/19 in the review of the submissions by the implementing agencies to ensure that there was consistent information provided in the proposals. It made certain that the project preparation request and the submission of the full project included the basic aspects of the ODS destruction process from collection, storage and transport to the destruction process itself. Co-financing options were considered an essential element of the proposal to ensure sustainability without additional future funding from the Executive Committee.5

18. It was observed that when the full demonstration project proposals were submitted, many contained far more complete information than earlier submissions during the preparatory funding request phase. Since the guidelines required that initially provided information be verified, agencies confirmed that the preliminary funding approved allowed them to validate the data submitted. It also allowed agencies to confirm or change the approaches initially envisaged for the disposal project. There were a few cases where data validation proved difficult even during the project preparation exercise.

19. Discussions between the Secretariat and the implementing agencies during the review process provided an opportunity to understand further the requirements of decision 58/19 and its challenges. This exercise often resulted in an agreement to revise the submissions in order for the project to move forward. In a few instances, some projects were deferred for submission to the following meeting to give time for further work on the data. The interim guidelines also required that details be provided for each of the ODS disposal activities (collection, transport, storage and destruction) in the project proposal.

[2] Report on the experience gained in the implementation of ODS disposal projects (UNEP/OzL.Pro/ExCom/64/49).
[3] Report on progress and experiences gained in demonstration projects for the disposal of unwanted ODS (UNEP/OzL.Pro/ExCom/70/54).
[4] UNEP/OzL.Pro/ExCom/70/54.
[5] As per the Guidelines for project preparation, specifically decision 58/19(a)(iv)a and 58/19(a)(iv)b.

Objectives

20. The desk study assesses to what extent the demonstration and pilot projects generated practical data and experience on management and financing modalities for ODS disposal in a variety of countries, including very LVC countries. It will summarize lessons learned that could be used for similar projects in the future.

21. To date, 12 country-specific and two regional pilot demonstration projects on ODS disposal and destruction have been approved, as well as one global project for development of strategies and methodologies for ODS disposal. Both the regional projects and three of the country-specific projects have bilateral funding as well as funding through the Multilateral Fund. The list of approved projects and their current status of implementation is presented in Annex II.

22. It has examined the project documents, comments from the Fund Secretariat and the responses thereon, and progress reports up to 2014 submitted by the IAs. Since none of the projects (except for the World Bank project) have been reported as completed, specific questions were sent to the IAs and the responses that were received are included in this study.

Project preparation and implementation

23. It took between 18 – 24 months on average for the projects to be submitted for review by the Secretariat. The World Bank global project for the development of strategies and methodologies for ODS disposal was completed in 12 months. The Georgia and Nepal projects are technically complete, with their ODS wastes exported and destroyed, while most of the others are at various stages of implementation (i.e., the Brazil and Algeria projects have yet to start implementation, while eight projects have reported that the completion dates approved will need to be extended).

24. Of the fifteen projects approved so far, eight of the projects are designed for export to destruction facilities compliant with international standards; two projects propose destruction in country by modifying/retrofitting cement kilns; and three projects will utilize existing hazardous waste destruction facilities by modifying rotary kilns and plasma incineration facilities. The Global project has completed a study to explore opportunities to mobilize resources from voluntary carbon markets to support ODS destruction activities in Article 5 countries. The Africa Regional project will develop strategies for data collection, legal-framework analysis, collection, and disposal options for five LVC Central African countries.

Type and amount of ODS destroyed

25. During project preparation stage, difficulties were identified in quantifying the amount and type of ODS waste, particularly where the waste was supposed to be stored at recovery/recycling centres. In addition, refrigerators replaced under energy-efficient schemes did not produce as much waste as expected.

26. Some expected more waste to be generated either through imports from surrounding countries, or from their end-of-life or energy-efficiency programs. Most of the ODS waste identified was CFC-11 (both by itself and in foam), CFC-12, small quantities of R-500, R502, CFC-13, HCFC-HFC mixtures, CTC and halon-1301.

27. It has been reported that some ODS waste stock had emitted out due to the deteriorated condition of aging gas cylinders and due to mishandling:

(a) In Ghana the collection of CFC-12 from disposed refrigerators under the GEF energy efficiency programme was lower than expected, as many refrigerators were not filled with CFCs;

(b) In Nigeria it was discovered that CFC-12 had escaped from many facilities. Also, some of the companies have closed down and disposed of their stocks; and

(c) In Turkey, assumptions related to the functioning of the ODS waste collection system in the country were not accurate, resulting in much lower availability of ODS waste, and leading to a re-design of the disposal strategy, the details of which have not yet been provided.

28. The calculation and collection of waste quantities varies from one country to another. For example, China has an organized institutional national collection system in place, while in Ghana such a system is not fully permanent and sustainable yet. Assumptions and estimates of ODS waste can also prove inaccurate, as in Turkey's case.

National hazardous and industrial waste management capacity

29. Various solutions were adopted to create or enhance the national capacity for ODS waste destruction. Brazil, Colombia, China and subsequently Mexico proposed to adapt the existing national hazardous and industrial waste management capacity. Algeria and Cuba proposed to modify cement kilns for ODS waste destruction. The Europe and Central Asia (ECA) Region, Georgia, Ghana, Lebanon, Nepal, Nigeria and Turkey have chosen to export their ODS waste for destruction.

30. The main modifications or variations needed for destroying CFC-12 were the installation of a new feed port in the front end of the kiln and setting up the feeding cylinder system with appropriate metering and automated record tabulation, as well as a switching and purging capability for cylinders. For liquid CFC-11 a dedicated feed tank, pump, metering system and flow controls, as well as a connection into the existing liquid feed system and burner nozzle, was needed.

31. In Mexico, at the time the project was approved, no facility had the necessary permits to destroy ODS waste, so exporting to the United States of America was considered the best strategy. However, in March 2014, during project implementation, one Mexican company using plasma technology got the necessary permits and a second one, a cement kiln, is expected to get the required permits before the end of 2015. As a result, the Ministry of Environment (Department of Waste Management) did not wish to authorize the export of a type of waste for which local destruction capacity now exists in the country.

Storage and transportation

32. Nearly all of the projects have ODS waste in dispersed locations across the country, which needs to be transported to one or two central or aggregation points, transferred to larger tanks and then transported to a destruction facility or exported:

(a) Brazil, given its geography, has major challenges in organizing waste aggregation;

(b) The challenge in China is linked to the differences in the way ODS waste is classified from province to province;

(c) Cuba needed to procure specialized transport units and adapt them to transport ODS between different locations;

(d) In Georgia, regular Basel convention procedures were applied for transportation, and were coordinated by a waste handling sub-contractor; and

(e) Ghana's export transportation to Poland ran into problems linked to the nature of the waste and public interest concerns in the destination country.

Synergies and collaboration between similar projects and initiatives

33. The need to solve problems related to waste disposal led to collaboration among various projects: For example, Georgia and Ghana combined export of ODS wastes with POP disposal under a GEF project. This resulted in a cost-effective method since the bulk of the waste transported and disposed of were POP wastes. In addition, Ghana's source of ODS for destruction was designed based on extracting ODS from the collection system of old refrigerators put in place by the GEF project on energy efficiency.

34. Most of the other projects claimed that there were potential synergies with POP destructions but no details were provided. In China two cement kilns and a hazardous waste treatment plant are involved in ongoing POP destruction. There are potential problems related to the combination of POP and ODS destruction in the same facility; some technical information shows that the change from POP to ODS destruction for the same rotary kiln makes the equipment less efficient, and also results in higher negative emissions (i.e., fluorine and chlorine). The problems can be minimized or completely removed by choosing the adequate operational parameters.

35. In Colombia the ODS destruction project is being implemented in parallel or somewhat ahead of a GEF PCB stockpiles project. The ODS disposal project has involved the staff and consultants who are working on the GEF project in various activities, and that project now employs a common national consultant in its implementation activities.

Training and capacity building

36. Training has been required in some projects for a limited set of stakeholders:

(a) In Georgia, staff responsible for operating the gas chromatograph were trained on the appropriate use of the equipment and on the shipment of ODS waste;

(b) In Ghana, the most important training was for the operators of the collection points of refrigerators, on how to recuperate the ODS/refrigerants safely;

(c) In Nigeria, the first stakeholder workshop that was held in November 2013 included capacity-building sessions for the ODS waste management sector. The workshop planned for October 2015 will focus on legislation for ODS waste management and disposal, and will include further stakeholder engagement on aggregation of waste (recovery, collection, storage and transportation), as well as existing recycling and extended producer responsibility (EPR) schemes;

(d) For Turkey, training on how to manage ODS waste contained in equipment upon arrival at collection centres seems to be needed; and

(e) The ECA Region project will provide an awareness-raising and training programme for ODS collection, storage, transportation and disposal for relevant stakeholders to increase their commitment towards ODS recovery, recycling, reclamation, collection and disposal.

Management and financial set-up

37. Most pilot demonstration projects report that the planned management and financial set-up as approved are achievable. As the project in Turkey demonstrates, the status of voluntary carbon markets prevents carbon revenue generation, regardless of the amount of ODS waste to be disposed of. The revised implementation plan is looking into the most cost-efficient way of managing the ODS waste collected while paying attention to the interests of Turkey when it comes to aligning their ODS waste management practices and procedures with those in the European Union, given Turkey's candidate-member status.

Policies and regulations

38. Changes were required in the existing national policy and regulatory infrastructure for the implementation of the ODS waste disposal projects in all countries except Ghana and Mexico. These changes primarily relate to legislation/regulation in support of collection, storage, analysis, tracking, certified destruction and reporting requirements applicable to the management of ODS waste. In China, Colombia and Cuba, ODS destruction was linked to strong national regulations that mandated ODS and other waste collection efforts and standards. Colombia has regulations that set out the monitoring and reporting requirements for stationary-source air emissions. None of the other countries have reported whether any standards had to be implemented to control toxic emissions. The information provided in the project documents and in response to questionnaires sent out to IAs is presented by country in Table 1 below.

Table 1. Changes in legislation and regulations

Country	Changes needed to legislation/regulation
Algeria	They need to develop a national waste collection system in line with existing laws mandating ODS waste collection in the country. They may also decide to put in place special provisions to allow the import of unwanted ODS into the country for the purpose of destruction.
China	The existing decentralized model for the transposition of nation-wide environmental legislation seriously hinders such co-operation. The consideration of ODS waste varies from province to province, with some of them referring to it as hazardous waste and some of them not; in this context, obtaining trans-provincial transport permits is a challenging task. The results and guidelines prepared from this pilot project will be used for setting up separate ODS collection and destruction facilities for each province.
Colombia	They will need legislation/regulation banning release of ODS and requiring its registered storage and environmentally sound destruction; regulatory technical guidance in support of collection, storage, analysis, tracking, certified destruction and reporting requirements applicable to the management of end of life (EOL) ODS; legislation/regulation of the technical criteria and specifications for the facilities managing EOL ODS; and legislation/regulation for the EPR system.
Cuba	Regulations are in place that prohibit the deliberate emission of ODS into the atmosphere (both CFCs and HCFCs). No other information is available regarding national policy and regulatory infrastructure for the implementation of ODS disposal projects.
Georgia	There is a lack of any regulatory mechanism requiring safe disposal and destruction of ODS waste. The project proposed to introduce special regulatory requirements for decommissioning refrigeration equipment that contains ODS, with disposal obligations, and to ensure that mandatory requirements for destroying ODS waste are put in place.
Ghana	Existing national policy and regulatory infrastructure was sufficient.

Country	Changes needed to legislation/regulation
Lebanon	Will need to introduce and enforce policies and regulations to facilitate export of ODS for destruction.
Mexico	The Official Standard NOM-052-SEMARNAT-2005 establishes the characteristics, process of identification, classification and listing of hazardous waste. In this standard the unwanted and recovered CFCs pure or in blends are considered as a hazardous waste. Thus the ODS waste must comply with all the regulations established in the General Law for the Prevention and Management of Wastes. A revision of all the regulations regarding generation, collection, labelling, packaging, storage, transport, handling, incineration and export activities for ODS waste was made. In addition, the Mexican Penal Code established penalties for intentionally emission of ODS.
Nigeria	The project will focus on how ODS waste management and disposal will be regulated, including the inclusion of a law on mandatory destruction of ODS waste in existing legislation.
Turkey	Revision of the legal framework has to be done to ensure that ODS waste management and disposal is regulated. This is ongoing work that will be finalized upon completion of the project. The development of the national legislation reflects Turkey's intention to join the EU and its effort to transpose EU regulations into national laws.
Central Africa region	The need for regulation can be better understood and measures can be enacted after the verification of existing laws and regulations in relation to collection and disposal of ODS in all the countries. This will be followed by an assessment of the legal and policy needs for each of the countries.
Europe and Central Asia region	The project will develop a strategy aligned with the EU Regulation for ODS waste management.

39. The export of ODS waste for destruction has been the selected method of disposal in seven projects (Georgia, Ghana, Lebanon, Nepal, Nigeria, Turkey and the Regional Europe), all of which are signatories to the Basel Convention. This allows for exports once receiving country gives its approval. The projects in Georgia, Regional Africa and Regional Europe are not accessing the carbon market, as quantities of ODS are too small. Ghana, Mexico, Nigeria and Turkey propose to use carbon credits to fund changes in legislation and to ensure long-term sustainability of the project. Lebanon will export but will set in place necessary logistical infrastructure for both export and establishment of a local destruction capacity for the disposal of ODS waste and other chemical waste.

40. In Mexico, there is no legal framework prohibiting export of ODS waste to date, but this is about to change due to the development of destruction capacity in the country, whose aim is also to explore the possibility of offering the country's destruction facilities for disposal of ODS waste generated in other countries in the Central American and Caribbean region. Nepal has already exported its ODS waste to the United States of America, but has only been able to cash in 25 per cent of the credits earned.

Selection of Technology

41. The selection of the ODS destruction technologies was based on what technologies were available; on whether facilities had permits to destroy ODS waste or could get permits for ODS waste destruction; and, in the case of cement plants, on whether the operators were interested in destroying ODS waste. The technologies being considered in each country are presented in Table 2 below.

Table 2. Technology selection for ODS destruction

Country	ODS destruction technology and criteria for selection
Algeria	The country decided to destroy locally the collected ODS stocks in an adequate cement kiln. To identify adequate cement kilns, a survey was developed to assess the facilities against 50 criteria. The evaluation showed that one of the assessed cement kilns (Lafarge facility in M'sila) performed significantly better than other assessed facilities.
Brazil	Liquid injection, static and rotary kiln, plasma arc and chemical thermal treatment technologies are available in the country. The qualification of the existing incineration facilities will be accomplished through test burns at two facilities that will be further selected under a public process. The test burn process will utilize the national regulatory requirements and protocols, supplemented by an international standard, likely as issued by the United States Environmental Protection Agency.
China	CFC-12 destruction will take place in a facility located in each participating province using plasma technology in one case and rotary kilns in another location. For CFC-11, two strategies will be considered: extraction of CFC-11 from foam in a hazardous waste treatment station working with a rotary kiln, and direct destruction of foam in two different types of destruction facility: a local municipal solid waste facility using a rotary kiln, and a local hazardous waste destruction facility using a rotary kiln. Existing destruction infrastructure in the six participating provinces/municipalities is in line with Technology and Economic Assessment Panel (TEAP) requirements and installed capacity allows for proper management of the ODS waste to be destroyed in the context of this project. 800 kg of CFC-12 were destroyed at a facility operating a rotary kiln. No modifications were required in the mainstream process, but monitoring measures more stringent than usual were adopted for the disposal to take place in line with the project requirements.
Colombia	There are 45 installations that are permitted or being permitted (incineration facilities and cement kilns involved or considering waste co-disposal). Screening of these facilities and their permitting status suggested that four facilities could be considered. The cement kiln option was not considered, as the owners could not justify the cost. Validation of the initial test burn (undertaken in 2014) was completed and second test burn was scheduled for the second half of 2015. Testing protocols are being set by the implementation team and materials are being collected to be fed in this test burn. No details have been provided.
Cuba	Transportation of ODS waste for destruction abroad (very high cost) as well as burning these in the flaring towers (not allowed under United Nations Framework Convention on Climate Change) were studied. The only viable alternative was to use the rotary kilns of the cement factory. Initial destruction tests in cement plant were conducted, but no details are available. There have been delays in the analysis of emissions at cement plant due to a lack of specialized laboratories in Cuba. UNDP provided the NOU with a list of laboratories that could carry out the analysis.
Georgia	Economic viability when co-disposed with POP was the main consideration.
Ghana	The following options were considered: cement kiln destruction; developing a local destruction facility; and export to a qualified destruction facility in an non-Article 5 country. Small plasma arc destruction facility was considered and dropped due to uncertainty of performance. Export was the best option, particularly since the Basel Convention would not prevent the movement of ODS between countries that have ratified the Basel Convention.

Country	ODS destruction technology and criteria for selection
Lebanon	Approaches considered for destruction of ODS included: destruction at a designated ODS incineration plant; destruction through co-incineration with other waste; destruction in a retrofitted cement kiln; destruction through plasma technologies; destruction through non-incineration technologies; and export for destruction. To ensure long-term sustainability of the project, retrofitting of a cement kiln in Lebanon to build its national capacity for ODS destruction was the option that was first considered. However, the lack of commitment from the cement kiln owner and the associated regulatory issues made this option difficult to implement. The other most feasible option assessed was to transport the unwanted ODS to a destruction facility in Europe.
Mexico	One Mexican company using plasma technology got the permits in March 2014, and a second one, a cement kiln, is expected to get these permits before the end of 2015. Trial operations have been carried out in a cement kiln facility in order for the company to obtain the adequate disposal permit. One tonne has been destroyed.
Nepal	The project was a one-time project to dispose of confiscated CFC-12. The ODS was exported and destroyed at a United States of America facility. Of the 89,000 credits, 22,000 have been sold by the company on the voluntary carbon market (VCM).
Nigeria	As there were no facilities available or interested within the country, it was decided that its ODS waste should be exported.
Turkey	The project aimed to develop a sustainable business model for ODS waste management from collection to disposal. To do this, it was necessary to export the ODS to a United States of America-accredited facility. The absence of expected revenue from carbon markets, and difficulties in collecting the foreseen amount of ODS waste has led to a re-design of the disposal strategy. Details are not available.
ECA Region	Project was designed to export ODS waste to an EU facility from the three participating countries.
Central Africa Region	This project will only develop a strategy for data collection, analysis of legal framework, collection, and disposal options.

Monitoring and verification of the destruction

42. The verification of ODS waste disposal, for countries which already have or will export their ODS waste for destruction, will be done through a signed and stamped certificate of proof of destruction provided by the destruction facilities. In-country database and monitoring of waste source, collection and aggregation will be done by some countries, while other countries (Georgia, Nepal, ECA Region and possibly Turkey) have outsourced these tasks to a qualified hazardous waste management firm or have had monitoring done by the project developer.

43. Where ODS waste is being destroyed in-country, good database and monitoring plans have/will be created to document every step, such as development of appropriate source certification, tracking, and destruction verification. Conclusive evidence of destruction will be provided by the national destruction facilities.

44. China has adopted monitoring measures more stringent than usual for the disposal to take place. An electronic verification system has been set up at the local level and there is an ongoing discussion about the feasibility of integrating the locally developed electronic systems into a nation-wide one. The management information system (MIS) established during the implementation of the project will require destruction facilities to provide a destruction verification document, certifying that the materials entering

the facility will be destroyed. Copies of these verification documents will also be submitted to the recycling and recovery centres from which they received the ODS waste. The verification document will include, an indication of the fact that the ODS waste has been destroyed with a destruction removal efficiency of at least 99.99 per cent as established by the TEAP. An information center is also in place for the traceability of dismantled household appliances.

45. In Colombia, the national regulations require inclusion of an operating monitoring and recording system. This project has incorporated features to ensure development of appropriate source certification, tracking and destruction verification.

46. The Ghana and Nigeria projects state that data collected in dismantling centres could include the serial number of the disposed equipment and indication of the quantities collected in each piece of equipment to link with the identification number of the cylinders to be used in the disposal centre. The monitoring procedure will allow the independent external verification of the destroyed ODS for certification of carbon credits. Ghana proposed to develop a stringent monitoring and verification plan for both dismantling and disposal centres according to approved carbon protocol so that all the baseline and project data and information captured and recorded can be validated and verified by independent third parties.

47. Nearly all the other projects will include information on the location and origin of the ODS waste destroyed (type of equipment it was obtained from) without recording information on each individual piece of equipment.

48. In several countries it is reported that collection centres obtain revenue from the sale of valuable components and materials contained in the equipment reaching the centres, with which they can offset some of the costs related to ODS waste management that are not covered by the project.

49. In Georgia, a draft financing scheme has been developed by the Refrigeration Association in close consultation with the NOU, but it is not clear whether it includes generating revenue from scrap.

Technical assistance

50. Technical assistance required by countries includes legal and regulatory institutional assistance for technology transfer, training of national experts, baseline environmental audits of the facilities, and environmental management plans required under national regulations. Several countries need assistance in the national aggregation process, such as local transportation, stock transfer, laboratory training, risk assessment and management training for the stakeholders, procurement and provision of equipment and tools to the national stakeholders. Development of a detailed test-burn protocol and specification, and design for any modifications required for the test burn is required in Colombia.

51. International experts would be needed, in Cuba, to provide technical assistance for technology transfer and training of national experts. Ghana informs that collaboration has been established with the Government of Germany (GIZ) to ensure a post-implementation plan for this project and ensure sustainability and replicability. One of the aspects for which specific effort is needed is the disposal of ODS-containing insulating foams from the refrigerators.

Financial aspects

52. Projects that have submitted responses to questionnaires have reported that funding was considered adequate. China reported that despite the fact that transportation and destruction costs seem to be higher than what was originally estimated, funding is deemed adequate, and intensive work is being done to

identify the causes of the deviation between estimated and planned costs, and to apply corrective measures that may pull real costs down to values more in line with estimates. Georgia reported that funding was considered adequate based on the fact that the larger POP pesticides disposal part was the largest part of the tender. Ghana reported that funding was considered adequate, although for a sustainable system to remain in place it will need to ensure continued governmental financial support.

53. Most countries have not yet established a financial model for additional ODS management and disposal/destruction, as the projects are still under implementation. Georgia has proposed a draft financing scheme to ensure the financial sustainability of the ODS waste destruction process consisting of three scenarios: imposing fees for importers/users of refrigerants; introducing incentive mechanisms through the country's taxation policy, and c) a "softer" taxation policy applied to those companies that cover the cost of disposal of unwanted ODS.

54. In Colombia, the financial model developed for the EPR system by, the organization responsible of the development and operation of a national EPR system for the recovery and replacement of both ODS-containing domestic refrigerators and older, low-energy-efficiency units with high-GWP refrigerants, indicates substantive revenue generation principally from scrap metal and plastic that is projected to largely support the EPR system, including environmentally sound destruction of ODS once the system is fully operating.

Sustainability and co-financing

55. Since most of the projects are still ongoing, information about replicability and sustainable self-funding is limited:

(a) Georgia and Ghana have achieved economies of scale through combining ODS waste export along with POP wastes and can continue to do so;

(b) Algeria expects lessons learned will contribute to encouraging owners of ODS stocks to co-finance ODS destruction activities in the country;

(c) China's project report states that if ODS destruction can be included in the existing national framework for management of hazardous wastes, destruction activities will be sustainable;

(d) Colombia expects the project to demonstrate synergy with other multilateral international programs, particularly the management of POP stockpiles and waste;

(e) Mexico expects that by creating destruction capacity, it can be used by countries in the Latin American and Caribbean region;

(f) In Turkey, the project is thought to be replicable in neighbouring countries to the European Union. Long-term sustainability of ODS waste management requires involvement and cooperation from collection centres; and

(g) The ECA region project reports that different countries apply different regulatory frameworks for import and export of ODS waste. This can cause problems for participation in the project by other countries in the region.

56. The option for LVC countries with no national hazardous waste disposal facilities appears to be export of ODS waste to the European Union or the United States of America. Mexico expects that its destruction facilities will be available for countries in the Latin American and Caribbean region.

57. The cost of destruction will be an issue. Destruction in rotary cement kilns, if found to be successful, can be an option for LVC countries, provided the cost of modification can be offset by charging for a regular defined amount of ODS waste to be destroyed. The ECA region project can provide key information about the strengths and challenges of the operating collection system in Croatia. This will help other regional and participating countries set up their own comprehensive systems, thus maximizing the collected, reused, reclaimed and recycled amounts, while minimizing or avoiding the venting of ODS. The Central Africa regional project will develop strategies for data collection, analysis of legal framework, collection, and disposal options, which can be of use to LVC countries.

58. Concerning co-financing, a variety of sources are considered. Revenues from carbon financing are considered, but also in-kind or financial Government contributions, as well as support from various stakeholders and industry. Various mechanisms and sources, such as revolving funds or revenues from material obtained from dismantling equipment are also considered. Details are provided in Table 3.

Table 3. Co-financing

Country	Co-financing source
Algeria	Upon completion of the project, any ODS destruction activity undertaken by the destruction facility will bring revenue to the cement kiln's owners. Revenues from carbon financing are considered as one of the components of the financing mix that will help ensure long-term sustainability of ODS destruction activities in the country.
Brazil	Initially, the project will analyze the possibility of using a carbon finance scheme for the short term; In the medium to long term, the EPR programme will fund the ODS waste system through the establishment of a financial mechanism (or fund), funded by RAC equipment producers, who will be responsible for the disposal of ODS-containing equipment.
China	Project implementation will provide information on cost-efficiency issues that can be useful for the establishment of financial mechanism to support ODS destruction activities (e.g., producer's fund, revolving fund to support collection activities).
Colombia	The project is estimated to utilize US $1,555,000 in co-financing from budget and in-kind contributions from the Ministry of Environment and Sustainable Development, and participating enterprises, initial revenues, and start-up contributions to the refrigerator replacement program from government and product manufacturers. The long-term plan has not been described.
Cuba	The Government has co-financed a substantial portion of the total cost and will continue to do so.
Georgia	The Government is committed to ensuring that this synergy is fully institutionalized into its system for chemical waste management and disposal, and would be a priority for implementation. The project will also design a sustainability scheme for accessing other unwanted ODS that can be collected through the two recovery and recycling centres, and develop a financial national system that will address accumulated waste for future disposal without dependence on external funding sources.
Ghana	Once the model has been tested and proven, additional Government support, continued revenues from the metal scrap of refrigerators, and additional bilateral support would allow the cycle to become self-sustainable. In addition, they will source the ODS waste by extracting it from the collection system of old refrigerators put in place by the GEF project on energy efficiency.

Country	Co-financing source
Lebanon	The project co-financing is in-kind. Future co-financing will consider carbon financing.
Mexico	A more stringent and enforceable regulatory framework on ODS waste management will make recycling centres use a portion of the revenue from materials from dismantling equipment to finance ODS waste destruction.
Nepal	It is not clear whether ODS disposal activities will be implemented in the future, as the project was designed around specifically disposing of a large quantity of confiscated ODS.
Nigeria	The project is co-financed by the Government and the oil industry. The financial model will include national regulation incentives and will look into how suppliers can be more involved in the end-of-life collection of equipment.
Turkey	Co-financing can only be made available from revenue obtained at collection centres from valuable components and materials contained in the equipment reaching the centres.
ECA Region	The project expects in-kind contributions from several sources: government, recovery and recycling centres and public and private sector. With better waste collection, higher amounts of ODS waste will be available for disposal and, due to market structure of disposal activities, unit prices are expected to go down. A concept for a joint ODS-POP inventory, collection, disposal and awareness programme will be developed. Because joint ODS-POP shipments are more economical for the incinerators, their inclusion in the programme of the regional cooperation forum beyond project completion seems adequate.

Communication and dissemination

59. Given the status of projects implementation results have not been disseminated. However, the proposals for sharing the results with other countries as stated in the project documents are generally through seminars and reports at regional network meetings. In Colombia, under the auspices of UNDP, the Ministry of Environment and the Ozone Technical Unit in Colombia have linked up with counterparts in Brazil, to transfer results and lessons learned in the development and implementation of test burns, and to support ODS collection programmes.

60. In terms of replicability of projects, financing the destruction of ODS is the main challenge. It will depend on the success of the financial model. In turn, the success of the financial model depends on local government inputs and the involvement of suppliers.

Conclusions

61. Existing national policy and regulatory infrastructures were either sufficient for the implementation of the ODS destruction projects, or flexible enough to allow for the changes needed to successfully implement the pilot projects.

62. Quantification of physical ODS waste and its subsequent collection, however, has proven to be of concern in some countries, for reasons ranging from loss in ODS waste after long storage times due to ventilation in storage areas, to less-than-calculated or non-existent ODS in the equipment where waste ODS was estimated to come from the replacement of old refrigerators. For example, in Nigeria, the stockpiles that were identified during project development could not be located, and in Turkey the ODS waste available was calculated on assumptions mostly related to the functioning of the ODS waste collection system, which proved to be misleading. This led to a redesign of the ODS disposal strategy.

63. There is need to raise awareness among waste management operators on the importance of having detailed procedures for the management and disposal of ODS waste. Logistical planning is a substantial part of the preparatory work for successful disposal of ODS waste. Synchronizing logistical details and procedures for obtaining the required permits is of utmost importance to prevent delays. Regarding the collection method of ODS, the most practical option seems to be collecting at the regional level, then transferring to a central aggregation point and sending the waste for destruction when a sufficient quantity has been accumulated.

64. Local destruction capacity was used whenever it was available. This allows for the sustainability of future ODS waste destruction at both the national and regional level. Additionally, joint POP waste and ODS waste disposal is cost-effective, and feasible as reported by Georgia and Ghana. The destruction technology is similar and, in general, for LVC countries, the quantity of ODS waste is far less than POP waste, leading to savings on transportation and shipping costs. Disposal prices in the European Union seem to be (on average) lower than those observed in other demonstration projects in various regions.

Field missions suggestions

65. Further investigation will be needed to collect additional data on the results of such projects, which currently are mostly at an incipient stage of implementation. Field work will be needed to collect detailed practical data on management and financing modalities for ODS disposal in a variety of countries, including very LVC countries.

66. Several countries are suggested for inclusion in the evaluation sample.

(a) China (UNIDO and the Government of Japan): While the project has progressed somewhat, it presents an unique situation where, for successful destruction of ODS waste, there will be a need for several ongoing sub-projects using different technologies due to the complications of different provincial regulations hindering movement of waste;

(b) Colombia (UNDP): The project is progressing as planned; test burns have been conducted (up to three domestic rotary kiln hazardous waste facilities will be used for test burns). Information on modifications required for the destruction facilities; the monitoring system, and financing mechanism, and more, can be collected;

(c) Cuba (UNDP): Trials of installed equipment were conducted. Final adjustments based on trial results are under implementation. It is the only project that needed a specialized transport vehicle for collection of ODS waste, and which has modified cement kilns to destroy their waste. The project has had problems in developing local capacity to analyse emissions. Information can be collected on the modifications required for the cement kiln and development of local emission analysis capacity;

(d) Georgia (UNDP). The project is also nearly complete and involves co-disposed ODS waste with POP waste;

(e) Ghana (UNDP). The project is nearly complete and good data on the management and financing modalities, including what benefits were found in co-disposal of ODS waste with POP waste, can be collected; and

(f) ECA Region (Croatia)(UNEP and UNIDO): The bulk of the project's ODS waste comes from Croatia and it has mostly been exported. Bosnia and Herzegovina, and

Montenegro's ODS waste was much smaller in comparison. It would be useful to meet a senior person from the Regional Cooperation Forum to understand how the project was implemented on a regional basis and what future it may have in attracting other neighbouring countries.

RECOMMENDATIONS

67. The Executive Committee may wish:

(a) To take note of the desk study on the evaluation of the pilot demonstration projects on ODS disposal and destruction contained in document UNEP/OzL.Pro/ExCom/75/10; and

(b) To invite the bilateral and implementing agencies to apply, when appropriate, the findings and recommendations of the desk study on the evaluation of the pilot demonstration projects on ODS disposal and destruction.

Annex I

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.[6]

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 meeting[7]. At its 58th meeting, the Executive Committee approved the guidelines[8] 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 projects[9]. 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 in a variety of countries, including very low-volume-consuming countries. 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 determining the ODS waste to be destroyed as part of the project? Was there data collection,

[6] Decision XX/7.
[7] Decision 57/6.
[8] 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.
[9] UNEP/OzL.Pro/ExCom/64/49, UNEP/OzL.Pro/ExCom/70/54.

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 meeting[10]

[10] Decision 73/7(c), UNEP/OzL.Pro/ExCom/73/62.

Annex II

PILOT DEMONSTRATION PROJECTS ON ODS DISPOSAL AND DESTRUCTION

	Country	Agency	Title	Date Approved	Planned date of completion	Method of Disposal	Current Status
1	Region AFR	France, and UNIDO	Strategy for disposal and destruction of ODS for five low-volume-consuming Central African countries (Burundi, Cameroon, Central African Republic, Congo and Guinea)	Dec-12	Dec-14	Development of strategy (data collection, analysis of legal framework, collection, and disposal option)	Project completion estimated as end of 2015. The project's Technical Report was delivered in February 2015 after coordinating the data collection exercise by the national experts and NOUs and working together with a group of international experts. An International Expert will be recruited to prepare a report for Policymakers based on the information from the Technical Report.
2	Algeria	France and UNIDO	Pilot demonstration project on ODS waste management and disposal	May-14	May-16	Incineration by retrofitting cement kiln	The project has yet to start up. It has encountered difficulties because the establishment of a working group with representatives of NOU Algeria, Group Lafarge and UNIDO was not possible due to the lack of response of the NOU for the nomination of their representative(s).
3	Brazil	UNDP	Pilot demonstration project on ODS waste management and disposal	May-14	Jan-18	Incineration at two existing hazardous and industrial waste management facilities.	The Project is just beginning implementation. However, it is still expected to be completed as planned.
4	Colombia	UNDP	Demonstration project on end-of-life ODS management and destruction	Apr-12	Apr-15	Incineration by modifying rotary kilns at three existing hazardous and industrial waste management facilities.	The project is progressing as planned. Since 2014, validation of the initial test burn (undertaken in Feb 2014) was completed and second test burn was scheduled for the second half of 2015.
5	China	UNIDO and Japan	Pilot demonstration project on ODS waste management and disposal	Jul-12	Jun-16	Incineration by plasma and by modifying rotary kilns at four existing hazardous and industrial waste management facilities.	The planned completion date of June 2016 is still the target, but there are some factors that may cause a delay from the planned schedule. The fact that the project requires coordination with various provinces and municipalities is a factor that adds more complexity than what had been planned initially.

	Country	Agency	Title	Date Approved	Planned date of completion	Method of Disposal	Current Status
6	Cuba	UNDP	Pilot demonstration project on ODS waste management and disposal	Dec-10	Jan-16	Incineration by plasma and modified cement rotary kiln	The project advanced according to plan. The destruction truck was delivered and initial destruction tests in the cement plant were conducted. There have been delays in the analysis of chimney emissions at the cement plant due to a lack of specialized laboratories in Cuba. In order to address these delays, UNDP provided a list of laboratories that could carry out the analysis for the NOU.
7	Region EUR	UNEP and UNIDO	Demonstration of a regional strategy for ODS waste management and disposal in the Europe and Central Asia (ECA) region (Bosnia and Herzegovina, Croatia and Montenegro)	Apr-13	Apr-15	Export to EU destruction facility	The estimated date of completion is now first quarter of 2016 due to a delay in the procedures for disposal of the third and last batch of ODS waste. UNIDO is currently in the process of completing the bidding process to select the contractor with whom the third batch will be disposed. Most of the waste disposed has been from Croatia, which has an operating waste collection system.
8	Georgia	UNDP	Pilot demonstration project on ODS waste management and disposal	Apr-13	Apr-15	Export to EU destruction facility	The project is technically complete. After verification of the amount of the ODS waste, it was accumulated at a centralized location in Tbilisi, transferred to transport pressure containers and exported to France for disposal by the Tredi plant.
9	Ghana	UNDP	Pilot demonstration project on ODS waste management and disposal	Apr-11	Dec-14	Export to Article 2 country	UNDP and the Government now have a planned completion date of end of December 2015. The sources of delay were in part the difficulty of access to some of the collected stocks of ODS; access to the sites has been restored since then but there was a significant impact on the functioning of the project team. Another reason for delay was the needed coordination with other projects, which required some additional time (the collection system of old refrigerators put in place by the GEF project on energy efficiency as well as the GEF project on PCB management and elimination).

	Country	Agency	Title	Date Approved	Planned date of completion	Method of Disposal	Current Status
10	Global	World bank	Development of strategy/ methodology for ODS disposal	Jul-08	Jul-09	Opportunities to mobilize resources from voluntary carbon markets to support ODS destruction activities in Article 5 countries	The project has completed a study to explore opportunities to mobilize resources from voluntary carbon markets to support ODS destruction activities in Article 5 countries.
11	Lebanon	UNIDO	Pilot demonstration project on ODS waste management and disposal	Nov-14	Nov-16	Export to EU destruction facility	As of December 2014, legal arrangements for grant approval have been completed. The project is expected to be completed by early 2017 only.
12	Mexico	UNIDO and France	Demonstration project for disposal of unwanted ODS	Apr-11	Apr-15	Export to US destruction facility	At the time when this project was approved by the ExCom, no facility had the necessary permits to destroy ODS waste in Mexico, so export to the U.S. was considered the best strategy. However, during project implementation, one Mexican company got the permits in March 2014, and a second one is expected to get these permits before the end of 2015.
13	Nepal	UNEP	Destruction of confiscated ODS	Nov-09	Dec-14	Export to US destruction facility	The ODS has been exported and destroyed. 22 000 of the 89 000 credits have been sold by the company in the Voluntary Carbon Market (VCM). The revised project completion date is December 2016. The delay is due to institutional changes in the ozone office in 2013 and limited capacity of the new Ozone Officer during 2014, as well as the recent earthquake. Sale of credits on the voluntary market affected by the crash in this market has delayed the sale for more than two years, and has also had an impact on final closure of the project.
14	Nigeria	UNIDO	Demonstration project for disposal of unwanted ODS	Jul-12	Mar-16	Export to US destruction facility	Project Management Unit set up with a coordinator. Aggregation and testing activities started in the 1st quarter of 2014. Low levels of CFC waste found. The project developer decided not to continue with the project due to losses during a previous project. A new project developer is to be selected. Planned completion date is March 2017.

	Country	Agency	Title	Date Approved	Planned date of completion	Method of Disposal	Current Status
15	Turkey	UNIDO	Demonstration project for disposal of unwanted ODS	Apr-12	Dec-15	Export	The disposal strategy initially conceived considered export of the ODS waste for destruction at a facility in the U.S. In the absence of expected revenue from carbon markets, logistical costs of exporting the ODS waste for disposal in the U.S. are much higher than export for disposal in an EU-based facility, which is the approach that will be followed for disposal of the collected ODS waste. Difficulties in collecting planned amount of ODS waste has led to a re-design of the disposal strategy.