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COMITE EXECUTIF
DU FONDS MULTILATERAL AUX FINS
D'APPLICATION DU PROTOCOLE DE MONTREAL
Soixante-sixième réunion
Montréal, 16 – 20 avril 2012

PROPOSITION DE PROJET : COLOMBIE

Le présent document contient les observations et les recommandations du Secrétariat du Fonds sur la proposition de projet suivante :

Destruction

- Projet pilote de démonstration sur la gestion et la destruction des SAO résiduaire PNUD

Élimination

- Plan de gestion de l'élimination des HCFC (phase I, deuxième tranche PNUD/PNUE

FICHE D'ÉVALUATION DU PROJET – PROJETS PLURIANNUELS**COLOMBIE****TITRE DU PROJET****AGENCE D'EXÉCUTION**

Projet pilote de démonstration sur la gestion et la destruction des SAO résiduares

PNUD

AGENCE DE COORDINATION NATIONALE : Unité technique de l'ozone (UTO)**DERNIÈRES DONNÉES COMMUNIQUÉES SUR LA CONSOMMATION DE SAO TRAITÉES DANS CE PROJET****A: DONNÉES EN VERTU DE L'ARTICLE 7 (TONNES PAO en 2010)**

| | | | |
|---------------|---|--|--|
| Annexe I, CFC | 0 | | |
| | | | |

B: DONNÉES SECTORIELLES DU PROGRAMME DU PAYS (TONNES PAO, 2010)

| SAO | Sous-secteur/quantité | Sous-secteur/quantité | Totaux |
|-----|-----------------------|-----------------------|--------|
| CFC | | | 0 |
| | | | |

PLAN D'ACTIVITÉS DE L'EXERCICE CONSIDÉRÉ : Financement total 1 209 375 \$US Élimination totale 75 tonnes PAO**TITRE DU PROJET**

| | | |
|--|----------|--|
| SAO UTILISÉES DANS L'ENTREPRISE | | s.o. |
| SAO À ÉLIMINER | | s.o. |
| SAO PROGRESSIVEMENT ÉLIMINÉS | | s.o. |
| PLAN D'ACTIVITÉS DE L'EXERCICE CONSIDÉRÉ | | Oui |
| SECTEUR | | SAO résiduares |
| SOUS-SECTEUR | | Secteur de l'entretien de la réfrigération |
| INCIDENCE DU PROJET | | 114 tonnes métriques de CFC-12 |
| DURÉE DU PROJET | | 36 mois |
| PROPRIÉTÉ LOCALE | | 100% |
| COMPOSANTE EXPORTATION | | % |
| SUBVENTION REQUISE DU FML | \$US | 1 195 000 |
| COÛTS D'APPUI DE L'AGENCE D'EXECUTION (7,5%) | \$US | 89 625 |
| COÛT TOTAL DU PROJET POUR LE FML | \$US | 1 824 625 |
| RAPPORT COÛT-EFFICACITÉ | \$US /kg | 10,48 SAO (métriques) |
| OBJECTIFS DE SURVEILLANCE DU PROJET | | Inclus |

RECOMMANDATION DU SECRÉTARIAT

À examiner individuellement

DESCRIPTION DU PROJET

Introduction

1. Au nom du Gouvernement de la Colombie, le PNUD a présenté lors de la 66^e réunion une proposition de projet pilote de démonstration sur la gestion et la destruction des substances appauvrissant la couche d'ozone (SAO) résiduelles à un coût de 1 195 000 \$US, comme présenté à l'origine. Ce projet est présenté conformément à la décision 58/19 et portera sur la destruction de 114 tonnes métriques des SAO résiduelles dans le pays.

2. À sa 57^e réunion, le Comité exécutif a fourni des fonds au PNUD afin de préparer un projet pilote de démonstration sur les SAO pour la Colombie. À cette réunion, la décision a été prise de prendre en considération des projets d'élimination des SAO répondant à la décision XX/7 de la Vingtième réunion des Parties, qui prévoyait que des projets pilotes pouvaient couvrir la collecte, le transport, le stockage et la destruction des SAO, en accordant une attention particulière aux stocks déjà constitués ayant un potentiel de réchauffement de la planète (PRG) élevé, et dans un échantillon représentatif de la diversité régionale des pays de l'article 5. Les membres ont également souligné que les projets de démonstration de la destruction des SAO devraient être réalisables et inclure des méthodes de recherche de cofinancement. La Colombie était l'un des pays sélectionnés sur la base de ces critères.

Contexte

3. À la 58^e réunion du Comité exécutif, les critères et lignes directrices relatifs à sélection des projets de destruction des SAO ont été examinés et ont conduit à la décision 58/19. Cette décision établissait les bases de l'examen et de l'approbation des projets de démonstration d'élimination des SAO. Le Secrétariat a examiné cette proposition sur la base des principes établis par la décision. Le Secrétariat a également appliqué le sous-paragraphe a) ii) de la décision, qui précise qu'aucun financement ne serait disponible pour la collecte des SAO résiduelles dans le cadre du projet pilote. La définition de la collecte des SAO était incluse dans l'annexe du rapport de la 58^e réunion, intitulée « Définition des activités figurant dans les lignes directrices intérimaires sur le financement des projets de démonstration sur la destruction des SAO ». Le projet pilote de la Colombie couvrira déjà les SAO résiduelles collectés ainsi que des montants supplémentaires qui seront collectés dans le cadre d'une prochaine politique nationale sur les déchets d'équipements électriques et électroniques (DEEE) qui devrait être mise en place d'ici 2013.

4. Ce projet pilote de démonstration vise à démontrer une approche durable de la gestion des SAO résiduelles, de la collecte à la destruction, en renforçant les capacités de destruction des installations nationales colombiennes à travers leurs intégration à des initiatives de plus grande envergure sur les déchets dangereux et les DEEE dans le pays. L'échéancier du projet donne également la possibilité d'établir une synergie avec un projet sur la destruction des stocks accumulés de polychlorobiphényles, du Fonds pour l'environnement mondial (FME), qui devrait être mis en œuvre en parallèle et sous une supervision institutionnelle commune. Ces efforts devraient être complétés par des projets existants, en particulier le plan de gestion de l'élimination des HCFC (PGEH) et ses activités liées aux opérations de récupération pour l'entretien de l'équipement de réfrigération existant, qui générera également un volume de SAO résiduelles qui ne peuvent plus être réutilisées. Une proposition de projet détaillée est jointe dans l'annexe I au présent document.

Description du projet

5. Ce projet pilote traitera d'abord de l'élimination de 114 tonnes de SAO résiduelles en vue de leur destruction. Il mettra également en place des mesures pour appuyer la viabilité du projet en tenant compte

des SAO résiduares disponibles qui seront collectés dans l'important secteur national de l'entretien de l'équipement de réfrigération dans le pays, exploité par un réseau de techniciens et d'entreprises du secteur privé, bien équipés d'un matériel de récupération de frigorigènes distribué pour aux centres de recyclage et de récupération à travers le pays. Ce réseau de collecte sera appuyé par trois initiatives politiques coordonnées et voisines actuellement mises en œuvre et qui généreront des quantités substantielles de destruction de SAO en fin de vie.

6. La première initiative concerne l'utilisation rationnelle et efficace de l'énergie et les sources non conventionnelles d'énergie, ce qui inclut le remplacement des réfrigérateurs domestiques par des modèles à haut rendement énergétique. Ce programme fonctionne également dans le cadre d'un projet financé par le FEM, qui traite du rendement énergétique des bâtiments, notamment les systèmes de climatisation. Le deuxième programme porte sur l'élaboration de stratégies à long terme dans le cadre d'une politique environnementale plus large de gestion des déchets dangereux, dont un objectif comprend la mise en œuvre d'un plan d'action au titre de la Convention de Stockholm et l'élimination des SAO aux termes du Protocole de Montréal. Cette initiative a permis le développement d'installations d'incinération modernes à fours rotatifs au cours des deux dernières années, ce qui a fourni une option de destruction des SAO, sous réserve que les installations satisfassent aux normes de destruction internationales. Le troisième programme politique est le DEEE, un programme évolutif sur la collecte de l'équipement électrique et électronique, qui traite notamment de la mise au rebut anticipée de l'équipement de réfrigération et climatisation ancien domestique/commercial qui utilisait du CFC-11 et du CFC-12. Il sera financé en partie par le biais d'un mécanisme de Responsabilité élargie des producteurs (REP) couvrant le remplacement subventionné des réfrigérateurs domestiques par un équipement à plus haut rendement énergétique/sans SAO, qui couvrira les coûts liés à la collecte, au traitement et à la gestion rationnelle des déchets de l'équipement mis hors service incluant la destruction des frigorigènes et des mousses.

7. Ces trois politiques ont débouché sur l'adoption d'un objectif national de remplacer 2,6 millions de réfrigérateurs à base de CFC sur une période de dix ans à compter de 2013. Cet objectif pour ce projet pilote permettra de collecter les SAO résiduares de 300 000 réfrigérateurs, qui seront traités sur une période démarrage de deux ans (2013-2015), ce qui permettrait de détruire 114 tonnes de CFC-11 et de CFC-12.

8. L'approche globale adoptée pour détruire les SAO résiduares en Colombie sera une destruction menée par le pays-même, en utilisant sa capacité existante de gestion de ses déchets dangereux. Le projet pilote aura donc pour visée de démontrer comment un pays en développement peut exploiter à plus grande échelle ses capacités de gestion des SAO en fin de vie et certifier la capacité de trois installations d'incinération à fours rotatifs (TECNIAMSA SA à Barranquilla, TECNIAMSA SA à Bogota et PROSARC, SA à Mosquera) à détruire les CFC-12, CFC-11 et mousses de polyuréthane contenant du CFC-11, qui sont en fin de vie pour satisfaire aux normes internationales, en réalisant des essais au four complets d'au moins 5 tonnes de chacun de ces flux résiduares dans au moins une installation. Deux de ces installations seront modifiées par l'ajout d'une chambre d'injection pour manipuler le CFC-12, et la troisième servira à détruire les mousses recueillies dans les réfrigérateurs. Un protocole de surveillance sera suivi, qui couvrira les conditions de fonctionnement (par ex., les températures de la chambre de combustion, les frais de temps estimés, les températures de la cheminée), le menu standard des émissions régies, notamment la dibenzodioxine polychlorée et le dibenzofuranne polychloré (PCDD/F) ainsi que les résultats des bilans de masse couvrant tous les rejets résiduels (solide, liquide et gazeux), et l'analyse des principaux contaminants (y compris les PCDD/F dans les cendres résiduelles solides et les résidus de lavage) et tous les flux résiduares liquides. L'intention est de déterminer à la fois le rendement de destruction et d'élimination (RDE) et le rendement de destruction (RD).

9. Le projet de démonstration de destruction des SAO devrait durer trois ans.

Estimation des SAO à détruire

10. Comme il est indiqué plus haut, le montant des SAO à gérer par le projet pilote sera de 114 tonnes, dont 11 ont déjà été collectées et stockées dans des cylindres pour CFC-12, et dans des sacs de mousses contenant du CFC-11. Ces quantités sont prêtes à être détruire. Les quantités de SAO résiduelles estimées dans le projet d'une durée de trois ans comprennent des quantités provenant du système national existant de collecte, dont les montants figurent dans le Tableau 1 ci-dessous :

Tableau 1: Quantités estimées de SAO résiduelles qui seront utilisées dans le projet

| Origine et quantités | | 2012 | | | 2013 | | | | 2014 | | | | 2015 | |
|---|-------------------|-----------------------|----|----|------|----|----|----|------|----|----|----|------|----|
| | | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| <i>CFC-11</i> | | <i>Total 8 120 kg</i> | | | | | | | | | | | | |
| En récupération, récupérées et stockées | 4 120 kg | — | | | | | | | | | | | | |
| À récupérer d'ici 2012 | 900 kg | — | — | | | | | | | | | | | |
| À récupérer d'ici 2013 | 3 100 kg | — | — | — | | | | | | | | | | |
| <i>CFC-12</i> | | <i>Total 5 674 kg</i> | | | | | | | | | | | | |
| Récupérées et stockées | 5 674 kg | — | | | | | | | | | | | | |
| <i>Autres</i> | | <i>1 249 kg</i> | | | | | | | | | | | | |
| HCFC, mélanges de HFC | 919 kg | — | | | | | | | | | | | | |
| CTC | 330 kg | — | | | | | | | | | | | | |
| <i>CFC du Programme EPE</i> | | <i>99 000 kg</i> | | | | | | | | | | | | |
| CFC-11 dans les mousses emballées | 65 000 kg | | — | — | — | — | — | — | — | — | — | — | — | — |
| CFC-12 | 34 000 kg | | — | — | — | — | — | — | — | — | — | — | — | — |
| TOTAL | 114 043 kg | | — | — | — | — | — | — | — | — | — | — | — | — |

Gestion du financement du projet

11. La proposition prévoyait que le financement du Fonds multilatéral couvrirait les coûts nécessaires pour les essais des installations d'incinération sélectionnées, et améliorer le fonctionnement de ces dernières de manière à satisfaire aux normes internationales, afin que les montants de SAO indiqués ci-dessus soient détruits dans les trois prochaines années. Il est prévu qu'une fois le projet pilote achevé, le fonctionnement futur de ces installations sera entièrement couvert par le programme EPE/DEEE, où d'autres matériaux récupérés d'anciens équipements généreront suffisamment de revenus qui permettront la destruction durable des futures SAO résiduelles. Après le projet pilote, la quantité effective de réfrigérateurs en fin de vie à couvrir sera de plus de 2 millions d'unités, ce qui devrait donner environ 700-800 tonnes de SAO résiduelles, selon des estimations modérées.

Sélection d'une technologie/approche

12. Les diverses options stratégiques et technologiques pour détruire les SAO en fin de vie, dont le CFC-11 contenu dans les mousses, ont été examinées et ont servi de base à l'élaboration de la conception du projet et de sa dimension détaillée. Trois options possibles ont été étudiées : i) exporter vers des installations de gestion des déchets dangereux qualifiées ; ii) développer de nouvelles installations nationales en utilisant des technologies importées; et iii) utiliser la capacité nationale de gestion des déchets dangereux et industriels. La première option n'a pas été considérée de par son coût élevé (11-12 \$US/kg comprenant les frais de transport et de transaction) et les questions liées à l'application des règlements de la Convention de Bâle dans le pays. L'option de développer de nouvelles installations au pays a aussi été examinée, et la conclusion était que l'investissement en capital serait excessif et la capacité de ces technologies ne conviendrait pas aux exigences de la Colombie.

13. La dernière option suppose l'utilisation des installations d'incinération nationales existantes à condition qu'elles satisfassent aux normes internationales, ce qui leur permettrait alors de détruire les SAO. Les normes et protocoles actuels d'obtention de permis et de qualification en vigueur en Colombie en matière de traitement thermique/d'installations d'incinération des déchets dangereux ont été examinés. Quatre installations ont été identifiées comme potentiellement capables de détruire les SAO en fin de vie, sous réserve d'une validation technique à travers les protocoles d'essai. Le Gouvernement de la Colombie estime qu'une fois que ces installations ont démontré qu'elles satisfont aux normes internationales, l'utilisation des capacités nationales de destruction est plus économique que les autres options proposées. La proposition présentée est donc conçue en fonction de cette option.

Surveillance et vérification de la destruction

14. Afin de s'assurer que toutes les SAO résiduelles sont convenablement prises en compte, le processus sera surveillé de près et les données seront enregistrées dans un système de données électronique qui sera mis en place à cette fin. L'origine de toutes les SAO en fin de vie récupérées pour être détruite est aisément déterminée car les stocks disponibles actuels sont retenus par les sources originales et collectés dans le cadre d'activités bien définies (par ex., les saisies de douane, les activités de l'entretien de l'équipement de réfrigération et les initiatives d'élimination telles que le projet de démonstration sur les refroidisseurs, la conversion des inhalateurs à dose et autres). Les SAO en fin de vie récupérées pendant la phase de démarrage du programme EPE de remplacement des réfrigérateurs seront surveillées de près car elles sont générées sur place. Dans les deux cas, le suivi de ces matériaux à travers la consolidation, la caractérisation, le stockage, le transport et la destruction subséquentes est explicitement fourni dans le cadre du projet, notamment la documentation détaillée et l'utilisation du système de base de données électronique, qui fait partie des extraits du projet. Il n'y a pas de risque de volumes gonflés ou de stocks inadmissibles étant donné qu'il n'existe pas d'installations de production en Colombie.

Coût du projet

15. Le coût total du projet, comme présenté à l'origine, a été établi à 2 750 000 \$US, le montant requis du Secrétariat du Fonds Multilatéral est de 1 195 000 \$US, comme il apparaît dans le tableau ci-dessous.

Tableau 2 : Coût proposé du projet

| Budget | Coût (\$US) | | |
|--|----------------|------------------|------------------|
| | FML | Cofinancement* | Total |
| Composante 1 : Démonstration de destruction des SAO | 835 000 | 1 235 000 | 2 070 000 |
| Consolidation/stockage/caractérisation/transport des SAO en fin de vie contenant du CFC-11 et du CFC-12 | 100 000 | 50 000 | 150 000 |
| Traitement manuel des réfrigérateurs dans les parcs à ferraille pour produire 10-15 tonnes de mousse à base de CFC-11 | 100 000 | - | 100 000 |
| Démonstration d'essais au four pour les CFC-11 et CFC-12 dans un incinérateur de déchets hospitaliers sélectionné | 250 000 | 165 000 | 415 000 |
| Démonstration d'essais au four pour les mousses contenant du CFC-11 dans deux installations d'incinération industrielles/déchets hospitaliers sélectionnées | 140 000 | 80 000 | 220 000 |
| Destruction des volumes de démarrage des mousses contenant du CFC-12 et du CFC-11 dans le cadre du projet EPE (sur la base de 300 000 unités, 34 t CFC-12 65 t CFC-11 dans 1 228 t de mousses) | 245 000 | 940 000 | 1 185 000 |

| Budget | Coût (\$US) | | |
|--|------------------|------------------|------------------|
| | FML | Cofinancement* | Total |
| Composante 2 : Assistance technique | 200 000 | 150 000 | 350 000 |
| Assistance technique institutionnelle juridique et en matière de réglementation | 50 000 | 25 000 | 75 000 |
| Appui technique/en matière de planification des activités pour la gestion des SAO en fin de vie dans le cadre du système EPE | 100 000 | 100 000 | 200 000 |
| Consultation et information du public | 50 000 | 25 000 | 75 000 |
| Composante 3 : Gestion/surveillance/évaluation du projet | 160 000 | 170 000 | 330 000 |
| Coordinateur national du projet | 60 000 | 60 000 | 120 000 |
| Direction du projet | - | 60 000 | 60 000 |
| Passation de marché de services divers et déplacements | 20 000 | 20 000 | 40 000 |
| Conseiller technique/en affaires international | 50 000 | - | 50 000 |
| Coûts suivi et évaluation | 30 000 | 30 000 | 60 000 |
| Total | 1 195 000 | 1 555 000 | 2 750 000 |

* D'entreprises et d'exploitants d'incinérateurs privés

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT

OBSERVATIONS

16. Le Secrétariat a transmis au PNUD des commentaires et observations à la lumière des critères établis dans la décision 58/19. Il est à noter que le système de collecte des SAO résiduaire repose sur une politique en phase finale d'approbation par le Parlement et qui exprime des inquiétudes quant aux options si la réglementation n'est pas approuvée. Le PNUD a expliqué que, si cela est le cas, le ministère de l'Environnement émettra un décret ministériel qui requerra la collecte de SAO résiduaire des 300 000 réfrigérateurs, ce qui fait partie du projet pilote. Cependant, le ministère est très optimiste quant à l'approbation de la législation proposée à la prochaine session du Parlement prévue au premier trimestre de 2012.

17. Les préoccupations concernant la logistique du démantèlement des réfrigérateurs domestiques dans le cadre du programme DEEE a également été soulevée par le Secrétariat. Le PNUD a indiqué que plusieurs entreprises sont concernées et plusieurs autres intéressées par le processus de démantèlement et qu'elles se trouvent dans les principales villes du pays. La structure décentralisée du démantèlement manuel rend également plus aisée la logistique. Le prix de la ferraille et autres matériaux récupérés est très élevé ; par conséquent, les opérations de démantèlement ainsi que la collecte des SAO résiduaire sont autosuffisantes.

18. Le Secrétariat a également cherché à savoir pourquoi il était nécessaire de tester les trois incinérateurs plusieurs qu'un seul comme incinérateur pilote. Le PNUD a indiqué que la sélection de ces installations était fondée sur des critères très stricts du gouvernement afin de montrer les différents aspects du processus de destruction. Comme le processus couvrira à la fois le CFC-12 qui est une substance gazeuse et le CFC-11 dans sa phase liquide, les fours rotatifs à température élevée auront besoin d'être testés et certifiés pour ce processus. Le processus comprendra un essai au four du CFC-12 dans sa phase gazeuse, un essai au four du CFC-11 dans sa phase solide/phase gazeuse (dans les mousses). Le fait d'utiliser ces trois installations donnera un large éventail des capacités techniques qui permettront au pays d'aller de l'avant dans la stratégie d'utilisation des installations nationales pour la destruction des SAO. Le PNUD a également souligné qu'aucun investissement de capitaux de la part du Fonds multilatéral n'est recherché pour ces installations dans le cadre du projet pilote. Chaque installation assumera les frais des modifications techniques, comme partie du cofinancement. La proposition sera axée sur les tests, la certification et l'enregistrement des résultats des protocoles d'essai.

19. Lors de délibérations ultérieures avec le PNUD, le Secrétariat a suggéré qu'un résultat important du projet, utile à la démonstration, serait de produire un rapport/manuel technique qui documenterait les étapes et les résultats atteints du protocole d'essai, comment les essais au four ont été menés, comment la validation technique s'est faite, comment les installations ont été actualisées, ainsi que les coûts impliqués. Il a suggéré que ce rapport puisse ensuite être utilisé à des fins de procédures d'essai similaires dans des installations d'incinération similaires, non seulement dans le pays mais également dans d'autres pays de l'article 5, et qu'il deviendra un résultat vital du projet de démonstration. Le PNUD a pris cela en compte et ajusté le budget en conséquence.

20. Le Secrétariat s'est également interrogé sur la viabilité du projet une fois la phase pilote terminée. La proposition indiquait clairement qu'une fois les essais dans ces installations terminés et une fois les normes acceptables de destruction satisfaites, les installations continueraient de fonctionner par elles-mêmes. Mais elle n'indiquait pas clairement qui serait éventuellement chargé de payer les frais de destruction des SAO résiduelles restantes une fois le projet pilote terminé. Le PNUD a expliqué que le projet pilote couvre seulement la phase de démarrage dans laquelle une petite portion des coûts de destruction seront financés, et que les coûts futurs seront couverts entièrement dans le cadre du programme DEEE/EPE et les revenus qu'il générera. Ces installations ont un stimulant économique qui garantit la destruction écologiquement rationnelle des SAO en fin de vie récupérées dans le cadre d'un tel programme en tant que déchets dangereux contrôlés. Le financement fourni par le Fonds multilatéral pour les essais est une condition d'un programme d'appui pour les entreprises collectant et démantelant l'équipement de réfrigération. À plus long terme, il est prévu que cette destruction peut aussi attirer les revenus du carbone, quoique cela ne soit pas considéré comme essentiel en Colombie actuellement, car le système fondé sur le démantèlement manuel peut être conservé.

21. Le coût final du projet a été approuvé tel que présenté à hauteur de 1 195 000 \$US, calculés à raison de 10,48 \$US/kg, ce qui est inférieur au seuil (13,2 \$US/kg) fourni dans la décision 58/19. Des modifications ont été apportées aux résultats et aux coûts afin d'inclure les suggestions du Secrétariat, comme l'illustre le tableau ci-dessous :

Tableau 3 : Coûts approuvés pour le projet

| Budget | Coût (\$US) |
|--|----------------|
| Composante 1 : Démonstration de destruction des SAO | 830 000 |
| Consolidation/stockage/caractérisation/transport des SAO en fin de vie contenant du CFC-11 et du CFC-12 | 100 000 |
| Consolidation/stockage/caractérisation/ transport des mousses contenant du CFC-11 en vue de démonstrations d'essais de fours | 100 000 |
| Démonstration d'essais au four pour les CFC-11 et CFC-12 dans un incinérateur de déchets hospitaliers sélectionné | 250 000 |
| Démonstration d'essais au four pour les mousses contenant du CFC-11 dans deux installations d'incinération industrielles/déchets hospitaliers sélectionnées | 135 000 |
| Destruction des volumes de démarrage des mousses contenant du CFC-12 et du CFC-11 dans le cadre du projet EPR (sur la base de 300 000 unités, 34 t CFC-12 65 t CFC-11 dans 1 228 t de mousses) | 245 000 |
| Composante 2 : Assistance technique | 255 000 |
| Assistance technique institutionnelle juridique et en matière de réglementation | 50 000 |
| Appui technique/en matière de planification des activités pour la gestion des SAO en fin de vie dans le cadre du système EPE | 75 000 |

| | |
|---|------------------|
| Consultation et information du public | 50 000 |
| Supervision technique et rapport technique sur l'ensemble du projet | 80 000 |
| Composante 3 : Gestion/suivi /évaluation du projet | 110 000 |
| Coordinateur national du projet | 60 000 |
| Direction du projet | - |
| Passation de marché de services divers et déplacements | 50 000 |
| TOTAL | 1 195 000 |

RECOMMANDATION

22. Le Comité exécutif peut souhaiter envisager :

- a) Prendre note avec intérêt de la présentation par le Gouvernement de la Colombie d'un projet de gestion et d'élimination des SAO résiduaire pour détruire 114 tonnes métriques de SAO résiduaire ; et
- b) Approuver la mise en œuvre en Colombie du projet pilote de gestion et de destruction des SAO résiduaire à hauteur de 1 195 000 \$US, plus les coûts d'appui d'agence de 89 625 \$US pour le PNUD, étant entendu qu'aucun financement supplémentaire ne sera disponible pour la Colombie pour tout projet futur d'élimination de SAO.

FICHE D'ÉVALUATION DU PROJET – PROJETS PLURIANNUELS

Colombie

| | |
|---|-------------------|
| (I) TITRE DU PROJET | AGENCE |
| Plan de gestion de l'élimination des HCFC (phase I) | PNUD (principale) |

| | | |
|--|--------------|--------------------|
| (II) DERNIÈRES DONNÉES DE L'ARTICLE 7 (Annexe C Groupe I) | Année : 2010 | 241,5 (tonnes PAO) |
|--|--------------|--------------------|

| (III) DERNIÈRES DONNÉES SECTORIELLES DU PROGRAMME DU PAYS (tonnes PAO) | | | | | | | | Année : 2010 | |
|---|---------|--------|-------------------------|---------------|-----------|----------|-------------------------|----------------------------|--------------------------------|
| Produits chimiques | Aérosol | Mousse | Lutte contre l'incendie | Réfrigération | | Solvants | Agent de transformation | Utilisation en laboratoire | Consommation totale du secteur |
| | | | | Fabrication | Entretien | | | | |
| HCFC-123 | | | 2,3 | | 0,0 | | | | 2,3 |
| HCFC-124 | | | | | 0,0 | | | | 0,0 |
| HCFC-141b | 0,6 | 160,1 | 4,1 | | 5,6 | 0,6 | | | 171,1 |
| HCFC-142b | | | | | 0,6 | | | | 0,6 |
| HCFC-22 | 0,2 | 7,6 | | 3,2 | 56,4 | | | | 67,4 |

| (IV) DONNÉES SUR LA CONSOMMATION (tonnes PAO) | | | |
|--|--------|--|--------|
| Référence 2009 - 2010 : | 225,57 | Point de départ des réductions globales durables : | 225,57 |
| CONSOMMATION ADMISSIBLE AU FINANCEMENT (tonnes PAO) | | | |
| Déjà approuvée : | 79,40 | Restante : | 146,17 |

| (V) PLAN D'ACTIVITÉS | | 2011 | 2012 | 2013 | 2014 | Total |
|-----------------------------|----------------------------------|------|---------|------|---------|---------|
| PNUD | Élimination des SAO (tonnes PAO) | | 10,5 | | 2,9 | 13,4 |
| | Financement (\$US) | | 591 250 | | 161 250 | 752 500 |
| PNUE | Élimination des SAO (tonnes PAO) | | 1,0 | | | 1,0 |
| | Financement (\$US) | | 56 500 | | | 56 500 |

| (VI) DONNÉES DU PROJET | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Total | |
|--|------|-----------------|-----------|-------|---------|--------|---------|-------|-----------|
| Limites de consommation du Protocole de Montréal | | s. o. | s. o. | s. o. | 225,57 | 225,57 | 203,01 | s. o. | |
| Consommation maximale admissible (tonnes PAO) | | s. o. | s. o. | s. o. | 225,57 | 225,57 | 203,01 | s. o. | |
| Financement approuvé (\$US) | PNUD | Coûts de projet | 6 021 483 | 0 | 550 000 | 0 | 150 000 | 0 | 6 721 483 |
| | | Coûts d'appui | 451 611 | 0 | 41 250 | 0 | 11 250 | 0 | 504 111 |
| | PNUE | Coûts de projet | 50 000 | 0 | 50 000 | 0 | 0 | 0 | 100 000 |
| | | Coûts d'appui | 6 500 | 0 | 6 500 | 0 | 0 | 0 | 13 000 |
| Fonds approuvés par le Comité exécutif (\$US) | | Coûts de projet | 6 071 483 | 0 | 0 | 0 | 0 | 0 | 6 071 483 |
| | | Coûts d'appui | 458 111 | 0 | 0 | 0 | 0 | 0 | 458 111 |
| Total des fonds requis pour approbation à la présente réunion (\$US) | | Coûts de projet | 0 | 0 | 600 000 | 0 | 0 | 0 | 600 000 |
| | | Coûts d'appui | 0 | 0 | 47 750 | 0 | 0 | 0 | 47 750 |

| | |
|--|-----------------------------|
| Recommandation du Secrétariat : | À examiner individuellement |
|--|-----------------------------|

DESCRIPTION DU PROJET

23. Au nom du Gouvernement de la Colombie, le PNUD, tant qu'agence d'exécution principale, a présenté lors de la 66^e réunion du Comité exécutif une demande de financement pour la deuxième tranche de la phase I du plan de gestion de l'élimination des HCFC (PGEH), d'un total de 647 750 \$US, soit 550 000 \$US plus les coûts d'appui d'agence de 41 250 \$US pour le PNUD, et 50 000 \$US plus les coûts d'appui d'agence de 6 500 \$US pour le PNUE. La présentation inclut un rapport périodique sur la mise en œuvre de la première année du PGEH, ainsi qu'un rapport de vérification sur la consommation de HCFC en Colombie, et des plans annuels de mise en œuvre pour 2012 et 2013.

Contexte

24. Le PGEH de la Colombie a été approuvé par le Comité exécutif à sa 62^e réunion, pour réduire la consommation de HCFC de 10 pour cent par rapport à la référence de base d'ici la fin de 2014, à un niveau de financement total en principe de 6 821 483 \$US, plus les coûts d'appui d'agence de 517 111 \$US. Cela comprend 5 621 483 \$US, plus les coûts d'appui d'agence de 421 611 \$US pour le PNUD, approuvés à la 60^e réunion, pour éliminer 56,00 tonnes PAO de HCFC-22 et HCFC-141b utilisés dans la production de mousses d'isolation dans le sous-secteur de la réfrigération domestique. À la 62^e réunion également, le Comité exécutif a approuvé un montant de 400 000 \$US, plus les coûts d'appui d'agence de 30 000 \$US pour le PNUD et 50 000 \$US, plus les coûts d'appui d'agence 6 500 \$US pour le PNUE, pour la mise en œuvre de la première année du PGEH.

Rapport périodique sur la mise en œuvre de la première tranche du PGEH

25. La mise en œuvre du projet de conversion du HCFC-22 et du HCFC-141b en hydrocarbures dans la production de mousses d'isolation dans le sous-secteur de la réfrigération domestique par les entreprises de fabrication de mousses, à sa voir Mabe Colombia, Industrias Haceb, S.A., Challenger et Indusel S.A., est bien avancée. Des mémorandums d'entente entre chacune de ces entreprises et le ministère de l'Environnement et du Développement durable ont été émis, qui décrivent les responsabilités spécifiques de chaque partie prenante, les critères de versement du financement et la vérification des rapports. Dans le cas d'Industrias Haceb et de Challenger, les deux entreprises ont déjà installé l'équipement nécessaire et elles effectuent des tests de production. En principe, la production sans HCFC devrait démarrer en 2012. Dans le cas de Mabe Colombia, l'équipement requis pour la conversion sera installé d'ici octobre 2012 et les essais seront effectués au cours du dernier trimestre de 2012, avec une production sans HCFC démarrant en janvier 2013. L'équipement requis pour Indusel est en cours de fabrication et sera livré au dernier trimestre de 2012. Il est prévu que la production sans HCFC démarre au premier trimestre de 2013.

26. Les activités suivantes ont été mises en œuvre dans le secteur de l'entretien de l'équipement de réfrigération et de climatisation :

- a) Le programme de formation et de certification des techniciens du secteur de la réfrigération et de la climatisation a commencé et 312 techniciens ont été certifiés jusqu'à présent. Trois ateliers sur les bonnes pratiques en matière d'entretien ont eu lieu avec la participation de 130 techniciens qui ont reçu une formation sur les opérations de récupération et de recyclage ; de maniement sécuritaire des frigorigènes à base d'hydrocarbures ; et en matière de mise en œuvre du Protocole de Montréal en Colombie. Une réunion avec 43 instructeurs en réfrigération sur le thème de la sécurité industrielle en ce qui concerne l'utilisation de frigorigènes de remplacement s'est tenue en novembre 2011 ;

- b) Des séminaires sur les frigorigènes de remplacement ayant un faible potentiel de réchauffement de la planète (PRG) ont été organisés pour 170 représentants d'ateliers d'entretien de l'équipement de réfrigération et de climatisation, et d'utilisateurs finaux ;
- c) Une assistance technique a été fournie aux ateliers d'entretien répartis à travers le pays pour les orienter dans l'application des bonnes pratiques d'entretien en matière d'installation et de maintenance des systèmes de réfrigération et de climatisation, de frigorigènes de remplacement et de destruction en toute sécurité des SAO ;
- d) L'UNO a visité 31 établissements commerciaux pour recueillir des informations détaillées sur les frigorigènes à base de SAO et sans SAO qui sont actuellement disponibles dans le pays. Ces visites ont également concouru à prévenir et à contrôler le commerce illégal des SAO ;
- e) En ce qui concerne l'élimination du HCFC-141b dans le rinçage des circuits de réfrigération, une évaluation de méthodes de remplacement a été effectuée en vue d'acheter des trousseaux d'entretien. Le cadre de référence pour la sélection de 165 bénéficiaires figurant dans la phase I a été préparé ;
- f) Le cadre de référence a été élaboré concernant l'équipement à acheter pour aider le réseau de récupération, recyclage et régénération des frigorigènes pendant la phase d'élimination des CFC.

27. En date du 31 janvier 2012, des 6 071 483 \$US approuvés pour la première tranche, 2 523 251 \$US ont été décaissés ou engagés. Le solde de 3 548 232 \$US sera décaissé en 2012.

Rapport de vérification

28. Une vérification de la consommation de HCFC en 2010 a été entreprise par un vérificateur indépendant. Le rapport a conclu « que les données de 2010 sur les importations de SAO communiquées par l'UNO sont totalement fiables et que la Colombie atteint ses objectifs sur la consommation interne, tel que convenu ». Le rapport de vérification recommandait aussi d'évaluer la possibilité d'établir des sanctions efficaces contre ceux qui violaient la réglementation sur les importations de SAO ; d'informer les citoyens sur la confiscation des SAO illégaux comme mécanisme de diffusion des restrictions existantes concernant leur commercialisation ; de faire apparaître sur la page web de l'UNO des informations sur le Protocole de Montréal.

Plans annuels pour la deuxième tranche du PGEH

29. Les principales activités à mettre en œuvre entre 2012 et 2014 sont présentées dans le Tableau 1 ci-dessous :

Tableau 1. Activités d'élimination à mettre en œuvre entre 2012 et 2014 en Colombie

| Résultats attendus | Activités proposées | Coût (\$US) |
|---|--|----------------|
| Conversion complète des entreprises de fabrication de mousses avec l'élimination totale des HCFC d'ici 2013 | Élimination des HCFC utilisés dans la fabrication des mousses d'isolation dans le secteur des réfrigérateurs domestiques | |
| Réduction de la consommation de HCFC dans le secteur de la réfrigération et de la climatisation | Consolidation et expansion du réseau de récupération, recyclage et régénération | 80 000 |
| | Formation et certification des techniciens en réfrigération et climatisation | 235 000 |
| | Assistance technique dans le secteur de l'entretien de l'équipement de réfrigération et de climatisation, et aux utilisateurs finaux | 44 000 |
| | Élimination du HCFC-141b utilisé dans le rinçage des circuits de réfrigération | 25 000 |
| Élimination de la consommation de HCFC-141b et de HCFC-22 dans les emplois produisant des émissions | Assistance technique pour l'élimination du HCFC-141b utilisé comme solvant dans la fabrication des aiguilles hypodermiques | 63 000 |
| | Assistance technique pour l'élimination du HCFC-141b utilisé comme agent de nettoyage de l'équipement électronique | |
| | Assistance technique pour l'élimination du HCFC-22 dans le secteur des aérosols | |
| Renforcement des institutions pour formuler et mettre en œuvre des politiques d'élimination des HCFC | Renforcement du cadre de réglementation de l'élimination des HCFC | 45 000 |
| | Renforcement du contrôle du commerce des HCFC et de l'équipement à base de HCFC | 50 000* |
| | Éducation en matière d'environnement, diffusion de l'information et, information dissémination et sensibilisation | 30 000 |
| Renforcement de l'équipe technique chargée de la mise en œuvre et de la surveillance du PGEH | Mise en œuvre, surveillance et évaluation de plans opérationnels annuels | 28 000 |
| Total | | 600 000 |

(*) À mettre en œuvre par le PNUE.

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT

OBSERVATIONS

Consommation de HCFC

30. La référence de base des HCFC aux fins de conformité a été établie à 225,57 tonnes PAO, sur la base de la consommation réelle communiquée au titre de l'article 7 du Protocole de Montréal pour 2009 et 2010 comme l'illustre le Tableau 2. La référence de base établie dépasse de 2,17 tonnes PAO celle de 223,40 tonnes PAO qui a été estimée au moment où le PGEF de la Colombie a été approuvé.

Tableau 2 Consommation de HCFC en Colombie (article 7)

| HCFC | 2006 | 2007 | 2008 | 2009 | 2010 | Référence |
|-------------------------|----------|----------|----------|----------|----------|-----------|
| Tonnes métriques | | | | | | |
| HCFC-22 | 1 147,17 | 855,16 | 1 221,20 | 1 358,99 | 1 226,19 | 1 292,59 |
| HCFC-141b | 871,69 | 1 431,58 | 1 250,36 | 1 203,48 | 1 555,44 | 1 379,46 |
| HCFC-142b | - | 1,01 | 0,86 | 5,39 | 9,61 | 7,50 |
| HCFC-123 | 77,90 | 77,40 | 73,69 | 106,39 | 114,40 | 110,40 |
| HCFC-124 | - | 2,33 | 0,14 | 2,88 | 0,68 | 1,78 |
| Total (tm) | 2 096,76 | 2 367,48 | 2 546,25 | 2 677,13 | 2 906,32 | 2 791,73 |
| Tonnes PAO | | | | | | |
| HCFC-22 | 63,09 | 47,03 | 67,17 | 74,74 | 67,44 | 71,09 |
| HCFC-141b | 95,89 | 157,47 | 137,54 | 132,38 | 171,10 | 151,74 |
| HCFC-142b | - | 0,07 | 0,06 | 0,35 | 0,62 | 0,49 |
| HCFC-123 | 1,56 | 1,55 | 1,47 | 2,13 | 2,29 | 2,21 |
| HCFC-124 | - | 0,05 | 0,00 | 0,06 | 0,01 | 0,04 |
| Total (tonnes PAO) | 160,54 | 206,17 | 206,24 | 209,67 | 241,47 | 225,57 |

31. Notant que la conversion des quatre entreprises de fabrication de fours devait être achevée d'ici décembre 2013, et étant donné le stade d'avancement de la mise en œuvre du projet, le Secrétariat a demandé s'il était possible d'achever la conversion à une date antérieure. Le PNUD a expliqué que la partie technique de la conversion sera achevée au début de 2013 ; cependant, la vérification de production d'équipement de réfrigération sans HCFC et les importations de HCFC-141b et de HCFC-22 continueront durant le reste de 2013.

32. En ce qui concerne les recommandations du Gouvernement de la Colombie présentées dans le rapport de vérification, le PNUD a indiqué que l'UNO a inclus des ateliers avec des agents de douane et des établissements commerciaux sur le commerce illégal et la confiscations des SAO dans la deuxième tranche de la phase I du PGEH. L'UNO fera également le suivi avec le Bureau des douanes afin d'évaluer la possibilité d'établir des sanctions contre le commerce illégal des SAO. Le site web de l'UNO a déjà inclus des renseignements sur les projets d'élimination des HCFC qui ont été élaborés et sont actuellement en cours de mise en œuvre. Des publications sur les SAO figurent également sur le site web.

Révision de l'accord relatif au PGEH

33. Le PGEH de la Colombie a été approuvé avant l'établissement de la référence de base des HCFC à titre de conformité. En conséquence, en approuvant le PGEH, le Comité exécutif a demandé au Secrétariat, entre autres, de mettre à jour l'Appendice 2-A (« Les objectifs et le financement ») de l'Accord avec les montants de la consommation admissible maximale, et d'informer le Comité des niveaux qui en résultent (décision 62/55 e)). Sur la base des données communiquées par le Gouvernement de la Colombie au titre de l'article 7 et de son calendrier d'élimination révisé, les paragraphes pertinents

de l'Accord ont été mis à jour et un nouveau paragraphe a été ajouté pour indiquer que l'Accord mis à jour remplace celui de la 62^e réunion, tel qu'il figure dans l'annexe I au présent document. L'Accord intégral révisé sera ajouté au rapport final de la 66^e réunion.

RECOMMANDATION

34. Le Comité exécutif peut souhaiter envisager :

- a) Prendre note du rapport périodique sur la mise en place de la première tranche de la phase I du plan de gestion de l'élimination des HCFC (PGEH) de la Colombie ;
- b) Prendre note que le Secrétariat du Fonds multilatéral a mis à jour le paragraphe 1 de l'Appendice 1-A « Les substances » et de l'Appendice 2-A « Les objectifs, et le financement » de l'Accord entre le Gouvernement de la Colombie et le Comité exécutif, fondé sur la référence de base des HCFC à titre de conformité, et un nouveau paragraphe 16 a été ajouté pour indiquer que l'Accord mis à jour remplace l'Accord conclu à la 62^e réunion, tel qu'il apparaît dans l'annexe I du présent document ;
- c) Prendre note que le point de départ révisé des réductions globales durables de la consommation des HCFC est de 225,57 tonnes PAO, calculées à partir de la consommation réelle de 209,67 tonnes PAO et des 241,47 tonnes PAO communiquées pour 2009 et 2010 respectivement, au titre de l'article 7 du Protocole de Montréal ; et
- d) Approuver la deuxième tranche de la phase I du PGEH de la Colombie, et les plans de mise en œuvre correspondants, à hauteur de 647 750 \$US, soit 550 000 \$US, plus les frais d'appui d'agence de 41 250 \$US pour le PNUD, et de 50 000 \$US, plus les frais d'appui d'agence de 6 500 \$US pour le PNUE.

Annexe I

TEXTE A INCLURE DANS LA MISE A JOUR DE L'ACCORD ENTRE LE GOUVERNEMENT DE LA COLOMBIE ET LE COMITE EXÉCUTIF DU FONDS MULTILATÉRAL POUR LA RÉDUCTION DE LA CONSOMMATION DES HCFC

(Les modifications pertinentes sont en caractères gras par souci de clarté)

1. Le présent Accord représente l'entente conclue entre le Gouvernement de la Colombie (le « Pays ») et le Comité exécutif concernant la réduction de l'usage réglementé des substances appauvrissant la couche d'ozone indiquées à l'appendice 1-A (les « Substances ») à un niveau durable de **203,01** tonnes PAO, avant le 1^{er} janvier 2015, conformément au calendrier du Protocole de Montréal. Cette quantité représente la consommation maximum permise en 2015 selon le calendrier d'élimination du Protocole de Montréal.

16. Le présent Accord mis à jour remplace l'Accord conclu entre le Gouvernement de la Colombie et le Comité exécutif à la 62^e réunion du Comité exécutif.

APPENDICE 1-A : LES SUBSTANCES

| Substance | Annexe | Groupe | Point de départ des réductions globales de consommation (tonnes PAO) |
|-----------|--------|--------|--|
| HCFC-22 | C | I | 71,09 |
| HCFC-141b | C | I | 151,74 |
| HCFC-142b | C | I | 0,49 |
| HCFC-123 | C | I | 2,21 |
| HCFC-124 | C | I | 0,04 |
| Total | | | 225,57 |

APPENDICE 2-A : LES OBJECTIFS ET LE FINANCEMENT

| Ligne | Détails | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Total |
|-------|--|-------------|------|---------|---------------|---------------|---------------|--------------|
| 1.1 | Calendrier de réduction des substances du groupe I de l'annexe C du Protocole de Montréal (tonnes PAO) | s.o. | s.o. | s.o. | 225,57 | 225,57 | 203,01 | s.o. |
| 1.2 | Consommation totale maximum permise des substances du groupe I de l'annexe C (tonnes PAO) | s.o. | s.o. | s.o. | 225,57 | 225,57 | 203,01 | s.o. |
| 2.1 | Financement convenu pour l'agence principale (PNUD) (\$US) | 6 021 483 * | 0 | 550 000 | 0 | 150 000 | | 6 721 483 |
| 2.2 | Coûts d'appui pour l'agence principale (\$US) | 451 611 * | 0 | 41 250 | 0 | 11 250 | 0 | 504 111 |
| 2.3 | Financement convenu pour l'agence de coopération (PNUE) (\$US) | 50 000 | 0 | 50 000 | 0 | 0 | 0 | 100 000 |
| 2.4 | Coûts d'appui pour l'agence de coopération (\$US) | 6 500 | 0 | 6 500 | 0 | 0 | 0 | 13 000 |
| 3.1 | Total du financement convenu (\$US) | 6 071 483 | 0 | 600 000 | 0 | 150 000 | 0 | 6 821 483 |
| 3.2 | Total des coûts d'appui (\$US) | 458 111 | 0 | 47 750 | 0 | 11 250 | 0 | 517 111 |
| 3.3 | Total des coûts convenus (\$US) | 6 529 594 | 0 | 647 750 | 0 | 161 250 | 0 | 7 338 594 |
| 4.1.1 | Élimination complète de HCFC-22 à réaliser en vertu de l'Accord (tonnes PAO) | | | | | | | 15,17 |
| 4.1.2 | Élimination de HCFC-22 à réaliser dans le cadre de projets approuvés précédemment (tonnes PAO) | | | | | | | 9,82 |
| 4.1.3 | Consommation restante admissible de HCFC-22 | | | | | | | 46,10 |
| 4.2.1 | Élimination complète de HCFC-141b à réaliser en vertu du présent accord (tonnes PAO) | | | | | | | 7,72 |
| 4.2.2 | Élimination de HCFC-141b à réaliser dans des projets approuvés précédemment (tonnes PAO) | | | | | | | 46,20 |

| Ligne | Détails | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Total |
|--------------|--|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| 4.2.3 | Consommation restante admissible de HCFC-141b (tonnes PAO) | | | | | | | 97,82 |
| 4.3.1 | Élimination complète de HCFC-123 à réaliser en vertu du présent accord (tonnes PAO) | | | | | | | 0 |
| 4.3.2 | Élimination de HCFC-123 à réaliser dans des projets approuvés précédemment (tonnes PAO) | | | | | | | 0 |
| 4.3.3 | Consommation restante admissible de HCFC-123 (tonnes PAO) | | | | | | | 2,21 |
| 4.4.1 | Élimination complète de HCFC-142b à réaliser en vertu du présent accord (tonnes PAO) | | | | | | | 0 |
| 4.4.2 | Élimination de HCFC-142b à réaliser dans des projets approuvés précédemment (tonnes PAO) | | | | | | | 0 |
| 4.4.3 | Consommation restante admissible de HCFC-142b (tonnes PAO) | | | | | | | 0,49 |
| 4.5.1 | Élimination complète de HCFC-124 à réaliser en vertu du présent accord (tonnes PAO) | | | | | | | 0 |
| 4.5.2 | Élimination de HCFC-124 à réaliser dans des projets approuvés précédemment (tonnes PAO) | | | | | | | 0 |
| 4.5.3 | Consommation restante admissible de HCFC-124 (tonnes PAO) | | | | | | | 0,04 |

*Un montant de 5 621 483 \$US plus frais d'appui d'agence de 421 611 \$US pour le PNUD a été approuvé lors de la 60^{ème} réunion pour l'élimination des HCFC utilisés dans la production de mousses rigides isolantes en polyuréthane dans le sous-secteur de la réfrigération domestique.



Project Document

Government of Colombia

United Nations Development Programme

Funded by the Multilateral Fund (MLF) for the Implementation of the Montreal Protocol

**Demonstration Project on “End of Life” ODS Management and
Destruction**

March 2012

COUNTRY: Colombia **IMPLEMENTING AGENCY:** UNDP
PROJECT TITLE: Demonstration Project on End of Life ODS Management and Destruction

PROJECT IN CURRENT BUSINESS PLAN: Yes
SECTOR: ODS-Waste
Sub-Sector: Refrigeration Servicing Sector

PROJECT IMPACT (ODP targeted): 114 Tonnes/year of CFC-12

PROJECT DURATION: 36 months
PROJECT COSTS: US\$ 2,750,000

LOCAL OWNERSHIP: 100 %
EXPORT COMPONENT: 0 %

REQUESTED MLF GRANT: US\$1,195,000
IMPLEMENTING AGENCY SUPPORT COST: US\$ 89,625 (7.5 %)
TOTAL COST OF PROJECT TO MLF: US\$ 1,284,625

COST-EFFECTIVENESS: 11.26 US\$ /kg ODS (metric) based on complete destruction of currently available end of life (EOL) ODS stocks in Colombia (15 Tons), and an anticipated 65 Tons of CFC-11 and 34 Tons of CFC-12 recovered over the first two years of implementation of the national refrigerator replacement program undertaken in accordance with WEEE legislation now being enacted. An annual estimated destruction rate of 56 Tons of CFC-11 and 29 tons of CFC-12 is projected beyond the project life.

PROJECT MONITORING MILESTONES: Included
NATIONAL COORDINATING AGENCY: Ozone Technical Unit (UTO) within the Division of Sectorial and Urban Environmental Affairs in the Ministry of Environment and Sustainable Development (MADS)

Brief Description.

The Ozone Technical Office of the Ministry of Environment and Sustainable Development in collaboration with UNDP has developed a project to demonstrate the environmentally sound, efficient and cost effective disposal of ODS refrigerants and blowing agents recovered from early retired refrigerators, from the servicing sectors and from some of the MLF investment and demonstration projects as part of broader national programs related to energy efficiency and the sustainable management of hazardous wastes and WEEE.

The project utilizes an existing stock of “end of life” ODS to qualify three domestic, modern, high temperature hazardous waste temperature incineration facilities to international standards. The project covers both the destruction of CFC-12 refrigerant and CFC-11 blowing agent, the latter in both pure form and contained in PU foam. Under the project, these facilities, as qualified, will destroy a more substantial quantity of EOL ODS that will be generated during the start phase of the above refrigerator replacement program now starting implementation. The

option of demonstrating destruction capability on such domestic facilities has been selected on the basis of it being the most cost effective route for Colombia relative other options available.

In terms of overall global demonstration value, the project offers a cost effect demonstration of what a middle income, industrializing Article 5 country can practically achieve in relation to EOL ODS destruction by integrating it into broader hazardous waste and WEEE management programs and energy efficiency initiatives while capitalizing on emerging domestic environmental management capability. It will also serves to demonstrate synergy with other multi-lateral international programs particularly management of POPs stockpiles and wastes, and contributes to the knowledge base on current issues under discussion by TEAP.

1. INTRODUCTION AND BACKGROUND.

In recent years it has become generally recognized that a significant bank of ODS remains in use, mainly as refrigerants and in foams, and that this ODS will be subject to atmospheric release at some point at the end of its useful life. As a consequence, the Parties to the Montreal Protocol have directed attention to the issue, particularly in developing countries where the major remaining banks of high ODP ODS (i.e. CFCs and halons) remain. Under Decision XX/7¹, the Parties requested ExCom to consider supporting demonstration initiatives in Article 5 countries as well as requesting TEAP to update its earlier guidance on ODS destruction² as adopted by the Parties³. In recognition of this, ExCom Decision 58/17⁴ approved a set of interim guidelines for the funding of demonstration projects for the disposal of ODS and agreed that the Multi-lateral Fund (MLF) will fund demonstration projects. Preparation funding for a number of such projects, including the current project proposed in Colombia were subsequently approved at ExCom 59⁵ (ExCom Decision 59/19). TEAP has also updated its guidance on destruction requirements and approved technologies for ODS destruction with inclusion of a current Task Force Report in its most recent Progress Report⁶.

Currently, there are several demonstration projects under preparation or implementation worldwide using MLF funding. Additionally, it is understood that the Global Environmental Facility in its capacity as the financial mechanism for ODS in Countries with Economies in Transition (CEITs) is considering a parallel program on ODS destruction. Overall it is apparent that experience with a variety of ODS destruction technologies, program/business models will be accumulated over the next several years that can serve as a basis for future decision making and action on the issue by both countries and collectively by the Parties.

In this proposal, the Government of Colombia is requesting funding for a project to demonstrate and evaluate the safe disposal and environmentally sound destruction of “end of life” (EOL) ODS, the need for which is becoming increasingly apparent. Stocks of EOL ODS have begun to accumulate in the country from its now operational recovery, recycling and reclaim system and targeted phase out initiatives resulting in unused inventories and replaced refrigerant. The country’s aggressive regulatory efforts are now preventing the release of this material and it is accumulating in secure storage as a regulated hazardous waste, something that is anticipated to steadily increase. Of greater long term significance is the anticipated dramatic growth in the immediate future with implementation of a program replacing domestic refrigerators as part of adopted national programs related to energy efficiency and management of waste electrical and electronic equipment (WEEE). The absence of cost effective demonstrated destruction capability represents a significant gap in that process and a barrier to its implementation.

¹ Montreal Protocol Handbook (8th Edition, 2009), Page 90 - http://ozone.unep.org/Publications/MP_Handbook/MP-Handbook-2009.pdf

² TEAP Task Force on Destruction Technologies Report – 2002 (Volume 3b of 2002 TEAP Report) - http://ozone.unep.org/Assessment_Panels/TEAP/Reports/Other_Task_Force/TEAP02V3b.pdf

³ Montreal Protocol Handbook (8th Edition, 2009), Page 457-464 - http://ozone.unep.org/Publications/MP_Handbook/MP-Handbook-2009.pdf

⁴ <http://www.multilateralfund.org/sites/58th/Document%20Library2/1/5853.pdf>

⁵ <http://www.multilateralfund.org/sites/59/Document%20Library2/1/5959.pdf>

⁶ May 2011 TEAP Progress Report – P65,

http://ozone.unep.org/Assessment_Panels/TEAP/Reports/TEAP_Reports/TEAP_Progress_Report_May_2011.pdf

From the perspective of the MLF, ExCom and the Parties generally, the proposed project provides an opportunity within the overall global ODS destruction demonstration program to support the practical implementation of ODS destruction using existing domestic capacity as an integrated part of broader national environmental and sustainable development programs utilizing various economic instruments such as Extended Producer Responsibility (EPR) applied to a WEEE management program, energy efficiency incentives and potentially carbon financing, all undertaken in a medium size industrializing Article 5 country. The project will also serve to address several technical issues that have been raised in recent TEAP discussions and add to the technical knowledge base related to environmental performance requirements applied to ODS destruction. Finally, the project's timing affords an opportunity to achieve synergies with a Global Environmental Facility (GEF) project addressing elimination of PCB waste stockpiles and which would be implemented in parallel and under common institutional supervision.

2. PROJECT CONTEXT AND BACKGROUND

Colombia has been an active Party to the Montreal Protocol as an Article 5 country, having acceded to the Vienna Convention and Montreal Protocol in 1990 and 1993 respectively and subsequently to all amendments. Institutionally, the management of ODS issues within the government is assigned to the Division of Sectorial and Urban Environmental Affairs in the Ministry of Environment and Sustainable Development (MADS). Within the division, the Country maintains an Ozone Technical Unit (UTO) that has direct operational control responsibility for the ODS issue. The legislative and regulatory base developed and in force respecting ODS and the Montreal Protocol is summarized in Appendix 2.

Within the Division of Sectorial and Urban Environmental Affairs there are also units having responsibility for waste management generally and specifically hazardous waste which under Colombian legislation includes waste or EOL ODS. This institutional linkage is of importance to this project because it is coordinating national initiatives related to waste diversion, recycling and resource recovery including the planned WEEE program which includes refrigeration equipment, hence the capture and environmental sound management of refrigerants and foam plowing agents.

Since the mid 1990's but most aggressively since 2000, Colombia has been pursuing the phase out of Annex A and B substances, something that was achieved accordance with its obligations in 2010 for new consumption manufacturing applications, notably in domestic and commercial refrigeration, foam and solvent sectors. Similarly, Colombia has banned the imports of Methyl Bromide for non QPS purposes since 1996. The country has also developed a strong national refrigeration servicing sector operated by a network of well equipped technicians and private sector companies with 572 refrigerant recovery equipment sets distributed in recycling centers and 5 reclaim centers. The country is currently completing a number of Annex A and B substance final phase out initiatives including; i) a chiller demonstration project involving the elimination of CFC-11 at installations in the country in 2012-13; ii) Replacement of CFC-11 and CFC-12 at a medical aerosol manufacturer in Bogota (LABORATORIO CHALVER); and iii) elimination of CTC process agent used in Cali (QUIMPAC). Additionally, the country has also

initiated work on its HPMP with MLF support and anticipates an accelerated phase out program for HCFCs.

One consequence of the above work associated with Annex A and B ODS phase out all coupled with a strong regulatory control function is the generation of a stock of EOL ODS. The principal sources are: i) unusable CFC-12 and other HCFC and HFC based refrigerants from recycling and reclaim activities, noting that it is also anticipated that as the stocks of remaining CFC based equipment is retired, an excess of recovered higher purity material would also be generated; ii) residual inventories of ODS (typically CFC-11, and CFC-12) that remain after phase out or conversions to non-ODS technology; iii) stocks that may exist in closed or bankrupt enterprises; and iv) material confiscated by customs authorities. Colombian regulations require registration and monitoring of all such stocks under the authority of UTO within MADS. A summary of UTO's current inventory records of monitored EOL ODS (including some projected to be generated in 2012-13) is provided in Appendix 3. Of specific interest to this project as it will provide the test burn material used for demonstrating national destruction facilities is the current inventory of 5.7 t of CFC-12, and 4.1 t of CFC-11, along with an additional 4 t of CFC-11 that will be generated in 2012-2013 from a MLF financed chiller demonstrative replacement project currently under implementation.

However, the main rationale for the country to address the issue of EOL ODS is recognition that there remains substantial banks of ODS within operational equipment and products in the country, including priority banks of CFCs which would likely be released in the absence of a targeted effort to capture and destroy them. Additional incentives to address such banks and particularly those contained in refrigeration and air conditioning equipment arises because of the potential energy efficiency gains obtained by its accelerated replacement and by the avoided climate impacts obtained by both energy efficiency improvement and eliminating release of CFC-12 in particular due to its high GWP.

Interest in ODS Banks dates back to 2003-2004 when UTO coordinated a research project with the support of the domestic refrigerators manufacturers that are part of the National Businessmen Association of Colombia (Asociación Nacional de Empresarios de Colombia - ANDI), the National University of Colombia and University of Los Andes, with the objective of gathering the information on banks of CFC-based domestic refrigerators and the possibility of developing reverse manufacturing capability in the country. This was followed by research in 2004 on national capacities for ODS destruction done by the Ministry of Environment, and the National University. Two years later, the Energy and Mining Planning Office (UPME) of the Ministry of Mining and Energy hired a consultancy on energy consumption of air conditioners and domestic refrigerators in 4 Colombian cities. The latter led the identification of domestic refrigerator replacement as a core program of the national strategy of rational energy use (see below).

The physical processing of domestic refrigerators was piloted in 2008 in a four month project undertaken in Bogota and involving the replacement of a variety of operating CFC based domestic refrigerators of a variety of sizes, the manual extraction of refrigerant and foam, recycling of other material, and destruction of captured CFC-12 and CFC-11 containing foam. Participants included domestic refrigerator manufacturers and retailers, and waste management companies developing recycling and specialized capability, as well as MADS and UNDP. The

destruction of the CFC-12 was contracted for export destruction and the bagged foam was destroyed in a domestic commercial solid industrial waste incineration facility. The former has not yet been completed due to high cost and administrative barriers. The destruction of the foam, while successful operationally, did not involve any evaluation of destruction efficiency or emissions as a basis for qualification against international standards and specifically the applicable TEAP guidelines. Overall, this pilot project determined various parameters for use in the development of a large scale program, particularly things like representative CFC-12 and CFC-11 content, capture rates and indicative unit cost, as well as establishing the initial feasibility of using domestic incineration facilities at least for foam destruction and getting a better understanding of issues associated with export. A final substantial benefit is the interest created in developing this kind of business both among the producers and retailers of refrigeration equipment and among national waste management service providers, an number of whom are pursuing investment plans to establish commercial scale capacity as part of national waste diversion and materials recovery program implementation related to WEEE and hazardous waste streams under the framework policies described below.

On the basis of this initial work, the country has moved rapidly over the last several years on three related and coordinated policy initiatives now being implemented and which will result in generation of substantial amounts of EOL ODS requiring destruction.

- *Program for on the Rational and Efficient Use of Energy and Non-conventional Energy Sources:* The Ministry of Mining and Energy and its subsidiary bodies have been configuring the national framework program on energy efficiency and alternative energy sources. This has now been formulated into the 2010-2015 Indicative Action Plan of the Programme on the Rational and Efficient Use of Energy and Non-conventional Energy Sources that has been adopted as government policy in Resolution No. 180919 of June, 1st 2010. Within this framework, the substitution of domestic refrigerators has been identified as a priority activity given that initial studies have shown in a 20-year scenario analysis the savings on consumption would be of about 198 GWH per year. One specific project initiated within this framework is an Energy Efficiency Project in Buildings being undertaken with GEF funding and supported by the UNDP, a portion of which includes air conditioning and chiller conversions. Most recently (2011), a more detailed study was undertaken on steps for its implementation and specifically it's financing and is now serving as the basis for development of financial incentives that will support the replacement of old refrigeration equipment, particularly domestic refrigerators. The estimates of avoided GHG emissions emission over a ten year period through such program is 420,000 t CO₂ Eq. The schedule for implementation of an energy efficiency related financial incentive for refrigerator replacement is anticipated to be implemented in early 2013.
- *Environmental Policy for Integrated Hazardous Waste Management:* The Environmental Policy for the Integral Management of Hazardous Wastes was adopted in 2005. It sets out long term strategies based on the principles of integrated product life cycle management with the general objective is to prevent the generation of hazardous wastes and to promote the environmentally sound management of those being generated, with the purpose of minimizing the risks on human health and on the environment, thus contributing to sustainable development. The specific objectives of this Policy are: i) Preventing and

minimizing the generation of hazardous wastes; ii) Promoting the environmentally-safe management and handling of hazardous wastes; and iii) Implementing the commitments of the International Conventions ratified by the country, related with hazardous substances and wastes. This third objective refers to the harmonization, cooperation and application of strategies and actions towards complying with the implementation of the National Application Plan of the Stockholm Convention and the Phase Out Plan for Ozone Depleting Substances – ODS and their wastes according to the Montreal Protocol. In the Action Plan of the Policy, a goal for the period 2006-2018 has been established that would to achieve 40% elimination of hazardous wastes that are a priority under the international commitments (including ODS) with a current year goal having a program for the management and final disposal of ODS wastes. One concrete result of this policy generally has been the recent development of modern rotary kiln high temperature incineration facilities in the last several years, something that now provides a domestic option for destruction of EOL ODS chemicals, subject to their qualification to international standards.

- National Policy on Waste Electrical and Electronic Equipment (WEEE): Division of Sectorial and Urban Environmental Affairs in MADS has been developing a policy and Action Plan on WEEE management since 2006. Previous work includes pilot studies such as described above for domestic refrigerators, as well as expanding programs on collection of cellular telephones, computers and other electronic equipment. The centre piece program under this policy is the early retirement of older domestic/commercial refrigeration and air conditioning equipment with a specific focus on domestic refrigerators that used CFC-11 and 12. The program will be funded at least in part by a national Extended Producer Responsibility (EPR) mechanism covering subsidized replacement with higher efficiency/non-ODS replacement equipment as well as the costs of collection, processing, and environmentally sound waste management of the resulting materials including destruction of refrigerant and foam. This policy has been formally approved by the government and the legislative basis for its implementation is currently before the national parliament. In parallel, the necessary regulatory and administrative measures for its implementation are under development. The schedule for the start up of the program is early 2013 with its full operation by 2015.

The above developments has resulted in the adoption of a national target of replacing 2.6 million CFC based domestic refrigerators over a ten year period beginning in 2013. Based on the data obtained in the 2008 pilot project this quantity of equipment is estimated to contain approximately 1,165 t of CFCs (420 t of CFC-12, 745 t of CFC-11)⁷. It is assumed that 300,000 units would be processed during a two year start up period (2013-2015) which would contain 134 t of CFC-11 and CFC -12. For purposes of estimating ODS destruction capacity the requirements based on conservative recovery efficiencies for manually extracted CFC-12 and CFC-11 containing foam⁸ would result in a 10 years requirement to destroy 294 t of CFC-12, 10,640 t of CFC-11 containing foam (resulting in destruction of 560 t of CFC-11). For purposes of this project that would just cover the first two years, the material that could be destroyed

⁷ Estimate based on data collected during 2008 trial processing with a representative unit containing 0.161 kg CFC-12, 4.092 kg of foam and at 7% retained blowing agent content, 0.286 kg CFC-11

⁸ Calculations based on a 70% recovery rate for CFC-12 using convention servicing equipment and a 75% recovery rate for CFC-11 using manual dismantling and foam removal. Recovery rates approaching 95% are achievable with more sophisticated extraction technology which might ultimately be justified.

would be 34 t of CFC-12, and 1,228 t of CFC-11 containing foam (effective destruction of 65 t of CFC-11).

Other preparatory work relating to the proposed project involved assessing the various options in terms of processing and EOL destruction technologies that might be available to support the national requirements as anticipated under the above initiatives. The following summarizes the results of this work as inputs to the project design and scope:

- Options for Refrigerator Disassembly and EOL ODS Recovery: Two generic options for refrigerator disassembly have been identified and assessed, manual dismantling and automated reverse manufacturing facilities.
 - a) Manual dismantling: This would involve the following main steps: i) extraction of refrigerant into ODS containers and compressor oil; ii) removal of the compressor, refrigeration piping for metals recovery; iii) separation of plastic door and cabinet liners; and iv) separation of PU foam from the metal door and cabinet panels with PU foam placed in bags. This process can be organized with various levels of sophistication in terms of an assembly line type operation to increase throughput and efficiency. It can also be tailored in terms of scale depending on the location and quantity available within an economic distance. As such, the country could be served by a number of such operations that might handle from a few thousand units per year in remote areas to up to 50,000 units per year in urban areas with the latter likely justifying more sophisticated CFC-12 extraction technology that would achieve >95% recovery efficiency rather than the basic refrigeration servicing equipment used in such operations. A number of interested contractors currently established in the waste management and scrap recycling business have expressed interest in such operations, often as physical extensions of their present operations that provide basic infrastructure and labor capacity. The process is labor intensive but can utilize relatively unskilled workers except for a requirement for qualified technicians handling refrigerant extraction. In environmental terms, the main limitation is the lower CFC-12 recovery efficiencies achieved in rapid excavation with conventional equipment, and loss of foam blowing agent that will occur during its manual removal. It is generally assumed that this would be approximately 25% of the originally retained volume. The initial capital investment entry barrier is low and suited to incremental development as the demand grows with developing programs. Based on initial experience from potential contractors undertaking this work for warranty and specialized product stewardship programs in Colombia, typical unit costs for manual disassembly and capture of refrigerant in cylinders and bagged foam is estimated to be US\$3.5 to 4.0 per unit. Somewhat lower costs would be anticipated for larger operations.
 - b) Reverse Manufacturing Facility: The second option examined was development of a reverse manufacturing facility specifically designed for refrigerators. These are commercially operated in some Western European countries, on a limited basis in North America, and are under development in several larger developing countries. Two such facilities have been commissioned in Brazil using bilateral capital funding but are not yet in commercial operation. As in manual dismantling these facilities manually extract refrigerant and compressor oils although in a production line setting and with

extraction/condensing equipment that facilitates rapid degassing of the complete refrigeration circuit. They then shred the remaining intact unit in a sealed environment and separate the metals, plastic, and PU foam solid fractions in a form available for sale into the recycled materials market. The emitted foam blowing agent is captured and condensed for containment and subsequent destruction with in excess of 95% capture efficiency. Some suppliers include destruction using a thermal process as an option that can be added to the facility. Estimating quotations applicable to Columbia for units of 300,000 and 400,000 units/year require base equipment investment of US\$4.4 and 4.9 million respectively exclusive of land, services, buildings, foundations and overall site infrastructure. An overall cost of US\$21/unit would be applicable to such facilities operating at full capacity, excluding any revenues obtained from recovered material sales. Estimates at comparable facilities developed in Brazil – provided by these operators - were in the range of US\$14/unit as a comparison.

The overall conclusion of this work was that, while ultimately Colombia may be able to sustain an automated reverse manufacturing facility this would not be justified at least during the start up of the refrigerator replacement program envisioned. It is recognized that there will be a start up period for the program where volumes of refrigerators collected will increase step by step, reaching a steady state level of 250,000-300,000 units per year over a two to three year period. However to make the level of investment required for economically scaled reverse manufacturing facilities, enterprises would have to have some assurance that these levels will be achieved and when. In that regard, the project has been following up the advances occurring in Brazil in this regard. In summary, the analysis undertaken suggests that it is advisable to take an incremental approach to investment in refrigeration equipment processing technology starting with manual operations scaled to local and region generation rates, while looking forward to capitalizing on the economies and higher environmental benefit efficiencies of more sophisticated CFC-12 extraction equipment first, and then if warranted modern automated reverse manufacturing technology. .

- Options for EOL ODS destruction: The various strategic and technology options for destruction of EOL ODS including CFC-11 containing foam have been reviewed as a basis for developing the project design and its detailed scope. In general, the menu of available technological options that would meet the destruction performance requirements set out by the Montreal Protocol is well known. These have been reviewed in the previous referenced TEAP documentation adopted by the Parties, including the most recent update in 2010 where a number of new innovative but as yet fully commercialized technologies were considered. Similarly, both the Basel Convention⁹ and the GEF Scientific and Technical Assessment Panel (STAP)¹⁰ have issued guidance documents on the selection of destruction technology for POPs which also provide relevant information given the similarities in requirements for environmentally sound destruction of chlorinated chemical wastes, including both so-called combustion and non-combustion technologies. Overall the strategic options considered for this project were: i) export to qualified facilities in countries party to the Basel Convention; ii) the development of new national facilities using imported technologies; and iii) utilization

⁹ <http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/techguid/tg-POPs.pdf>

¹⁰ http://www.unep.org/stap/Portals/61/pubs/POPs_Disposal_Final_low.pdf

of existing national hazardous and industrial waste management capacity that could potentially be qualified to international standards. Each of these is discussed below.

- a) Export to qualified hazardous waste management facilities: This option would essentially be applicable to the actual chemicals under the assumption that the cost of bulk export of any significant quantities of CFC-11 containing foam would be prohibitive. The export options considered available to Colombia are North America and Europe, noting that the United States status as a non-party to the Basel convention limits consideration of that destination directly. Facilities qualified and experienced in destroying EOL ODS exist in Mexico, the United States and Canada. These primarily employ high temperature incineration (HTI) although commercial plasma arc facilities employing PLASCON technology operate in Mexico and the United States. In Europe, to date HTI is the main available commercial option with a number of facilities existing that have destroyed EOL ODS. As part of the preparation work for this project, Colombia has initiated export of a small trial quantity of CFC-12 from the 2008 refrigerator processing trial to Finland for incineration. In general, facility gate market prices for EOL ODS destruction with HTI in North America range from approximately US\$1.5/kg to US\$3.0/kg and essentially mirror the market pricing for non-flammable halogenated waste. Destruction with plasma arc technology is reported to be somewhat higher. The European market is generally more expensive with gate destruction costs ranging from US\$4-5/kg, although recent trends have shown that pricing in the general hazardous waste market in Europe to be dropping. Current pricing for POPs shipped from Eastern Europe is in the range of US\$1.5-2.0/kg. It should be noted that all of these costs exclude Basel Convention transaction, local administration/supervision, local handling and sea container transportation. Based on quotations from the UNDP demonstration project in Ghana (overall destruction cost of US\$12.3/kg), reasonable estimates of these would be US\$6/kg including US\$3/kg for transportation and US\$1/kg transaction costs for Basel documentation into the EU. Colombian experience for export of CFC-12 from its pilot program was US\$11-12/k inclusive of transportation and transaction costs.
- b) Development of new national facilities using imported technologies: The option of developing specialized facilities for destruction of EOL ODS has been evaluated, as well as consideration of possible utilization of such facilities for POPs as well. The two technologies evaluated were the Asada Plasma X unit and a PLASCON unit. The Asada unit with a capital cost of US\$156,000 (excluding supporting infrastructure and permitting costs) and estimated annual operating cost of approximately US\$30,000/year to destroy under 3 t of CFC-12/year was considered both prohibitively expensive (Estimated as US\$22.8-25.9/kg) and inadequate in terms of capacity for Colombia's requirements. The PLASCON unit evaluated had a capacity of approximately 200 t/year (80 kg/hr feed rate) and was quoted with a basic capital cost of US\$2.1 million excluding transportation from Australia, supporting infrastructure and permitting costs, An overall unit cost range of US\$10.3-18.5/kg is estimated for this technology, noting that a cost of US\$6.5/kg in Australia would apply at an operating commercial facility there. The assessment concluded that development of this technology in Colombia exclusively for EOL ODS destruction would not be viable as it was relatively high cost and oversized for the national requirement. However, it could be a fall back option under certain

conditions, namely it could also serve to destroy POPs and other priority high risk chemical wastes, and if less expensive qualified options were not available, specifically export and use of existing domestic facilities if qualified.

- c) *Utilization of existing national hazardous and industrial waste management capacity:* This option involved re-examining the potential for existing domestic incineration facilities to be qualified to international standards, specifically those that could potentially be qualified to international standards as referenced above. This involved review of the present permitting and qualification protocols and standards in force in Colombia as applied to hazardous waste thermal treatment/incineration facilities as well as identify these facilities subject to this legislation and permitting process. The specific regulatory requirements in force under the Ministry of Environment and Sustainable Development that apply are as follows:
- i) DECRETO NUMERO 4741(30 DIC 2005), “*Por el cual se reglamenta parcialmente la prevención y el manejo de los residuos o desechos peligrosos generados en el marco de la gestión integral*”: This is the national hazardous waste regulatory act and provide for the environmental sound management of hazardous waste. In general it is a comprehensive document fully aligned and comparable to similar legislation in OECD countries.
 - ii) RESOLUCIÓN NÚMERO (909), “*Por la cual se establecen las normas y estándares de emisión admisibles de contaminantes a la atmósfera por fuentes fijas y se dictan otras disposiciones*”, 5 de junio de 2008: This is the principle regulatory document covering air emissions for fixed sources and generally applies emission standards generally equivalent to US Clean Air Act standards. Chapter VII provides for an environmental license and environmental management plan. Chapter XII applies specifically to emissions from hazardous waste disposal in thermal treatment facilities, specifically incineration and cement kilns. It requires a supervised test burn on each hazardous was aggregate processed as a condition of permitting and inclusion of an operating continuous monitoring and recording system. Minimum operating conditions and air emission limits are also specified for both hazardous waste incinerators and cement kilns. These are summarized in Appendix 3. These generally meet or exceed those applied in North American and EU standards as well as the Basel, GEF STAP and TEAP destruction guidance standards. Of particular relevance is the universal adoption of the 0.1 ng ITEQ/Nm³ requirement in 2012. This exceeds the current TEAP limit of 0.2 ng ITEQ/Nm³ and is the same as that generally adopted in the other standards and guidance referenced.
 - iii) “*PROTOCOLO PARA EL CONTROL Y VIGILANCIA DE LA CONTAMINACIÓN ATMOSFÉRICA GENERADA POR FUENTES FIJAS (Protocol for Control and Surveillance against the Atmospheric Contamination Generated by Stationary Sources)*”, Versión 2.0, OCTUBRE DE 2010 – This document sets out the monitoring and reporting requirements for stationary source air emissions and in Chapter 8, specifically sets out the procedural requirements applicable to the test burns required of hazardous waste

incineration/thermal treatment facilities specified in RESOLUCIÓN NÚMERO (909) above. This effectively provides the national baseline requirement for developing test burn specifications that would qualify facilities for EOL ODS destruction. It also defines the basic destruction performance requirement in the form of target destruction removal efficiency (DRE). This is set at 99.99%, a level lower than typically applied to chlorinated hazardous waste in OECD countries and the Basel and GEF STAP guidance documents (typically 99.9999%) but is consistent with the requirement in the TEAP guidance adopted by the Montreal Protocol.

In terms of available facilities in Colombia for the destruction of hazardous and industrial waste, there are 45 installations that are permitted or being permitted. This includes incineration facilities and cement kilns involved or considering waste co-disposal. The incineration facilities range from medical waste incinerators of various sizes, basic fixed hearth and vertical chamber industrial incineration facilities through to several modern rotary kiln incinerators recently commissioned to respond to the growing demand created by the increasingly strict national regulation of hazardous waste as well as the country's rapid industrialization. Screening of these facilities and their permitting status suggested that four facilities would potentially be capable of consideration for EOL ODS, two of which are operated by the same national hazardous waste management company. These are:

- i) **TECNIAMSA S.A – Barranquilla:** This facility was commissioned in 2010 as part of an integrated hazardous waste management facility including a modern engineered hazardous waste landfill. It is located in a rural setting approximately 20 km from the port city of Barranquilla on the Caribbean coast. Overall the incineration facility contains all the current technology including a rotary kiln primary combustion chamber, high temperature secondary combustion chamber stack quenching unit and sequence semi-dry wet scrubbers and bag house filters, as well as continuous air emission monitoring and a modern automated control system. The rated capacity is 1,000 kg/hour but is planned to be able to double capacity by addition of a second rotary kiln. The facility currently handles liquid and solid waste with a dual feed system. It could be readily modified with an additional injection port for gaseous waste stream such as CFC-12 as released from pressurized cylinders. The facility is currently restricted in waste chlorine content but intends to extend its test burn qualification menu to include halogenated wastes with a potential interest in destruction of POPs (specifically PCBs). Test burn and regular testing done twice per year on current waste streams indicates very low PCDD/F emission levels (0.0005 ng- ITEQ/Nm³) suggesting that it would have good potential to handle higher chlorine content waste.
- ii) **TECNIAMSA S.A – Bogota:** This facility, located in an industrial area outside of Bogota, was commissioned in late 2011 is essentially the same technically as the facility described above in Barranquilla including capacity and licensing conditions, including classes of halogenated chemical wastes although not

including ODS. Given the recent commissioning of the facility full test burn qualifications are not yet completed, including for PCCD/F emissions. However, a reasonable expectation would be that it would have comparable performance to the Barranquilla facility.

- iii) **Protección Servicios Ambientales Rellenos de Colombia S.A. ESP - PROSARC S.A. ESP:** This is a rotary kiln incineration facility located in Mosquera, Cundinamarca municipality which has been used to dispose of PU foam extracted from the pilot refrigerator replacement and processing project. The facility was established in 2006 for the handling and treatment of organic and inorganic hazardous waste. It has a single rotary kiln commissioned in 2010 with a capacity of 500 kg/hour equipped with a secondary combustion chamber and basic air pollution control system. It handles a wide range of waste ranging from medical waste to various industrial and consumer waste streams. It has limited experience with halogenated wastes. The most recent test burn results indicated PCCD/F emissions of 0.48 ng/m³ which exceed limits to be in force in mid 2012 and which would qualify the facility for EOL ODS destruction. However, the facility indicates that this will be improved.
- iv) **HOLCIM Colombia S.A.(Eco Procesamiento Ltda):** Holcim Colombia S.A operates a large modern cement kiln located at Nobsa. The facility reflects current dry process technology and air pollution control facilities, and is generally viewed as the best facility in the country. Through a subsidiary involved in acquiring waste (Eco Procesamiento Ltda), they have been working with MADS on processing various wastes for a number of years, and have attempted to destroy various hazardous waste streams including PCBs and POPs pesticides. While technically this was likely feasible, they have dropped that direction due to public resistance. Subsequently they had expressed interest in processing EOL ODS, specifically PU foam wastes. However, the main limitation in relation to this is the inefficiency of handling and injecting a relatively small quantity of bulky low mass material into a facility of this scale. Consideration was also given to disposing of CFC-12 which likewise would likely be technically feasible but the capital investment to install the necessary injection ports and burners could only be justified on the small volumes involved if there was a viable carbon crediting or offset mechanism they could utilize corporately within the company's global system. This continues to be investigated but would not be available as an option to the current project.

Therefore, Colombia has a well established mature legal and regulatory system for the management of hazardous waste. The requirements and procedures in place and enforced by institutions and technical capability are generally aligned with those in developed countries. Similarly, the country has a rapidly developing and capable waste management service provider base that is investing in modern capability, both in the collection and handling of hazardous waste and in its environmental sound processing, treatment and disposal. In particular, it now has several thermal treatment and destruction facilities that should be capable of undertaking the destruction of EOL ODS. Subject to demonstration of this capability in accordance with

international standards, utilization of domestic destruction capability should be more cost effective than alternatives of export to qualified facilities elsewhere, or developing new purpose built facilities with alternative technologies.

In summary, Colombia is moving rapidly to implement the policy, regulatory and financial mechanisms that will to capture a substantial quantity of CFC based equipment subject to early replacement. It has piloted their processing up to the capture of the EOL ODS in the form of extracted CFC-12 and manually removed foam. Substantial interest exists among private sector waste management contractors already undertaking this kind of work as part of warranty and commercial refrigeration equipment replacements undertaken directly by equipment manufacturers and beverage producers. Subject to evolving global experience, and the program reaching the necessary economies of scale, it is anticipated that in the longer term one or more of these firms will incrementally invest in higher efficiency and potentially automated reverse manufacturing technology to maximize recovery of EOL ODS.

At present, the remaining gap in the operational capability needed to support the program is the identification of a cost effective and environmentally sound means to destroy the substantial quantities of EOL ODS, particularly high global impact CFCs. In fact, this represents a major current barrier to implementation of the refrigeration replacement programs that now have policy commitment and are developing the necessary financing mechanisms. The proposed project described below is designed to fill this gap.

3. PROJECT OBJECTIVES AND DESIGN

The overall project objective is to put in place a sustainable, environmentally sound and affordable capability for Colombia to destroy the “end of life” ODS that it is accumulating and which will rapidly increase with current policy energy efficiency and waste management initiatives involving the replacement of CFC based domestic refrigerators. Other objectives are to: i) integrate the management of EOL ODS into the countries overall hazardous waste management system; ii) to enhance synergies with initiatives related to meeting national obligations under the Stockholm Convention respecting the destruction of POPs stockpiles; iii) contribute to the technical knowledge base on destruction and environmental performance of technologies accessible to developing countries; and iv) demonstrate how a developing country can develop national capability to manage EOL ODS for broader replication as appropriate.

The proposed project design is based on the use of MLF funding to support the qualification of three domestic incineration facilities for the destruction of EOL CFC-12, CFC-11 and CFC-11 containing PU foam.

The strategic selection of existing domestic incineration facilities as the basis for the project is based on the extensive project preparation investigations of various options described above. While both export and development of purpose-built facilities, specifically those employing plasma arc technology, constitute options that are technically viable options, both are assessed as involving significantly higher unit costs for destruction than should be achievable by employing qualified domestic hazardous incineration facilities. Export to Europe or North America would be in the range of US\$10-12/kg. Plasma arc facilities installed in Colombia are estimated to involve costs in the range of US\$18-25/kg with scale limitations in relation to national requirements. However, it was concluded that the PLASCON technology package could be an option in the longer term in the context of its possible integration with a reverse manufacturing facility but also for use with other difficult to destroy liquid and gaseous hazardous waste. For this reason, some technical assistance funding is proposed to pursue more detailed evaluation of this option in support of the incremental development process.

In strategic terms, the election to demonstrate domestic options is also based in part on a policy position to avoid waste exports if possible given the country’s policy of banning imports. The development of environmentally sound waste destruction capability is also generally consistent with the country’s industrial infrastructure strategy and most immediately supports national management of persistent organic pollutants (POPs). The latter would be fostered by ensuring the close integration of this project with the current GEF PCB management project being coordinated within a common institutional structure and potentially utilizing the knowledge base developed in the qualification of domestic destruction facilities to further achieving the objectives of both the Montreal Protocol and the Stockholm Convention.

The rationale behind qualifying destruction capability for both for CFC-11 containing foam and recovered CFC-11 in liquid form is so that two options are covered given the overall incremental approach adopted for developing domestic EOL ODS destruction capability. Recognizing the capital investment and cost barriers as well as risks in going directly to sophisticated reverse manufacturing capacity elsewhere, it is prudent to start off with a manual process that can be

incrementally scaled up as supply develops, notwithstanding the penalties in ODS recovery efficiency. The latter will be partially offset by provision in the project for introduction of more sophisticated high efficiency CFC-12 refrigerant recovery equipment employing de-gassing capability as refrigerator processing volumes increase. The pre-qualification of CFC-11 liquids serves to remove a possible barrier to the eventual investment in such high efficiency capability when economies of scale and financing mechanisms (particularly carbon finance) are in place. This incremental project design strategy should serve as useful and practical demonstration for broader replication elsewhere.

The qualification of the existing domestic incineration facilities will be accomplished through undertaking comprehensive test burns on not less than 5 t of each of these waste streams at least one facility. The required CFC-12 and CFC-11 as summarized in Tables 1 and 2 below currently exists and is under the regulatory control of the UTO. MLF funding will not cover the collection of this material, but rather only the centralized consolidation, storage, characterization and transport. Likewise, the CFC-11 containing foam used will have already been collected at metal scrap enterprises processing scrapped domestic refrigerators and MLF funding will support its extraction, storage, characterization and transport for destruction through arrangements with these enterprises. . In its second phase based on the qualification results, the project will then cover the destruction of CFC-12 and CFC-11 containing foam to be manually recovered from the initial 300,000 domestic refrigerators generated by the appliance replacement program. This will involve the destruction of an estimated 34 t of CFC-12, and 1,228 t of CFC-11 containing foam (effective destruction of 65 t of CFC-11). The project will also support the incremental development of key institutional and technical capacity through technical assistance related to regulatory measures, the practical implementation of the EPR and energy efficiency based financing mechanisms and potential future technology selection that could be introduced to optimize EOL ODS destruction efficiency when the refrigerator replacement program offers appropriate economies of scale. Provision is also made for development of a summary technical report reflecting the project's results, comparative analysis with other global experience and recommendations for use by ExCom and the Parties in advancing and replicating this experience.

As elaborated in more detail in Section 5 below, the project complies with the criteria established by Decision 58/19 and involves aspects that are not necessarily addressed by other pilot projects approved by ExCom. As such it should be of significant value in the broader context of demonstrating practical aspects of implementing a sustainable EOL ODS destruction program in comparable in Article 5 countries generally. More specifically the project includes the following features that should be of broader demonstration value:

- Provides an example of the ability of a country to manage its own EOL ODS issues on a cost effective basis without relying on export
- Develops an incremental approach to developing EOL capture and destruction capacity by utilizing and qualifying facilities and service providers in a manner that recognizes the need for intermediate steps involving manual processes and lower efficiency destruction capability for foam before implementation of highly sophisticated technologies for reverse manufacturing and destruction capability will be affordable or sustainable.
- Demonstrates the integration of EOL ODS management into a broader WEEE management program in a industrializing middle income Article 5 country such that it is

mainstreamed with both current global and developed country policy approaches to life cycle waste management generally and energy efficiency/carbon foot print reduction.

- Fosters synergies with Stockholm Convention by undertaking its implementation in close coordination with a current GEF Chemicals Focal area project managing national PCB waste stockpiles and contaminated sites such that common standard and methodologies for globally significant chemical wastes destruction are demonstrated and established, with associated economies of scale and a common service provider base.
- Inform current discussions within the TEAP ODS Destruction Task Force as reflected in the most recent TEAP ODS Destruction Task Force report referenced above regarding the equivalency of these two parameters used in assessing environmental performance of organic waste destruction facilities generally.
- Directly captures and destroys all currently available EOL ODS stocks including those directly resulting from other MLF funded ODS phase out projects which incorporated mandatory care and custody provisions for ODS that was being phase out (i.e. in refrigeration servicing, MDI and chiller projects).

The tables 1 and 2 show the summary of available and/or potential available EOL CFCs for destruction. Detailed information about sources can be found in the Appendices 3.

Table 1: Summary of Available and Potentially Available End of Life CFC-12 for Destruction Demonstration (kg)

| | |
|--|--------------|
| CFC-12 and CFC-12 mixtures Totals | 5,674 |
| Available immediately | 5,674 |

Table 2: Summary of Available and Potentially Available End of Life CFC-11 for Destruction Demonstration (kg)

| | |
|------------------------------|--------------|
| CFC-11 Totals | 8,120 |
| Immediately Available | 1,823 |
| Availability being confirmed | 2,297 |
| Availability – end of 2012 | 900 |
| Availability –end of 2013 | 3,100 |

4. PROJECT DESCRIPTION

The proposed project described below has been structured into three components. Component 1 (ODS Destruction Demonstration), Component 2 (Technical Assistance) and Component 3 (Project Management, Monitoring and Evaluation). Within each, a number of sub-components and discrete activities have been defined. These are summarized to the sub-component level with proposed financing and timing in Table 3 below. A more detailed and elaborated project framework matrix listing activities is provided in Appendix 5 and detailed schedule in Appendix 6. The following provides a detailed project description by Component, Sub-Component and Activity.

Component 1 – ODS Destruction Demonstration: This is the project's main component and covers the actual destruction demonstration work. The proposed activities are staged. The first stage (Sub-components 1.1 and 1.2) involve the assembly/consolidation/characterization of EOL ODS for the test burns, inclusive of current stocks of CFC-11 and CFC-12 (Tables 1 and 2 above), as well as extraction of sufficient CFC-containing foam from previously collected refrigerator carcasses at two or potentially three larger metal scrap yards. This would occur over a nine month period starting in mid 2012. The second stage (Sub-components 1.3 and 1.4) is the actual monitored test burns involving pre characterized packages of at least 5 t of material at up to three domestic rotary kiln hazardous waste facilities. This would be undertaken throughout 2013 with preparatory work in late 2012. The third stage Sub-Component 1.5) is the use of those facilities qualified to destroy the CFC-12 (estimated 34 t) and CFC-11 containing foam (estimated 1,228 t) derived from the first 300,000 refrigerators recovered in the start up phase of the national replacement program. The timing for this would be throughout 2014 and early 2015 as required. A more detailed description of each sub-component follows:

- *1.1 Consolidation/storage/characterization/transport of CFC-11 and CFC-12 EOL ODS:* As indicated in Tables 1 and 2 above the inventories of CFC-11 and 12 while secured under UTO regulatory control are widely distributed, of variable purity in some cases, and in relatively small containers for the most part. The activities in this sub-component cover the collection to centralized storage sites (not MLF funded), consolidating the material into larger containers (sizing anticipated to be at least 50 kg containers selected for compatibility with onward transport and incineration feed infrastructure), its characterization as to CFC content and contaminants, secure storage, and ultimately transportation to the test burn sites. It is envisioned that four centralized sites based on current recycling and reclaim operations will be involved. The locations tentatively selected are Bogotá, Medellín, Cali and Barranquilla which offer good national geographical and demographic coverage, and would likely be the locations where larger refrigeration dismantling capacity will develop. The initial collection stage up to the consolidation and storage sites will not be MLF funded but paid for by the current holders. In most cases this obligation is provided for as a condition of earlier CFC phase out project agreements requiring beneficiaries to be responsible for CFC stores. MLF grant funding is proposed for four sets of conventional refrigerant recover equipment (inclusive of tools, accessories and portable analyzers) and a quantity of larger multiple use cylinders and CFC-11 liquid containers with appropriate vapour locks and purging capability. The number will be determined based on compositions and suitability for transport and use at the incineration

Table3: Summary Project Framework and Cost Estimate

| Component/Sub-Component/Activity | ODS (kg) | Cost Estimate (US\$) | | | 2012 | | 2013 | | | | 2014 | | | | 2015 | |
|---|----------------|----------------------|------------------|------------------|------|----|------|----|----|----|------|----|----|----|------|----|
| | | MLF | Other | Total | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| Component 1: ODS Destruction Demonstration | | 830,000 | 1,235,000 | 2,065,000 | | | | | | | | | | | | |
| 1.1 Consolidation/storage/characterization/transport of CFC-11 and CFC-12 EOL ODS | | 100,000 | 50,000 | 150,000 | | | | | | | | | | | | |
| 1.2 Consolidation/storage/characterization/transport of CFC-11 containing Foam for test burn demonstrations | | 100,000 | - | 100,000 | | | | | | | | | | | | |
| 1.3 Test Burn demonstrations for CFC-11 and CFC-12 at a selected HW Incinerators | 13,767 | 250,000 | 165,000 | 415,000 | | | | | | | | | | | | |
| 1.4 Test Burn demonstration for CFC-11 containing foam at two selected Industrial/HW Incineration Facilities | 1,249 | 135,000 | 80,000 | 215,000 | | | | | | | | | | | | |
| 1.5 Destruction of EPR program start up volumes of CFC-12 and CFC-11 containing foams (Based on 300,000 units, 34 t CFC-12, 65 t CFC-11 in 1,228 t of foam) | 99,000 | 245,000 | 940,000 | 1,185,000 | | | | | | | | | | | | |
| Component 2.0 Technical Assistance | | 255,000 | 150,000 | 405,000 | | | | | | | | | | | | |
| 2.1 Legal and regulatory institutional TA | | 50,000 | 25,000 | 75,000 | | | | | | | | | | | | |
| 2.2 Technical/business planning support for EOL ODS Management under the EPR system | | 75,000 | 100,000 | 175,000 | | | | | | | | | | | | |
| 2.3 Public Consultation and Information | | 50,000 | 25,000 | 75,000 | | | | | | | | | | | | |
| 2.4 Technical Oversight and Overall Project Technical Report | | 80,000 | - | 80,000 | | | | | | | | | | | | |
| Component 3.0 Project Management/Monitoring/Evaluation | | 110,000 | 170,000 | 280,000 | | | | | | | | | | | | |
| 3.1 National Project Coordinator | | 60,000 | 60,000 | 120,000 | | | | | | | | | | | | |
| 3.2 Project office administration | | - | 60,000 | 60,000 | | | | | | | | | | | | |
| 3.3 Misc. contract services and travel | | 20,000 | 20,000 | 40,000 | | | | | | | | | | | | |
| 3.4 M&E costs | | 30,000 | 30,000 | 60,000 | | | | | | | | | | | | |
| Totals | 114,016 | 1,195,000 | 1,555,000 | 2,750,000 | | | | | | | | | | | | |

facilities. Finally, a specific activity is identified to document and report on the origin, tracking, and verification of all the EOL ODS in accordance with procedures suitable for use under an international carbon crediting system if that were to apply. These activities would start in Q2 2012 and be completed by Q1 2013,

- *1.2 Consolidation/storage/characterization/transport of CFC-11 containing Foam for test burn demonstrations:* At present no CFC-11 containing foam is available for a test burn but substantial amounts are included in white goods metal scrap being continuously processed for use in each of Colombia's electric arc steel plants. Operators of these plants and several larger scrap yards feeding these have agreed to include a contracted segregation operation of incoming material (prior to shredding) that would allow accumulation of enough material for the test burn. This would be a simple manual process of removing block PU foam from refrigeration equipment carcasses. Hand held screening detection equipment will be used to separate CFC-11 and HCFC-141b based PU foam and both will be bagged for storage. A target accumulation of at least 10 and preferably 15 t of bagged foam will be accumulated. This process will be contracted competitively, likely to one of the national waste management service providers with current experience manually dismantling refrigeration equipment working in cooperation with the scrap processing enterprises. MLF funding including transportation to the test burn incinerators and analytical costs is proposed recognizing the demonstration value of qualifying a destruction option for manually extracted ODS based PU foam as an important step in an incrementally developed EOL ODS capture and destruction system. It is anticipated that this work will be undertaken during a period from Q4 2012 through Q 2 2013
- *1.3 Test Burn demonstrations for CFC-11 and CFC-12 at selected HW Incinerators:* It is proposed to undertake test burns at the two new rotary kiln incineration facilities operated by TECNIAMSA, one for CFC-12 and one for CFC-11. The test burn process will be utilize the national regulatory requirements and protocols described above, supplemented by an international standard, likely as issued by USEPA^{11,12}. The initial activity will be technical assessment work undertaken jointly by an MLF funded consultant and the incinerator operator that will include a base line environmental audit of the facilities and current environmental management plan required under national regulations, development of a detailed test burn protocol and specification, and design for any modifications required for the test burn. A key part of this will be determination of an appropriate ODS feed rate and the waste stream to be co-disposed with ODS along with its compositional characterization.

In terms of facility modifications required, these are anticipated to be relatively minor as provided for in the ExCom Decision XX/7. For CFC-12 it will involve 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 CFC-11, modifications may involve either a dedicated feed system but more likely simply a connection into the existing liquid feed system and burner

¹¹ <http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/chap13.pdf>

¹² <http://www.epa.gov/osw/hazard/tsd/td/combust/pdfs/burn.pdf>

nozzle, although for purposes of the test burn and integrity of input measurement a dedicated feed tank, pump, metering system and flow controls will likely be required.

On each facility/ODS chemical combination, there will be a baseline test burn with the normal waste stream to be co-disposed, and then a test burn with the ODS. In each case, the monitoring protocol will be followed covering operating conditions (i.e. combustion chamber temperatures, estimated resident times, stack outlet temperatures), the standard menu of regulated emissions including PCDD/F as well as mass balance inputs covering all residual release paths (solid, liquid and gaseous), analysis for key contaminants (including PCDD/F) in solid bottom ash, scrubber residuals) and any liquid residual streams. The intention is to determine both Destruction Removal Efficiency (DRE) and Destruction Efficiency (DE). This would serve to inform current discussions within the TEAP ODS Destruction Task Force as reflected in the most recent TEAP ODS Destruction Task Force report referenced above regarding the equivalency of these two parameters used in assessing environmental performance of organic waste destruction facilities generally. DE is generally considered more comprehensive since it covers all releases though DRE which only assesses releases to air is more generally used including in the TEAP guidelines. It is generally felt that gaseous or high vapor pressure CFCs would only be subject to air release but this should be validated. Likewise, analysis for PCDD/F and any recombinant CFC residuals in all release medium would likewise be useful contributions to the technical knowledge base.

The funding of the test burns is generally split between the MLF and the incinerator operators, the latter who will make substantial direct contribution to the actual testing through labor, modifications and lost business during tests (not accounted for in the cost estimates). Provision for independent supervision of the test burn by an expert consultant is provided for. This will include documentation and reporting, including verification protocols related to actual destruction, consistent with model carbon crediting protocols. In terms of timing, the technical development and planning work would be initiated in Q4 2012 with the actual test burns being undertaken sequentially in 2013 recognizing that some flexibility will be required to work around the regular business of the facilities and annual maintenance shut down schedules.

- *1.4 Test Burn demonstration for CFC-11 containing foam:* This sub-component will follow the same scope and proposed funding pattern as the test burns on the CFC chemicals except that the waste would not be co-disposed with other waste streams eliminating the need for a baseline reference test burn and facility modifications would be minimal and handled by the enterprises. Given that bulked bagged foam is being incinerated existing hopper/container feed systems that include weight scales and recording devices will be used. It is proposed to undertake these test burns at two facilities, likely one of the TECNIAMSA facilities and the PROSARC facility, noting that further investigation of the latter's emission performance will be made in advance. It should also be noted that a comparative assessment of impact on performance will also be undertaken on HCFC-141b based foam and a mixture of this and CFC-11 foam if material is available. This would be of practical value in the longer terms as it may be more efficient to simply destroy mixed foam as manually collected during actual operation of the system. It is anticipated that this work would be undertaken in the latter part of 2013.

- *1.5 Destruction of EPR program start up volumes of CFC-12 and CFC-11 containing foams:* This sub-component covers the destruction of CFC-12 (34 t) and CFC-containing foam (1,228 t containing 65 t of CFC-11) obtained from the dismantling of the first 300,000 refrigerators during the startup phase of the national replacement program. This will be done at domestic facilities qualified through the above work. The CFC-12 is assumed to be done at one or perhaps both of the TECNIAMSA facilities and the CFC-11 containing foam at TECNIAMSA and/or PROSARC with the selection being determined competitively. The destruction costs are indicative at this point but based on current market destruction costs for comparable wastes. The MLF funding is limited to a small portion of the destruction costs overall but will cover all the recovered CFC-12 destruction costs. Additionally, provision is made to apply MLF co-financing to the purchase of two high recovery efficiency plant based CFC -12 recovery units having degassing capability. These would be supplied at the point where the manual dismantling operations had reasonable economies of scale (approximately 50,000 refrigeration units per year) and would allow CFC-12 recovery efficiency to be increased to >95% and accommodate the higher production line scale through puts. The final activity in this component would be development of the overall ODS source through to destruction tracking, monitoring, destruction verification and reporting capability for the commercially scaled system. This will be established utilizing experience gained in Sub-component 1.3 and 1.4 above and will be designed and implemented with a view to being suitable for accreditation under an appropriate international carbon crediting mechanism should that financing option be developed at some point. It is anticipated that this sub-component will be undertaken throughout 2014 as material becomes available in commercial lots for destruction.

Component 2.0 Technical Assistance: This component covers technical assistance and related development work associated with evaluation, regulation and implementation of the ODS destruction demonstration project and in ensuring the legal, regulatory, technical and public acceptance tools are in place to sustain capacity so qualified. It has three sub-components as described below:

- *2.1 Legal and regulatory institutional technical assistance:* This sub-component provides limited MLF support, co-financed by MADS for regulatory enabling measures facilitating and regulating the capture and destruction of EOL ODS. This would include: i) legislation/regulation banning release of ODS and requiring its registered storage and environmentally sound destruction; ii) regulatory technical guidance in support of collection, storage, analysis, tracking, certified destruction and reporting requirements applicable to the management of EOL ODS; iii) legislation/regulation of the technical criteria and specifications for the facilities managing EOL ODS; and iv) legislation/regulation for the EPR system. This work would be undertaken early in the project beginning in Q3 2012.
- *2.2 Technical/business planning support for EOL ODS Management under the EPR system:* This sub-component supports technical and business planning capacity strengthening that will be required by both various stakeholder government agencies and the private sector service providers and investors in implementing the EOL ODS aspects of the overall refrigerator replacement and recovery program. This will include: i) training and technical

support related to operational EOL ODS management; ii) technology option assessment in relation to future EOL ODS processing and destruction technology investments including acquisition of reverse manufacturing capability and purpose built destruction capability; and iii) assessing the options available to development a sustainable carbon crediting mechanisms for EOL ODS

- *2.3 Public Consultation and Information:* This sub-component provides resource financed by both the MLF and government to support stakeholder and public consultations/awareness development on the national EOLODS management system development and its implementation. Given that ultimately any program of this type depends on voluntary participation of individual households and small business, this aspect is fundamental to the sustainability of the initiative. The work funded would take the form of production/dissemination of the normal range information products and use of public promotion vehicles including popular media, web based communication and social media. It would also involve support for a range of stakeholder workshops of both a technical and business nature.
- *2.4 Technical Oversight and Overall Project Technical Report:* This sub-component covers an international consultant having expertise in hazardous waste and WEEE management who will provide technical and business advisory services related to the project's overall implementation and specifically in relation to detailed scope definition and peer review of test burn design, and various technical assistance work above including refrigeration equipment processing and technology destruction evaluations, WEEE/EPR system implementation and introduction of carbon finance. It will also cover the preparation of a detailed technical completion report documenting project's results (facility baseline, kiln modifications, test burn procedures, performance against reference standards); life cycle tracking procedures and results; comparative analysis with other global experience and recommendations for use by ExCom and the Parties in advancing and replicating this experience report upon completion. The inclusion of this sub-component was included based on consultation with the MLF Secretariat and recognizes the broader demonstration value.

Component 3.0 Project Management/Monitoring/Evaluation: This component covers the normal project management costs associated with this kind of project which would be primarily funded by MADS. MLF funding would be associated with partial funding of incremental staffing costs in the form of a full time project coordinator, project documentation printing/translation costs and local project related travel. This component also provides for normal M&E costs also on a cost shared basis between the MLF and the government.

5. PROJECT JUSTIFICATION AGAINST FUNDING GUIDELINES

The Executive Committee, at its 58th Meeting approved a set of interim guidelines for the funding of demonstration projects for the disposal of ODS in accordance with paragraph 2 of decision XX/7 of the Meeting of the Parties. The following information is provided by way of direct response to the requirements as set out by the above mentioned Decision 58/19:

5.1. Updated and more detailed information on all issues that were required for obtaining project preparation funding

i. An indication of the category or categories of activities for the disposal of ODS (collection, transport, storage, destruction), which will be included in the project proposal

The overall project addresses the complete range of activities associate with ODS disposal. In its entirety provides demonstration across all activity categories and their integration. However, MLF support is limited to only transport, storage and destruction, and then only for purposes of consolidating current stocks of EOL ODS, undertaking their characterization , providing secure storage until demonstration of destruction is undertaken, and then transport for such destruction. The initial collection of demonstration materials is financed by the current holders or is undertaken by tapping into an established commercial collection system as is the case for CFC-11 based foam used for the test burn material of this type. More broadly, the larger scale demonstration obtained in the start up phase of the national EPR based refrigerator replacement program is entirely nationally financed with the exception of modest increment equipment additions to capitalize on economies of scale and optimize EOL ODS capture efficiency, and for payment of a minority portion of actual destruction costs.

ii. An indication of whether disposal programmes for chemicals related to other multilateral environmental agreements are presently ongoing in the country or planned for the near future, and whether synergies would be possible

Colombia is an active participant of all major chemicals multi-lateral agreements and initiatives, a number of which have current and future synergies with the proposed project. At a high level, it actively participates in activities associated with the International Conference on Chemicals Management and work under the SACIM framework promoting sound chemicals management.

Similarly it is a highly involved Party to the Basel Convention and a principle advocate of implementation of the Basel Ban Amendment endorsed at the last Basel COP which was held in Colombia. Linkage to the Basel Convention is significant in the context of this project given the strategic focus it has taken to utilize domestic destruction capability, as opposed to export of its wastes. It is also a strong policy motivator behind the countries broader national hazardous waste management policy and implementation of WEEE and waste derived resource recovery programs into which EOL ODS management is integrated (Section 2 above).

This project has a close linkage to the country's work implementing the Stockholm Convention through its National Implementation Plan. The recently approved GEF-5 PCB management project where arranging environmentally sound disposal of PCB stockpiles and wastes under

Article 5 of the Stockholm Convention has specific synergies respecting this project and enhancement of its demonstration value. As highlighted in Appendix 5, a number of specific activities in the project offer opportunities for complimentary synergy with the GEF project and potential to optimize long term economies associated with implementation of both the Montreal Protocol and Stockholm Convention. These include: i) the development of technical specifications, guidance materials and protocols governing the qualification of destruction facilities for complex halogenated chemicals; ii), facility upgrades and modifications; iii) baseline destruction facility performance testing; iii) consulting and supervision services; iv) regulatory development with a common waste management framework; v) public consultation and information; and vi) general project management support. These will be further developed during the PPG stage of the POPs project which has been approved for funding and is preparing for implementation. The linkage is further strengthened at a practical level by the common line institutional responsibility for implementation in the same division of MADS.

The final chemicals management aspect where such synergies exist are in relation to international initiatives related to climate change and green house gas reduction. The project itself will provide a significant avoidance of GHG release from the destruction of ODS alone (Estimated to be over 750,000 t of CO₂ Eq). The full implementation of the planned 10 years program to replace 2,600,000 domestic refrigerators would result in approximately 2.2 million t CO₂ Eq in GHG avoidance. During the same period, the preparation studies undertaken by the government suggest that implementation of the refrigeration program will result in GHG release reductions of 420,000 t CO₂ Eq. While no decisions on the incorporation of carbon finance mechanisms in the national program has been made, consideration is being given to development of a Kyoto Protocol CDM project and the potential for the use of voluntary carbon markets, both of which could be linked to possible GEF funding. In anticipation of these possibilities, this project has incorporated features to ensure development of appropriate source certification, tracking and destruction verification. These are elaborated generally below in relation to monitoring and verification procedures.

iii. An estimate of the amount of each ODS that is meant to be handled within the project

The amounts of ODS meant to be handled in the project are described in detail in previous sections and Appendix 3. Currently available end of life (EOL) ODS stocks in Colombia are 15 t, and an anticipated 65 t of CFC-11 and 34 t of CFC-12 recovered over the first two years of implementation of the national refrigerator replacement program undertaken in accordance with WEEE legislation now being enacted. An annual estimated destruction rate of 56 tons of CFC-11 and 29 t of CFC-12 is projected beyond the project life.

iv. The basis for the estimate of the amount of ODS; this estimate should be based on known existing stocks already collected, or collection efforts already at a very advanced and well-documented stage of being set up

Currently available end of life (EOL) ODS stocks in Colombia are 15 t , and an anticipated 65 t of CFC-11 and 34 t of CFC-12 recovered over the first two years of implementation of the

national refrigerator replacement program undertaken in accordance with WEEE legislation now being enacted.

v. For collection activities, information regarding existing or near-future, credible collection efforts and programmes that are at an advanced stage of being set up and to which activities under this project would relate

These are reviewed in Section 2 above and are based on the rapid implementation of policy and legislative measures to put in place an accelerated domestic refrigerator replacement program based on at least four large regional centres and smaller ones in lower population locations. The system is anticipated to begin initial operation in 2013 and reach a full annual capacity of 250-300,000 units per year in 2015. It will be financed by a combination of extended producer responsibility funds and energy efficiency incentive payments, with possible carbon finance at some future point.

vi. For activities that focus at least partially on CTC or halon, an explanation of how this project might have an important demonstration value

This project will focus primarily on the destruction of contaminated CFCs. However, during the course of implementation, opportunities to also destroy the small quantities of EOL HCFC, HCFC based mixtures, HFCs and CTC that currently exist (Appendix 3) and which will continue to accumulate, particularly as a result of the HPMP implementation will be explored. Halon stocks are being banked for use in the civilian aircraft sector, and no destruction requirements are involved in this work

5.2. Detailed information on issues required for project submission

i. Updated information for issues mentioned under project preparation: Provided in Sections 1 through 4 above

ii. Project Implementation: The project implementation will follow the estimated Timetable:

Table 5 – Overall Implementation Timeline

| Activity | 2012 | | | 2013 | | | | 2014 | | | | 2015 | |
|--|------|----|----|------|----|----|----|------|----|----|----|------|----|
| | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| <i>Project Start-up</i> | | | | | | | | | | | | | |
| ExCom Project Approval | ■ | | | | | | | | | | | | |
| Receipt of Funds | | ■ | | | | | | | | | | | |
| Project/Grant Signature | | ■ | | | | | | | | | | | |
| <i>Management activities</i> | | | | | | | | | | | | | |
| Progress Reports to ExCom | | | | | ■ | | | | ■ | | | | ■ |
| <i>Project Implementation</i> | | | | | | | | | | | | | |
| Component 1: ODS Destruction Demonstration | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| Component 2.0 Technical Assistance | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| Component 3.0 Project Management/Monitoring/Evaluation | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| <i>Project Closure</i> | | | | | | | | | | | | | |
| Final Report (Including Output of Sub-component 2.4) | | | | | | | | | | | | | ■ |
| Certificate of Technical Completion | | | | | | | | | | | | | ■ |
| Operational and Financial Closure | | | | | | | | | | | | | ■ |

iii. Other sources of funding.

The project is estimated to utilize US\$1,555,000 in co-financing from other sources. These include budget and in-kind contributions from MADS and participating enterprises (holders of EOL ODS and waste management service providers), initial revenues and startup contributions from government and product manufacturers to the refrigerator replacement program. As noted above (Section 5.1 ii), there are a number of areas the current GEF POPs could contribute to this project. The details of this will be addressed in the PPG currently being initiated for that project, including areas where funding economies might exist. However, given the different nature of the project cycle and eligibility criteria, it is unlikely practical to have these as shared costs. In this discussion, it is emphasized that in this cost estimate there are no costs assigned for MLF funding that would be duplicated in the GEF project. The economies are primarily related to the effectiveness of the result and in the longer term sustainability of both initiatives.

iv. Concept for monitoring the origin of recovered ODS

The nature of the origin of all EOL ODS recovered for destruction is readily determined given that the currently available stocks are held by their original generators, are derived from well defined activities (customs seizures, refrigeration servicing activities and well documented phase out initiatives (i.e. chiller demonstrative project, MDI conversion, solvent phase out) where recovered material and excess stocks are covered by implementation agreements. These stocks have been and continue to be subject to regulatory monitoring by UTO. The EOL ODS recovered during the start up phase of the national EPR refrigerator replacement program will likewise be closely monitored as it is generated at source. In both cases the tracking of these materials through subsequent consolidation, characterization, storage, transport and destruction is explicitly provided for within the project including detailed documentation. There is no risk in this project or in the subsequent large scale recovery programs to inflate volumes managed with ineligible stocks such as might be generated for purposes of deriving revenues, given there are no such sources, namely production facilities, in Colombia.

While the detailed design of the required EOL ODS Monitoring/Tracking System is part of the proposed project itself and its documentation would in fact be a replicable output, a general outline of the principles and approaches to be applied is provided below:

- *Ensuring EOL ODS cannot be re-used:* In principle, a portion of the EOL managed by the project and the overall WEEE/EPR system can theoretically be re-used, namely any uncontaminated refrigerants and CFC-11 stocks. However, CFC-11 use is effectively banned in Colombia and CFC-12 use in existing equipment is rapidly declining and fully serviced by the present R&R infrastructure. HCFC-22, where recovered, would be re-used as long as a servicing requirement existed. CFC-11 and HCFC-141b in foam is unsuitable for re-use by definition.
- *Verification of source and onward tracking through to destruction – Current EOL ODS Stocks:* The EOL ODS that is earmarked for use in qualifying domestic destruction facilities is currently in the hands of originators, all who can demonstrate where it came from with appropriate documentation. Additionally it is held under the oversight monitoring and

regulatory control of UTO as a hazardous waste in accordance with national legislation. The steps of moving this from these locations through to consolidation/characterization/storage and onward to destruction facilities would involve standard hazardous waste tracking documentation (way-bills/manifests), in/out weighing at each step and analytical verification of consolidated stocks. This would have matching receipt weighting at the incineration facilities and matching against manifest with a final analytical characterization of lots as they were accepted for incineration. The facilities would have metered flow and associated recorders applied to the feed lines from container to primary combustion chamber entry port of the destruction unit as well as provision for purging and verification of containers being empty. This upgrading is specifically provided for in the project. This would definitively measure and allow verification and documentation of the actual amounts entering the process for destruction. By definition the test burn is designed to precisely demonstrate the destruction efficiency of the process by monitoring what is released by any potential path against what is put in.

- *Verification of source and onward tracking through to destruction – EOL ODS Extracted from Replace Equipment:* The source of this EOL ODS would be based initially on record keeping and tracking of collected equipment upon receipt at the dismantling facility through a inventory control system (likely based on bar code labeling applied at source) with the units tracked in the dismantling process. Such tracking would have to be in place in any event for purposes of administering payments under the system. Dedicated refrigerant extraction equipment and containers would be used with recovery containers being uniquely labeled, again with bar code based inventory tracking approach. Foam extracted manually would likewise be bagged and labeled for onward tracking. Shipment of refrigerant containers and bagged foam would be done using hazardous waste transport tracking documentation such as a manifest with receipt confirmation matched in terms of labels and shipping weights. A sampling protocol would also be applied at the incineration facility to verify content at a suitably established frequency which could be 100% in the case of refrigerant basic analyzers were used. Processing tracking would be monitoring at the feed point as described above with the agreed facility rated destruction facility applied, such destruction frequency being tested periodically as required by regulation.
- *Additional considerations associated with possible export and carbon finance arrangements:* The proposed project does not involve export but if it did the same process principles would apply with any additional provisions in terms of manifests, labeling and composition verification required under the Basel Convention and prior consent regulations of export, transit and receiving jurisdictions. The above practices generally meet the monitoring and tracking requirements of the current voluntary carbon credit protocols accepting ODS destroyed by rotary kiln incineration and where a specific commercial arrangement was entered into as may be the case in the future it would be enhanced to meet any specific requirements or procedures specified.

v Assurances that the amount of ODS mentioned will actually be destroyed.

Following from the above, the project provides for independent supervision and verification of destruction. This includes development and implementation of protocols for this which will be utilized in the future and will be designed to meet international practice, specifically those applied to carbon crediting arrangements. Assurance of actual effectiveness of destruction as

quantified in destruction efficiency parameters are a specific output of the project applicable to the destruction facilities being qualified, thus a direct validation of their effectiveness is provided.

vi Exploration of other disposal options for the used ODS.

Sections 2 and 3 above provide a discussion of the various strategic and technological destruction options considered for the project. These include the three generic options of export, development of new purpose built facilities and utilizing existing modern domestic hazardous waste management infrastructure in the form of rotary kiln high temperature incineration (HTI). During preparation, the complete range of potentially available technologies associated performance assessments as documented in the technical literature was reviewed, particularly recent publications by the GEF STAP and the most recent TEAP task force report, both referenced above. Preparation of the project also involved inputs from a TEAP Task Force member.

The result of this work supports the selection of both the option of utilizing existing facilities and conventional rotary kiln high temperature incineration technology. HTI remains the technology of choice worldwide for the destruction of halogenated hazardous waste, POPs and ODS. With the strict caution that its operation must be undertaken by competent and creditable operators and it is closely monitored, HTI generally achieves substantially higher destruction efficiencies and lower critical emission levels (i.e. PCDD/F) than required under the TEAP requirements adopted by the Parties and in fact the more strict requirements applied under the Stockholm Convention for POPs. Likewise HTI is generally the lowest cost technology available with destruction costs for chlorinated hazardous wastes in Colombia under US\$2.0/kg and which should generally apply to EOL ODS once domestic HTI facilities are qualified. Other technologies that might practically be used in Colombia, namely plasma arc, appear to have substantially higher unit costs (US\$12 to 27/kg). While these technologies theoretically might offer higher nominal destruction efficiencies this actually offers minimal actual increase in the amount of ODS destroyed. Notwithstanding the above analysis, the project technical assistance scope has included further technology assessment work related to plasma arc facilities to evaluate its applicability in a full scale refrigerator recovery program as an integrated part of a reverse manufacturing operation and as a possible technology that might also have application to POPs destruction as well as EOL ODS. In the technical reporting detailed in Sub-component 2.4, the technical, environmental and economic performance of the destruction options utilized will be document and compared to experience globally current at that time.

6. Appendixes

Appendix 1: Transmittal Letter

Appendix 2: Legal and Regulatory Framework for ODS in Colombia

Appendix 3: Current National Inventory of End of Life ODS

Appendix 4: Summary of Operating Condition and Environmental Performance Requirements
for Hazardous Waste Incineration Facilities in Colombia

Appendix 5: Project Framework and Cost Estimate

Appendix 6: Overall Project Schedule by Component/Sub-Component/Activity

Appendix 1: Transmittal Letter

Appendix 2 – Legal and Regulatory Framework for ODS in Colombia

Colombia is a signatory to the Montreal Protocol on Substances that Deplete the Ozone Layer. The status of the ratification of this protocol and its Amendments is as follows:

| Instrument | Congress Law |
|-----------------------------|------------------|
| Vienna Convention (1985) | # 30, 5-Mar-90 |
| Montreal Protocol (1987) | # 29, 28-Dec-92 |
| London Amendment (1990) | # 29, 28-Dec-92 |
| Copenhagen Amendment (1992) | # 306, 5-Aug-96 |
| Montreal Amendment (1997) | # 618, 6-Oct-00 |
| Beijing Amendment (1999) | # 960, 28-Jun-05 |

1. Control Measurements

In chronological order, the regulations that apply to ODSs are:

- **Law 99 of 1993** (Congress): The Secretary of Environment, *Ministerio del Medio Ambiente*, was created, and the National Environmental System was organized. Environmental licenses -issued by the Secretary of Environment- for the importation and production of substances controlled by international treaties were established.
- **Resolution 528 of June 18, 1997** (Secretaries of Environment and Foreign Trade): The use of CFCs (refrigerant and blowing agent) for the production of domestic refrigerators was banned.
- **Resolution 304 of April 16, 2001** (Secretaries of Environment and Foreign Trade): Imports of ODS listed in the Annex A, Group I, were regulated¹³. Annual quotas per company, defined according to the Country Programme and the import history, were established. NOU approval is required for the expedition of the environmental license.
- **Resolution 734 of June 22, 2004** (Secretaries of Environment -now *Ministerio de Ambiente, Vivienda y Desarrollo Territorial*- and Foreign Trade -now called *Ministerio de Comercio, Industria y Turismo*-): Resolution 304 was modified to take into account the adjusted Country Programme.
- **Resolution 874 of July 23, 2004** (Secretaries of Environment and Foreign Trade): Resolution 734 is expanded. Methodology to quotas allocation is defined.
- **Government Decree 423 of February 21, 2005**: Exports of substances listed in Annex A, Groups I and II, Annex B, Groups I, II and III, Annex C, Groups I, II and III, and Annex E, Group I, are regulated. They required the approval of the Secretary of Environment (UTO)¹⁴.
- **External Resolution 21 of April 1, 2005** (Secretary of Commerce, Industry and Tourism): The approval of UTO (Secretary of Environment) for the imports of HCFCs and Halons is established. The duty positions that require NOU approval are listed: Annex A, Groups I and II, Annex B, Groups I, II and III, Annex C, Groups I, II and III, Annex E, Group I, substitutes for HFCs, refrigerant blends containing ODS and HFCs and blends based on Methyl Bromide.

¹³ Unfortunately, substances listed in Annex A, Group II, were not included.

¹⁴ In 2003 it was estimated that 12 % of the imported ODS were exported.

- **External Resolution 22 of April 1, 2005** (Secretary of Commerce, Industry and Tourism): The exports of substances listed in Annex A, Groups I and II, Annex B, Groups I, II and III, Annex C, Groups I, II and III, and Annex E, Group I are regulated. The Secretary of Environment (UTO) should established annual quotas per substance.
- **External Resolution 23 of April 7, 2005** (Secretary of Commerce, Industry and Tourism): The list of duty positions belonging to domestic refrigerators and freezers, whose imports require UTO approval, is updated.
- **Resolution 2188 of December 29, 2005** (Secretary of Environment): Exports are regulated with reference to Decree 423.
- **Resolution 901 of May 23, 2006** (Secretary of Environment): Imports of ODS listed in the Annex A, Group II, Halons, were regulated. Annual quotas per company, defined according to the Country Programme and the import history, were established. The use of halons in new installations was banned.
- **Resolution 902 of May 23, 2006** (Secretary of Environment): Imports of ODS listed in the Annex B, Group I, II and III, were regulated. Annual quotas per company, defined according to the Country Programme and the import history, were established. The use of halons in new installations was banned.
- Since 1999 HCFCs imports require environmental license.
- **Resolución 2120 of October 31, 2006** (Secretary of Environment): Establish the measurements to control Annex C substances.

Since December 2005 Colombia has an overall policy for the management of hazardous waste, where ODSs are included. This policy is covered in the **Decree 4741 of 2005** based on the implementation of the Basel Convention.

Appendix 3 – Current National Inventory of End of Life ODS

| Source | Quality | Ownership/Control | Location | Current Storage Condition | Quantity (kg) |
|--|---------------------------|--|---|---------------------------|---------------|
| CFC-11 | | | | | |
| Phase 1(a) - Chiller replacement program – Q1/2 2012 | Recovered CFC-11 | - MLF project legal agreement obligation to hold for destruction - UTO monitoring | Cali | 210 l drums | 370 |
| Phase 1(b)- Chiller replacement program – Q3/4 2012 | Recovered CFC-11 | - MLF project legal agreement obligation to hold for destruction - UTO monitoring | Medellín | 210 l drums | 530 |
| Phase 2(a) - Chiller replacement program – Q1/2 2013 | Recovered CFC-11 | - MLF project legal agreement to hold for destruction - UTO monitoring | Medellín | 210 l drums | 500 |
| Phase 2(b) - Chiller replacement program – Q3/4 2013 | Recovered CFC-11 | - MLF project legal agreement to hold for destruction - UTO monitoring | Medellín | 210 l drums | 2,600 |
| LABORATORIO S CHALVER DE COLOMBIA (MDI manufacturer) | Pure CFC-11 | - LABORATORIO S CHALVER DE COLOMBIA (MDI manufacturer) - MLF project legal agreement to hold for destruction/UTO monitoring | Bogota | 57 kg cylinder | 1,367 |
| Excess Stocks in held by phased out users | Pure and recovered CFC-11 | - Excess stocks at 5 users - Availability being confirmed | Bogota, Cali, Cartagena, Rionegro, Ibaguè | Various containers | 456 |
| Stocks at bankrupt former users | Pure and recovered CFC-11 | - Excess stocks at 2 bankrupt users - Availability being confirmed | Espinal y Barranquilla | Various containers | 2,297 |
| CFC-11 Totals | | | | | 8,120 |
| Immediately Available | | | | | 1,823 |
| Availability being confirmed | | | | | 2,297 |
| Availability – end of 2012 | | | | | 900 |
| Availability –end of 2013 | | | | | 3,100 |

| Source | Quality | Ownership/Control | Location | Current Storage Condition | Quantity (kg) |
|--|---|--|---|----------------------------------|---------------|
| CFC-12 | | | | | |
| Regional Recover and Recycling Centers and Reclaim Centers | Contaminated reclaim/servicing residuals CFC-12 (separated) | <ul style="list-style-type: none"> - Held by 16 refrigeration service providers - UTO registration and monitoring - Supply to project committed | Regional Reclaim Centers - 10 locations | 13.6 kg cylinders | 236 |
| Regional Recover and Recycling Centers and Reclaim Centers | Contaminated reclaim/servicing CFC-12 residuals (>70%) | <ul style="list-style-type: none"> - Held by 35 refrigeration service providers - UTO registration and monitoring - Supply to project committed | Regional Reclaim Centers – 18 locations | 13.6 kg cylinders | 1,142 |
| National Customs – DIAN | CFC-12 and mixtures of CFC-12 seized | <ul style="list-style-type: none"> - Held by 5 regional customs offices | Regional customs offices – 5 locations | 13.6 kg cylinders and 340 g cans | 1,500 |
| LITO | Contaminated reclaim/servicing CFC-12 residuals- >70% | <ul style="list-style-type: none"> - Held or accessible by national service provider (LITO) - UTO registration and monitoring - Supply to project committed | LITO Storage Site - Bogota | 13.6 kg cylinders | 1,246 |
| LABORATORIO CHALVER DE COLOMBIA (MDI manufacturer) | Pure CFC-12 | <ul style="list-style-type: none"> - MLF project legal agreement to hold for destruction/UTO monitoring | Bogota | 13.6 kg cylinders | 1,550 |
| CFC-12 and CFC-12 mixtures Totals | | | | | 5,674 |
| Available immediately | | | | | 5,674 |

| Source | Quality | Ownership/Control | Location | Current Storage Condition | Quantity (kg) |
|--|---|--|--|---------------------------|---------------|
| HCFC, HFC and mixtures of HCFC - HFC | | | | | |
| Regional Recover and Recycling Centers and Reclaim Centers | Contaminated reclaim/servicing residuals HCFC-22 (separated) | <ul style="list-style-type: none"> - Held by 15 refrigeration service providers - UTO registration and monitoring - Supply to project committed | Regional Reclaim Centers and end users - 9 locations | 13.6 kg cylinders | 336 |
| Regional Recover and Recycling Centers and Reclaim Centers | Contaminated reclaim/servicing residuals HFC-134a (separated) | <ul style="list-style-type: none"> - Held by 11 refrigeration service providers - UTO registration and monitoring - Supply to project committed | Regional Reclaim Centers and end users - 8 locations | 13.6 kg cylinders | 204 |
| Regional Recover and Recycling Centers and Reclaim Centers | Contaminated reclaim/servicing residuals mixtures of HCFCs and other HFCs | <ul style="list-style-type: none"> - Held by 7 refrigeration service providers - UTO registration and monitoring - Supply to project committed | Regional Reclaim Centers and end users- 3 locations | 13.6 kg cylinders | 379 |
| HCFC, HFC and mixtures of HCFC - HFC Totals | | | | | 919 |
| Available immediately | | | | | 919 |

| Source | Quality | Ownership/Control | Location | Current Storage Condition | Quantity (kg) |
|-----------------------|--|-------------------|----------|---------------------------|---------------|
| CTC | | | | | |
| Pure CTC | MLF project legal agreement to hold for destruction/UTO monitoring | | Cali | 210 l drum | 330 |
| CTC Total | | | | | 330 |
| Available immediately | | | | | 330 |

Appendix 4 – Summary of Operating Condition and Environmental Performance Requirements for Hazardous Waste Incineration Facilities in Colombia

| Requirement | Capacity > 500 kg/hr | Capacity < 500 kg/hr |
|--|----------------------------------|----------------------------------|
| Combustion chamber temp. (°C) | | |
| Primary | > 850 | > 1200 |
| Secondary | > 800 | > 1100 |
| Secondary combustion chamber residence time (sec) | > 2 sec. | > 2 sec |
| Gas exhaust temp. (°C) | < 250 | <250 |
| Air Emissions (O ₂ reference @11%) – mg/m ³ | | |
| Particulate | Av. Day - 10 Av. Hr. - 20 | Av. Day - 15 Av. Hr. - 30 |
| SO ₂ | Av. Day - 50 Av. Hr. - 300 | Av. Day - 50 Av. Hr. - 200 |
| NO _x | Av. Day - 200 Av. Hr. - 400 | Av. Day - 200 Av. Hr. - 400 |
| CO | Av. Day - 50 Av. Hr. - 100 | Av. Day - 50 Av. Hr. - 100 |
| HCL | Av. Day - 10 Av. Hr. - 40 | Av. Day - 15 Av. Hr. - 60 |
| HF | Av. Day - 1 Av. Hr. - 4 | Av. Day - 1 Av. Hr. - 4 |
| Hg | Av. Day - 0.03 Av. Hr. - 0.05 | Av. Day - 0.05 Av. Hr. - 0.10 |
| Total hydrocarbons | Av. Day - 10 Av. Hr. - 20 | Av. Day - 10 Av. Hr. - 20 |
| PCDD/F (ng – ITEQ/m ³) | 0.1 | 0.1 |
| Air Emission Heavy Metals (Reference Conditions 25°C, 760 mm Hg) - mg/m ³ | | |
| Sum of Ca, Tl, and its compounds | 0.5 | 0.5 |
| Sum of As, Cu, Cr, Pb, Co, Ni, V, Mn, Sb, Sn | 0.5 | 0.5 |
| Destruction Performance | | |
| DRE –Waste (%) | 99.99 | 99.99 |
| DRE – HCl (%) | 99 | 99 |

Appendix 5: Detailed Project Framework and Indicative Cost Estimate

| Component/Sub-Component | Activity Description | Cost Estimate (US\$) | | | Timing/Remarks |
|---|--|----------------------|-----------|-----------|-----------------|
| | | MLF | Other | Total | |
| Component 1: ODS Destruction Demonstration | | 830,000 | 1,235,000 | 2,065,000 | |
| 1.1 Consolidation/storage/characterization/transport of CFC-11 and CFC-12 EOL ODS | | 100,000 | 50,000 | 150,000 | Q3/4 2012 |
| 1.1.1 Supply of extraction/transfer equipment and ODS analyzers | Four recovery machines with N ₂ purge capability and associated tools. Four ODS analyzers | 20,000 | 20,000 | 40,000 | Q3 2012 |
| 1.1.2 Supply of bulk cylinders | Sufficient multiple use cylinders of size optimized for qualified destruction facilities. | 15,000 | 15,000 | 30,000 | Q3 2012 |
| 1.1.3 Collection/transport of distributed CFC- 11 stocks | Pick up of CFC-11 as currently stored from chiller sites, bankrupt enterprises, former user enterprises and LABORATORIO CHALVER for delivery to contracted project consolidation/storage site (s) | - | 5,000 | 5,000 | Q4 2012 |
| 1.1.4 Collection/transport of distributed CFC- 12 stocks | Pick up of CFC-12 as currently stored at reclaim center/national customs, LITO and LABORATORIO CHALVER and delivered to contracted project consolidation/storage site (s) | - | 10,000 | 10,000 | Q4 2012 |
| 1.1.5 Consolidation/storage of CFC-11 stocks | Screening analysis, consolidating into optimized cylinders for destruction and secure monitored storage at a contracted project site | 10,000 | - | 10,000 | Q4 2012 |
| 1.1.6 Consolidation/storage of CFC-12 stocks at contracted project storage site | Screening analysis, consolidating into optimized cylinders for destruction and secure monitored storage at a contracted project site | 10,000 | - | 10,000 | Q4 2012 |
| 1.1.7 Verification analysis of consolidated CFC-11 and CFC-12 | Independent laboratory analysis of consolidated EOL ODS in each bulk cylinder. | 20,000 | - | 20,000 | Q4 2012 |
| 1.1.8 Transportation to incineration facility | Transport as required by test burn schedule | 15,000 | - | 15,000 | Q3 2013 |
| 1.1.9 Documentation and reporting | Assembly of auditable documentation on the origin, tracking and certified analysis of EOL ODS for test burns stocks in suitable for accreditation under an international carbon crediting mechanism. | 10,000 | - | 10,000 | Q4 2012-Q1 2013 |
| 1.2 Consolidation/storage/characterization/transport of CFC-11 containing Foam for test burn demonstrations | | 100,000 | - | 100,000 | Q4 2012-Q1 2013 |
| 1.2.1 Test burn foam separation, and storage | Contractor set up to extract, and bag foam at scrap yards inclusive of secure onsite storage or | 60,000 | - | 60,000 | Q1 2013 |

| Component/Sub-Component | Activity Description | Cost Estimate (US\$) | | | Timing/Remarks |
|---|---|----------------------|----------------|----------------|--|
| | | MLF | Other | Total | |
| | other interim storage | | | | |
| 1.2.2 Transportation | Transportation to incineration facilities and interim storage as required | 15,000 | - | 15,000 | Q2 2013 |
| 1.2.3 Site screening of extracted foam. | Supply of ODS screening equipment for foam/Contracted service for screening | 10,000 | - | 10,000 | Q4 2012-Q1 2013 |
| 1.2.4 CFC -11 content analysis | Contracted verification analysis of CFC-11 content | 15,000 | - | 15,000 | Q2 2013 |
| 1.3 Test Burn Demonstrations for CFC-11 and CFC-12 at selected HW incinerators | | 250,000 | 165,000 | 415,000 | Q3 2013 |
| 1.3.1 Test burn planning and design | Detailed test burn design, specification and proposal documents including baseline environmental audit for each (2) test burn facility. | 20,000 | 30,000 | 50,000 | Q3 2012-Q2 2013 Enterprise in-kind and co-finance of baseline EA Potential economies with GEF POPs project |
| 1.3.2 Minor facility modifications | Material feed, control and measurement infrastructure at HW incineration facility <ul style="list-style-type: none"> - Primary combustion chamber port modifications for high vapor pressure liquid and/or compressed gas feed - Dedicated liquid feed from barrels or containers inclusive of weight scale, pump, fugitive emission containment, flow controls and flow metering - Dedicated gaseous feed from pressurized containers inclusive of weight scale, pump, fugitive emission containment, flow controls and flow metering - Container purging capability | 30,000 | 10,000 | 40,000 | Q2 2013 Enterprise in-kind Potential economies with GEF POPs project |
| 1.3.3 Baseline feed selection/characterization | Selection/characterization of a representative baseline feed to be co-disposed with ODS | 10,000 | 10,000 | 20,000 | Q3 2013 Enterprise in-kind including characterization analysis. |
| 1.3.4 Baseline test burn | Baseline test burn on representative normal feed mix | 50,000 | 25,000 | 75,000 | Q3/4 2013 Enterprise in-kind |

| Component/Sub-Component | Activity Description | Cost Estimate (US\$) | | | Timing/Remarks |
|--|---|----------------------|--------|---------|--|
| | | MLF | Other | Total | |
| | <ul style="list-style-type: none"> - Incineration facility operating conditions - Stack analysis for regulated emissions including HF and PCCD/F - Bottom ash analysis - Scrubber waste water (as applicable) analysis | | | | Potential economies with GEF POPs project |
| 1.3.5 Test burn for CFC-11 | Continuous metered injection of 5 t of CFC-11 at pre determined rates with monitoring and documentation of: <ul style="list-style-type: none"> - Incineration facility operating conditions - Stack analysis for regulated emissions plus HF and PCCD/F - Bottom ash analysis - Scrubber waste water (as applicable) analysis | 60,000 | 45,000 | 105,000 | Q3/4 2013 Enterprise in-kind for operational, permitting and result audit documentation costs |
| 1.3.6 Test burn for CFC-12 | Continuous metered injection of 5 t of CFC-12 at pre determined rates with monitoring and documentation of: <ul style="list-style-type: none"> - Incineration facility operating conditions - Stack analysis for regulated emissions plus HF and PCCD/F - Bottom ash analysis - Scrubber waste water (as applicable) analysis | 60,000 | 45,000 | 105,000 | Q3/4 2013 Enterprise in-kind for operational, permitting and result audit documentation costs |
| 1.3.7 Test burn supervision | Independent supervisory/audit consultant(s) undertaking test burn oversight, data analysis and reporting. | 20,000 | - | 20,000 | Q2 –Q4 2013 Potential economies with GEF POPs project |
| 1.4 Test Burn Demonstration - for CFC-11 containing foam at two selected Industrial/HW Incineration Facilities | | 135,000 | 80,000 | 215,000 | Q2 2013 |
| 1.4.1 Test burn planning and design | Detailed test burn design, specification and proposal documents for test burns including baseline environmental audit. | 20,000 | 20,000 | 40,000 | Q4 2012-Q1 2013 Enterprise in-kind and co-finance of baseline EA |
| 1.4.2 Minor facility modifications | Material feed, control and measurement infrastructure at HW incineration facility (assumed existing bulk solid feed systems with minimal modification) | - | 10,000 | 10,000 | Q1 2013 Enterprise in-kind |
| 1.4.3 Test burn on CFC-11 containing foam | Test burn on 5t of foam at two qualified facilities: | 100,000 | 50,000 | 150,000 | Q2 2013 |

| Component/Sub-Component | Activity Description | Cost Estimate (US\$) | | | Timing/Remarks |
|---|--|----------------------|---------|-----------|--|
| | | MLF | Other | Total | |
| | <ul style="list-style-type: none"> - Incineration facility operating conditions - Stack analysis for regulated emissions including HF and PCCD/F - Bottom ash analysis - Scrubber waste water (as applicable) analysis | | | | Enterprise in-kind |
| 1.4.4 Test burn supervision | Independent supervisory/audit consultant(s) undertaking test burn oversight, data analysis and reporting. | 20,000 | - | 20,000 | Q4 2012-Q3 2103 |
| 1.5 Destruction of EPR Program Start up volumes of CFC-12 and CFC-11 containing foams (Based on 300,000 units, 34 t CFC-12, 65 t CFC-11 in 1,228 t of foam) | | 245,000 | 940,000 | 1,185,000 | Q1 2014 –Q4 2014 |
| 1.5.1 EOL ODS collection, extraction, consolidation and transport | Collection, extraction, storage, consolidation, and transport of CFC-12 and CFC-11 containing foam to qualified incineration facilities | - | 400,000 | 400,000 | Q2 2013-Q3 201 |
| 1.5.2 CFC-12 destruction | Destruction of 34 t of CFC-12 @ commercial rate of \$2,000/t | 70,000 | - | 70,000 | Q3 2014 Assume 70% CFC-12 recovery |
| 1.5.3 CFC-11 containing foam destruction | Destruction of 1,228 t of CFC-11 containing foam (assumed contain 45 t CFC-11) @ commercial rate of \$ 500/t | 100,000 | 465,000 | 565,000 | Q4 2014 Assume 75% CFC-11 retained in destroyed foam |
| 1.5.4 High efficiency CFC-12 recovery equipment | Supply of high efficiency CFC recovery unit with oil and refrigerant circuit de-gassing and multiple stations. | 50,000 | 50,000 | 100,000 | Q1 2014 Assume two large manual dismantling operations each with one unit 50% co-financed by MILF |
| 1.5.5 Reporting of commercial ODS destruction under the EPR Program start up | Preparation of consolidated documentation and verification protocols for routine assembly of auditable documentation on the origin, tracking, certified analysis and destruction of EOL stocks in suitable for accreditation under an international carbon crediting mechanism | 20,000 | 25,000 | 50,000 | Q1 2015 |
| Component 2.0 Technical Assistance | | 255,000 | 150,000 | 405,000 | Q3 2012-Q1 2014 |

| Component/Sub-Component | Activity Description | Cost Estimate (US\$) | | | Timing/Remarks |
|---|---|----------------------|---------|---------|--|
| | | MLF | Other | Total | |
| 2.1 Legal and regulatory institutional TA | <p>Support for legal and regulatory enabling measures facilitating development and implementation of the national EOL management system</p> <ul style="list-style-type: none"> - 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 EOL ODS. - Legislation/regulation of the technical criteria and specifications for the facilities managing EOL ODS - Legislation/regulation for the EPR system | 50,000 | 25,000 | 75,000 | Q3 2012-Q2 2013 Potential economies with GEF POPs project |
| 2.2 Technical/business planning support for EOL ODS Management under the EPR system | <p>Support for technical/business planning and administration of the developing EOL ODS aspects of the EPR system</p> <ul style="list-style-type: none"> - Training and Technical Support for Operational EOL ODS Management - Technology option assessment for future EOL ODS processing and destruction - Development of sustainable carbon crediting mechanisms for EOL ODS | 75,000 | 100,000 | 175,000 | Q3 2012-Q3 2013 |
| 2.3 Public Consultation and Information | <p>Support for stakeholder and public consultations and awareness development on the national EOLODS management system development and implementation</p> <ul style="list-style-type: none"> - Information products/public promotion - Stakeholder workshops | 50,000 | 25,000 | 75,000 | Q3 2012-Q1 2014 Potential economies with GEF POPs project |
| 2.4 Technical Oversight and Overall Project Technical Report | <p>Part-time international consultant with expertise in hazardous waste and WEE management to provide:</p> <ul style="list-style-type: none"> - Oversight and technical advice on the overall project implementation - Critical review if technical assistance products, specifically processing and | 80,000 | - | 80,000 | Q3 2012-Q2 2015 |

| Component/Sub-Component | Activity Description | Cost Estimate (US\$) | | | Timing/Remarks |
|---|--|----------------------|-----------|-----------|---|
| | | MLF | Other | Total | |
| | technology destruction evaluations, WEEE/EPR system implementation and introduction of carbon finance; - A detailed technical completion report documenting project's results (facility baseline, kiln modifications, test burn procedures, performance against reference standards); life cycle tracking procedures and results; comparative analysis with other global experience and recommendations for use by ExCom and the Parties in advancing and replicating this experience report upon completion. | | | | |
| Component 3.0 Project Management/Monitoring/Evaluation | | 110,000 | 170,000 | 280,000 | Q3 2012-Q2 2015 |
| 3.1 National Project Coordinator | National expert on ODS, hazardous waste and WEEE management with overall responsibility for project coordination, reporting to UTO NOU, and working in close cooperation with GEF POPs project PMU | 60,000 | 60,000 | 120,000 | Q2 2012-Q1 2015 Full time 2.5 years |
| 3.2 Project office administration | Project office administrative staffing, office and related overheads | - | 60,000 | 60,000 | Q2 2012-Q1 2015 Gov. in-kind Shared costs with GEF POPs project |
| 3.3 Misc. contract services and travel | Project documentation,/translation and local project management travel | 20,000 | 20,000 | 40,000 | Q2 2012-Q4 2014 Gov. in-kind |
| 3.4 M&E costs | Contracted national and international M&E costs | 30,000 | 30,000 | 60,000 | Q2 2012-Q2 2015 |
| Totals | | 1,195,000 | 1,555,000 | 2,750,000 | |

Appendix 6: Overall Project Schedule by Component/Sub-Component/Activity

| Project Component/Sub-Component/Activity | 2012 | | 2013 | | | | 2014 | | | | 2015 | |
|---|------|----|------|----|----|----|------|----|----|----|------|----|
| | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| Component 1: ODS Destruction Demonstration | | | | | | | | | | | | |
| 1.1 Consolidation/storage/characterization/transport of CFC-11 and CFC-12 EOL ODS | | | | | | | | | | | | |
| 1.1.1 Supply of extraction/transfer equipment and ODS analyzers | | | | | | | | | | | | |
| 1.1.2 Supply of bulk cylinders | ■ | | | | | | | | | | | |
| 1.1.3 Collection/transport of distributed CFC- 11 stocks | | ■ | | | | | | | | | | |
| 1.1.4 Collection/transport of distributed CFC- 12 stocks | | ■ | | | | | | | | | | |
| 1.1.5 Consolidation/storage of CFC-11 stocks | | ■ | ■ | ■ | ■ | | | | | | | |
| 1.1.6 Consolidation/storage of CFC-12 stocks | | ■ | ■ | ■ | ■ | | | | | | | |
| 1.1.7 Verification analysis of consolidated CFC-11 and CFC-12 | | ■ | | | | | | | | | | |
| 1.1.8 Transportation to incineration facility | | | | ■ | ■ | | | | | | | |
| 1.19 Documentation and reporting | | ■ | ■ | ■ | ■ | | | | | | | |
| 1.2 Manual processing- CFC-11 refrigeration equipment at scrap yards to produce 10-15 t of CFC-11 containing foam | | | | | | | | | | | | |
| 1.2.1 Test burn foam separation, and storage | | ■ | ■ | ■ | | | | | | | | |
| 1.2.2 Transportation | | | ■ | ■ | | | | | | | | |
| 1.2.3 Site screening of extracted foam. | | ■ | ■ | ■ | | | | | | | | |
| 1.2.4 CFC -11 content analysis | | | ■ | ■ | | | | | | | | |
| 1.3 Test Burn Demonstrations for CFC-11 and CFC-12 at selected HW incinerators | | | | | | | | | | | | |
| 1.3.1 Test burn planning and design | | ■ | ■ | ■ | ■ | | | | | | | |
| 1.3.2 Minor facility modifications | | | | ■ | ■ | | | | | | | |
| 1.3.3 Baseline feed selection/characterization | | | | | ■ | ■ | | | | | | |
| 1.3.4 Baseline test burn | | | | | ■ | ■ | ■ | ■ | | | | |
| 1.3.5 Test burn for CFC-11 | | | | | ■ | ■ | ■ | ■ | | | | |
| 1.3.6 Test burn for CFC-12 | | | | | ■ | ■ | ■ | ■ | | | | |
| 1.3.7 Test burn supervision | | | | ■ | ■ | ■ | ■ | | | | | |
| 1.4 Test Burn Demonstration - for CFC-11 containing foam at two selected Industrial/HW Incineration Facilities | | | | | | | | | | | | |
| 1.4.1 Test burn planning and design | | ■ | ■ | ■ | ■ | | | | | | | |
| 1.4.2 Minor facility modifications | | | ■ | ■ | | | | | | | | |
| 1.4.3 Test burn on CFC-11 containing foam | | | | ■ | ■ | | | | | | | |
| 1.4.4 Test burn supervision | | | ■ | ■ | ■ | ■ | | | | | | |
| 1.5 Destruction of EPR Program Start up volumes of CFC-12 and CFC-11 containing foams | | | | | | | | | | | | |
| 1.5.1 EOL ODS collection, extraction, consolidation and transport | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 1.5.2 CFC-12 destruction | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ |
| 1.5.3 CFC-11 containing foam destruction | | | | | | | | ■ | ■ | ■ | ■ | ■ |

| Project Component/Sub-Component/Activity | 2012 | | 2013 | | | | 2014 | | | | 2015 | |
|--|------|----|------|----|----|----|------|----|----|----|------|----|
| | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| 1.5.4 High efficiency CFC-12 recovery equipment | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ |
| 1.5.5 Reporting of commercial ODS destruction | | | | | | | | ■ | ■ | ■ | ■ | ■ |
| Component 2.0 Technical Assistance | | | | | | | | | | | | |
| 2.1 Legal and regulatory institutional TA | ■ | ■ | ■ | ■ | ■ | | | | | | | |
| 2.2 Technical/business planning support for EOL ODS Management | ■ | ■ | ■ | ■ | ■ | | | | | | | |
| 2.3 Public Consultation and Information | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 2.4 Technical Oversight and Overall Project Technical Report | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Component 3.0 Project Management/Monitoring/Evaluation | | | | | | | | | | | | |
| | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |