



**Programme des
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COMITÉ EXÉCUTIF
DU FONDS MULTILATÉRAL AUX FINS
D'APPLICATION DU PROTOCOLE DE MONTRÉAL
Quarante et unième réunion
Montréal, 17 - 19 décembre 2003

PROPOSITIONS DE PROJET : MEXIQUE

Le présent document porte sur les observations et les recommandations du Secrétariat du Fonds sur les propositions de projet suivantes :

Aérosols

- Projet parapluie concernant la conversion des CFC-11, CFC-12 et CFC-113 aux HFC, HCFC, HFE pour les aérosols techniques chez Tecnosol et Dimmex Banque mondiale

Réfrigération

- Plan d'élimination du CFC dans le secteur de la réfrigération (première tranche) ONUDI

FICHE D'ÉVALUATION DU PROJET MEXIQUE

SECTEUR : **Aérosols**

Consommation sectorielle de SAO (2002) : 70,1 tonnes PAO

Seuil de coût-efficacité du secteur :

s.o.

Titre du projet :

- a) Projet parapluie concernant la conversion des CFC-11, CFC-12 et CFC-113 aux HFC, HCFC, HFE pour les aérosols techniques chez Tecnosol et Dimmex

Données du projet	Aérosols
Consommation de l'entreprise (tonnes PAO)	70,1
Incidence du projet (tonnes PAO)	57,3
Durée du projet (mois)	36
Montant initial demandé (\$US)	308 620
Coût final du projet (\$US) :	252 340
Surcoûts d'investissement (a)	0
Coût d'imprévu (b)	0
Surcoûts d'exploitation (c)	252 340
Coût total du projet (a+b+c)	252 340
Participation locale au capital (%)	100 %
Élément d'exportation (%)	0 %
Montant demandé (\$US)	252 340
Rapport coût-efficacité (\$US/kg)	4,40
Financement de contrepartie confirmé ?	
Agence nationale de coordination	NAFIN/SEMARNAT
Agence d'exécution	Banque mondiale

Recommandations du Secrétariat	
Montant recommandé (\$US)	252 340
Incidence du projet (tonnes PAO)	57,35
Rapport coût-efficacité (\$US/kg)	4,40
Coût de soutien à l'agence d'exécution (\$US)	18 925
Coût total pour le Fonds multilatéral (\$US)	271 265,5

DESCRIPTION DU PROJET

Historique

1. Le gouvernement mexicain a soumis une proposition de projet parapluie en phase finale concernant la conversion des aérosols techniques à base de CFC, destinés à l'entretien de matériel électronique et industriel et fabriqués par trois entreprises : Tecnosol (25 000 bombes/an), Envatec (32 822 bombes/an) et Dimmex (112 140 bombes/an).
2. L'exécution de ce projet donnera lieu à l'élimination de 70,1 tonnes PAO de CFC (30,3 tonnes PAO de CFC-11, 4 tonnes PAO de CFC-12 et 35,8 tonnes PAO de CFC-113).
3. Les trois entreprises sollicitent une assistance du Fonds multilatéral, uniquement destinée à couvrir les surcoûts d'exploitation associés au remplacement du CFC (en tant que propulseur) par un mélange de vertrel, HFE-7100 et HFC-134a.
4. Les surcoûts totaux d'exploitation (VAN pour 4 ans) ont été estimés à 3 617 470 \$US. Toutefois, compte tenu du seuil de coût-efficacité (4,40 \$US/kg), le financement maximal sollicité s'élève à 308 620 \$US.
5. Une lettre du gouvernement mexicain justifiant l'utilisation des technologies à base de HCFC est jointe au présent document.
6. Aucun financement supplémentaire ne sera demandé du Fonds multilatéral pour le secteur mexicain des aérosols.

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT

OBSERVATIONS

7. Le Secrétariat a demandé des détails sur les dates de mise en service des chaînes de production de CFC de ces trois entreprises. D'après les données de production fournies pour Envatec et Dimmex (production nulle en 2000 et production de 2002 trois ou quatre fois supérieure à celle de 2001), il semblerait que la chaîne de production de CFC soit entrée en service après le 25 juillet 1995. L'intermédiaire financier de la Banque mondiale a précisé que Dimmex et Tecnosol ont été constituées le 20 mars 1995. Il s'avère toutefois que Envatec n'est pas admissible aux fins de financement. Le coût du projet a donc été ajusté en conséquence.
8. La proposition de projet indique que le remplacement du CFC-113 dans les aérosols pose de sérieux problèmes pour ces deux entreprises. « La NASA continue de l'utiliser, n'ayant pas réussi à trouver un produit de remplacement aussi efficace. » Le meilleur produit de remplacement est un mélange de HFC, HCFC ou HFE « d'un prix élevé et pas encore très fiable ». Par ailleurs, le rapport coût-efficacité du projet soumis s'élève à 52 \$US/kg (les sociétés ne sollicitent de financement qu'à hauteur de 4,40 \$US/kg, ce qui correspond au seuil du secteur des aérosols). Compte tenu de ce qui précède et du fait que le gouvernement mexicain devrait être en mesure d'atteindre l'objectif d'élimination de CFC pour 2007 grâce aux projets

d'investissement approuvés à ce jour et à la mise en œuvre du plan national d'élimination concernant le secteur de la réfrigération (présenté à la 41^e réunion), le Secrétariat a proposé d'envisager de soumettre ce projet à une date ultérieure, lorsque des produits de remplacement plus viables et plus économiques seront disponibles sur le marché.

9. La Banque mondiale a informé le Secrétariat que les trois sociétés participant au projet sont fermement résolues à éliminer leur consommation de CFC. Le secteur privé est conscient des obligations du Mexique concernant l'élimination du CFC d'ici 2010 et ce projet sera accompagné d'une réglementation interdisant l'utilisation du CFC dans ces applications d'ici 2007. La viabilité de la conversion ne peut être mise en doute compte tenu du fait que les prix des substances de remplacement devraient progressivement baisser avec l'augmentation de la consommation et avec la transition à des produits sans CFC.

RECOMMANDATION

10. Le Secrétariat du Fonds recommande l'approbation globale du projet avec le niveau de financement et les coûts d'appui associés indiqués dans le tableau ci-dessous :

	Titre du projet	Financement du projet (\$US)	Coûts d'appui (\$US)	Agence d'exécution
a)	Projet parapluie concernant la conversion des CFC-11, CFC-12 et CFC-113 aux HFC, HCFC, HFE pour les aérosols techniques chez Tecnosol et Dimmex	252 340	18 925	Banque mondiale

FICHE D'ÉVALUATION DU PROJET MEXIQUE

SECTEUR : Réfrigération Consommation sectorielle de SAO (2002) : 1 669 tonnes PAO

Seuil de coût-efficacité du secteur : s.o.

Titre du projet :

- a) Plan d'élimination du CFC dans le secteur de la réfrigération (première tranche)

Données du projet	Multiple
	Plan national
Consommation de l'entreprise (tonnes PAO)	1 669
Incidence du projet (tonnes PAO)	1 669*
Durée du projet (mois)	82
Montant initial demandé (\$US)	3 004 176
Coût final du projet (\$US) :	
Surcoûts d'investissement (a)	
Coût d'imprévu (b)	
Surcoûts d'exploitation (c)	
Coût total du projet (a+b+c)	10 168 056
Participation locale au capital (%)	100
Élément d'exportation (%)	0
Montant demandé pour la première tranche (\$US)	1 492 100
Rapport coût-efficacité (\$US/kg)	6,09**
Financement de contrepartie confirmé ?	
Agence nationale de coordination	Ministère de l'Environnement (SEMARNAT)
Agence d'exécution	ONUUDI

<i>Recommandations du Secrétariat</i>	
Montant recommandé (\$US)	
Incidence du projet (tonnes PAO)	
Rapport coût-efficacité (\$US/kg)	
Coût de soutien à l'agence d'exécution (\$US)	
Coût total pour le Fonds multilatéral (\$US)	

* L'incidence totale du projet est 1 669 tonnes PAO. L'incidence de la première tranche est 0 tonnes PAO.

** Rapport coût-efficacité du plan d'élimination.

DESCRIPTION DU PROJET

Données générales sur le secteur

Profil de consommation et d'élimination des CFC (Groupe I de l'Annexe A)

Le Mexique a choisi l'Option 1 de la Décision 35/37 pour définir le point de départ. À la 35^e réunion, un accord a été conclu avec le Comité exécutif concernant le point de départ qui s'élève à :

- Consommation restante de CFC admissible aux fins de financement en novembre 2003 (conformément à l'accord précité)	2 879,6 tonnes PAO
- Incidence de tous les projets sur les CFC ayant fait l'objet de demandes de financement (novembre 2003)	1 669 tonnes PAO
- Consommation restante de CFC admissible aux fins de financement suite à l'approbation des projets soumis à la 41 ^e réunion	1 210 tonnes PAO
Consommation totale de CFC en 2002	1 947,2 tonnes PAO

11. Une étude nationale réalisée lors de la préparation du plan d'élimination du CFC dans le secteur mexicain de la réfrigération a estimé la consommation de CFC des différents sous-secteurs de la réfrigération. Ces données de consommation sont présentées en tonnes métriques dans le tableau ci-dessous. La consommation totale de CFC du secteur de la réfrigération a augmenté de 105,1 tonnes métriques par rapport à 2002.

Sous-secteur	Fabrication	Entretien	Total
Climatiseurs d'automobiles		1 028	1 028
Équipements commerciaux : Gros équipements commerciaux (chambres froides, groupes compresseur-condenseur et autres équipements non unitaires)		25	25
Équipements commerciaux : Petits équipements commerciaux (vitrines réfrigérées, congélateurs et autres équipements unitaires)	49,7	656	705,7
Équipements ménagers : Réfrigérateurs et congélateurs ménagers		18	18
Total	49,7	1 728	1 777,7

Secteur de la fabrication d'équipements de réfrigération

12. Le Comité exécutif a approuvé un total de 39 projets dans le secteur mexicain de la réfrigération. Trente-cinq de ces projets sont achevés; ils ont bénéficié d'un financement total de 17 906 243 \$US et ont éliminé 1 414,3 tonnes PAO de CFC.

13. Tous les gros fabricants mexicains d'équipements de réfrigération à usage commercial et domestique ont été convertis à des technologies sans CFC. En particulier, l'utilisation des CFC

dans le sous-secteur de la fabrication d'équipements de réfrigération à usage domestique a été complètement éliminée en 1997 grâce à quatre projets de conversion exécutés par le PNUD. Actuellement, tous les nouveaux appareils ménagers utilisent des technologies sans CFC.

14. La seule activité manufacturière utilisant du CFC est le sous-secteur de la réfrigération commerciale. Les 15 fabricants restants d'équipements de réfrigération commerciale sont des petites entreprises ayant un accès limité aux technologies de remplacement n'utilisant pas de CFC.

Secteur de l'entretien des équipements de réfrigération

15. La consommation du sous-secteur de l'entretien, détaillée dans le tableau du paragraphe 1, se répartit comme suit : 59,5 % pour le sous-secteur des climatiseurs d'automobile, 39,5 % pour le sous-secteur commercial et 1 % pour le sous-secteur ménager. Le parc automobile mexicain est estimé à 16 millions de véhicules, dont environ 20 % (soit 3,5 millions) sont équipés de climatiseurs. On estime par ailleurs que 800 000 climatiseurs d'automobiles utilisent toujours du CFC-12 comme frigorigène. La quantité totale de frigorigène nécessaire à l'entretien des climatiseurs d'automobile est estimée à environ 1 040 tonnes métriques de CFC-12.

16. Le nombre total de réfrigérateurs ménagers est estimé à 20 millions, dont 50 % utilisent toujours du CFC-12. Environ 100 000 réfrigérateurs ménagers sont dépannés chaque année, ce qui représente une consommation d'environ 20 tonnes de CFC-12.

17. La consommation de CFC du sous-secteur de l'entretien des équipements de réfrigération commerciale est estimée à environ 680 tonnes métriques. La durée de vie des équipements de réfrigération commerciale est relativement longue et il reste un grand nombre de vieilles unités ayant des taux élevés de fuite de frigorigène.

18. Selon une vaste étude réalisée dans 40 villes mexicaines sur le secteur de l'entretien des équipements de réfrigération, le nombre total d'ateliers s'élève à 8 000 et le nombre total de techniciens à 20 000. Les ateliers d'entretien peuvent être classés selon leur taille comme suit :

- Grands et moyens ateliers, avec plus de 100 employés – 1 % du total;
- Petits ateliers, avec 16 à 100 employés – 4 % du total; et
- Micro ateliers, avec 1 à 15 employés – 95 % du total.

Stratégie

19. L'objectif stratégique du plan d'élimination du CFC dans le secteur de la réfrigération est de garantir des réductions de CFC conformes aux obligations du Mexique en la matière pour 2007 et 2010 aux termes du Protocole de Montréal.

20. Toutes les activités du plan d'élimination du secteur respecteront les principes suivants :

- L'industrie des substances de remplacement du CFC doit être développée de manière durable car il est estimé que, d'ici 2005, les nouveaux équipements des secteurs de la réfrigération et des mousses n'utiliseront plus de CFC.
- Les niveaux d'emploi doivent être maintenus dans toutes les industries connexes, en particulier dans les petites et moyennes entreprises (PME), qui jouent un rôle majeur dans le sous-secteur de l'entretien des équipements de réfrigération.
- Le besoin de frigorigènes à base de CFC destinés à l'entretien et à la maintenance des climatiseurs existants doit être satisfait et ces produits doivent être fournis dans le cadre du projet national de récupération et de recyclage.
- De vastes efforts de coordination seront nécessaires dans le secteur mexicain de l'entretien en raison du grand nombre de PME concernées.
- La disponibilité de CFC pourra être limitée dans un proche avenir.

21. Le gouvernement s'est efforcé de respecter le calendrier suivant de réduction de la consommation de CFC dans le cadre du plan d'élimination du secteur de la réfrigération :

Année	2004	2005	2006	2007	2008	2009	2010
Réductions au titre du plan d'élimination du secteur de la réfrigération (tonnes métriques)	0	50	655	500	350	200	100

22. Le plan d'élimination du CFC du secteur de la réfrigération comprend les projets suivants :

Programme de formation des agents des douanes

23. Ce projet entend former environ 200 agents des douanes (environ cinq agents dans chaque poste douanier) aux questions liées à l'ozone ainsi qu'à l'identification des substances réglementées par le Protocole de Montréal et des équipements et produits les contenant. Ce projet entend par ailleurs équiper les principaux postes douaniers du pays d'appareils de détection des CFC et promouvoir la création d'une base de données sur les SAO importées.

Programme national de formation des techniciens de la réfrigération

24. Ce programme entend former 4 000 techniciens de la réfrigération sur les 20 000 estimés dans le pays. La formation sera axée sur les bonnes pratiques d'entretien, qui permettent d'éviter ou de réduire le rejet intentionnel ou accidentel de frigorigènes dans l'atmosphère, ainsi que sur le bon usage des frigorigènes réglementés, à savoir le CFC-12 et le CFC-11. Ce projet encouragera par ailleurs la récupération, le recyclage et la régénération des frigorigènes afin de réduire la dépendance vis-à-vis des CFC vierges.

Programme national de récupération et de recyclage

25. Ce programme permettra de créer 36 centres de recyclage sur l'ensemble du territoire. Chaque centre de recyclage sera équipé d'un appareil de récupération, d'un appareil de recyclage pouvant récupérer les gaz non condensables, de plusieurs petits cylindres de récupération, de pompes à vide, d'un identificateur de frigorigène (de type infrarouge), d'un cylindre de stockage, d'outils d'entretien (soupape de perçage, manomètre, etc.) et d'un détecteur de fuites portable. Les centres recevront par ailleurs un cylindre de stockage des frigorigènes non recyclables jusqu'à ce qu'ils puissent être traités. Ce programme utilisera efficacement le centre de régénération établi au Mexique dans le cadre d'un projet antérieur.

26. Des ateliers d'entretien seront sélectionnés pour recevoir les équipements essentiels à de bonnes pratiques d'entretien ainsi qu'à la récupération des frigorigènes. Au total, 3 000 unités de récupération seront fournies à ces ateliers, qui recevront par ailleurs des pompes à vide, des cylindres et des registres de récupération et d'autres outils d'entretien. Afin de faciliter la réduction de l'utilisation de CFC-11 en tant qu'agent de rinçage des systèmes de réfrigération, des unités utilisant des agents de rinçage sans SAO (alcools, glycol, ethers, etc.) seront fournies à des ateliers d'entretien sélectionnés où la consommation de CFC-11 est élevée.

Programme d'encouragement concernant les équipements de réfrigération industrielle

27. Ce programme encouragera la conversion ou le remplacement des équipements de réfrigération à base de CFC intégrés à des installations de relativement grande taille, telles que les chaînes de supermarchés.

Support technique

28. Ce volet du plan d'élimination aura pour objectif de garantir la durabilité de toutes les mesures prises dans le cadre du plan ainsi que leur conformité aux autres objectifs du gouvernement. Il comprendra les éléments suivants :

- Élaboration de normes de qualité et de performance concernant les produits et applications sans CFC du secteur;
- Fourniture d'assistance technologique à l'industrie afin d'assurer la durabilité des applications sans CFC grâce à des ateliers et réunions techniques;
- Création d'un programme de formation, de certification et de permis destiné aux opérateurs et techniciens d'équipements de production de systèmes de réfrigération afin de soutenir les technologies sans CFC.

Cadre juridique proposé

29. Le gouvernement mexicain élaborera une réglementation détaillée visant à surveiller et contrôler l'utilisation des substances appauvrissant la couche d'ozone (SAO) dans le pays. Les principaux éléments de cette réglementation seront :

- Abandon progressif de l'utilisation des SAO dans tous les secteurs, conformément aux obligations découlant du Protocole de Montréal. Cette règle sera obligatoire pour tous les producteurs, importateurs, exportateurs, distributeurs, vendeurs et consommateurs commerciaux et industriels de CFC;
- La commercialisation de CFC ne sera autorisée que pour satisfaire les besoins internes de base et les utilisations essentielles dans le pays. La réglementation comprendra des barèmes spécifiant les quantités maximales admissibles pour ces applications, pour chaque année jusqu'en 2010;
- Interdiction de produire ou d'importer des équipements de réfrigération ou de climatisation, des propulseurs, des mousses plastiques ou des installations de nettoyage à base de solvants utilisant ou contenant du CFC, à l'exception des utilisations essentielles au sens du Protocole de Montréal;
- Cette réglementation définira par ailleurs des règles contrôlant la commercialisation des CFC recyclés ou retraités.

Assistance technique

30. Les activités d'assistance technique (formation, sensibilisation et suivi) ont été intégrées aux fonctions de l'équipe de gestion qui sera mise en place en vue de l'exécution du plan d'élimination sectoriel. Ces activités sont les suivantes :

- Élaboration et mise en œuvre des activités de formation, de sensibilisation et de renforcement des capacités destinées aux principaux services publics, législateurs, décideurs et autres parties prenantes institutionnelles, pour garantir leur attachement aux objectifs du plan d'élimination sectoriel;
- Sensibilisation des consommateurs et de la collectivité au plan d'élimination sectoriel et aux obligations découlant du Protocole de Montréal, par le biais d'ateliers, d'annonces dans les médias et d'autres méthodes de diffusion de l'information;
- Mise en place et en application d'un mécanisme décentralisé de surveillance et d'évaluation des réalisations du plan d'élimination sectoriel.

État d'avancement du « Projet pilote de prêt à des conditions de faveur pour le secteur des refroidisseurs »

31. La première phase du projet s'est achevée avec succès. Au total, 12 refroidisseurs ont été remplacés au lieu des 10 prévus et 7,8 tonnes PAO de CFC ont été éliminées au lieu des 5 tonnes PAO anticipées. L'approbation de la deuxième phase du projet est en suspens jusqu'à l'examen des questions d'orientation par les Parties au Protocole de Montréal.

Surcoûts

32. Les surcoûts ont été déterminés comme suit:

Volet de projet et activités	Total partiel	2003	2004	2005	2006	2007
Gestion du projet	905 000	117 000	235 750	235 750	180 750	135 750
Support technique	400 000	0	0	100 000	100 000	200 000
Secteur de la fabrication d'équipements de réfrigération	981 876	544 000	0	437 876	0	
Programme de formation des agents des douanes	337 000	337 000	0	0	0	0
Projet national de formation des techniciens d'entretien	1 928 300	113 300	907 500	907 500	0	0
Projet national de récupération et de recyclage	5 115 880	380 800	2 135 000	2 135 000	465 080	0
Programme d'encouragement en matière de conversion et de remplacement	500 000	0	0	0	0	500 000
Coût total du projet	10 168 056	1 492 100	3 278 250	3 816 126	745 830	835 750
Coûts d'appui de l'agence d'exécution	762 604	111 908	245 869	286 209	55 937	62 681
Subvention totale du Fonds multilatéral	10 930 660	1 604 008	3 524 119	4 102 335	801 767	898 431
Plan d'activité 2003 - 2005		3 225 000	0	5 913 000	0	0

33. La gestion globale du plan sera entreprise par le gouvernement mexicain avec l'assistance de l'ONUDI.

34. La mise en œuvre du plan d'élimination se fera en relation et en collaboration étroite avec les actions menées par le gouvernement mexicain en matière de politique, de réglementation, de fiscalité, de sensibilisation et de renforcement des capacités afin de garantir la cohérence avec les priorités du gouvernement.

Surveillance et évaluation

35. La surveillance de la consommation de SAO sera entreprise par le gouvernement dans les sociétés qui seront converties à des technologies sans SAO. Suite à la mise en place du programme national de récupération et de recyclage des frigorigènes, l'activité de surveillance sera élargie pour inclure tous les centres de recyclage et ateliers d'entretien.

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT**OBSERVATIONS**

36. Le Secrétariat a demandé des éclaircissements concernant les incohérences portant sur les données de consommation de CFC et d'élimination contenues dans le projet d'accord et le plan

relatif au secteur de la réfrigération. L'ONUDI a fourni des informations complémentaires et apporté les modifications nécessaires au plan.

37. Le plan sectoriel proposé ne couvre pas l'élimination de la consommation de CFC dans le sous-secteur de l'entretien des refroidisseurs. Le Secrétariat a soulevé la question de l'engagement du gouvernement mexicain concernant l'élimination totale du CFC dans le secteur de la réfrigération. L'ONUDI a confirmé que si le plan sectoriel est approuvé, le gouvernement mexicain s'engagera à éliminer la consommation totale de CFC du secteur de la réfrigération, refroidisseurs compris. Le Secrétariat examine avec l'ONUDI les dispositions financières permettant d'aborder le secteur des refroidisseurs dans le cadre du plan.

38. Le Secrétariat a mis en question la base de calcul des coûts d'investissement et d'exploitation invoqués pour 15 entreprises du sous-secteur de la fabrication d'équipements de réfrigération commerciale. L'ONUDI a recalculé les surcoûts relatifs à ces entreprises qui sont maintenant intégrés au volet d'assistance technique du plan.

39. Plus de 2,8 millions \$US ont été approuvés pour les sous-secteurs mexicains de l'entretien des équipements de réfrigération et des refroidisseurs. Le Secrétariat a demandé à l'ONUDI d'évaluer l'incidence des projets de récupération/recyclage et de formation sur la réduction de la consommation de CFC du sous-secteur de l'entretien. Le Secrétariat a par ailleurs demandé des informations complémentaires sur la répartition des activités des 8 000 ateliers d'entretien parmi les divers sous-secteurs.

40. Un montant de 500 000 \$US a été sollicité pour encourager la conversion des équipements existants à des produits de remplacement sans CFC en 2007 (en tant que montant forfaitaire) sans proposition détaillée. Le Secrétariat a demandé des informations détaillées à ce sujet ainsi que des justifications concernant les coûts invoqués.

41. Le plan d'élimination comprend une proposition concernant un projet national de récupération et de recyclage d'un coût de 5 115 880 \$US (50 % du coût total de la proposition), comprenant la création d'un réseau de 36 centres de recyclage, de 3 000 unités de récupération, de 4 000 pompes à vide et d'autres équipements accessoires. Le plan sectoriel ne précise toutefois pas quelles seront les priorités concernant la formation des techniciens et les opérations de récupération et de recyclage. Le plan sectoriel ne fournit par ailleurs pas d'informations suffisantes concernant la demande future de frigorigènes à base de CFC dans les sous-secteurs des équipements ménagers, des équipements commerciaux et des climatiseurs d'automobile à la lumière de la réduction continue de la demande de CFC, dans le cadre des activités d'entretien, associée au remplacement des équipements à base de CFC par de nouveaux équipements sans SAO. Dans le sous-secteur de l'entretien des climatiseurs d'automobile, 41 % des ateliers d'entretien sont déjà équipés d'unités de récupération. Une évaluation devrait étudier la mesure dans laquelle cet équipement peut répondre aux besoins actuels et futurs de récupération et de recyclage. Le bien fondé d'un programme de récupération et de recyclage d'une telle envergure devrait être mieux documenté. Au vu du manque d'efficacité des activités de récupération et de recyclage approuvées à ce jour, il a été recommandé à l'ONUDI d'envisager d'autres approches qui pourraient inclure la coordination d'une mise en œuvre par étapes de ces activités afin d'en éprouver l'efficacité. L'examen de ces questions par le Secrétariat et l'ONUDI se poursuit.

42. Le coût total de la gestion et du soutien technique du projet (1 305 000 \$US) représente plus de 12,8 % du coût total du projet. Le Secrétariat a proposé à l'ONUDI de réduire ces coûts afin de les aligner sur ceux d'autres plans semblables préalablement approuvés par le Comité exécutif. Ces coûts ont été ajustés en conséquence.

43. Le Sous-comité sur l'examen des projets sera informé de l'issue des discussions menées entre le Secrétariat et l'ONUDI s'il y a lieu.

RECOMMANDATIONS

44. En attente

PROJECT COVER SHEET

COUNTRY : Mexico
IMPLEMENTING AGENCY : UNIDO
PROJECT TITLE : Refrigeration sector CFC phase-out plan
PROJECT IN CURRENT BUSINESS PLAN : Yes
SECTOR : Refrigeration
ODS USE IN SECTOR (2002) : : 1,669 ODP tonnes
PROJECT IMPACT : 1,669 ODP tonnes
PROJECT DURATION : 2003 - 2010
PROJECT COST : USD 10,169,756
LOCAL OWNERSHIP : 100%
EXPORT COMPONENT : Nil
REQUESTED GRANT : USD 10,168,056
COST-EFFECTIVENESS : USD 6.09 per kg ODP
IMPLEMENTING AGENCY SUPPORT COST : USD 762,604
TOTAL COST OF PROJECT TO MULTILATERAL FUND : USD 10,930,660

FINANCING ARRANGEMENT : Project cost Grant with support cost

2003 tranche	: USD 1,492,100	USD 1,604,008
2004 tranche	: USD 3,278,250	USD 3,524,119
2005 tranche	: USD 3,816,126	USD 4,102,335
2006 tranche	: USD 745,830	USD 801,767
2007 tranche	: USD 835,750	USD 898,431

STATUS OF COUNTERPART FUNDING : N/A
PROJECT MONITORING MILESTONES INCLUDED : Yes
NATIONAL COORDINATING AGENCY : SEMARNAT

PROJECT SUMMARY: The present CFC phase-out plan aims at phasing-out all the remaining consumption of Annex A, Group I CFCs in the refrigeration sector in Mexico over the period of 2003 - 2010. A series of investment, non-investment, and technical support activities are proposed to achieve this target in the refrigeration sector. The present CFC Phase-out Plan will enable the Government of Mexico to totally phase-out the CFC consumption by January 01, 2010 except the CFC usage for chiller servicing. Considering this multi-faceted approach it is crucial that flexibility be given to the Government of Mexico to adapt or modify its strategies during implementation of this plan as the need arises.

The Government of Mexico requests about US\$ 10.2 million as the total funding from the Multilateral Fund for the total elimination of all Annex A Group 1 substances (CFCs) in the refrigeration sector. The funding will be paid out in installments as specified in the Agreement attached. Being a performance based Agreement, future payments will be conditioned to meeting the performance targets and conditions specified in the Agreement. The approval of this project will result in the elimination of CFCs consumption in the refrigeration sector of Mexico and will substantially contribute to the ability of the country to meet its Montreal Protocol obligations.

Prepared by UNIDO/SEMARNAT
 Reviewed by J Ellis/P Appleyard

Date: 9 September 2003
 Date: September 2003

CONTENTS

Chapter 1. General information of the proposal

Chapter 2. Impact of the proposal

- 2.1 Basic information on the country consumption of CFCs
- 2.2 Assessment of the consumption reduction schedule

Chapter 3. Data collection and validation

- 3.1 Methodology for data collection
- 3.2 Sector distribution of the remaining eligible CFC consumption

Chapter 4. Strategy and plan of implementation

- 4.1 General strategy of reduction of CFC consumption
 - 4.1.1 Annual reduction of CFC consumption
 - 4.1.2 Management of the supply and demand of CFC
 - 4.1.3 Policy instruments
 - 4.1.4 Steps to be taken to gradually curtail CFC demand
- 4.2 Refrigeration manufacturing sub-sector implementation program
 - 4.2.1 Current situation of the sub-sector
 - 4.2.2 Phase-out plan
- 4.3 Refrigeration service sub-sector implementation program
 - 4.3.1 Current situation of the sub-sector
 - 4.3.2 Phase-out plan
- 4.4 Incentive program for retrofitting and replacement
- 4.5 Technical support component
- 4.6 Implementation timeframe

Chapter 5. Incremental costs

- 5.1 Refrigeration manufacturing sector
- 5.2 Refrigeration service sector
- 5.3 Management and technical support component

Chapter 6. Management

Chapter 7. Monitoring and evaluation

Chapter 8. Performance target and disbursement schedule

- ANNEX I** Regions and customs offices location in Mexico
- ANNEX II** Cost break down for incremental costs for the refrigeration manufacturing sector
- ANNEX II** Cost breakdown of project components
- ANNEX III** Draft agreement between Mexico and the Executive Committee of the Multilateral Fund for the phase-out of ozone-depleting substances

Chapter 1. General information

The present project proposal consists of a refrigeration sector CFC phase-out plan in Mexico. The proposal aims at reduction of the consumption of Annex A, Group I substances, CFCs in Mexico in compliance with the Montreal Protocol obligation. The plan has duration of 7 years (funding is requested for 5 years).

Ratification status of Mexico is as below,

Vienna Convention, -----	ratification on 14 September 1987
Montreal Protocol, -----	acceptance on 31 March 1988
London Amendments, -----	acceptance on 11 October 1991
Copenhagen Amendment, ----	acceptance on 16 September 1994
Montreal Amendment, -----	under study
Beijing Amendment, -----	under study

Chapter 2. Impact of the proposal

2.1 Basic data on the country consumption of CFCs

Mexico used to have two CFC production factories, Quimobasico and DuPont. The DuPont plant was closed in 1995 and the Quimobasico plant is only a remaining CFC production facility. Table 1 shows production and consumption of CFCs from 1995 to 2002.

Table 1. Consumption and Production of Annex A Group I substances in Mexico, in ODP tonnes

Max allowed consumption	-	-	-	-	4,624.9	4,624.9	4,624.9	4,624.9
Consumption	4,859	4,859	4,157	3,483	2,838	3,060	2,224	1,947
Production	15,737	8,959	8,431	5,252	5,530	7,546	6,640	5,652

Mexico's baseline average consumption of Annex A, Group I substances for the period from 1995 to 1997 amounted to 4,624.9 ODS tonnes. The country has always been in compliance with the Montreal Protocol control measures for the CFC consumption from 1999.

Relevant data for Multilateral Fund assistant scheme are given below.

Table 2. CFC Consumption data related to MFMP assistance for Mexico, ODP tones.

Baseline consumption	4,624.9
Starting point established by Decision 35/57	3,059.5
Consumption funded since the starting point	179.9
Remaining eligible consumption un-funded as of submission of the proposal	2,879.6

2.2 Assessment of the consumption reduction schedule

The remaining CFC consumption is 1,947.2 ODP tonnes in 2002 for all sectors. In the refrigeration sector, there was total of 1,669.2 ODP tonnes of CFC consumption, which correspond to 86% of the total country consumption.

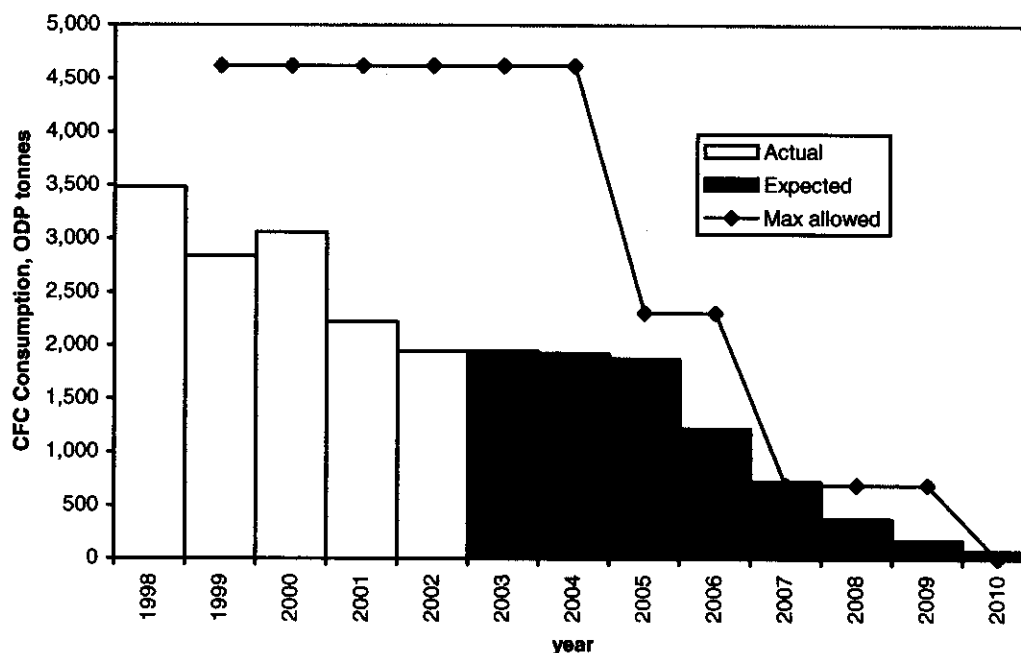
The projection of the CFC consumption trend as the result of the implementation of the present phase-out plan and that of on-going MFMP projects is given in Table 3 and illustrated in Fig. 1. A part of CFC consumption in the refrigeration manufacturing sector (20 ODP tonnes) will be reduced through the completion of a on-going project. It is also assumed that the consumption of 192 ODP tonnes in the foam sector will be phased out with a new activities, and that 14.5 ODP tonnes of usage in the sterilants sector will be phased out with implementation of the newly approved project at the 40th ExCom.

In the present sector phase out strategy, about 50 ODP tonnes of CFC consumption in the commercial refrigeration manufacturing sector is planned to be phased out in 2006, and the total CFC usage for the refrigeration service sub-sector is planned to be reduced gradually. By 2010, there is expected zero "consumption" for the refrigeration sector. Only limited amount of CFC usage will remain in solvent, aerosol (particularly medical application) sectors and for chiller servicing.

It is expected that Mexico will achieve the 50% reduction target in 2005, 85% reduction in 2007 and zero consumption after 2010 except the CFC usage for specific application through implementation of activities included in this project proposal.

Table 3. CFC Consumption reduction schedule, in ODP tonnes

Year	2003	2004	2005	2006	2007	2008	2009	2010
1. Max allowable total consumption of CFC	4,625	4,625	2,312	2,312	694	694	694	0
2. Reduction from ongoing projects as per business plan	0	20	0	0	0	0	0	0
3. New reduction under the present plan	0	0	50	655	500	350	200	100
4. Total annual reduction of CFC	0	20	50	655	500	350	200	100
5. Expected total consumption of CFC	1,947	1,927	1,877	1,222	722	372	172	72
NB: New reduction as per business plan 2003 - 2005	0	0	582	500	600			

Fig. 1. CFC Consumption reduction schedule in Mexico

Chapter 2. Data collection and validation

2.1 Methodology for data collection

Data of CFC consumption

CFC Consumption data are reported to the Montreal Protocol Secretariat according to the definition of the Montreal Protocol; i.e., Consumption = Production + Import - Export. The distribution of the CFC use in the country was determined by SEMARNAT through extensive survey of relevant industries including CFC suppliers and distributors.

Data of refrigeration sector

The Ozone office in SEMARNAT conducted the survey of remaining commercial manufacturers, that still use CFCs, to identify eligible enterprises.

UNIDO contracted with a local consulting firm, Objectivos Adhoc, that has experiences with survey of the refrigeration industry and market in Mexico, for the collection of information required for preparation of the refrigeration service sub-sector phase out plan, including:

- District wide distribution of service workshops (see ANNEX I for regions in Mexico),
- Estimation of total number of workshops,
- Current service practices,
- Potential service providers,
- Market situation of CFCs,
- CFCs commercial supply routes,

- CFCs and alternatives trends,
- Pricing and taxation of CFCs,
- Trade agreement with neighboring countries,
- Industrial statistics of production and import of refrigeration and air-conditioning equipment,
- Technical institutions and vocational training centers,
- Industrial associations,
- Governmental Agencies relevant to ODS issues,
- Amount of CFCs in installed units.

The contractor has already a list of about 4,000 workshops as published in their publication related to the refrigeration and air-conditioning industry in Mexico. In the study, about 1,800 service workshops in 40 largest cities were directly interviewed to gather information of the situation of the relevant sector in the year 2003 (see Table 4)¹. The result of the extensive survey was summarized in the survey report with the database of all service shops investigated.

Table 4. Surveyed cities for data collection in the service sub-sector²

#	Region	Cities
1	South	Acapulco, Cuernavaca, Toluca, Puebla, Queretaro, San Juan del Rio, Tlaxcala
	Federal district	Mexico city
2	Southeast	Cancun, Campeche, Coatzacoalcos, Merida, Veracruz, Villahermosa
3	North	Saltillo, Cd. Juarez, Cd. Victoria, Chihuahua, Matamoros, Nuevo Laredo, Reynosa, Torreon, Tampico, Cd. Delicias, Gomez Palacios, Durango
	Monterey	Monterey
4	Pacific central	Celaya, Leon, Cd. Obregon, Culiacan, Hermosillo, Mazatlan, Puerto Vallarta, San Luis Potosi
	Guadalajara	Guadalajara
5	Free frontier	Ensenada, Tijuana, Mexicali, Nogales

During the above survey exercise, official bodies, industrial associations³, refrigerants distributors, importers of refrigeration equipment and other stakeholders were consulted. The support was given from the CFCs producer, Quimobasicos, and refrigerant distributors to obtain precise data about sales, stocks, and trends of refrigeration/air conditioning equipment, and other equipment as well as refrigerants price information.

¹ Direct interviews were conducted with director generals (40%), directors of business (22%), technical directors (36%) and managers of the technical department (2%).

² South region stands for Zona Sur in ANNEX I, Southeast region for Zona Sureste, North region for Zona Norte, Pacific central region for Zona Pacifico Centro, and Free frontier for Zona Libre Frontera.

³ ANTAD (Asociacion nacional de Tiendas de Autoservicio y Departamentales), ASHRAE (ASHRAE Mexico chapter), CEAC (Cultura Ecologica), ANFIR (Asociacion Nacional de Fabricantes para la Industria de la Refrigeracion), AMDA (Asociacion Mexicana de Distribucion de Automotores), AMIA (Asociacion Nacional de la Industria Automotriz), ANIQ (Asociacion Nacional de la Industria Quimica).

The usage of CFC at service workshops determined through direct survey was doubly checked based on the obtained industrial statistics of appliances and automobiles.

3.2 Sector distribution of the remaining eligible CFC consumption

The distribution of the consumption of CFCs in Mexico is given below.

Table 5. Distribution of CFC consumption, 2002

Sector	Aerosol	Foam	Refrigeration manufacturing	Refrigeration service	Solvent	Total
CFC-11	30.3	192.0	29.7	175.0	0	427.0
CFC-12	10.0	0	20.0	1,431.0	0	1,461.0
CFC-113	0	0	0	0	57.0*	57.0
CFC-114	0	0	0	0	0	0
CFC-115	0	0	0	16.9	0	16.9
TOTAL, MT	40.4	192.0	49.7	1,622.9	57.0	1,961.9
TOTAL, ODP tonnes	40.4	192.0	49.7	1,619.5	45.6	1,947.2

* Solvent for aerosol formulation.

Chapter 4. Strategy and plan of implementation

4.1 General strategy of reduction of CFC consumption

4.1.1 Annual reduction of CFC consumption

In 2004, 20 MT of CFC consumption will be reduced through completion of on-going projects as projected in the 2003 – 2005 rolling business plan of implementing agencies.

New activities were planned in the 2003 – 2005 rolling business plan by UNIDO. Based on the scenario in this business plan, totally 984 ODP MT will be reduced in Mexico by 2007. However, according to the analysis made after the intensive investigation of the remaining CFC consumption along with the extensive survey of the remaining user sectors, it is expected that the CFC consumption in 2007 would exceed the maximum amount allowed for the country, if only the activities in the business plan would be executed. Therefore, the activities necessary to achieve the compliance target particularly in 2007 are proposed in the present phase out strategy.

In the present proposal, the total CFC consumption in the refrigeration-manufacturing sector is going to be phased out by 2006. In the refrigeration service-sector, a certain amount of CFC usage is expected to be reduced by implementation of technicians training program, which is proposed in this strategy, since intentional or non-intentional leakage of CFC refrigerants from equipment will be reduced during service or maintenance work as well as during operation of the equipment due to better service practices.

It is aimed to gradually reduce the CFC consumption in the service sector from 2005 till 2010 by introducing the national recovery and recycling scheme. Thereby, service workshops will be able to rely on recovered, recycled or reclaimed refrigerants for their service job to greater extent⁴.

There is relatively small amount of CFC usage in aerosol and solvent sectors and for chiller maintenance. The CFC usage for chiller servicing will continue as no measure is considered at the moment.

It is worth mentioning that the quite big amount of consumption reduction is planned in 2006 and 2007 in order to achieve the 85% reduction target in 2007. This is the critical objective for the success of the present strategy.

4.1.2 Management of the supply and demand of CFC

The local manufacturer, Quimobasicos is a major supplier of CFCs to the local market. A part of the local demand was satisfied by imports through major importers⁵.

At the 40th Executive Committee meeting, the Government of Mexico agreed to gradually reduce the CFC production. According to the agreement, the total CFC production for 2003 – 2005 is limited to 22,000 metric tonnes and the production is to be ceased in 2005. Table 6 shows the comparison between the local CFC demand expected in the present strategy

⁴ A certain amount of spontaneous reduction would also be expected in the refrigeration service sector due to the replacement of CFC appliances and MAC with non-CFC units. However, the amount of spontaneous reduction is uncertain.

⁵ In 2001, about 75% of local demand was satisfied by the local production.

and the local production. The demand after 2006 may be satisfied by a stock.

Table 6. Production and consumption of CFCs, Mexico, in ODP tonnes

year	1995	1996	1997	1998	1999	2000	2001	2002
Max allowed consumption					4,624.9	4,624.9	4,624.9	4,624.9
Consumption	4,859	4,859	4,157	3,483	2,838	3,060	2,224	1,947
Production	15,737	8,959	8,431	5,252	5,530	7,546	6,640	5,652
year	2003	2004	2005	2006	2007	2008	2009	2010
Max allowed consumption	4,625	4,625	2,312	2,312	694	694	694	0
Expected consumption,	1,947	1,927	1,877	1,222	722	372	172	72
Max allowed production as per Agreement*	12,353	12,353	6,750	0	0	0	0	0

* The total production for 2003 – 2005 must not exceed 22,000 metric tonnes.

4.1.3 Policy instruments

A. Introduction

This chapter describes the policies that will be introduced to support the phase-out plan and its implementation, in light of the experiences to date with the policies and actions already taken to reduce production and consumption of CFCs in Mexico. Since the late eighties the Government of Mexico has been applying a policy approach using a mix of instruments in the form of voluntary agreements with private sector, adoption of legislation and regulation. The Government of Mexico will reinforce this approach to ensure an appropriate implementation of the phase-out program in the refrigeration sector.

B. Past policy and actions for phase-out

Mexico holds one of the most advanced CFC phase-out programs among Article 5 Countries. Actions started as early as in 1988 and have become a permanent effort of the Government of Mexico. These actions have been coordinated through the Ministry of Environment (currently SEMARNAT). The Mexican CFC policy framework has been focusing on the use and supply of CFCs rather than on actions to control production. Some of the most important measures implemented, include:

- a) Conversion of the propellant industry: Negotiations headed by Government of Mexico led to the complete conversion of the non-medicinal aerosol and propellant producing industry from CFCs to hydrocarbons in 1989. The decision was formalized through a voluntary agreement signed between the Government of Mexico and the domestic propellant producers. The program was implemented without financial assistance from the Fund to compensate the incremental investment cost of industry.

- b) **Monitoring on trade of CFCs:** Starting from 1993, the Ministry of Environment has required the national CFC producing enterprises to voluntarily report domestic and international commercial activities such as production, imports and exports volumes. The industry is fully compliant with this requirement.
- c) **Import control on CFCs and CTC:** SEMARNAT has set up an import licensing system on CFCs and CTC, using an inter-ministerial mechanism called CICOPAFEST. The Ministry of Finance through the Customs Office enforces this regulation. Under the system, only the holders of import rights (namely Quimobásicos and DuPont de México) are allowed to import CFCs and CTC. Allocation of rights is based on historical (1990) domestic sales data. Quotas are established according to the average sales of the years 1995-1997 and subjected to the internal goals of SEMARNAT.
- d) **Constraints for growth on industrial demand of CFCs:** Since 1993, SEMARNAT has played an active role to circumvent the installation of any new CFC consuming facility in the Country, with emphasis on the original equipment manufacturer (OEM) sector. For the installation of any new production facility in the Country Mexican law requires an operation's license, which is granted by SEMARNAT, in order to manage related environmental impact and risks, and to establish emission prevention and control requirements, as well as to define operational conditions and growth. To enable compliance with the Mexican obligations under Montreal Protocol, SEMARNAT has been able to discourage the use of CFCs, and negotiate in favor of CFC substitutes, thus avoiding new progress on CFC consumption in the OEM sector.

Notwithstanding the current degree of success of controlling and diminishing CFC consumption in the Country, the major concerns of the Government regarding further progress of the phase-out process enabling definite compliance with Montreal Protocol obligations are:

- a) **Conversion of medium and small size commercial, institutional and industrial end users:** Despite the successful conversion of large industrial CFC consumers, there are still lagging segments, which continue demanding CFCs. To this end, the Government through SEMARNAT and the National Ozone Unit are working on preparing and presenting projects to MLF in order to eliminate demand of CFCs in particular for servicing equipment still in use in such consuming sectors.
- b) **Prohibition of import of CFC containing equipment:** Since 1998 the Government has been setting up temporary prohibitions on import of refrigeration, air conditioning and water cooling equipment using CFCs in order to halt new additional CFC demand, and complement efforts in controlling manufacturing industry's demand. Permanent control measures will be established by SEMARNAT to prohibit import of equipment using CFC, including also used cars in addition to refrigeration equipment.
- c) **Elimination of CFC demand for household refrigerator and air-conditioning equipment, and mobile air conditioning units:** The Government of Mexico's approach to manage residual end-consumer demand is based on technology substitution (meaning discontinued use of CFC-based equipment by end-users through acquiring newer generation, CFC-free equipment). The rate of replacement depends on a complex array of factors, including the purchasing power of end-users. To that extent, potential measures to be implemented include: making new CFC-containing equipment unavailable (as discussed above), implementing a training program for refrigeration technicians, and developing educational and promotional campaigns for the general public.

- d) Controlling availability of CFCs on the Mexican market: Collaboration with CFC producers/importers has provided major advancements on control of CFC availability. An agreement on a definite CFC production and import phase-out schedule is already formalized. Nevertheless, the Government of Mexico is concerned about the uncontrolled introduction of CFCs to the Country, and to that end, is preparing actions to strengthen regulations and enforcement to control illegal trade. Support from the international community is requested as part of this project to enhance and speed-up the implementation of such regulations and enforcement.

C. Policy objectives and instruments

The Government of Mexico will establish a set of additional supporting policies and measures to promote CFC phase-out in the Country. The main objective of the formulation of new regulatory instruments is the strengthening of a policy framework to achieve complete ODS phase-out, complying with the obligations under the Montreal Protocol in a gradual and orderly manner to minimize adverse economic affects to all sectors involved.

CFC production quota system

In order to ensure that Mexico's CFC production sector complies with the phase-out schedule targets, the Government will legally formalize a mandatory production quota (or cap) system. The production quota system will be the key policy element for implementing the CFC production sector phase-out plan in Mexico.

Ozone Depleting Substances (ODS) Regulations

The Mexican Government has initiated formulation of a detailed regulation to monitor and control the production and uses of Ozone Depleting Substances in the Country. Salient features of the proposed regulation regarding CFCs are:

- (i) Gradual abandonment of the use of substances that deplete the Ozone layer in all sectors consistent with the Montreal Protocol obligations. The rule would be compulsory for all producers, importers, exporters, distributors, vendors and commercial and industrial consumers of CFCs.
- (ii) From the date of implementation of the norm, authorized commercialization of CFCs will be only permitted to satisfy basic internal needs and essential uses in the Country. The regulation will include schedules with maximum allowable quantities permitted for such uses on a yearly basis until 2010.
- (iii) From the date of implementation of the regulation, it will be prohibited to produce or import all kinds of refrigeration equipment, air conditioning equipment, propellant formulations, plastic foam or solvent cleaning operations that use or contain CFCs, except those related to essential uses as defined by the Montreal Protocol .
- (iv) The regulation will establish rules to control the commercialization of recycled or reprocessed CFCs.

4.1.4 Steps to be taken to gradually curtail CFC demand

Along with the control of CFC production under the Agreements made with CFC producing Article 5 countries (China, India, DPR Korea, and Argentina), the Mexican program of

production phase-out would result in adequate reduction of supply of CFCs in the country. Possible reduction of CFC production in Venezuela and non-Article 5 countries in Europe would further create a favorable circumstance for the present CFC consumption phase-out program, since production phase out programs result in short of virgin CFC availability, encouraging user industries to convert to alternative technologies and to consider the responsible use of refrigerants including recovery and recycling exercise.

Completion of on-going projects supported by the Multilateral Fund will reduce the consumption of CFCs in the refrigeration manufacturing sectors according to the 2003 – 2005 rolling business plans approved at the 39th ExCom. This will be followed by the new activities proposed in the aerosol, foam and refrigeration manufacturing sectors.

In the present sector phase out plan, activities relevant to the CFC phase out in the refrigeration manufacturing sub-sector are proposed. Similarly, activities required for CFC consumption phase-out in the service sub-sector are proposed, including -

Customs training program,
Service technicians training program, and
National recovery and recycling scheme.

At the late stage of the present plan, an incentive program will be introduced to encourage retrofitting and replacement of existing relatively large equipment working with CFCs. It will facilitate the phase-out of final CFC consumption for servicing these units. Chillers are not subject to the incentive program, however.

Except the usage of CFCs for servicing chillers, the CFC demand in the refrigeration sector will be gradually reduced to zero consumption by 2010.

4.2 Refrigeration manufacturing sector implementation program

4.2.1 Current situation of the sub-sector

A. Domestic refrigeration

MFMP Projects in the domestic refrigeration sector are given in Table 7. Through these projects, major OEMs (Mabe and Vitro groups) have already converted CFC production technology to non-CFC including compressor production. Currently all new domestic appliances are based on non-CFC technologies.

Table 7. MFMP Projects in the domestic refrigeration sub-sector; IA, UNDP, all projects completed.

Project title	Description	Impact ODP tonnes	Grant
Conversion of CFC-12 domestic refrigerator compressors to HFC-134a at (Comasa, Mabe Group)	Installation of a 5 stage degreasing cleaning system, 2 dehydration ovens, a compressor leak detector equipment, testing, trials and training. Conversion is a joint venture with Sanyo, a foreign partner and will increase the production capacity threefold.	0	\$1,188,724
Conversion of CFC-12 domestic refrigerator compressors to HFC-134a at Fabricacion de Compresores S.A. (Facosa, Vitro Group)	Replacement of upper and lower shell dies, retrofitting of 2 welding machines, ultrasonic immersion cleaner, compressor leak detector equipment, testing, technology transfer and training.	0	\$584,000
Elimination of CFC in the manufacture of domestic refrigerators at Ensambladora de Refrigeradores (Enresa, Mabe Group)	Replacement of low-pressure machines by high-pressure units (foam component), charging boards, leak detectors, retrofitting of 80 vacuum pumps and 5 new vacuum pumps, and a lube storage and dehydration system (refrigerant component), testing, technology transfer.	47	\$867,033
Elimination of CFC in the manufacture of domestic refrigerators at Industrias Astral (Mabe Group)	Replacement of low-pressure machines by high-pressure units and machine for pilot series (foam component), charging boards, leak detectors, retrofitting of 80 vacuum pumps and 10 new vacuum pumps, and a lube storage and dehydration system	344	\$2,439,932
Elimination of CFC in the manufacture of domestic refrigerators at Supermatic, S.A. (Vidro Group)	Enhanced ventilation system (foam component), retrofit of the existing charging boards, 2 leak detectors, retrofitting of 53 vacuum pumps and 10 new vacuum pumps, and a lube storage and dehydration system (refrigerant component), testing, technology transfer.	366	\$2,017,517
Elimination of CFC in the manufacture of domestic refrigerators at Estufas y Refrigeradores Nacionales S.A. (Erna, Vitro Group)	Replacement of low-pressure machines by high-pressure units and enhanced ventilation (foam component), charging boards, leak detectors, retrofitting of 35 vacuum pumps and 5 new vacuum pumps, and a lube storage and dehydration system (refrigerant component)	49	\$1,038,309
TOTAL		806	

B. Commercial refrigeration

This sector includes manufacturers of refrigerated showcases, bottle coolers, ice cream machines, ice machines, condensing units and cold storage rooms. The national manufacturers supply almost 100% of the market, though some of parts or components used in their products are imported.

Commercial equipment manufacturers under the MFMP assistance for technology conversion are listed in Tables 8 and 9. In Table 8 assistance for retrofitting of CFC equipment at super market chains, Gigante, Aurrera and Chedroui) are also included.

Table 8. Commercial refrigeration projects (refrigeration parts) under the

Multilateral Fund assistance, all projects completed, IA, IBRD.

Project title	Description	Impact ODP tonnes	Grant
Replacement of CFC-12 with HFC-134a refrigerant in the manufacturing of commercial refrigeration in Refrigeración Ojeda	Modification of a refrigeration manufacturing line to use HFC-134a refrigerant. It includes procurement of refrigerant recharges, vacuum pumps and testing equipment. NOTE: Approved within the \$4 million line of grant.	13	\$225,000
ODS phase out at Gigante 1	Elimination of CFC-12 and R502 at 53 stores of Gigante supermarket through a combination of near drop-in retrofitting of intermediate age compressors. NOTE: Approved within the \$4 million line of grant.	38	\$496,380
ODS phase out at Aurrera 1	Project consists of combination of retrofitting of intermediate age compressors (3-7.5 HP) per manufacturer's guidelines for near drop-in retrofit procedures; and replacement of older units not feasible to be retrofitted. NOTE: Approved within the \$4 mil	44	\$500,000
ODS phase out at Gigante 2	Elimination of ODS at several stores of Gigante supermarket through a combination of near drop-in retrofitting of intermediate age compressors. NOTE: Approved within the \$4 million line of grant.	18	\$278,070
ODS phase out at Chedraui stores	Elimination of CFC-12 in 16 stores of Chedraui through retrofitting of intermediate age compressors (3.5-7.5 HP) per manufacturer's guidelines for near drop-in retrofit procedures for use with MP-39. NOTE: Approved within the \$4 million line of grant.	15	\$228,120
ODS phase out at Aurrera 2	Project consists of combination of retrofitting of intermediate age compressors (3-7.5 HP) per manufacturer's guidelines for near drop-in retrofit procedures; and replacement of older units not feasible to be retrofitted. NOTE: Approved within the \$4 mil	22	\$275,000
TOTAL		150	

Table 9. Commercial refrigeration projects (whole operation); IA, UNIDO.

Project title	Description	Impact ODP tonnes	Status	Grant US\$
Phasing out of CFCs at Criotec S.A.	The company is requesting retroactive funding of a portion of the capital cost (2 high pressure foaming machines, 2 refrigerant charging boards, retrofitting of 6 vacuum pumps and 2 leak detectors), and the incremental operating costs for 2 years.	16	Completed	240,794

Project title	Description	Impact ODP tonnes	Status	Grant US\$
Phasing out of CFCs at Torrey S.A.	The company is requesting partial funding of a portion of the capital cost (a high pressure foaming machine, 3 refrigerant charging boards, and 2 leak detectors), and the incremental operating costs for 2 years.	15.1	Completed	228,165
Phasing out of CFCs at Nieto S.A.	The company is requesting retroactive funding of a portion of the capital cost (3 high pressure foaming machines, 3 refrigerant charging boards, retrofitting of 14 vacuum pumps and 3 leak detectors), and the incremental operating costs for 2 years.	24.6	Completed	353,976
Phasing out of CFC at Vendo S.A.	The company is requesting retroactive funding of a portion of the capital cost (2 high pressure foaming machines, 2 refrigerant charging boards, retrofitting of 7 vacuum pumps and 2 leak detectors), and the incremental operating costs for 2 years.	16.5	Completed	248,524
Phasing out of CFC-11 and CFC-12 with HCFC-141b and HFC 134a at Plásticos Técnicos Mexicanos (PTM) in the manufacture of commercial refrigeration equipment	The enterprise is equipped with 2 high-pressure foaming machines; funds are only requested for retrofitting one of these machines.	50.6	Completed	398,439
Phasing out CFC-11 with cyclopentane and CFC-12 with HFC-134a in the manufacturing plant of commercial refrigerators of Metaplus S.A. de C.V.	The enterprise possesses four low pressure foaming machines, 10 cabinet and 2 door foaming fixtures, refrigerant charging equipment, leak detectors and vacuum pumps. Replacement of existing 4 low pressure foam dispensers with one high pressure dispenser	20.1	On-going	303,094
Phasing out CFC-11 with HCFC-141b and CFC-12 with HFC-134a in the manufacturing plant of commercial refrigerators at Refrigeración Durán S.A. de C.V.	Retrofitting of 2 Gusmer low pressure foaming machines (foam component), retrofit of vacuum pumps, replacement of refrigerant charging units and leak detectors (refrigeration component), redesign, testing, trials, technical assistance and training. Increm	15.1	On-going	112,985
TOATAL		158		

In addition to manufacturers listed above, this sub-sector comprises of a number of small enterprises, which are geographically scattered and are of little access to sophisticated alternative technology and non-CFC production processes. Table 10 lists these enterprises, which are to be assisted for the CFC phase-put.

Table 10. Remaining enterprises in the commercial refrigeration sector

Enterprises	Location	Annual CFC Consumption, MT
Aislamientos Const.	Apodaca	8.5
Banda, Ap.y Eq.R.	Morgue	2.1
Equip.y Refac,Refrig.	Mexico	6.23
Frio y Control de V	Veracruz	1.13
Friooima, SA.	Celaya	4.09
G.I.Gareli	Cadereyta	4.65
Ingeni.en Prod.Con	Mexico	0
Kidron,S. de R.L.	Monterrey	0.35
Manitogo Refrigerera.	Mexico	4.5
Pure, S.A.	Mexico	1.3
Refrieom	Veracruz	1.35
Refrigerera. Campos	Morelia	1.6
Refrigerera. Moderna	Veracruz	0.45
Refrigeracion y Re.	Escabedo	11.35
Zelma Kooler de Me.	Merida	2.1

C. Mobile air conditioner (MAC).

The conversion of CFC-12 MAC was started in 1993 at the factory of VolksWagen, Mexico. As a result of two MFMP projects (Table 11) and the conversion of production technology at all automobile assembly factories⁶ to non-CFC, all new MACs produced in Mexico are with non-CFC refrigerant from 1996. Annual output of the total cars were in a range of 600,000 units for 1992 -1999 and 900,000 - 1,000,000 for recent three years⁷; about 70% are passenger cars. In the past, only 15% of passenger cars were equipped with air-conditioners. However, recently percentage of cars with air-conditioners have been increased in this decade and 80% of passenger cars produced in 2002 were equipped with ACs.

Table 11. MAC Project under the Multilateral Fund Assistance, all projects completed, IA, IBRD.

Project title	Description	Grant
Manufacture of complete heat exchanger systems for air conditioning equipment that use HFC-134a at Climax de Mexico	The project proposes to change the tube and fin condenser to parallel flow design which requires a new multi-flow-tube cutting system and a fin machine for manufacturing the corrugated fins, a Nocolok furnace brazing process	\$2,359,812
Conversion of CFC-12 to HFC-134a technology in the production of MAC systems at Airtemp	The project is to convert the tube and fin condenser and evaporator designs to parallel flow designs. It includes a Nocolok furnace brazing process, a fin machine, a tube straighten machine, a core builder, and a condenser header, technology transfer	\$1,651,430

D. Industrial refrigeration and air conditioning

⁶ Major automobile assembly factories in Mexico include General Motors, Nissan, Ford, VolksWagen, Chrysler, Honda, Mercedes Benz, Renault, and Seat.

⁷ The sales of vehicles in Mexico was 1,969,779 in 2002. 60% of cars produced in Mexico were exported, and the same amount was imported.

Majority of industrial refrigeration equipment is based on ammonia and non-CFC refrigerants. Transportation refrigeration units were already converted to non-CFC refrigerants several years ago, and their servicing and maintenance is done by foreign OEMs (like Thermoking).

4.2.2 Phase out plan

As seen in Table 10, there are identified remaining eligible small and medium size enterprises that are manufacturing commercial refrigeration equipment using CFCs. Some of them have facilities of foaming and refrigerant charging, and some have only refrigerant charging facility. They are still manufacturing products with CFC-11 and CFC-12. Alternative technology selected was HCFC-141b as foam blowing agent and HFC-134a as refrigerant. These substitutes are accepted and recommended by TEAP as alternatives to CFC-11 and CFC-12. Depending on the current baseline equipment, assistance for necessary production line modification will be provided.

The investment component of the plan will focus on enabling the participant enterprises to eliminate CFCs from their production activities and would comprise of the following elements:

- Assessment of the technical requirements of conversion
- Determining the scope of international and local procurement
- Development of technical specifications and terms of reference for procurement
- Pre-qualification and short-listing of vendors
- International/local competitive bidding
- Techno-commercial evaluation of bids and vendor selection
- Procurement contracts
- Site preparation
- Customs clearance and delivery
- Installation and start-up
- Product and process trials
- Operator training
- Commissioning of CFC-free production
- Destruction of baseline equipment

The approach for implementing the investment component in the remaining eligible and not funded enterprises in the sector is executed as below:

Foam Operations

a) The use of new formulations will lead to a marginal change in mixing ratios and increased viscosity leading to reduced flow ability of the PU material. In case of rigid foam conversions, the HCFC-141b based foam will have an increased thermal conductivity in relation to that produced with CFC-11, which is being replaced. The existing manual mixing process or low-pressure foam dispensers will not be able to handle the new formulations without adversely affecting the cell structure and thereby the thermal conductivity of the foam. Hand mixing is also not recommended from occupational health and safety standpoints. Therefore, new high or medium-pressure foam dispensers of equivalent effective capacity will be needed to replace the existing dispenser/hand-mixing process. They will provide a finer cell structure and help minimize the deterioration of thermal conductivity of the foam, and also minimize the occupational health and safety risks,

b) The HCFC-141b based foam will have an increased molded density with respect to the

CFC-11 based foam, resulting in increased requirement of chemicals.

Refrigerant Operation

- a) Compressors suitable and optimized for HFC-134a will be required.
- b) The chemical stability of polyolester lubricants compatible with HFC-134a is highly sensitive to moisture and impurities in the system, as compared to that with CFC-12. The evacuation/charging process for HFC-134a and polyolester lubricant will need to ensure the required level of cleanliness and dryness in the system. To ensure this the following is proposed:
- The vacuum pumps will need to be suitable for use with HFC-134a. Retrofitting of vacuum pumps has not proven feasible or cost-effective in the past due to several factors (unsatisfactory condition, inaccessible suppliers, unavailability of parts, production downtime, etc) therefore appropriate quantities of new vacuum pumps suitable for the conversion, consistent with the baseline capacities, will be provided.
 - The existing refrigerant charging units/kits are not suitable for use with HFC-134a and cannot be retrofitted, and will therefore be replaced with automatic charging units or portable semi-automatic charging units suitable for HFC-134a duty.
- c) The design/sizing of the refrigeration cycles need to be optimized to ensure the viability of the process and to maintain the product standards for performance and reliability, such as:
- Reengineering evaporators and condensers, so as to ensure the levels of cleanliness and contamination that can be tolerated with HFC-134a.
 - Lengthening of the capillaries or changing the thermostatic expansion valve models.
 - Use of filter-dryers with finer pores, suitable for use with HFC-134a.

The existing leak detection is unsuitable for detecting HFC-134a leakages; therefore suitable hand-held leak detectors will need to be provided.

Equipment will be procured and delivered to the country by UNIDO based on their financial rule and regulation and in accordance with SEMARNAT. The planned project duration is 30 months, and the CFC consumption in the sub-sector will be phased out by 2006.

4.3 Refrigeration service sector implementation program

4.3.1 Current situation of the sub-sector

A. MFMP Projects

Approved MFMP projects related to the refrigeration service sub-sector are listed in Tables 12. Table 13 is a list of MFMP projects related to chillers.

Table 12. MFMP Projects related to recovery and recycling, all projects completed.

Project title	Description	Impact ODP tonnes	Grant US\$	IA
MAC recovery/recycling, Demonstration project in MAC	Collection and analysis of information on MAC sector, MAC recycling workshop for approximately 20 repair shops in a single city, furnishing recycling machines and related equipment to participating repair shops (to be funded by the UNDP Global MAC project)	25	120,000	USA
Demonstration programme in CFC recovery and recycling of the Instituto Mexicano del Seguro Social (IMSS) refrigeration equipment	Demonstration programme for the recovery and recycling of CFC in the IMSS refrigeration and air conditioning equipment. The project will lead to the development of a detail recovery programme. NOTE: Approved within the \$4 million line of grant.	15	499,918	IBRD
CFC recovery and recycling of refrigeration equipment in Monterrey City (Climas Jiménez)	Recovery and recycling of CFC from refrigeration and air conditioning equipment in operation in the city of Monterrey through 4 recovery machines. NOTE: Approved within the \$4 million line of grant.	4	29,328	IBRD
CFC recovery and recycling programme through Quimobasicos, S.A.	Establishment of a CFC recovery, recycling and reclaimed network with recovery units, to be managed by Quimobásicos, S.A. The CFC recovered will be reclaimed by the company and return to the market. NOTE: Approved within the \$4 million line of grant.	140	222,540	IBRD
Recovery of CFC-12 servicing of domestic refrigeration at Vitromatic Comercial y Servicios Integrados	Implementation of national programme for recovery and recycling of refrigerant in the refrigeration sector. It will be implemented through the service companies of 2 domestic refrigerator manufacturers (Vitro and Mabe).	76	352,610	UNDP
Pilot sectoral study and action plan in commercial refrigeration	Study and pilot action plan for the commercial refrigeration/chiller sub-sector to be presented to industry associations and selected supermarkets, prepare 2 project proposals covering more than 220 stores.	0	410,000	USA
Training of Quimobasicos personnel in the use of CFC recovery and recycling equipment	Establishment of technical and operational conditions at the local producer of CFCs to recover and recycle CFCs and training programme for service technicians. NOTE: Approved within the \$4 million line of grant.	0	252,246	IBRD
TOTAL		260	2,076,642	

Table 13. MFMP Projects related to chillers

Project title	Description	Impact ODP tonnes	Status	Grant US\$	IA
Chiller hands-on training	Development of instruction material in Spanish, demonstration and hands-on training on recovery and recycle equipment; develop information on the chiller market in Mexico; 2 training workshop to 167 chiller servicing technicians; identification and contact	-	Completed	81,000	USA
Cancun chiller workshop	Training refrigeration technicians from IMSS and other enters to reduce emissions of ODS during operation and maintenance of chillers.	-	Completed	90,000	USA
Chiller concessional lending pilot project	The project intends to use a grant to leverage matching funds from local sources to set up a revolving fund to finance replacement of 20 CFC chillers with high-energy efficient chillers using HFC-134a (and HCFC-123 when no other alternative is viable) as	5	On-going	565,000	UK

B. Number of service workshops

For preparation of the sound strategy for phasing-out CFC consumption in the service sector, it is essential to have a deep understanding of the sub-sector. Therefore, the extensive survey was conducted as described in Chapter 3.1. The information collected through direct interview with 1,800 service workshops in 40 cities of Mexico during mid of 2003 is summarized below.

The total number of service workshops in Mexico is estimated to be 8,000 and the number of service technicians is 20,000. The regional distribution is shown in Table 14.

Table 14. Distribution of service workshops in Mexico.

Zone	Region	Direct sample	Estimated Number of shops	Estimated number of technicians
1	South	120	824	2,060
	Mexico city	335	1,681	4,202
2	Southeast	172	831	2,078
3	North	345	1,322	3,305
	Monterey	243	864	2,160
4	Pacific central	302	1,245	3,112
	Guadalajara	139	720	1,800
5	Free frontier	145	513	1,283
	TOTAL	1,801	8,000	20,000

Size and life of workshops are summarized in Table 14. Characteristics of service technicians in service workshops are summarized in Table 15. Majority of service shops are small and medium size enterprises.

Table 15. Characteristics of service workshops in Mexico.

Size	Total number of employees	%
Micro	1 to 15	95
Small	16 to 100	4
Medium	101 to 250	0.5
Large	over 250	0.5
Years in business		%
	1 to 9	33
	10 to 19	31
	20 to 29	17
	30 to 39	5
	over 40	14

Table 16. Characteristics of service technicians

Age of technicians	%	Qualification	%
20 to 29	20	None	1
30 to 39	38	Primary school	11
40 to 49	24	Secondary school	24
50 to 59	13	High school	23
over 60	5	Technical school	21
		College	20
Technician's experiences	%	After school training	%
over 3 year	71	Courses	88
1 to 3 years	20	Personal	1
6 - 12 month	7	Practical	11

As summarized in Table 17, the awareness of Ozone issue is quite high, though the existence of the Ozone unit is not well known.

Many of workshops had experiences with refrigerant leakage of equipment at servicing. A half of workshops know the concept of recovery, and many of them intend to recycle the recovered refrigerant. About a half of workshops had experience with retrofitting, mainly by changing lubricant and refrigerant with no change of compressor and other system components. There is limited difficulty in obtaining alternative refrigerant in Mexico.

Table 17. Awareness and practice at service workshops in Mexico.

Items	Known %
Ozone issue	94
Ozone depletion substances	90
CFC phase-out in 2010	73
National ozone office	26
Retrofitting	85
Recovery	52

Items	Yes, %	Items	Yes, %
Aware of concern for leak by customer	69	Difficulty to get alternative	15
Experience with leakage due to	83	Experience of retrofitting	48
corrosion	27	Number of cases, 1 -9	39
friction	34	10 -19	22
vibration	33	20 - 29	11
bad servicing	37	30 - 39	7
temperature change	11	40 - 49	6
no maintenance	4	over 50	15
Idea on how to handle recovered refrigerants		Destruction 4%, recycle 77%, store 5%, reuse, 8%, send to distributor, 2%, emission 1%, others 2%	

As summarized in Table 18, many of workshops do not have vacuum pumps and use compressors for evacuation of the system.

Table 18. Service equipment availability

Equipment	%	Equipment	%
vacuum pump	17	pipe expansion tool	79
compressor	71	charging cylinder	46
recovery unit	41	welding machine	85
manifold	99	hand tools	86
nitrogen cylinder	47	Measuring tools like ampere meter, thermometer, weigh	11
oil pump	32	Pressure regulator	68
pipe cutter	90	leak detector	60
pipe bender	68	freer tool	82

D. CFC service usage by region and application

Regional CFC usage for refrigeration service is summarized in Table 19. North and Pacific central regions are major CFC consumption areas in the country due to high temperature climate.

Table 19. Regional distribution of CFC usage in service sector according to the direct survey of service workshops.

Zone	Region	CFC Total* MT	CFC-11 MT	CFC-12 MT
1	South	114	9	99
	Mexico city	151	13	132
2	Southeast	142	6	136
3	North	371	20	337
	Monterey	253	24	190
4	Pacific central	396	43	351
	Guadalajara	139	3	134
5	Free frontier	161	13	132
	TOTAL	1,728	131	1,509

*The total amount estimated based on the direct contacts with service workshops in 2003 is higher than the amount of service usage verified by the NOU in 2002. CFCs other than CFC-11 and CFC-12 are CFC-13 (1 MT), R-500 (6.2 MT), R-502 (69.8 MT), R-503 (2.9 MT), CFC-114 (4.57 MT) and CFC-113 (3.2 MT).

Table 20 lists the amount of CFC used for the service jobs for respective refrigeration and air-conditioning units, which has been determined through the analysis of the information given through the direct survey of service shops.

Table 20. CFC Service usage by application.

Type of units	Estimated on direct survey
Mobile air-conditioners	1,028
Heavy duty commercial equipment, e.g., cold rooms, condensing units	25
Light duty commercial equipment, e.g., show cases, freezers	656
Domestic refrigerators	18
Total	1,728

Amount of automobiles in fleet is 13 millions, and 7.5 million are produced before 1996. Out 7.5 million cars, 15% are equipped with MAC. Therefore the amount of cars with CFC-12 MAC is 1.1 million. Assuming the average service use of CFC-12 for MAC is 1.3 kg and 70% MAC need annual service charge, the annual usage was calculated as 1,001.

On the other hand, it is estimated that the total unit of domestic refrigerators in Mexico is 20 million, and a half was already converted to HFC-134a. Therefore, the unit operating with CFC-12 is 10 million. In Mexico only limited amount of these CFC appliances are subject to annual service charge, resulting in 20 metric tonnes of CFC-12 usage.

The CFC usage for servicing commercial equipment is big in Mexico. The life time of commercial refrigeration equipment is quite long and many old equipment is still in operation. They need annual maintenance and recharge.

As a summary, it is revealed that in Mexico the major use of CFC-12 is for servicing of MAC followed by commercial equipment.

D. CFC supply and prices of refrigerants

There is one producer and two importers of CFCs in Mexico permitted by CICOPLAFEST (see Chapter 4.1.3). Totally 78 distributors distribute CFCs in the country with more than 1,000 retail shops. Distribution of distributors is as follows, -

National distributors, 8
Regional distributors, 20
Local distributors, 50

Delivered prices of refrigerants in small cylinders) in the market are given below, -

CFC-11, \$ 8.8/kg
CFC-12, \$ 17/kg
HFC-134a, \$ 11.5/kg
HCFC-22, \$ 6/kg

4.3.2 Phase out plan

It is inevitable to take necessary measures for the reduction of the service use of CFC, in order for Mexico to be in compliance with the 50% reduction obligation for the year 2005, followed by the 85% reduction obligation in 2007. Measures for service use reduction are further important. The sector phase-out plan framework is, therefore, of essential importance for Mexico's compliance with the Montreal Protocol. As Mexico is a big country with about 8,000 workshops, the implementation would need several years. It should be started as soon as possible, to enable the country to meet its obligation for the years 2005, 2007 and 2010.

The conditions and constraints for the sector phase-out plan in Mexico are described below.

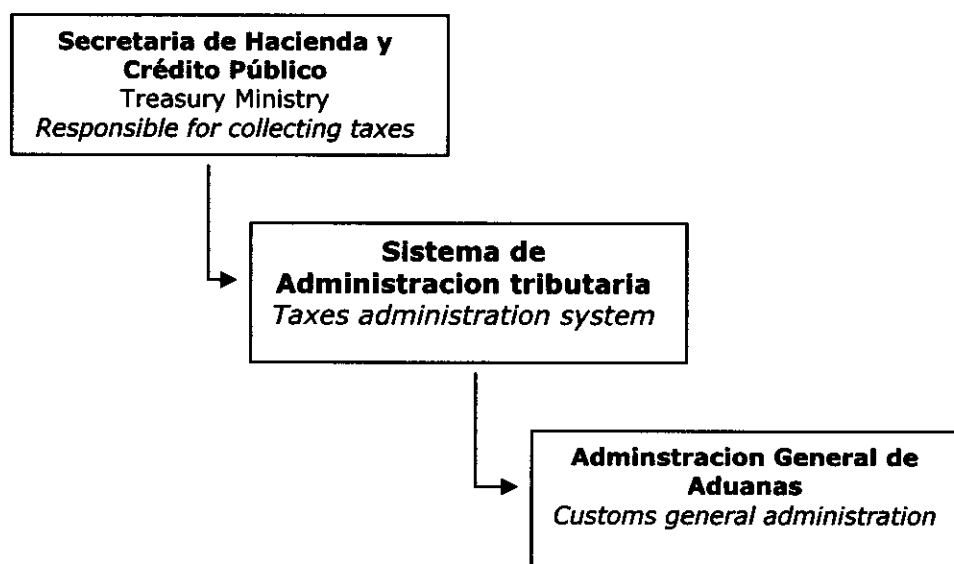
- The industry related to CFCs must be developed in a sustainable manner.
- Employment must be kept in all related industries, particularly in small and medium sized enterprises (SMEs), which play a major role in the refrigeration service sector. Even more employment may be created as a result of successful implementation.
- The requirements of CFC refrigerants for servicing and maintenance of existing CFC refrigeration and air-conditioning equipment must be satisfied and must be supplied through the national recovery and recycling project.
- The service sector in Mexico is not well coordinated due to the huge number of SMEs involved.
- Availability of CFC is limited in the near future.
- Legislation framework in Mexico may need is to be fine tuned.

Under the above circumstances, the present sector phase-out plan must serve as a seed to initiate a sustainable national system for refrigerant recovery and recycling and the responsible use of refrigerant in the refrigeration industry and the consumer sector.

Project components with specific activities or actions, objectives and modalities of implementation in each project component are elaborated below.

A. Customs training program

Current system: The current organization of customs offices in Mexico is illustrated below.



Customs general administration is a Governmental organization belonging to Federal Government under SAT office (Taxes Administration Service) of SHCP (Secretaria de Hacienda y Crédito Público – Treasury Ministry for collecting taxes).

Their main function is acting as public prosecutor, to watch over and to inspect and take control about incoming and leaving commodities to assure carrying out customs laws referring to exterior trade, collecting taxes. It also provides guidelines on import/export procedures, Customs law, currency exchange rate, and related matters.

There are 48 customs and 177 service points in Mexico, as follows:

19	North Border (3,152 km)
2	South Border (1,149 km)
17	maritime (11,122 km of coasts)
10	inside
48	Total

Out of 48 offices, sixteen (16) offices located in the north boarder are important for

investigation of CFC and CFC equipment.

Every custom has following officers, -

Chief administrator,
Administrators for general matter, specific sectors, accounting and banks, textile sector,
Sub-administrators for accounting, banking operations, importers and general census,
Chiefs for baking institutions, accounting, public attention,
fiscal policemen, customs officers, customs operators and tax collector.

The average number of staff in each customs office is 130. These customs officers are not trained on the issues of ODSs and Montreal Protocol. None of customs point is equipped with tools to identify CFCs.

Program: In the present project proposal, two different kinds of training workshops are planned, that is, (1) the general training for all customs offices on ODS issues, and (2) the intensive training for 16 important customs offices.

The training of 150 customs officers (about 3 officers from one customs office) will be carried out to get them acquainted with the Montreal Protocol and related environment issues, and to enable 16 key offices to identify controlled substances under the Montreal Protocol, and imported refrigerators, freezers and other refrigeration and air-conditioning equipment using CFCs.⁸ The experience obtained at customs authorities in non-A5 countries will be shared at training courses. For this purpose, ten one-day training workshops will be organized.

The intensive training course for three days will be organized for staff of five key customs offices. In addition to general training on ODS issues, practical training will be given to key customs officers on use of refrigerant identifiers, details of CFC and CFC containing equipment, and illegal trade of CFC and CFC equipment.

CFC detection equipment will be provided to major customs points in the country. In addition, the project allows the customs department to create a database on imported ODS.

B. National technicians training program

Overview: One of the components of a CFC phase-out strategy in the refrigeration service sub-sector is a program for training service technicians in the good service practices in refrigeration and air conditioning, to avoid or reduce the intentional or unintentional release of refrigerant to the atmosphere and particularly about the proper use of controlled refrigerants, CFC-12 and CFC-11. In addition, this project promotes the recovery, recycling and reclamation of refrigerants in order to reduce the reliance on virgin CFCs for their service business, leading to the CFC consumption reduction.

The training provided should be specified in such a way that at the end of the courses each technician should be able to:

⁸ "Training manual for customs officers" published by UNEP is a basis of training manual.

- Understand how the CFC refrigerants affect the ozone layer and what kind of effects for the damage of the ozone layer have concerning life on earth.
- Apply appropriate methods of repairs, maintenance and installation of refrigeration or air conditioning equipment.
- Use refrigerant detection equipment to identify early leaks of gases to the atmosphere.
- Apply proper methods of cleaning, charging and discharging refrigeration units to avoid or to reduce the release of ODS into the atmosphere.
- Use proper methods to assess the correct amount of refrigerant to be put into the refrigeration unit during service or repair.
- Use properly the equipment for the recovery or the recycling of refrigerant in the workshops.
- Recognize the ethical implications of using ODS for the future of the world.

The national training plan will be developed in several phases;

- Training of trainers who will be teacher for consecutive training courses.
- Training courses to train and certificate 4,000 service technicians out of 20,000 technicians in 8,000 workshops.

Due to the constraint of the funding, only a part of technicians from selected service workshops will be trained under the present project. Certified technicians or workshops will receive service tools or recovery unit. Training of the rest of the technicians as a part of a certification continuous program will be developed in an early future.

The conditions and specifications of this technician certification program is to be developed by the administration of the program.

Training institute and training material: In Mexico there are several training institutions,

CONALEP (Colegio Nacional de Educación Pública),
D.G.T.I. (Dirección General de Educación Tecnológica Industrial),
CECATI (Centros de Capacitación para Trabajo Industrial),
ITESM (Instituto Tecnológico de Estudios Superiores de Monterrey),
UNAM (Universidad Nacional Autónoma de México),
UECYTM (Dirección General de Educación en Ciencias y Tecnología del Mar) and
ITACE (Instituto Tamaulipeco de Capacitación Para el Empleo).

CONALEP is a country wide institution for training of refrigeration technicians. They have 429 schools all over the country. CECATI in Mexico city has 41 schools and provides 6 months training, 20 people in 6 months. OEMs (York, Carrier etc.) also have their own training function to train their service technicians. Above institutions are expected to take part in the present program.

Although training institutes in Mexico are relatively well equipped with teaching aids and training equipment, selected schools will be upgraded in terms of training facility by providing with tools for recovery and recycling.

The instructor or the administration of the courses develop or select the appropriate training materials for the courses in Spanish, which includes standard textbooks with the support of audiovisual materials such as computer assisted animations, technical films, transparency films.

The suitability of using the UNEP publication as a textbook of any of the courses should be evaluated, as well as any other training materials from other Spanish speaking countries for similar training.

Instructors for the training Program should demonstrate their technical skills and experience in training and that they should speak Spanish Language by registering at the Office with the responsibility for the Administration of the Program using their curriculum vitae or resume.

In accordance with the required profile they should have:

- a) Academic background appropriate for each level of training
- b) Experience as instructor in refrigeration.
- c) Practical experience in the area.
- d) Knowledge about the national and international regulations for protecting the ozone layer.

C. National recovery and recycling project

Establishment of recycling centers: Totally 36 recycling centers will be established at major cities in each region, so that every service workshop can access to centres.

Table 21. Proposed recycling centres, number in parenthesis.

Region	Cities
South (7)	Acapulco (1), Toluca (1), Puebla (1), Queretaro (1)
	Mexico city (3)
Southeast (5)	Cancun (1), Campeche (1), Merida (1), Veracruz (1), Villahermosa (1)
North (10)	Cd. Juarez (1), Cd. Victoria (1), Chihuahua (1), Nuevo Laredo (1), Reynosa (1), Torreon (1), Tampico (1), Durango (1)
	Monterey (2)
Pacific central (9)	Leon (1), Cd. Obregon (1), Culiacan (1), Hermosillo (1), Mazatlan (1), Puerto Vallarta (1), San Luis Potosi (1)
	Guadalajara (2)
Free frontier (5)	Ensenada (1), Tijuana (1), Mexicali (1), Nogales (1), La Paz (1)

Equipment to be provided to recycling centers includes a recovery machine, a recycling machine, a recycling machine with function to remove non-condensable gas, several small recovery cylinders, vacuum pumps, a refrigerant identifier (infrared type), a storage cylinder, service tools (piercing valve, gauge manifold etc.), and a hand-held leak detector. They also

need a cylinder to keep un-recyclable refrigerants until further treatment will be done. Reclamation facility already installed in Mexico will be effectively used in the scheme.

Service equipment and recovery machines: Essential service equipment for good servicing practice and refrigerant recovery will be provided to selected service workshops under defined criteria by SEMARNAT with the assistance of UNIDO. It includes vacuum pumps, recovery machines, piercing valves and other service tools. In order to facilitate the reduction of use of CFC-11 for flushing refrigeration systems, flushing units with non-ODS flushing agents (e.g., alcohols, glycol, ethers) are going to be provided to selected service workshops, where amount of CFC-11 usage is high. All recipients must be certified after the training planned in the present plan.

4.4 Incentive program for retrofitting or replacement of industrial equipment

Incentive program for encouraging retrofitting or replacement of existing CFC based relatively big installation is planned in addition to already completed projects at supermarket chains. Target end-users of this scheme includes corporate users including remaining super market chains, and public users of refrigeration equipment.

4.5 Technical Support Component

Since the sector phase-out plan will address the entire refrigeration sector, the industry as a whole will need to be supported through provision of a technical support component to ensure that phase-out actions and initiatives are not only technically sound but also sustainable, and consistent with the important priorities of the Government, which are to prevent industrial dislocation and obsolescence. The technical support component will assist the refrigeration sector as a whole, on, -

- a) Establishment quality and performance standards for the CFC-free products and applications within the sector;
- b) Interaction with the user industry for providing technology assistance for sustainability of CFC-free refrigeration applications through technical workshops and meetings;
- c) Establishment of a training, certification and licensing program for refrigeration system production equipment operators and technicians for sustaining the CFC-free technologies.

This would also provide the Government of Mexico with flexibility for project implementation, thereby the strategy is able to cope with specific situation occurring during the execution of the program.

4.6. Timetable for implementation of the sector phase out plan

Table 22 shows the timeframe for the implementation of each activity in each project component.

Table 22. Timetable for implementation of the THE SECTOR PHASE-OUT PLAN,

Mexico

Year	2003	2004	2005	2006	2007	2008	2009	2010
Reduction in ref. manufacturing sector					50			
Reduction in service sector	0		0	50	400	500	350	200
Approval	*							
Project management								
Coordination group set up								
Training of national experts								
Awareness promotion								
Monitoring								
Reports		*	*	*	*	*	*	*
Technical support component								
Refrigeration manufacturing sector								
Customs training								
Technician training								
Recovery and recycling scheme								
Equipment delivery to centres								
training of centre staff								
Delivery of equipment to shops								
Incentive program								

Chapter 5. Incremental costs**5.1 Refrigeration manufacturing sector**

Incremental costs for the manufacturing sector plan is composed of equipment costs for modification of existing foaming machines and refrigerant charging units depending on the baseline equipment of enterprises. Incremental operating cost for 24 months operation will be provided to assist enterprises included in the present sector phase-out plan for conversion. The cost detail is elaborated in ANNEX I.

5.3 Refrigeration service sector

Financial assistance required for each activity is summarized in Table 23 for the consideration by the Multilateral Fund. The grant is requested in five tranches from 2003 to 2007, so that an effective use of the allocated fund is ensured. The administration costs of the implementing agency are 7.5 % of the project cost.

Table 23. Costs of the CFC NPP, Mexico

Project component and activity	Sub Total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche
PROJECT MANAGEMENT	905,000	117,000	235,750	235,750	180,750	135,750
TECHNICAL SUPPORT COMPONENT	400,000	0	0	100,000	100,000	200,000
REFRIGERATION MANUFACTURING SECTOR PROGRAM	981,876	544,000	0	437,876	0	0
CUSTOMS TRAINING PROGRAM	337,000	337,000	0	0	0	0
NATIONAL PROJECT FOR TRAINING SERVICE TECHNICIANS	1,928,300	113,300	907,500	907,500	0	0
NATIONAL RECOVERY AND RECYCLING PROJECT	5,115,880	380,800	2,135,000	2,135,000	465,080	0
INCENTIVE PROGRAM FOR RETROFITTING AND REPLACEMENT	500,000	0	0	0	0	500,000
TOTAL PROJECT COST	10,168,056	1,492,100	3,278,250	3,816,126	745,830	835,750
IA Support cost	762,604	111,908	245,869	286,209	55,937	62,681
Total Grant by MFMP	10,930,660	1,604,008	3,524,119	4,102,335	801,767	898,431
Business plan 2003 - 2005		3,225,000	0	5,913,000	0	0

The cost breakdown of activities in the project components is given in Annex III.

Chapter 6. Management

The overall management of the plan will be carried out by the Government of Mexico with the assistance of UNIDO.

The Ozone Office will be responsible for monitoring the implementation of the phase-out plan. The Ozone office in SEMARNAT will be responsible for tracking the promulgation and enforcement of policy and legislation and will assist UNIDO with the preparation of annual implementation plans and progress report to the Executive Committee.

The implementation of the phase-out plan will need to be closely aligned and coordinated with the various policy, regulatory, fiscal, awareness and capacity-building actions, which the Government of Mexico is executing, in order to ensure the consistency with the Government priorities.

The phase-out plan for the whole refrigeration sector will be managed by a dedicated team, consisting of a coordinator to be designated by the Government and supported by representatives and experts from the implementing agency and the necessary support infrastructure. The policy and management support component of the phase-out plan will include the following activities for the duration of the plan:

- a) Management and co-ordination of the Plan implementation with the various Government policy actions pertaining to the refrigeration sector,
- b) Establishment of a policy development and enforcement program, covering various legislative, regulatory, incentive, disincentive and punitive actions to enable the Government to acquire exercise the required mandates in order to ensure compliance by the industry with the phase-out obligations
- c) Development and implementation of training, awareness and capacity-building activities for key government departments, legislators, decision-makers and other institutional stakeholders, to ensure a high-level commitment to the Plan objectives and obligations
- d) Awareness creation of the Phase-out Plan and the Government initiatives in the Sector among consumers and public, through workshops, media publicity and other information dissemination measures
- e) Preparation of annual implementation plans including determining the sequence of enterprise participation in planned sub-projects
- 1) Verification and certification of ODS phase-out in completed sub-projects within the Plan through plant visits and performance auditing
- g) Establishment and operation of a reporting system of usage of ODS/substitutes by users
- h) Reporting of implementation progress of the Plan for the annual performance-based disbursement
- i) Establishment and operation of a decentralized mechanism for monitoring and evaluation of Plan outputs, in association with provincial regulatory environmental bodies to ensure sustainability.

For implementation of service sector activities, the coordination office in the four regions of Mexico will coordinate the project implementation in each region for following activities, -

- Reassessment and analysis of the sector after the approval of the sector phase-out plan.
- Determination of the specification of equipment to be provided by the sector phase-out plan.
- Selection of trainers for training of technicians (SEMARNAT with the help of UNIDO).
- Selection of service workshops to be trained.
- Awareness promotion.
- Assist SMRNAT for developing licensing system.
- Monitoring and report to SEMARNAT.

Coordination offices are to be established in the south, southeast, north and pacific central regions. One in the pacific central region looks after north border region. Location of the regional coordination offices are as below, -

1. South region, Mexico city
2. Southeast region, Merida
3. North region, Monterey
4. Pacific central region and Free frontier region, Hermosillo

SEMARNAT will be responsible for the national coordination of the whole program. Table 24 is a management organization of the service sector program.

Table 24. Management organization of service sector program

Region	Coordination office	Recycling centre	Number of workshops	Number of technicians	CFC Usage	
					MT	%
SEMARNAT	Central office	-	-	-	-	-
South	1	7	2,505	6,262	265	15
Southeast	1	5	831	2,078	142	8
North	1	10	2,186	5,465	624	37
Pacific central	1	9	1,965	4,912	535	31
Free frontier		5	513	1,283	161	9

In each region, an advisory committee consists of representatives of the local governments (environmental departments and industry departments), customs offices, education and training institutions and industries.

The activities envisaged in the following are required for the coordination:

- A list of service workshops should be updated in terms of their CFC consumption, necessary equipment for recovery, their readiness to recover CFC, commitment to CFC phase out activity, capability and other factors relevant to the recovery and recycling scheme project.
- Possible institutes and/or enterprises for centers for training and recycling should be surveyed.
The business criteria of refrigerant recycling center should be developed.
- Recipient service workshops of recovery machine should be determined.
- Un-recyclable refrigerants should be kept for further treatment at the proper site.

Further, local distribution of service equipment and refrigerant recovery and recycle machines, which will be procured through UNIDO bidding procedure and delivered to the country, should be executed.

Chapter 7. Monitoring and evaluation

SEMARNAT monitors the consumption data of all ODS. Inspections at reconverted companies are foreseen to ensure the non uses of CFCs after project completion. The licensing system will be a tool to monitor and ensure compliance of control measures.

The Government has offered and intends continuing to offer continuity of activities and endorsement for the projects through the institutional support (National Ozone Unit) over the next years. This will guarantee the success of any activity approved for Mexico.

After the establishment of the countrywide scheme of refrigerant recovery and recycling, the monitoring activity will be initiated to know whether the project is successfully implemented and the target CFC phase out is achieved.

Monitoring activity will be done by:

- (1) Establishing the system to ensure with the counterpart institute, that every recycling center and service workshop is encouraged or obliged to report data and give information to the recovery and recycling scheme. This may be enabled through forms to be filled by recycling centers and service workshops.
- (2) Setting up adequate office facilities including a computer system to collect and analyze the data.
- (3) Regular communication with the counterpart institute.
- (4) Occasional visits to workshops and recycling centers.
- (5) Regular communication with customs offices.

Following information will be collected from recycling centers and workshops.

CFC quantity

- number of appliances subjected to refrigerant recovery and type of these appliances at every service workshop,
- amount of recovered CFC refrigerants at every workshop,
- amount of recovered CFC refrigerants sent to the recycling centers at every workshop,
- amount of recovered CFC refrigerants stored at every workshop,
- amount of recovered CFC refrigerants received from service workshops at every recycling center,
- amount of recycled CFC refrigerants at recycling centers,
- amount of recycled CFC refrigerants returned (sold) to workshops,
- amount of recycled CFC refrigerants used in workshops and its application,
- amount of CFC refrigerants, which can not be recycled and are subject to further treatment (e.g., sent to reclaiming plants, or decomposition plants abroad)
- other data relevant for monitoring the scheme (amount of imported CFC refrigerants etc.).

Cost information

- cost of recovery at every service workshop and parties who bear the cost,
- cost of recycling at every recycling center and parties who bear the cost,
- price of recycled CFC refrigerants,
- other financial information relevant to monitoring the recovery and recycling scheme.

Data and information collected will be analyzed to check the adequate operations of the scheme.

Chapter 8. Performance targets and disbursement schedule

Table 25 gives an overview of the annual performance targets.

Table 25. Performance targets of the national CFC phase out plan, Mexico

Tranche	Management	Refrigeration manufacturing sector	Refrigeration service sector	CFC Reduction, MT
2003	Project approval			0
2004	Establishment of operational mechanism for management and monitoring of the phase-out plan	Working agreement with enterprise in the manufacturing sector	Training of national core team	0
	Coordination groups set up	Bidding of foaming equipment	Coordination office set up	
	Start of awareness promotion		Selection of recycling centres	
	Monitor and evaluation		Bidding of recycling centre equipment	
			Training of centre staff	
			Selection of training institutes	
2005	Monitor and evaluation	Provision of foaming and charging units to manufacturing enterprises	Bidding for service equipment for workshops (phase 1)	50
			Training of technicians (phase 1)	
2006	Monitor and evaluation	Commissioning of foaming equipment and charging units	Delivery of service equipment (phase 1)	655
	Workshops e.g., supplementary training		Bidding of service equipment (phase 2)	
			Training of technicians (phase 2)	
2007	Monitor and evaluation		Delivery of service equipment (phase 2)	500
	Workshops e.g., supplementary training		Selection of end-users or retrofitting and replacement	
2008	Monitor and evaluation		Execution of retrofitting and replacement	350
2009	Monitor and evaluation			200
2010	Monitor and evaluation			100

Upon approval of the phase-out plan by the MLF, the Government of Mexico, through UNIDO, requests the Executive Committee to authorize disbursement of funding for 2004 in advance, the implementation plan for which, is as following:

- a) Establishment of operational mechanism for management and monitoring of the phase-out plan;
- b) Formulation of detailed terms of reference and work plans for various activities under the technical support and policy & management support components;
- c) Establishment of an operational mechanism for participation in the phase-out plan and for obtaining phase-out commitments from enterprises;
- d) Initiating CFC phase-out activities for the ... medium-sized enterprises through individual sub-projects;
- e) Selection of the small-sized enterprises for group projects;
- f) Two workshops under the technical support component for technology assistance to prospective participant enterprises in the sector;
- g) One workshop for public awareness and information dissemination under the policy and management support component.

Since the average duration required for completion of project components is expected to be 10 – 30 months, the phase-out activities initiated in 2003 will not produce results until mid or end-2004, contributing to the reduction of consumption starting 2005. Therefore, the Government of Mexico through UNIDO, will request the disbursement of the 2004 funding at the last Meeting of the Executive Committee in 2003. The funds for 2005 and 2006 will be transferred to UNIDO at the first meeting of the Executive Committee in these years, for the amounts listed in the table above, upon approval of the annual implementation plan and upon confirmation by the Government and UNIDO, that the agreed reduction targets and relevant performance milestones of the respective preceding years have been achieved.

The further detail must be agreed with the Executive Committee and stated in the Agreement.

ANNEX I. Regions and customs offices in Mexico



ANNEX II Project cost break down of phase-out plan in the manufacturing sector

A. Indicative list of remaining enterprises in the refrigeration manufacturing sector

#	Name	CFC -11 MT/year	CFC -12 MT/year	CFC TOTAL	Location
1	Aislamientos Const.	0.9	7.6	8.5	Apodaca
2	Banda, Ap.y Eq.R.	1.5	0.6	2.1	Morelia
3	Equip.y Refac.Refrig.	4.13	2.1	6.23	México
4	Frío y Control de V	1.13	0	1.13	Veracruz
5	Friocima, S.A.	2.49	1.6	4.09	Celaya
6	G.I.Gareli	2.95	1.7	4.65	Cadereyta
7	Ingeni.en Prod.Con	0	0	0	México
8	Kidron,S. de R.L.	0.35	0	0.35	Monterrey
9	Manitogo Refrigerera.	3.2	1.3	4.5	México
10	Pure, S.A.	0	1.3	1.3	México
11	Refricom	1.35	0	1.35	Veracruz
12	Refrigerera. Campos	0.9	0.7	1.6	Morelia
13	Refrigerera. Moderna	0.45	0	0.45	Veracruz
14	Refrigeracion y Re.	9.15	2.2	11.35	Escobedo
15	Zelma Kooler de Mé.	1.2	0.9	2.1	Mérida
	Total(15 enterprises)	29.7	20	49.7	
	ODS phased-out	26.43	20.00	46.433	

#	Name	Baseline equipment Foaming	Baseline equipment Refrigeration	Eligibility
1	Aislamientos Const.	Hand mixing equip.	9 VP& 1 CB & 2 LD	yes
2	Banda, Ap.y Eq.R.	LP Gusmer F1600	2 VP& 1 CB & 1 LD	yes
3	Equip.y Refac.Refrig.	LP Gusmer	3 VP& 1 CB & 1 LD	yes
4	Frío y Control de V	LP Gusmer FF	1 VP& 1 CB & 1 LD	yes
5	Friocima, S.A.	LP Gusmer H3	1 VP& 1 CB & 2 LD	yes
6	G.I.Gareli	LP Gusmer HL2000	2 VP& 1 CB & 1 LD	yes
7	Ingeni.en Prod.Con	no foam operation	1 VP& 1 CB & 1 LD	no
8	Kidron,S. de R.L.	LP Gusmer H-II	N.A.	yes
9	Manitogo Refrigerera.	Hand mixing equip.	1 VP& 1 CB & 1 LD	yes
10	Pure, S.A.	no foam operation	3 VP& 2 CB & 2 LD	yes
11	Refricom	LP Gusmer 1600	1 VP & 1 CB & 1 LD	yes
12	Refrigerera. Campos	Hand mixing equip.	1 VP& 1 CB & 1 LD	no
13	Refrigerera. Moderna	LP Gusmer FF	1 VP & 1 CB & 1 LD	yes
14	Refrigeracion y Re.	LP Cannon C60	4 VP & 1 CB & 3 LD	yes
15	Zelma Kooler de Mé.	LP Cannon L-100	1 VP & 1 CB & 1 LD	yes

VP= Vacuum pump 31 units
 CB= Charging board 15 units
 LD= Leak detector 19 units

B. INCREMENTAL CAPITAL COSTS

Foaming operation			
base line	Hand mixing	Dispenser	Subtotal
Number of enterprises	2	10	13
Foam dispenser	20,000	45,000	
Trials	2,000	2,000	
Technical asistance	1,500	1,500	
Training	1,000	1,000	
Subtotal	24,500	49,500	
Sub-total foaming (all enterprises)	49,000	495,000	544,000
Refrigerant operation			
Equipment	unit cost	Number	
Vacuum pumps	2,500	31	77,500
Charging units	2,000	15	30,000
Leak detectors	1,000	19	19,000
Subtotal refrigeration equipment			126,500
Technical services			
Trials			1,000
Technical asistance			1,000
Training			500
Subtotal			2,500
Number of enterprises			13
Subtotal for techncial service			32,500
Subtotal refrigeration equipment & services			159,000
Sub-total foaming & refrigeration			703,000
Contingencies (10%)			70,300
Grand Total			773,300

C. INCREMENTAL OPERATING COSTS

Foam operation		Before conversion	After conversion
Foam chemicals	kg	228,462	239,885
Rate	US\$/kg	2.5	2.67
Amount	US\$	571,154	640,492
Net incremental Costs	US\$	69,338	
(5%) Savings due to more efficient operation	US\$	3,467	
Incremental Operating costs	US\$	65,871	
One year (10% discount factor)	US\$	59,943	
Second year (10% discount factor)	US\$	54,673	
I.O.C. Two years	US\$	114,616	
Incremental Operating costs for foaming operation	US\$	114,616	
Refrigerant operation			
Item	Refrigerant		
unit	kg		
Quantity	20,000		
Price differential (pre and post conversion)	US\$	3	
Modifying factor	US\$	0.9	
Net incremental cost (US\$/year)	US\$	54,000	
One year (10%) discount factor (.91)	US\$	49,140	
Second year (10%) discount factor (.83)	US\$	44,820	
Incremental operating cost for refrigerant operation	US\$	93,960	
Total Incremental Operating costs (foam & refrigeration)	US\$	208,576	

D. TOTAL COSTS

Incremental Capital Costs including contingencies	US\$	773,300	
Incremental Operating Costs	US\$	208,576	
GRAND TOTAL INCREMENTAL COSTS	US\$	981,876	

ANNEX II. Cost breakdown of project components of National CFC phase-out plan, Mex co, in US\$

Items	Description	unit cost	Q'ty	Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche
PROJECT MANAGEMENT									
International consultant		5,000	6	30,000	5,000	10,000	10,000	5,000	0
Training of national experts		2,000	30	60,000	60,000				
Awareness promotion		5,000	12	60,000	15,000	15,000	15,000	15,000	
Coordination	National consultant in SMARNAT			100,000	25,000	25,000	25,000	25,000	
	Coordination office set up	115,000	4	460,000	0	115,000	115,000	115,000	115,000
	Office equipment	3,000	4	12,000	12,000				
	local services, e.g., selection of service providers and recipients, distribution of equipment			100,000		50,000	50,000		
	travel	500	150	75,000		18,750	18,750	18,750	18,750
	report and sundries	2,000	4	8,000		2,000	2,000	2,000	2,000
Element Total				905,000	117,000	235,750	235,750	180,750	135,750
Items	Description	unit cost	Q'ty	Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche
TECHNICAL SUPPORT COMPONENT				400,000		0	100,000	100,000	200,000
Items	Description	unit cost	Q'ty	Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche
REFRIGERATION MANUFACTURING SECTOR PROGRAM									
	Equipment, foam operation			544,000	544,000				
	Equipment, refrigeration operation			159,000			159,000		
	Contingency			70,300			70,300		
	Incremental operating cost			208,576			208,576		
Element total				981,876	544,000	0	437,876	0	0
Items	Description	unit cost	Q'ty	Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche
CUSTOMS TRAINING PROGRAM									
	Training material draft and printing 1,000 pieces			50,000	50,000				
	General workshops x 10 with 20 participants, totally 200 customs officers to be trained	9,580	10	95,800	95,800				

3 days- Intensive workshop for important 16 customs points, 8 participants from each point	teachers (\$ 5,000), conference room (\$ 2,000), travel & DSA (\$ 83,200, 128 x \$650)	91,200	1	91,200	91,200					
	International customs experts	5,000	5	25,000	25,000					
Identifiers		1,000	50	50,000	50,000					
Contingency				25,000	25,000					
Element Total				337,000	337,000	0	0	0	0	0
Items	Description	unit cost	Q'ty	Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche	
NATIONAL PROJECT FOR TRAINING SERVICE TECHNICIANS										
Establishment of training centres										
Training of trainees		500	30	15,000	15,000					
Training equipment	teaching aids	400	10	4,000	4,000					
	training rigs	1,000	10	10,000	10,000					
	recovery machine	500	10	5,000	5,000					
	recycling machine to be used for both training and recycling in R&R project	6,000	10	60,000	60,000					
	cylinders, 13 kg	30	10	300	300					
	vacuum pumps	300	10	3,000	3,000					
	refrigerant identifier	1,000	10	10,000	10,000					
	service tools, piercing valve, gauge manifold etc.	300	10	3,000	3,000					
	leak detector	300	10	3,000	3,000					
Training workshops	400 x 3-days training course with 10 trainees									
	support for outstation trainees	150	4,000	600,000		300,000	300,000			
	material - preparation drafting, translation, printing 10,000 copies	10	10,000	100,000		50,000	50,000			
	fee for teachers	250	400	100,000		50,000	50,000			
	training course arrangement	2,000	400	800,000		400,000	400,000			
	certification	10	4,000	40,000		20,000	20,000			
Contingency				175,000		87,500	87,500			
Element Total				1,928,300	113,300	907,500	907,500			
Items	Description	unit cost	Q'ty	Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche	
NATIONAL RECOVERY AND RECYCLING PROJECT										
Establishment of recycling centre	Total 36 recycling centres									
Training of recovery centre staff		500	36	18,000	18,000					

Centre equipment	recycling machine with air purge function	8,000	36	288,000	288,000					
	recovery cylinders	50	200	10,000	10,000					
	storage cylinders	200	36	7,200	7,200					
	service tools (piercing valve, gauge manifold etc.)	300	72	21,600	21,600					
	refrigerant analyzer	1000	36	36,000	36,000					
	Sub total			380,800						
Equipment for service shops										
	Recovery unit with filters	700	2000	1,400,000	0	700,000	700,000	0	0	
	Recovery unit	500	1,000	500,000	0	250,000	250,000	0	0	
	Vacuum pump	200	4,000	800,000	0	400,000	400,000	0	0	
	Recovery cylinder	30	4,000	120,000	0	60,000	60,000	0	0	
	flushing unit with non-CFC	500	500	250,000	0	125,000	125,000	0	0	
	service tools (piercing valve, gauge manifold etc.)	300	4,000	1,200,000	0	600,000	600,000	0	0	
	Sub total			4,270,000						
Contingency				465,080					465,080	
Element Total				5,115,880	380,800	2,135,000	2,135,000	465,080	0	0
Items	Description	unit cost	Q'ty	Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche	
INCENTIVE PROGRAM FOR RETROFITTING, REPLACEMENT				500,000	0	0	0	0	500,000	
				Sub total	2003 tranche	2004 tranche	2005 tranche	2006 tranche	2007 tranche	
Total funding				10,168,056	1,492,100	3,278,250	3,816,126	745,830	835,750	
IA Cost				762,604	111,908	245,869	286,209	55,937	62,681	
Total Grant Ex MFMP				10,930,660	1,604,008	3,524,119	4,102,335	801,767	898,431	

**GOVERNMENT NOTE
OF TRANSMITTAL OF INVESTMENT PROJECTS**

PROJECT OF THE GOVERNMENT OF MEXICO

The Government of Mexico requests the WORLD BANK to submit the project listed in Table 1 below to the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol for consideration at its 41st Meeting.

Section I: ODS Consumption Data

1. The ODS consumption figures of the project have been validated by the National Ozone Unit (NOU) to the level required under this performance agreement.
2. The consumption data have been retained in the records of the NOU for reference and/or future verification.
3. The Government has been advised by the NOU that the agreement to the projects indicates a commitment to ensure that the validated phaseout figures will be realized and will yield a sustained reduction from the 2002 consumption.

Table 1: Project Submitted to the 41st Meeting of the Executive Committee

PROJECT TITLE	Type of ODS	Consumption (ODP t)	Amount to be Deducted (ODP t)	Implementing Agency
Conversion from CFC-11, CFC-12 and CFC-113 into HFC, HCFC, HFE for technical aerosols at Teenosol, Envatec and Dimmex.	CFC-11	30.31	30.31	WORLD BANK
	CFC-12	4.00	4.00	
	CFC-113	35.8	35.8	
TOTAL		70.11	70.11	

Section II: Other Relevant Actions Arising from Decision 33/2


4. It is understood that, in accordance with the relevant guidelines, the funding received for a project would be partly or fully returned to the Multilateral Fund in cases where technology was changed during implementation of the project without informing the Fund Secretariat and without approval by the Executive Committee;
5. The National Ozone Unit undertakes to monitor closely, in cooperation with customs authorities and the environmental protection authorities, the importation of CFCs and to combine this monitoring with occasional unscheduled visits to importers and foam companies to check invoices and storage areas for unauthorized use of CFCs.
6. It is understood that the National Ozone Unit might conduct a determined number of unscheduled visits to the recipient enterprises.
7. The National Ozone Unit will cooperate with the relevant implementing agencies to conduct safety inspections where applicable and keep reports on incidences of fires resulting from conversion projects.

Section III: Projects Requiring the Use of HCFCs for Conversion

In line with Decision 27/13 of the Executive Committee and in recognition of Article 2F of the Montreal Protocol, the Government

- (a) has reviewed the specific situations involved with the projects as well as its HCFC commitments under Article 2F; and
- (b) has nonetheless determined that, at the present time, the projects needed to use HCFCs for an interim period with the understanding that no funding would be available for the future conversion from HCFCs for the company/companies involved.

Name and signature of responsible Officer:


Sergio Sanchez Martinez

Designation:

Date:

Director General

13-Oct-03

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