NATIONS UNIES

EP

Programme des Nations Unies pour l'environnement

Distr.
Restreinte

UNEP/OzL.Pro/ExCom/42/33
2 mars 2004

FRANÇAIS
ORIGINAL: ANGLAIS

COMITÉ EXÉCUTIF
DU FONDS MULTILATÉRAL AUX FINS
D'APPLICATION DU PROTOCOLE DE MONTRÉAL
Quarante-deuxième réunion
Montréal, 29 mars - 2 avril 2004

PROPOSITIONS DE PROJETS : INDE

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

Élimination

- Plan d'élimination des CTC dans les secteurs de la consommation et de la production : programme annuel 2004 — Banque mondiale

Production :

- Élimination sectorielle graduelle de la production de CFC : programme annuel 2004 — Banque mondiale

Réfrigération :

- Plan d'élimination de la consommation nationale de CFC — Allemagne, Suisse, PNUD/ONUDI

PLAN D'ÉLIMINATION DU CTC DANS LES SECTEURS DE LA CONSOMMATION ET DE LA PRODUCTION : PROGRAMME ANNUEL POUR 2004

Description du projet

Historique

1. En juillet 2003, à sa 40e réunion, le Comité exécutif a décidé d'approuver en principe un montant total de 52 millions $ US afin d'aider l'Inde à se conformer au calendrier de contrôle du Protocole de Montréal pour la production et la consommation de tétrachlorure de carbone (CTC), et a décaissé à cette session une première tranche de 5 millions $ US pour le démarrage de la mise en œuvre du projet. Le Comité exécutif a en outre approuvé, à sa 41e réunion, l'accord pour l'élimination de la consommation et de la production du CTC en Inde, et a décaissé le solde de 3 520 843 $ US pour le financement du programme annuel de travail de 2003. En ce qui concerne l'Accord relatif à l'approbation lors de la première réunion de l'année, des tranches de financement de 2004 et 2005, la Banque mondiale est en train de soumettre à nouveau le programme annuel 2004 qui est une version révisée du programme présenté à la 41e réunion. Le tableau ci-dessous montre un résumé du plan sectoriel ainsi que le programme annuel de travail 2004.

Pays	Inde
Titre du projet	Plan d'élimination du CTC
Année du plan	2004
Nombre d'années achevées	0
Nombre d'années restant en vertu du Plan	6
Total du financement approuvé en principe pour le Plan d'élimination du CTC	52 000 000 $ US
Total du financement décaissé à la date de décembre 2003	8 520 843 $ US
Niveau de financement requis pour le programme 2004	13 380 112 $ US

Programme de travail 2004

2. Le programme de travail 2004 comprend un bref rapport sur le programme de travail et les activités proposées pour 2004.

3. La mise en œuvre du programme de travail 2003 devait s'étaler sur une période de six mois, étant donné que le financement pour le plan sectoriel avait été approuvé en principe en juillet 2003 et que les fonds reçus avaient été affectés aux activités de conversion dans les applications du CTC pour la production du caoutchouc chloré, des chloroalcanes, des produits pharmaceutiques et des produits agrochimiques. Deux ateliers ont été organisés avec les intervenants pour les sensibiliser sur le plan sectoriel du CTC et sur le calendrier d'élimination, et encourager les parties intéressées à planifier leurs activités d'élimination et à tirer parti de la

subvention. Parallèlement, les instruments juridiques ont été signés entre le Gouvernement de l'Inde d'une part, et la Banque mondiale et les agences bilatérales d'autre part, pour la mise en œuvre de l'accord sectoriel. Le budget de 2003 d'un montant de 8,5 millions $ US a été reparti entre les 5 domaines d'activités suivants: élimination de CTC dans la production du caoutchouc chloré, des chloroalcanes, des produits pharmaceutiques, des solvants, et établissement d'un centre de gestion du projet ; on prévoit que le décaissement se fera surtout en 2004.

4. Le programme de travail 2004 comprend un certain nombre d'activités qui devront être réalisées par le Gouvernement afin de faciliter la mise en œuvre du plan sectoriel. Un système d'enregistrement sera mis en place pour obliger tous les producteurs, importateurs, exportateurs, vendeurs et utilisateurs de CTC à se faire enregistrer auprès du Gouvernement avant de recevoir toute subvention de ce dernier. Le Gouvernement accordera aussi des exonérations des droits de douanes et des taxes sur les biens d'équipement destinés aux activités d'élimination du CTC. Un travail de préparation sera réalisé en vue l'introduction des quotas d'importations de CTC et d'un système de surveillance pour veiller à ce que le CTC importé pour les usages non liés aux produits intermédiaires soit effectivement utilisé à cette fin. De la même manière, un système de quotas de production de CTC pour les usages non liés aux produits intermédiaires sera développé et mis en œuvre d'ici janvier 2005.

5. En ce qui concerne 2004, un plan a été proposé pour la mise en œuvre des activités de conversion des entreprises industrielles par la Banque mondiale et les agences bilatérales dans les secteurs des agents de transformation et des solvants où le CTC est utilisé. Le tableau ci-dessous présente un résumé de l'impact de ces activités ainsi que leurs dates d'achèvement :

Secteur	Agence	Impact (Tonnes PAO)	Achèvement
Agents de transformation	Banque mondiale	1 243	Fin 2005
Solvants (chimiques)	Banque mondiale	770	Fin 2005
Solvants (métalliques)	Japon	533	Fin 2005
Solvants (petits utilisateurs pour le métal et le textile)	Allemagne en co-opération avec la France, le Japon et la Banque mondiale	3 462	Fin 2009

6. Cinq activités seront lancées en 2004 au titre de l'assistance technique : l'établissement du centre de gestion du projet, l'élaboration d'un programme d'information du public, mise au point d'une stratégie de développement des capacités afin d'appuyer l'établissement de solutions de rechange du CTC, mise sur pied d'un système de gestion de l'information et recherche de possibilités de transfert de technologie pour les producteurs de CTC.

7. Pour le programme de travail 2004, la Banque mondiale demande un total de 14 491 120 $ US ventilés ainsi qu'il suit : 13 380 112 $US pour le programme et 1 111 008 $US pour les coûts d'appui. La répartition entre la Banque mondiale et les agences bilatérales est la suivante : 9 180 112 $US plus 688 508 $US de coûts d'appui pour la Banque mondiale,

1 000 000 $US plus 85 000 $US de coûts d'appui pour la France; 700 000 $ US plus 57 500 $US de coûts d'appui pour l'Allemagne; et 2 500 000 $US plus 280 000 $US de coûts d'appui pour le Japon. Le budget de 2004 couvre les conversions des entreprises industrielles, l'appui au centre de gestion du projet et l'assistance technique.

Rapport sur les importations de CTC en 2001.

8. Les données sur les importations de CTC en 2001 fournies dans le plan sectoriel de CTC de la Banque mondiale et celles contenues dans le rapport d'audit technique de l'Inde présentent de grandes différences. Or ces données constituaient l'un des principaux éléments ayant servi à déterminer le niveau de financement du plan sectoriel de CTC de l'Inde. Lors de l'approbation en principe des 52 millions $ US pour le plan sectoriel à la 40e réunion,, le Comité exécutif avait demandé à l'Inde et à la Banque mondiale de fournir, à sa 41e réunion, un rapport expliquant les divergences dans les chiffres des importations de tétrachlorure de carbone. A cet égard, s'il s'avérait que les importations réelles de tétrachlorure de carbone de 2001 étaient inférieures de plus de 10 pour cent aux 24 661 tonnes métriques indiquées dans les documents du projet, le montant de 52 millions $ US allait être réduit d'une somme équivalente à la différence entre 24 661 tonnes métriques et le chiffre réel des importations, sur la base de 2000 $ US par tonne (Décision 40/54).

9. Le Gouvernement de l'Inde a donc recueilli des informations auprès des producteurs, utilisateurs et importateurs de CTC, et a présenté à la 41e réunion un rapport de vérification dont la conclusion indiquait qu'en 2001, les importations du CTC étaient de 23 006,94 tonnes métriques, ce qui est moins de 10 pour cent inférieur chiffre de 24 661 tonnes métriques indiqué dans le plan sectoriel.

10. Le Sous-groupe sur le secteur de la production a examiné la question à la 41e réunion, sans toutefois aboutir à une conclusion, et a décidé de reprendre les discussions à sa prochaine réunion.. Entre-temps, le Secrétariat a consulté le Secrétariat de l'ozone et a confirmé le niveau des importations de CTC de l'Inde en 2001 à 24 661 tonnes métriques, chiffre qui se situe dans l'ordre de la différence de 10% des 23 006,94 tonnes métriques vérifiées par la Banque mondiale et le Gouvernement de l'Inde. Par conséquent, le niveau de financement du plan sectoriel devrait rester inchangé conformément à la Décision 40/54.

Observations du Secrétariat

11. Le programme annuel de travail 2004 est d'une importance capitale pour la capacité du Gouvernement de l'Inde à se conformer aux mesures de contrôle du Protocole de Montréal pour la production et la consommation de CTC. En effet, conformément aux objectifs de l'Accord, l'Inde devra, d'ici le 1er janvier 2005, réduire sa consommation de CTC, en passant de 11 553

tonnes PAO, sa consommation de base, à 1 726 tonnes, ainsi que sa production de CTC en passant 11 553 tonnes PAO, sa production de base, à 1 726 tonnes. Le Gouvernement est en train de proposer un certain nombre de mesures incitatives pour l'année et envisage des activités qui devront être mises en œuvre par les entreprises industrielles, afin de réduire la consommation de CTC. Étant donné que la plupart des conversions sont des objectifs de la fin de 2005, date de leur achèvement, l'on pense que le Gouvernement va appliquer la même politique que pour les sous-secteurs du caoutchouc chloré et des chloroalcanes, et que les entreprises qui ne pourront pas terminer leurs activités d'élimination avant le premier janvier 2005 seront contraintes d'utiliser le CTC accumulé en 2004.

12. Il est également important de surveiller et de vérifier la mise en œuvre du plan sectoriel de CTC, étant donné notamment la nécessité de distinguer la consommation et la production de CTC pour les utilisations intermédiaires et les autres types d'application. Par sa Décision 41/95, le Comité exécutif a demandé à la Banque mondiale de mettre au point un système de vérification afin de faciliter la tâche de vérification de l'achèvement du plan sectoriel, et de lui présenter à la 42^{e} réunion, un projet préliminaire du cadre de vérification comprenant des objectifs pour l'achèvement du système de vérification. D'après les informations reçues par le Secrétariat, la Banque mondiale travaille en ce moment sur le cadre de travail et devrait le présenter dès qu'il sera prêt.

Recommandations

13. Le Comité exécutif est invité à :

a) Approuver le programme de travail de 2004 pour le plan sectoriel de CTC de l'Inde au niveau de financement de 14 491 120 $US comprenant :13 380 112 $US pour le coût du programme et 1 111 008 $US pour les coûts d'appui. La répartition entre la Banque mondiale et les agences bilatérales est la suivante : 9 180 112 $ US (plus 688 508 $ US de coûts d'appui) pour la Banque mondiale, 1 000 000 $ US (plus 85 000 $US de coûts d'appui) pour la France, 700 000 $ US (plus 57 500 $ US de coûts d'appui) pour l'Allemagne, et 2 500 000 $US (plus 280 000 $US de coûts d'appui) pour le Japon.

b) De prendre note que, d'après le rapport de vérification, les importations de CTC de l'Inde en 2001 totalisent 23 006,94 tonnes métriques, chiffre qui se situe dans l'ordre de la différence 10% des 24 661 tonnes métriques énoncé dans le plan sectoriel, et qu'en conséquence, le niveau de financement dudit plan devrait rester inchangé.

ÉLIMINATION SECTORIELLE GRADUELLE DE LA PRODUCTION DE CFC : PROGRAMME ANNUEL DE TRAVAIL 2004

Description du projet

14. La Banque mondiale a soumis pour approbation par la 42e réunion, le programme annuel pour la mise en oeuvre du programme d'élimination sectorielle graduelle de la production de CFC de l'Inde, en même temps que le rapport de vérification de la mise en œuvre du programme de travail annuel 2003 (les deux documents sont joints, hormis la partie relative aux données). Cette soumission est conforme à l'Accord conclu entre le Gouvernement de l'Inde et le Comité exécutif, et approuvé à la 29e réunion.

Pays :	Inde
Titre du projet:	Élimination sectorielle graduelle de la production de CFC
Année du Plan:	2004
Nombre d'années achevées	5
Nombre d'années restant en vertu du Plan	7
Consommation maximale des SAO pour 2004 (en tonnes métriques), Plan annuel 2004	13 176 MT
Financement total approuvé en principe pour l'élimination de CFC	82 millions $US
Financement total libéré à la date de décembre 2003	46 millions $US
Niveau de financement demandé pour le Plan annuel 2004	6 millions $US

Programme de travail 2004

15. Le programme de travail annuel 2004 débute avec la revue de la mise en œuvre du programme de travail 2003. La revue porte sur la réalisation des objectifs de réduction de CFC de 2003 : conformément aux termes de l'accord, la production autorisée de CFC dans le pays en 2003 avait été arrêtée à 15 058 tonnes métriques (soit une réduction de 1 883 tonnes métriques à partir du niveau de production qui était de 16 941 tonnes métriques en 2002) Le rapport fait état d'une production commercialisable de 15 015 tonnes pour l'année, quantité inférieure à l'objectif. Des 6 millions $US décaissés pour le programme de 2003, 5,265 millions $US ont été versés par tranches aux 4 entreprises, en fonction des progrès enregistrés dans la réalisation de l'objectif défini pour chacune d'entre elles; le solde de 0,585 million $US sera décaissé à l'issue de la vérification finale de la production de 2003. Aucun décaissement n'a été effectué sur la somme de 0,15 million $US réservée aux activités d'assistance technique. La gestion de la mise en œuvre de la réduction de la production est assurée par l'introduction d'un système de permis de produire conformément à l'Ordonnance sur les Quotas de Production promulguée par le Gouvernement en novembre 1999.

16. La deuxième partie du rapport décrit les objectifs et les activités du programme de travail 2004. Conformément à l'Accord, la limite de production de CFC pour 2004 est de 13 176 tonnes métriques, ce qui nécessite une réduction supplémentaire de 1 832 tonnes métriques sur le volume de production de 2003 qui était de 15 058 tonnes métriques. Cet objectif sera réalisé grâce au maintien du système de quotas de production. Des efforts soutenus seront menés afin de surveiller les importations et les exportations de CFC par le biais des permis, la mise au point d'un plan d'action conjointement par le secteur industriel et le Gouvernement pour lutter contre le commerce illicite (activité reportée du plan de 2003 à celui de 2004), l'institution d'un système d'enregistrement/re-enregistrement des producteurs, négociants et utilisateurs des SAO. En outre, le programme de travail comprend la liste des activités qui seront entreprises en 2004 dans le cadre de l'assistance technique, à savoir : la formation, l'exploitation d'un système de gestion de l'information, les activités de sensibilisation du public. Le financement demandé pour le programme de travail de 2004 s'élève à 6 millions $US; de ce montant, on envisage verser 5,85 millions aux 4 entreprises en guise de compensation pour les réductions supplémentaires de la production de CFC et de réserver 0,15 million pour le programme d'assistance technique. La Banque mondiale demande 450 000 $US pour les coûts d'appui associés, soit 7,5% du programme de travail 2004.

Rapport de vérification de la production de 2003

17. La vérification a été effectuée en janvier 2003 par la même équipe locale constituée par Deloitte Touche Tohmatsu India Private Limited et la Indian Institute of Technology, Delhi. Le rapport de vérification commence par un résumé analytique de l'ensemble des résultats de la vérification qui fournit des informations sur les quotas de 2003, le stock de départ de CFC, la production brute, les pertes, la production nette commercialisable, le stock acquis, les ventes, le stock final et le pourcentage de production réalisé dans le cadre du quota par chacune des 4 entreprises productrices, les totaux nationaux. Le rapport indique que la production brute de CFC de l'Inde en 2003 est de 15 104 tonnes métriques, chiffre supérieur de 46 tonnes à l'objectif stipulé dans l'Accord, à savoir, 15 058 tonnes métriques. En conséquence, l'Inde a dépassé l'objectif d'élimination de 2003. Le rapport de vérification fait état de 90 tonnes métriques de pertes survenues lors des opérations de remplissage des cylindres et d'une production nette commercialisable de CFC de 15 015 tonnes PAO pour 2003, soit 43 tonnes PAO de moins que l'objectif énoncé dans l'Accord. Par conséquent, la vérification conclut que l'Inde s'est conformée à l'objectif de production de CFC de 2003 tel qu'indiqué dans l'Accord.

18. Le rapport proprement dit commence par un bref historique sur l'Accord entre l'Inde et le Comité exécutif relatif à l'élimination de la production de CFC, les technologies de production utilisées par les 4 producteurs ainsi que la capacité de conversion au HCFC-22 de ces derniers. Le rapport couvre également la méthodologie de vérification qui comprend : les visites dans les entreprises, les contrôles inopinés des registres de production ainsi que les discussions avec le personnel de l'usine. Le rapport présente ensuite les observations et les résultats de la visite de chaque usine. Chaque rapport comprend les sections suivantes :

a) La section générale fournit les noms et les coordonnées des personnes rencontrées à l'usine ainsi que les noms des vérificateurs;

b) La section sur la présentation de l'usine fournit des informations sur l'histoire et la technologie de l'usine;

c) La section sur les informations détaillées relatives à la production de 2002 et 2003 fournit des données sur les quotas de production attribués, les dates de production pour le CFC et dans certains cas, pour le HCFC-22, la production de CFC-11 et de CFC-12, le pourcentage de production réalisé dans le cadre des quotas;

d) La section sur le ratio de consommation de matière première indique le ratio entrées-sorties entre la consommation des produits intermédiaires et la production de CFC;

e) La section sur l'enregistrement et les permis d'exploitation fournit des informations sur la conformité de l'usine en ce qui concerne la lutte contre la pollution et l'élimination de la production de CFC;

f) La section sur la consommation des matières premières fournit des données sur la fourniture et la consommation des matières premières;

g) La section sur les pertes examine les pertes de la production de CFC survenues lors des opérations de remplissage des cylindres à partir des réservoirs avec le produit fini;

h) La section sur l'analyse d'échantillons inclut les données sur le volume de l'échantillon utilisé par l'équipe de vérification; ce volume correspond à 5 jours de production de CFC-12 et 5 jours de production de HCFC-22 prélevée sur des mois différents;

i) Une section sur l'évaluation du respect des quotas par l'entreprise.

19. Le rapport examine la question du statut de CFC-113a en tant que matière première utilisée dans la production de l'acide trifluoroacétique (TFA), soulevée dans le cas de Navin. Selon le rapport, la Cellule de l'Ozone de l'Inde a demandé en 2002 à une firme nationale de vérifier l'utilisation de CFC-113a en tant que produit intermédiaire par cette entreprise. Le rapport fourni par la Cellule de l'Ozone n'a cependant pas certifié le statut de CFC-113a comme étant un produit intermédiaire. A la demande du Secrétariat, le Gouvernement a pris l'engagement de lui faire parvenir une copie du rapport dans un délai d'un mois. Le rapport conclut que toutes les 4 entreprises ont respecté leurs quotas de production en 2003.

20. Enfin, le rapport présente les résultats de la vérification en utilisant le format réservé à la vérification de l'élimination de la production des SAO; ce format fournit, reparties par mois, des données sur le nombre de jours d'exploitation, la quantité de matière première consommée et le volume en tonnes de CFC produit.

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT

OBSERVATIONS

Le programme annuel de 2004

21. Le rapport présente clairement l'objectif de production de CFC qui est conforme à l'objectif stipulé dans l'Accord, ainsi que les instruments de politique mis en place pour faciliter la réalisation de cet objectif. Des efforts soutenus sont entrepris en vue de surveiller les importations et les exportations de CFC par le biais notamment de l'institution des permis; cependant, le rapport ne fait état d'aucun nouvel élément dans le statut de la politique d'importations /exportations qui, d'après le rapport du programme de travail de 2003, aurait été soumis au Gouvernement pour approbation.

Rapport de vérification de la production de 2003

Conformité à la Décision 39/50 et aux directives approuvées pour la vérification de l'élimination de la production des SAO

22. Se conformant à l'exigence de la Décision 39/50 de soumettre le rapport de vérification à temps, la Banque mondiale a soumis le rapport de vérification de la production de CFC de 2003 à la date due, ce qui constitue une amélioration considérable, comparativement à la vérification de 2002 dont le rapport était arrivé un jour avant la date de distribution de la documentation. Cette diligence est aussi le résultat d'une meilleure conformité aux directives approuvées relatives à la vérification de l'élimination de la production des SAO.

L'utilisation de la production nette commercialisable dans le calcul de la production de CFC et ses implications.

La vérification a défini la production de CFC aux fins de l'Accord sur l'élimination de la production comme étant la quantité de substance transférée à partir des réservoirs de produits finis dans les cylindres en vue de la vente dans le pays ou de l'exportation, encore appelée production nette commercialisable. En adoptant cette définition, l'équipe de vérification fait abstraction de la différence entre la quantité réelle produite et la quantité vendue. Cette différence a été classée comme « pertes ». Bien que le processus de vérification de la production de CFC en Inde ait utilisé cette définition pendant les deux dernières années sans aucune remise en question par le Secrétariat, cela soulève cependant un certain nombre de questions :

a) Tout d'abord, les pertes déclarées sont importantes : 244 tonnes métriques en 2002 et 90 en 2003. Dans certains cas, ces pertes représentent environ 1% de la production totale d'une entreprise, ce qui n'est pas acceptable d'après les normes industrielles.

b) Cette définition n'est pas conforme à la définition de la production utilisée dans le Protocole de Montréal suivant laquelle une tonne de PAO de CFC produite doit être comptabilisée comme telle, quelle soit vendue ou pas, car le CFC et autres produits intermédiaires sont consommés dans le processus. Aussi, la conformité aux exigences du Protocole de Montréal d'un pays se mesure en termes de CFC produit et non pas de CFC vendu. C'est cette définition qui est utilisée lorsque le Fonds multilatéral intervient dans le cadre de l'aide à la conformité.

c) Cette définition n'est pas favorable à l'objectif environnemental du Protocole de Montréal, car le fait que l'on ne soit pas tenu de rendre compte des pertes survenues lors du remplissage des cylindres n'incite pas les producteurs de CFC à réduire ces pertes et par conséquent, à réduire les émissions de CFC dans l'atmosphère.

d) Dans le cas spécifique de la mise en œuvre de l'objectif d'élimination de CFC de 2003, la définition de la production de CFC détermine la situation de la conformité à l'objectif défini dans l'Accord. Si l'on utilise la production réelle ou la production brute mentionnée dans le rapport de vérification, la production totale de CFC de l'Inde pour 2003 sera de 15 104 tonnes métriques, volume qui est de 46 tonnes PAO supérieur à l'objectif de 15 058 tonnes stipulé dans l'Accord. En conséquence, l'Inde aura dépassé la limite de production de 2003. Cependant, la vérification ayant adopté la définition de production nette commercialisable, la production totale de CFC de l'Inde en 2003 est de 15 015 tonnes PAO ou 43 tonnes PAO en dessous de l'objectif stipulé dans l'Accord. La vérification a alors conclu que l'Inde s'est conformée à l'objectif de production de CFC indiqué dans l'Accord.

e) De la même manière, le statut de conformité de 2 des 4 entreprises, c'est-à-dire Gujarat et Navin, dépendait de l'utilisation de cette définition de la production, car les deux entreprises seront en situation de dépassement de quotas de production pour 2003 si l'on utilise la production réelle pour déterminer le niveau de production.

23. Conformément à l'information qu'il a fournie au Comité exécutif aux 36^{e} et 39^{e} réunions, le Secrétariat n'a pas inclus la partie du rapport de vérification relative aux données. Cependant, ces données seraient mises à la disposition de tout membre du Comité qui en ferait la demande.

RECOMMANDATIONS

24. Le Secrétariat recommande au Comité exécutif :

a) D'approuver le programme annuel 2004 du programme d'élimination de la production de CFC de l'Inde au niveau de financement de 6 millions $US plus les coûts d'appui associés de 450 000 $US pour la Banque mondiale.

b) De demander à la Banque mondiale et aux autres agences d'exécution compétentes d'utiliser le tonnage réel de CFC et des autres SAO produits pour déterminer et vérifier le niveau de production de CFC et autres SAO dans la mise en œuvre de l'élimination de la production des SAO.

c) De demander au Gouvernement de l'Inde et à la Banque mondiale d'aider les producteurs de CFC à réduire les pertes liées aux transferts et cela dans le cadre du programme d'assistance technique financé en vertu de l'Accord relatif à l'élimination de ce secteur de la production.

d) de demander au Gouvernement de l'Inde de mettre à la disposition du Secrétariat une copie de l'application de l'évaluation de l'utilisation du CFC-113a dans la production de l'acide trifluoroacétique lorsqu'elle sera terminée.

FICHE D'ÉVALUATION DE PROJET
INDE

SECTEUR: Réfrigération Consommation de SAO (2002) 3 917 tonnes PAO

Seuil de coût-efficacité du secteur : N/D

Titres des projets:

(a) Plan national d'élimination de la consommation de CFC

Données du projet	**Plusieurs secteurs confondus**			
Consommation de l'entreprise (tonnes PAO)	3917			
Incidences du projet (tonnes PAO)	847			
Durée du projet (mois)	72			
Montant initial demandé ($US)	12 656 670			
Coût final du projet ($US):				
Surcoûts d'investissement (a)				
Coût d' imprévus (b)				
Surcoûts d'exploitation (c)				
Coût total du projet (a+b+c)	12 656 670			
Participation locale aux capital (%)				
Elément exportation (%)				
Montant demandé ($US)	418 005	289 620	253 909	310 754
Rapport coût-efficacité ($US/kg.)	14,94			
Financement de contrepartie confirmé?				
Agence nationale de coordination	Ministère de l'Environnement et des Forêts (MoEF)			
Agences d'exécution	Allemagne	Suisse	PNUD	PNUE

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

DESCRIPTION DU PROJET

Historique du secteur

Consommation et profil d'élimination de CFC (Groupe I Annexe A)

A la 35e réunion, un accord avait été conclu avec le Gouvernement de l'Inde sur le volume de départ qui a été fixé à	1 530,4 tonnes PAO
.Consommation résiduelle de CFC admissible au financement lors la 41e réunion (Décision 35/57, clause B)	847 tonnes PAO
. Consommation de CFC en 2002 telle que rapportée par le Secrétariat du Fonds Multilatéral	3 917 tonnes PAO

25. Un plan national d'élimination de CFC pour l'Inde (le Plan) a été soumis par le Gouvernement d'Allemagne dans le cadre d'une coopération bilatérale. Ce plan d'élimination sera la dernière activité du Fonds Multilatéral traitant de la consommation de CFC en Inde et devra aider ce Gouvernement dans ses efforts d'élimination de la consommation de cette catégorie de substances réglementées. Le Plan comprend deux composantes principales : Composante 1- Stratégie sectorielle pour l'élimination de la consommation de CFC dans le secteur de la réfrigération et de la climatisation; Composante 2- Stratégie de Politique et de formation des agents des douanes.

Composante 1- Stratégie sectorielle pour l'élimination de la consommation de CFC dans le secteur de la réfrigération et de la climatisation.

26. La stratégie du secteur de l'entretien en réfrigération assistera le Gouvernement indien dans la réalisation de l'élimination totale avant 2010, de la consommation de CFC-12 dans ce secteur. Une consommation totale de 1 502 tonnes de PAO de CFC-12 (dont 847 tonnes sont admissibles au financement) sera éliminée dans le cadre de ce plan sectoriel. La stratégie sectorielle de l'entretien en réfrigération facilitera l'élimination de CFC-12 en Inde grâce aux politiques et règlements existants, et au soutien financier qu'apporte à ce projet la coopération bilatérale suisse, parallèlement aux activités du Fonds Multilatéral. La stratégie encouragera l'utilisation responsable des frigorigènes en assurant la formation, le suivi de l'équipement, la récupération et le recyclage, ainsi que les activités d'adaptation des équipements et d'assistance technique, en particulier le remplacement de CFC au cours des réparations des équipements, afin de minimiser et éventuellement, éliminer l'utilisation de CFC.

27. Le plan sectoriel est basé sur un certain nombre de considérations importantes :

- L'utilisation de CFC en réfrigération par les petits assembleurs qui pourraient ne pas être touchés par les projets du Fonds Multilatéral sera prise en compte dans ce plan sectoriel;

- Ce plan sectoriel ne vise pas la consommation de CFC –11 dans les refroidisseurs. L'élimination en ce qui concerne les refroidisseurs sera prise en charge par un programme spécial de la Banque mondiale sans toute autre intervention du Fonds Multilatéral;
- La consommation de 120 tonnes de PAO de CFC-12 dans le secteur des inhalateurs doseurs sera éliminée dans le cadre de ce plan qui ne prévoit aucun projet d'investissement pour les inhalateurs doseurs à aérosol, conformément à la Décision 41/31;
- La fourniture d'équipement sera liée à la formation, cette dernière étant considérée comme un préalable : l'équipement sera livré une fois que la formation sera achevée.

28. Sur cette base, le plan sectoriel examine un certain nombre de mesures bien coordonnées pour atteindre l'élimination. L'élimination de la consommation de CFC-12 en Inde sera réalisée à travers trois approches différentes :

- Le retrait naturel des équipements utilisant le CFC et ayant atteint la fin de leur cycle naturel. Selon les lois indiennes promulguées en 2000 et réglementant les SAO, aucun nouvel équipement contenant du CFC ne doit être fabriqué après le 1er janvier 2003;

- La mise en application de meilleures pratiques dans le secteur de l'entretien, dont la récupération et le recyclage, servira à réduire la consommation sans toutefois permettre de réaliser une élimination totale;

- Le type actuel d'équipement de réfrigération qui sera encore en service en 2010 et au-delà, devra être converti, probablement avant 2015, s'il doit toujours être utilisé. Ce plan sectoriel de l'entretien fournit l'infrastructure nécessaire pour entreprendre de telles conversions.

29. La consommation de CFC dans le secteur de l'entretien en réfrigération en Inde est très répandue. Le nombre total d'ateliers d'entretien est estimé à 39 000 environ. Cependant, le nombre d'entreprises où la consommation est importante demeure faible. En effet, moins de 100 compagnies atteignent une consommation supérieure à 500 kg de CFC-12 par an, ce qui représente un total de seulement 7% de la consommation visée dans le cadre de ce plan. Dans ces circonstances, la récupération et le recyclage ne peuvent pas être la principale force de ce plan, étant donné que ces opérations de récupération et de recyclage devront être multipliées indéfiniment et que leur potentiel réel de réduction est limité. La stratégie met l'accent sur les mesures visant à réduire la consommation de CFC dans les opérations d'entretien telles que : la réduction du poids de charge, le contrôle approprié de la pression, la détection des fuites et la prévention des pannes actuellement si fréquentes.

30. Le secteur indien de la réfrigération comprend les sous-secteurs suivants :

- La réfrigération domestique;
- La réfrigération commerciale

- La climatisation unitaire (n'utilisant typiquement que le HCFC-22)
- La climatisation mobile. Ce sous-secteur peut être divisé en quatre sous-sections :
  - Entretien de la climatisation des véhicules automobiles;
  - Entretien de la climatisation des autobus;
  - Entretien de la climatisation des trains; et
  - Entretien de la climatisation des navires et des bateaux;
- Réfrigération dans les transports;
- Équipements de chambres froides et de transformation des aliments;
- Entretien en réfrigération industrielle;
- Équipements de grande taille (Refroidisseurs industriels)

31. Le secteur d'entretien assure un soutien à toutes ces sections. Dans la plupart des cas, les entreprises assurent l'entretien de plusieurs sections en se concentrant principalement sur une en particulier. En ce qui concerne l'entretien des systèmes de grande taille et de grande complexité qui ne sont pas très répandus, un plus haut niveau de savoir-faire technique et d'équipement est requis.

32. La plus grande partie de la consommation de CFC du secteur de l'entretien (environ 800 tonnes de PAO) est réalisée dans le sous-secteur de la réfrigération domestique. La production de l'Inde a augmenté de manière significative au cours de la dernière décennie. La stratégie en question portera également sur la mise en place de l'infrastructure en termes d'équipements et de formation nécessaires à la conversion et à l'entretien qui en résulte, des réfrigérateurs adaptés; elle comprendra aussi les mesures nécessaires pour assurer un accès suffisant à cet équipement et aux autres outils. L'on estime à plus de 30 millions le nombre de réfrigérateurs à base de CFC actuellement utilisés en Inde. Leurs besoins d'entretien devraient atteindre leur point culminant seulement en 2006; ces besoins seront alors de 22% supérieurs à ceux d'aujourd'hui et diminueront lentement après cette date. Le CFC sera nécessaire pour l'entretien en réfrigération jusqu'en 2017, et l'on estime que 19 millions de réfrigérateurs à base de CFC seront encore en utilisation en 2010. La mise en application de certaines bonnes pratiques en entretien et la fourniture d'outils nécessaires vont réduire la consommation de CFC lors des opérations d'entretien.

33. La formation et la fourniture d'équipement sont les éléments les plus importants de la stratégie. Une liste d'équipements a été élaborée sur la base d'une analyse des pertes inutiles de CFC; cette liste va permettre aux entreprises d'entretien d'acquérir progressivement de meilleures aptitudes afin d'améliorer l'efficacité de l'utilisation de CFC et de réduire les pertes. Cette liste a été confectionnée en accordant la priorité à l'impératif associé d'élimination de CFC et en tenant compte du coup absolu de l'équipement. La formation et l'équipement visent les réductions de la consommation de CFC par le biais des bonnes pratiques, de la capacité de convertir les équipements (en particulier les réfrigérateurs domestiques) à des technologies sans CFC, d'un entretien continu de l'équipement converti et par le biais aussi de la récupération et du recyclage. Une infrastructure solide en termes de formation et d'équipement devra être mise en place pour permettre d'encadrer environ 40 000 entreprises avec plus de 70 000 techniciens, en tenant compte du fait que les moyens de transport et les structures de constitution de réseaux disponibles en Inde sont typiquement très modestes.

34. Plus de 50% des entreprises d'entretien sont concentrées dans les 5 états les plus importants (Uttar Pradesh et Uttranchal, Maharashtra, Andhra Pradesh, Tamil Nadu et Gujarat). Les 10 états suivants en importance rassemblent quant à eux 47% du nombre total des entreprises et avec les 5 autres états, regroupent presque 97% des techniciens qualifiés. Dans les 11 états restants et les quatre territoires de l'Union, les entreprises d'entretien en réfrigération et climatisation, ainsi que les techniciens qualifiés ne sont pas nombreux (3%).

35. Plusieurs catégories de structures de formation seront impliquées dans la réalisation des programmes de formation : il s'agira entre autres : des instituts de formation gouvernementaux et privés affiliés, des petits instituts d'entretien industriel, des instituts de formation privés non affiliés/ONG délivrant des diplômes privés; et des entreprises industrielles capables d'assurer la formation.

36. Un modèle de formation des techniciens d'entretien par le biais de l'utilisation des cellules de formation est proposé dans le plan sectoriel d'entretien. Ces cellules de formation seront choisies parmi toutes les catégories de structures de formation sur la base de leurs capacités techniques et administratives à assurer la formation requise, ainsi que leur aptitude à mener cette formation sur une base autonome.

37. Le Gouvernement participera aux activités d'élimination en prenant en charge une petite partie des coûts de formation et d'équipement qui seront livrés selon un mécanisme de rotation, dans le cadre de sa contribution à la mise en œuvre de la stratégie. Un soutien supplémentaire fourni par la Suisse, dans le cadre du projet HIDECOR Indoa-Swiss pour la réalisation de la composante formation. Ce projet est une activité bilatérale complémentaire cofinancée par le gouvernement suisse.

38. Une composante sensibilisation du plan est proposée pour accroître la sensibilisation sur les capacités d'entretien des entreprises d'entretien et stimuler ainsi les demandes en équipements et en formation. Elle visera aussi directement les entreprises d'entretien. Les intervenants importants, en particulier les services gouvernementaux des états seront interpellés par le biais des ateliers et par l'utilisation des réseaux inter-états.

39. Le plan comprend les composantes d'assistance technique nécessaires pour le renforcement de la capacité du pays à entreprendre les activités d'investissement, de réglementation et de sensibilisation. Il propose une modalité de mise en œuvre comprenant une composante surveillance qui puisse assurer la mise en œuvre réussie et effective de ce plan d'élimination dans le secteur d'entretien en réfrigération.

40. La composante surveillance est capitale pour la réalisation de l'objectif global de ce plan d'élimination du secteur d'entretien en réfrigération; cette surveillance en effet, assurera la répartition efficace des ressources et les décaissements seront liés à la confirmation de la réalisation des objectifs de réduction de CFC.

Composante 2 : Stratégie de politique et de formation des agents des douanes

41. La stratégie de politique et de formation des agents des douanes soumise en même temps que la stratégie du secteur d'entretien, fait partie du plan national d'élimination de CFC. Elle prévoit un nombre de mesures qui seront coordonnées avec la stratégie du secteur de l'entretien.

42. La stratégie du secteur de l'entretien est hautement liée aux structures du Gouvernement central de l'Inde ainsi qu'à celle des gouvernements des différents états. En conséquence, les responsables compétents ainsi que leurs supérieurs doivent être informés de l'objectif global de l'élimination des SAO, ainsi que des opportunités et des responsabilités prévues dans le cadre de la stratégie du secteur de l'entretien. La stratégie du secteur de l'entretien utilisera cette base pour assurer une surveillance durable de la mise en œuvre de la consommation et des réductions de CFC et de la disponibilité des produits de remplacement de CFC.

43. La formation des agents des douanes contribuera aussi à la mise en œuvre de la stratégie d'entretien en réfrigération. Il est important de maintenir sur le marché un prix relativement élevé de CFC-12, puisque les importations illégales de ce produit qui en déprécient le coût, entraveront par la suite les efforts entrepris pour minimiser son utilisation.

Activités proposées et coûts.

44. Les budgets détaillés pour la composante du secteur de l'entretien et de la composante du secteur de stratégie politique et douanes indiquant tous les surcoûts ont été arrêtés. En se basant sur la consommation résiduelle admissible au financement, les surcoûts admissibles du projet sont fixés à 12 656 670 $ US, avec la répartition suivante :

Activités	$ US
Stratégie de politique et de formation en	493 120
Sensibilisation	773 150
Formation des techniciens en activité	
Formation des formateurs et activités de formation	2 367 730
Équipement de formation	443 020
Perfectionnement des nouveaux techniciens	
Formation des formateurs	44 930
Équipement de formation	850 160
Fourniture des équipements pour techniciens	5 157 090
Conversion des équipements existant	723 800
Surveillance et gestion en cours	653 060
Imprévus	1 150 610
Total	12 656 670

45. Le calendrier de décaissements ainsi que les objectifs de performance pour l'élimination de CFC seront fournis dans le projet d'Accord.

46. Le plan d'élimination de CFC-12 du secteur de réfrigération sera mis en œuvre sous la supervision directe du directeur de l'Ozone, Cellule de l'Ozone, Ministère de l'Environnement et des Forêts du Gouvernement de l'Inde.

47. Le projet sera mis en œuvre conjointement par 4 agences d'exécution et bilatérales. Toutes ces agences mettront à contribution leurs expériences dans leurs domaines d'excellence spécifiques pour la réussite de l'opération. Ces agences ont par ailleurs de liens étroits avec l'Inde, une certaine expérience avec les activités de cette stratégie, ont accumulé beaucoup d'expérience dans le domaine des essais et mettront tout cela à profit dans ce projet.

OBSERVATIONS ET RECOMMANDATIONS DU SECRÉTARIAT

OBSERVATIONS

48. Le plan du secteur de l'entretien en réfrigération de l'Inde a été préparé par l'Allemagne sur une base bilatérale, en utilisant les fonds de préparation de projet d'un montant de 240 000 $US approuvé à la 32e réunion du Comité exécutif. Le plan sectoriel sera mis en œuvre avec la participation du PNUE, du PNUD et de la Suisse. Le niveau de financement demandé est d'environ 12,6 millions $ US. Le plan triennal d'élimination prévoit que l'Inde devra atteindre ses objectifs 2005 et 2007 d'élimination de CFC par le biais de la mise en oeuvre d'activités approuvées. Ainsi donc, aucune élimination de CFC n'a été incluse dans les plans d'élimination 2003-2005 du Fonds Multilatéral. En conséquence, la proposition a été soumise dans le créneau de financement des projets d'élimination accélérée ou de maintien du rythme, conformément aux Décisions 41/13, 41/81 et 40/7. Le critère « (iv) pays pour lesquels la préparation de projet a été approuvée et utilisée » énoncé par la Décision 40/7 pourrait s'appliquer à cette proposition.

49. Le plan du secteur de l'entretien en réfrigération de l'Inde a été communiqué pour la première fois au Secrétariat avant la 39e réunion. Depuis cette date, le Secrétariat mène des discussions avec le Gouvernement allemand sur les questions relevées dans l'examen en cours par le Secrétariat, en vue de préparer la proposition pour soumission lors d'une prochaine réunion.

50. Le plan sectoriel a relevé une consommation de 1 502 tonnes PAO de CFC-12 utilisées dans l'entretien de l'équipement de réfrigération en Inde. Le Secrétariat a discuté avec le gouvernement de la question de la consommation résiduelle admissible au financement de CFC en Inde. Le Secrétariat a analysé la structure de la consommation de CFC en Inde sur la base des données 2002 de consommation de CFC présentées par secteur et par substance par le Gouvernement indien au Secrétariat du Fonds. Les informations sur l'élimination de CFC par substance dans les projets approuvés ont été également utilisées dans cette analyse.

51. Une analyse de la consommation résiduelle de CFC a été menée en Inde avant la 38e réunion en même temps que l'étude du plan sectoriel de fabrication en réfrigération présentée par le PNUD. D'après les informations parvenues au Comité exécutif, le volet mousse de ce secteur ne serait pas admissible au financement et la proposition pourrait ne pas être recommandée

financement. Des discussions entre le Gouvernement de l'Inde et le PNUD ont permis de trouver une solution en considérant la proposition dans le contexte de la consommation nationale globale résiduelle admissible basée sur le point de départ déterminé conformément aux Décisions 37/57 et 37/66. Le Comité exécutif a accepté cette approche et par la suite, a approuvé le plan sectoriel de fabrication en réfrigération. Sur la base de cette analyse et considérant comme point de départ pour l'Inde le volume de 1 530,4 tonnes PAO approuvé lors de la 38e réunion, ainsi que les activités d'élimination de CFC approuvées par la suite pour ce pays, la consommation résiduelle de CFC admissible au financement dans le cadre de la proposition actuelle est de 847 tonnes PAO.

52. Il a été reconnu que le Gouvernement indien et les agences d'exécution des plans sectoriels pourraient rencontrer des difficultés au moment de la déclaration des éliminations réalisées pour chaque substance. Étant donné que le présent plan sectoriel est le dernier projet qui traite de la consommation de CFC en Inde, le Secrétariat a proposé que le reliquat du plan sectoriel soit reformulé comme Plan national d'élimination de CFC (le Plan) traitant de la question de la consommation nationale globale résiduelle en Inde. En consultation avec le Gouvernement indien, le Gouvernement allemand a donc reformulé sa proposition initiale qui devient Plan national d'élimination et qui est proposé à l'examen du Comité exécutif. Le Plan détermine aussi la quantité de CFC-12 qu'il faudra stocker pour répondre à la demande du secteur d'entretien en réfrigération après 2010. Les limites de consommation établies conformément à l'Article 7 sont proposées dans le Plan, et les quantités à stocker seront conformes à l'Accord en vigueur pour le secteur de la production en Inde.

53. S'appuyant sur cette base, l'Allemagne, en collaboration avec le Secrétariat, est en train de finaliser un projet d'accord qui engloberait le projet de plan pour le secteur de l'entretien en réfrigération, les plans sectoriels de mousse et de fabrication en réfrigération approuvés dans le cadre du Plan national d'élimination de CFC, créant ainsi le cadre d'une collaboration étroite dans la mise en œuvre des activités d'élimination dans les différents secteurs par plusieurs agences d'exécution. L'Accord fournira un mécanisme de surveillance et d'établissement de la consommation totale de CFC conformément à l'Article 7, du calendrier de réduction totale de CFC, de la quantité à stocker et de la demande totale restante en CFC du pays.

54. Une consommation de 120 tonnes PAO de CFC-12 a été identifiée dans le secteur des inhalateurs doseurs de l'Inde. Cette consommation sera éliminée dans le cadre du Plan conformément à la Décision 41/31 qui souligne notamment que « l'Inde a déjà affecté tout ce qui reste de sa consommation de CFC, admissible au financement, à l'entretien dans le secteur de la réfrigération et qu'il n'envisage pas soumettre de projet d'investissement pour les inhalateurs doseurs à aérosol ».

55. Le Secrétariat a constaté que le total de la demande au titre de la coopération bilatérale, plus les fonds approuvés en 2003, comparés à ses contributions de 2004, sont supérieurs aux 20% de la contribution de l'Allemagne pour 2004. Cette question est examinée en détail dans les paragraphes 10 et 11 du document UNEP/OzL.Pro/ExCom/42/17, sur la coopération bilatérale.

56. Le Secrétariat est en train d'examiner avec le Gouvernement allemand la question du surcoût du Plan. Étant donné la complexité de la proposition, la question de l'admissibilité des

surcoûts au financement, ainsi qu'un projet d'accord entre le Comité exécutif et le Gouvernement indien, sont en train d'être discutés. L'affectation des ressources aux agences d'exécution participantes se fera à la dernière étape de la préparation du projet d'accord. Les conclusions adoptées à la fin de ces discussions seront communiquées avant la réunion du Comité exécutif, si nécessaire et compte tenu des recommandations de la Décision 41/80.

RECOMMANDATIONS

57. En attente.

INDIA CTC PHASE-OUT PLAN

2004 ANNUAL IMPLEMENTATION PLAN

OZONE CELL
MINISTRY OF ENVIRONMENT AND FORESTS
STATE GOVERNMENT OF INDIA

AND

THE WORLD BANK

March 2, 2004

India CTC Phase-out Plan for Consumption and Production
2004 Annual Implementation Plan
Submitted to the 42nd Executive Committee Meeting
March 29 – April 3, 2004

1. DATA SHEET

COUNTRY:	**INDIA**
PROJECT TITLE:	CTC Phase-out Plan
YEAR OF PLAN:	2004
NO. OF YEARS COMPLETED:	0
NO. OF YEARS REMAINING UNDER THE PLAN	6 (2004 – 2009)
TARGET CTC CONSUMPTION IN 2003:	N/A
TARGET CTC PRODUCTION IN 2003:	N/A
TARGET CTC CONSUMPTION IN 2004*:	N/A
TARGET CTC PRODUCTION IN 2004*:	N/A
TOTAL FUND APPROVED IN PRINCIPLE FOR THE CTC PHASE-OUT PLAN:	US $52,000,000
TOTAL FUNDING RELEASED AS OF DEC. 2003:	US $ 8,520,843
LEVEL OF FUNDING REQUESTED FOR 2004 ANNUAL PLAN:	US $13,380,112 (US $9,180,112 for World Bank; US $1,000,000 for France; US $700,000 for Germany; and US$2,500,000 for Japan)
NATIONAL IMPLEMENTING AGENCY:	Ozone Cell Ministry of Environment and Forests
LEAD IMPLEMENTING AGENCY:	The World Bank
CO-IMPLEMENING AGENCIES:	France, Germany, and Japan

PROJECT SUMMARY

The CTC Phase-out Plan will completely phase out CTC production and consumption as defined by the Montreal Protocol from the baseline levels of 11,553 and 11,505 ODP tons, respectively, during the period from 2004 – 2010. To achieve these targets, a series of investment, non-investment, technical assistance, and capacity building activities, will be jointly implemented by the World Bank and bilateral donors: France, Germany, and Japan (through UNDP).

IMPACT OF PROJECT ON COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS: The project will enable the Government of India to meet all of its Montreal Protocol obligations.

* In accordance with the Agreement between India and the Executive Committee of the Multilateral Fund for the Phase-out of Consumption and Production of Carbon Tetrachloride approved by the Executive Committee at its 41st Meeting in December 2003.

2. TARGETS

Targets:					
Indicators		**Chemicals**	**Preceding Year (2003)**	**Year of Plan (2004)**	**Reduction**
Supply of CTC	**Import**	CTC	N/A	N/A	N/A
	Production	CTC	N/A	N/A	N/A
	Total	CTC	N/A	N/A	N/A
Demand of CTC	**Process Agents**	CTC	N/A	N/A	N/A
	Solvent	CTC	N/A	N/A	N/A
	Total	CTC	N/A	N/A	N/A

3. INDUSTRY ACTION

Sector	**Actual Consumption[1] Preceding Year (ODP Tonnes) 2003 (1)**	**Target Consumption Year of Plan (ODP Tonnes) 2004 (2)**	**Reduction Within Year of Plan (1)-(2)**	**Number of Projects Completed**	**Number of Servicing Related Activities**	**ODS Phase-out (in ODP tonnes)**
Manufacturing						
Process Agents	1,917	N/A				
Solvents	4,746	N/A				
Other	-	-				
Total	**6,663**	**N/A**				
Servicing						
Total						
GRAND TOTAL	**6,663**	**N/A**				

Investment Activities in 2003

A total funding of US$ 8,520,843, excluding agency support costs, is allocated for supporting the initiation of activities in 2003. Part of the funds will be used for supporting conversion of CTC consuming enterprises in the process agent sector. This sector includes chlorinated rubber, chlorinated paraffin, pharmaceutical, and agro-chemical sub-sectors. The balance is allocated for supporting the establishment of the project management unit. While funding was requested in 2003, the actual disbursement could take place after 2003.

[1] Estimates

The total funding of US$ 8,520,843 has already been approved to India as of December

The detailed distribution of the 2003 resources is shown in Section 6 of this Annual Work Program.

Investment Activities in 2004

The following investment activities will be undertaken in 2004:

Process Agent Sector – The 2004 funding level as proposed in the agreement to be considered by the ExCom includes additional funding to support CTC phase-out in the process agent sector, mainly in pharmaceutical and agro-chemical applications. With this additional funding in 2004 and the financial support already received in 2003, all CTC consuming enterprises in the process agent sector will be invited to receive financial support from the Government of India. An invitation for enterprises to apply for financial assistance from the Government of India will be announced in early 2004. Enterprises will be required to submit their interest and documents to substantiate their level of CTC consumption to the Government of India in 2004. All enterprises will be encouraged to start their conversion process as soon as possible.

The Government of India has assigned the World Bank to take the lead in the implementation of investment activities in this sector. To facilitate expeditious phase-out in this sector, the World Bank and the Government of India will design a grant agreement with flexibility to accommodate early conversion undertaken by enterprises.

When completed, these activities will lead to permanent phase-out of 1,243 ODP tons of CTC in the consumption sector.

Solvent Sector – The proposed 2004 funding level includes funding to support investment activities in the solvent sector. These activities include conversion of CTC consuming technologies in the chemical solvent, metal cleaning, and textile industry. All CTC phase-out activities in the chemical solvent sub-sector will be implemented through the World Bank. It is planned to complete the phase-out activities in this sub-sector before the end of 2005. When completed, activities undertaken in this sub-sector will lead to permanent phase-out of 770 ODP tons of CTC.

Activities in the metal cleaning and textile industry are expected to involve conversion at four large CTC consuming enterprises and a number of small CTC users in the metal cleaning and textile industry. The four large CTC consuming enterprises are Nissan Copper Pvt., Western Engineering, Steel Authority of India, and Hindustan Metals and Tubes. The total funding to support conversion at these enterprises will be drawn from the bilateral contribution of the Government of Japan. The Government of Japan with concurrence of the Government of India will assign UNDP to undertake implementation of these activities on its behalf. Conversion at these enterprises is expected to complete before the end of 2005. When completed, 533 ODP tons of CTC will be permanently phased out.

CTC phase-out activities in small users in the metal cleaning and textile industries will be jointly implemented by the three bilateral partners (France, Germany, Japan) and the

World Bank. Pending the confirmation of the Government of India, Germany is expected to take a leading role in coordinating these activities. Because of the large number of potential beneficiaries to be covered by these activities, it is anticipated that the total phase-out in the small scale users would be achieved by the end of 2009. When completed, 3,462 ODP tons of CTC will be permanently phased out.

Sector	Impact (ODP tons)	Completion
Process Agent Sector	1,243	End of 2005
Solvent (Chemical)	770	End of 2005
Solvent (Metal)	533	End of 2005
Solvent (small users for metal cleaning and textile)	3,462	End of 2009

4. TECHNICAL ASSISTANCE

Activities to be Undertaken in 2004

Project Implementation Unit: Terms of Reference for the PMU and its organization and management framework will be finalized. The recruitment process for key PMU staff members will be completed in 2004. Workshops and meetings with industry, distributors, the implementing agency, and bilateral agencies, will be organized in order to maintain constant dialogue with industry. The purpose of these workshops and meetings is to obtain feedback for improving implementation mechanism in large and small enterprises. PMU will also take the lead in preparation of the 2005 annual work program and get actively involved in the design and implementation of the production and consumption verification process in 2004. Based on the design of the verification process, PMU will assist the Ozone Cell to strengthen the licensing system to cover CTC distributors, CTC solvent and process agent users, feedstock users, and CTC producers. It is expected that all CTC producers and process agent users would be covered by the licensing system by 2004. The strengthening of the licensing system would be fully completed in 2005.

Development of a Public Outreach Program: A detailed public outreach strategy will be jointly developed by PMU/Ozone Cell, the implementing agency, and bilateral agencies, to increase awareness of the CTC Phase-out Plan and related regulations. The strategy will include action plans to disseminate knowledge of non-ODS technology options to the targeted groups in an effective manner. The targeted groups will be further identified with the assistance from CTC producers and distributors. PMU/Ozone Cell will participate actively in the implementation of this strategy.

Development of a Capacity Building Strategy: A detailed action plan will be developed jointly by Ozone Cell/PMU, the implementing agency, and bilateral agencies. Part of the action plan will include identification of technical institutions and distributors of CTC and alternatives. A list of CTC applications and non-CTC alternatives will be developed. Training modules for different non-CTC alternatives for all the identified CTC applications will be made. Selection of trainers from interested training institutes and distributors will be completed in 2004. Training of key trainers will start in 2004.

Activities will start in a few priority states. Priority states are Tamil Nadu, Mahasahtra, Gujarat, Delhi, Karnataka, Kerala, Andhra Pradesh, and Madhya Pradesh.

Development of a Management Information System: Terms of reference for development of an MIS will be finalized in 2004. The consultant selection process to appoint a highly qualified consulting firm to develop a computerized and relational MIS database system will be concluded in 2004.

Technology Transfer for CTC Producers – The Ozone Cell/PMU and the Indian CTC producers will work closely with the Government of France to develop an action plan for technology transfer to enable the CTC producers to comply with the production targets set forth in the agreement for the CTC Phase-out Plan and to comply with the Montreal Protocol obligations. This activity will start in 2004.

5. GOVERNMENT ACTION

Activities Undertaken in 2003

Memorandum of Agreement Meeting – Shortly after the 40th ExCom Meeting a MOA meeting was jointly organized by the Government of India and the Bank to prepare an agreement for the CTC Phase-out Plan between the Government of India and the ExCom. Bilateral donors were invited to this meeting. Coordination mechanism among various agencies and the Government of India and responsibility and accountability framework for the lead and co- implementing agencies were agreed. This is used as part of the input for the development of the agreement and this annual work program. The Government of India decided that bilateral agencies could sub-contract their activities to other implementing agencies (i.e., UNDP, UNEP, and UNIDO). However, prior consultation with the Government of India is required.

Memorandum of Agreements between the Government of India and Bilateral Agencies – As an outcome of the MOA meeting mentioned above, all bilateral parties agreed to have separate agreements with the Government of India to reflect their scope of work, responsibility and accountability, in line with the conditions stipulated in the agreement between the Government of India and the ExCom. The development and finalization of these MOAs will be carried out in the first part of 2004.

Grant Agreement between the Government of India and the World Bank – A grant agreement to allow the flow of funds from the Multilateral Fund through the World Bank to the Government of India is under preparation. The grant agreement will also describe a framework for verifying the actual CTC phase-out achievements in the consumption and production sectors. A preparation mission will be held in November 2003. The grant agreement is expected to be finalized and signed by the first quarter of 2004.

Government/Industry Meetings – As part of the preparation mission for developing the grant agreement between the Government of India and the Bank, the Ozone Cell will organize two workshops to inform relevant stakeholders of the decision of the ExCom to approve, in principle, the India CTC Phase-out Plan. During these workshops, the Ozone Cell and the Bank will discuss with potential beneficiaries of this CTC Phase-out Plan key project implementation issues as well as the level of funding for various sectors.

Given the time constraint imposed on India to meet the 85% reduction target in 2005, the industry will be encouraged to inform the Ozone Cell immediately of its plan to phase out CTC and its interest to benefit from the MLF resources.

Activities to be Undertaken in 2004

Memorandum of Agreements between the Government of India and Bilateral Agencies – The memorandum of agreements with respective parties will be finalized and signed by early 2004 in order to allow implementation of all bilateral agencies to start.

Grant Agreement between the Government of India and the World Bank – The grant agreement will be negotiated and signed in 2004. After the effectiveness of the grant agreement, funds will be immediately transferred to a special account in India to allow investment and non-investment activities, and the establishment of the PMU, to start in the early part of 2004.

Verification Framework – The Government of India will work closely with the World Bank and all co-implementing agencies to develop a verification framework for implementation of the Agreement for the CTC Phase-out Plan between India and the Executive Committee.

Registration of CTC Producers, Importers, Exporters, and Sellers – The Ozone Cell/PMU will announce the requirement for all CTC producers, importers, exporters, sellers, and users (if possible) to register their production and consumption of CTC with MoEF. This registration will be used as a condition for receiving financial assistance from the Government of India.

Promotion of non-ODS Alternatives – The Government of India will extend its fiscal incentives to promote conversion to non-CTC alternatives through exemption of customs duties and excise tax on capital goods required for implementation of CTC phase-out activities. In 2004, the Government of India will also explore possibility of introducing a penalty scheme whereby significant fees could be imposed on any use of CTC after 2004.

Import Quota System for CTC – An import quota system for CTC will be explored and developed in 2004. Annual import quotas to be granted by the Government of India will take into account the CTC production quotas for non-feedstock applications granted by the Government based on the ODS Rules 2000. To ensure that imported CTC is used by the intended applications, a monitoring system to track the flow of CTC will be developed and administered by the PMU. The development of this monitoring system will start in 2004 and is expected to complete in 2005.

CTC Production Quota System – The Ozone Cell/PMU will work with CTC producers and the Association of Chloromethane Manufacturers (ACM) to develop a production quota system for CTC production for non-feedstock applications. The production quotas for non-feedstock applications will be given to each of the CTC manufacturers on an annual basis starting from 1 January 2005. The production quota system should be agreed upon by the ACM and its members by no later than the end of 2004.

Phase-out of CTC Consumption in the Chlorinated Rubber and Chlorinated Paraffin Sub-Sectors – The Government of India will announce its policy of not allowing any registrations of imports and sells of CTC to enterprises in these sub-sectors from 1 January 2005. In case some of the enterprises in these sub-sectors could not complete their phase-out activities by 1 January 2005. They will be allowed to continue using CTC up to the end of 2005. However, CTC consumed beyond 2004 must be drawn from existing stocks.

Policy/activity planned	**Schedule of implementation**
Memorandum of Agreements between the Government of India and Bilateral Agencies	August 2003 – March 2004
Grant Agreement between the Government of India and the World Bank	August 2003 – March 2004
Registration of CTC Producers, Importers, Exporters, and Sellers	January 2004 – December 2004
Promotion of non-ODS Alternatives	January 2004 – July 2004
Import Quota System for CTC	June 2004 – December 2004
CTC Production Quota System	June 2004 – December 2004
Announcement of the CTC Consumption Phase-out Requirement in the Chlorinated Rubber and Chlorinated Paraffin Sub-Sectors	January 2004 – June 2004

6. ANNUAL BUDGET

2003 Annual Budget

Activity	**Committed Funds (US $)**	**Planned expenditures (US $)***
CTC Phase-out in the Chlorinated Rubber Industry	4,330,000	-
CTC Phase-out in the Chlorinated Paraffin Industry	1,140,843	-
CTC Phase-out in the Process Agent Applications in the Pharmaceutical Sub-Sector	2,000,000	-
CTC Phase-out in the Solvent Sector	1,000,000	-
Establishment of PMU	50,000	-
Total	**8,520,843**	**-**

*No disbursement is planned as an agreement between the Government of India and the ExCom has not been finalized. In addition, legal instruments between the Government of India and the Bank and other bilateral donors are not in place. Disbursement is expected to start in 2004

2004 Annual Budget

Activity	New Request (US $)	Committed Funds from Prv. Approvals (US $)	Planned expenditures (US $)
CTC Phase-out in the Chlorinated Rubber Industry		4,330,000	-*
CTC Phase-out in the Chlorinated Paraffin Industry		1,140,843	-*
CTC Phase-out in the Process Agent Applications in the Pharmaceutical Sub-Sector	2,763,002	2,000,000	-*
CTC Phase-out in the Solvent Sector	7,045,278	1,000,000	2,000,000
CTC Phase-out in the Agro-Chemical Industry	393,082		-*
CTC Production Gradual Phase-out	2,000,000		1,500,000
Establishment of PMU	678,750	50,000	300,000
Technical Assistance for the Production Sector	500,000		250,000
Total	**13,380,112**	**8,520,843**	**4,050,000**

*Agreements will be signed by eligible enterprises. Therefore, almost all of the funds approved up to 2004 will be fully committed. However, disbursement will be made only when enterprises complete their phase-out activities. Full disbursement is expected in the end of 2005 or early 2006.

INDIA

CFC Production Sector Gradual Phaseout Project (ODS III)

2004 Annual Work Program

January 29, 2004

New Delhi Office
South Asia Environment and Social Unit
World Bank

INDIA

CFC PRODUCTION SECTOR
GRADUAL PHASEOUT PROJECT (ODS III)

CY2004 ANNUAL PROGRAM

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INDIA

CFC PRODUCTION SECTOR
GRADUAL PHASEOUT PROJECT (ODS III)

CY2004 ANNUAL PROGRAM

A. INTRODUCTION

In accordance with Decision 29/65 of the Executive Committee of the Multilateral Fund, the World Bank, as the implementing agency, is submitting an Annual Program for India's CFC Production Sector project, for the period "1 January - 31 December 2004", for consideration at the March 2004 meeting of the Executive Committee. This Annual Program has been prepared in cooperation with the Ministry of Environment and Forests (MoEF), Government of India, United Nations Environment Programme (UNEP) and the Project Management Unit (PMU) of the Ozone Cell.

Through the implementation of the CY2003 Annual Program of the *CFC Production Sector Gradual Phaseout Projec*t, India has met its 2003 CFC production quota level of 15,058 metric tons (MT).

This document verifies the successful implementation of the CY2003 Annual Program by India and details the planned program and activities for 2004. It is being submitted for approval and release of the sixth tranche of funds, amounting to US$ 6 million (including technical assistance component) for the implementation of the CY2004 Annual Program.

	Agreed Schedule		Actual		
Year	CFC Production not exceeding (MT)	Phaseout Amount (MT)	Verified CFC Production (MT)	Phaseout Amount (MT)	Annual Funding Level (US$ million)
1999	22,588	-	22,411	-	12.0
2000	20,706	1,882	20,407	2,181	11.0
2001	18,824	1,882	18,693	2,013	11.0
2002	16,941	1,883	16,890	1,934	6.0
2003	**15,058**	**1,883**	**15,014**	**1,927**	6.0
2004	13,176	1,882			6.0
2005	11,294	1,882			6.0
2006	7,342	3,952			6.0
2007	3,389	3,953			6.0
2008	2,259	1,130			6.0
2009	1,130	1,129			6.0
2010	0	1,130			6.0
Total Funding					**82.0**

B. CY2003 ANNUAL PROGRAM ACHIEVEMENTS

B.1 ODS Phase-out and Disbursement

CFC production in CY2003 amounted to 15,014 MT, against the quota of 15,058 MT, reflecting a reduction of 11% (1,876 MT) from the previous year. CFC production volumes have reduced by about 7,500 MT since the commencement of the project.

Disbursements to CFC producers in CY2003 amounted to US$ 5.265 million, reflecting 90% of the 2003 allocation of US$ 5.85 million, allocated for enterprise compensation. Disbursement to UNEP amounted to US$ 0.27million in 2003, for the implementation of the TA component.

Year	Production Phase-out		Grant Tranches (US$ m)	
	Target (MT)	Achieved	Allocation (US$ million)	Status of Disbursements
2003	15,048	The independent Audit Teams appointed by MoEF and WB separately verified CFC production in CY2003. Total production of CFCs was ascertained by both teams as 15,014 MT.	5.85	▪ 10% of CY2002 allocation (US$ 0.59 million) disbursed in February 2003 ▪ 60 % of CY2003 allocation disbursed in May 2003 (US$ 3.5 million) ▪ 30 % disbursed in December 2003 (US$ 1.755 million) ▪ *The last 10% (US$ 0.59 million) is to be disbursed after final verification of CY2003 production is completed* .

Under the TA component, US$ 1.13million has been disbursed from the Multilateral Fund to the World Bank. Total disbursement to UNEP from the Bank amounts to US$ 0.65million, of which approximately US$ 0.6 million has been disbursed to the PMU for implementation of TA activities.

B.2 Enterprise-Level CFC Production Phaseout targets (MT)

At the enterprise level, the performance with regard to meeting the quota allocations for CY2003 is summarized in the following table.

Name of company	(Metric Tons)	
	Quota	Achieved
SRF Limited	4429	4422
Gujarat Fluorochemicals	5377	5370
Navin Fluorine (Mafatlal)	3968	3943
Chemplast Sanmar Limited	1284	1279
TOTAL	**15,058**	**15014**

** No quota trading occurred between the enterprises in 2003.*

The following table reflects the quota achievements by the four beneficiary enterprises between 2000 and 2003:

Name of company	2000 (Metric Tons)			2001 (Metric Tons)		2002 (Metric Tons)		2003 (Metric Tons)	
	Quota	Quota adjusted for trades	Achieved	Quota	Achieved	Quota	Achieved	Quota	Achieved
SRF Ltd	6,090	6,146	6,053	5,536	5,518	4,982	4,973	4429	4422
Gujarat Fluorochem	7,395	7,482	7,352	6,722	6,615	6,050	6,037	5377	5370
Navin Fluorine	5,455	5,249	5,179	4,960	4,959	4,464	4,440	3968	3943
Chemplast Sanmar Ltd	1,766	1,829	1,823	1,606	1,601	1,445	1,440	1284	1279
TOTAL	20,706	20,706	20,407 (98.5%)	18,824	18,693 (99%)	16,941	16,890 (99.7%)	**15,058**	**15014 (99.71%)**

B.3 Policy Measures

As detailed in CY2003 Annual Program, a number of policy measures were adopted and implemented during the course of the year as summarized below:

Activity	Key Actions	Target Dates	Status
Production Quota license	Applications for a CY2003 Production Quota license received from all four CFC producers will be examined by MoEF for issuance of licenses.	No later than January 31, 2003.	Completed
Monitoring of illegal trade	National Action plan will be prepared to monitor and control illegal trade. The newly constituted Committee will provide recommendations to the Empowered Steering Committee, which is the apex body for policy and implementation decisions regarding the Montreal Protocol in India.	September 2003	Not completed. To be postponed to 2004
Registration of producers	Applications submitted for renewal of each CFC producer, as required by the Ozone Rules, will be examined by MoEF and processed for renewal of registration.	By April 2003.	Completed

B.4 Technical Assistance Activities

Key activities undertaken by the MoEF as proposed in the Annual Program CY2003 are detailed in table below:

Activity	Key Actions	Target Dates	Status
Awareness of ODS phaseout	▪ Monitoring of public awareness activities (School Package, Television spots, Press Ads, short films) for ODS users as undertaken by Communications Agency	2003	In progress
	▪ Organize and implement public awareness workshops in remaining 3 states (Manipur, J&K and Jharkhand) and 2 UT (Andaman & Nicobar and Lakshadeep)	By June 2003	Completed except in 2 UTs
	▪ Finalize a concept note on establishment of national networking system at zonal level, based on feedback received from state level workshops	Sept 2003	Not completed. Consultant drafting note.
Training/ Workshops	▪ A National Follow-up capacity building workshop with State focal points	Jan/Feb 2003	Completed in February 2003
	▪ Regional workshops to review the implementation and enforcement of ODS Rules. This will be a training and awareness programme for officials of State Government, Pollution Control Board, local authority and other stakeholders	By Sept 2003	Postponed until regional structure is put in place
	▪ 5 training workshops for customs & excise para-military forces, judicial authorities and government departments. Equipment to be supplied to customs officials of port and customs check point, para-military forces, placed in borders (such as BSF and coast guards).	Feb - Dec 2003	Completed. Equipment being procured by UNEP
	▪ DCSSI to organize a national interactive session for all 28 small and medium scale enterprises institutes (SISIs) and their beneficiaries on ODS phaseout. This session will include issues such as registration of small units under ODS Rules and implementation and monitoring of ODS phase out projects	June 2003	Postponed to 2004
	▪ 2 capacity building workshops to be held by NACEN for training of trainers at field level. Target group are NACEN officials, key ministries and agencies (DGFT, MOEF)	Sept 2003	Completed in August 2003
Operations of	▪ Half-yearly technical audits of CFC producing	July 2003	Completed

Activity	Key Actions	Target Dates	Status
PMU	enterprises		
	▪ Meetings with CFC producers to initiate the follow up action on recommendations from audit findings.	March 2003	Ongoing
	▪ Monitoring of CFC production phaseout project and other ODS phase out projects in other sectors	Ongoing	Ongoing
MIS Operation	▪ Updation of database and MIS	2003	Completed
	▪ A state-of-art report from 1999-2002 on ODS phase out program to be prepared	By Dec 2003	First draft completed
	▪ In-house development of database of import-export data on ODS, based on license, exemption certificates etc.	By Dec 2003	In progress
	▪ Implementation of information system for facilitating chiller sector phaseout strategy	September 2003	Completed
Studies	▪ Development of low-cost technology, equipment for charging of non-ODS refrigerant and for recovery, recycling and reclamations in servicing sector. (A proto-type equipment will be developed.	To be initiated by June 2003	Not commenced
	▪ Technology for conversion of ODS to non-ODS or destruction will also be attempted.)	To be initiated by June 2003	Not commenced
	▪ Assessment of demand and supply of substitutes and impact on conversion activity.	April 2003	Not commenced
	▪ Completion of Market study on preparedness of refrigeration food processing industry	June 2003	Completed
	▪ Completion of study on assessment of demand supply of ODS		First draft received in December 2003

B.5 Monitoring and Reporting Activities

The reporting mechanism is detailed below:

Report	Submitted by	Target Date	Comments
Progress report	UNEP	July 2003 January 2003	Detailed reports received from PMU and reviewed during supervision mission in September 2003
Financial Audit	UNEP	June 2003	UNEP unable to provide audited statements for CY2002 until the biennium 2002-2003 is audited. Certified financial report for CY2002 has been submitted. Audited financial report for CY2003 is to be submitted mid 2004.
Disbursement Report	IDBI	July 2003 January 2004	Satisfactory reports received
Financial Audit	IDBI	September 2003	Satisfactory report received October 2003
Performance Audit	Auditor/ MoEF	January 2003	Not undertaken in 2003. Next performance audit to be initiated in 2004
Technical Audit	Auditor/ MoEF	July 2003 January 2004	Satisfactory reports received in August 2003 and January 2004
Technical Audit	Auditor/ WB	January 2004	Satisfactory report received in January 2004
Supervision report	WB	January 2003 August 2003 January 2004	Supervisions were undertaken in June 2003. Satisfactory reports prepared and disseminated. Next supervision postponed to March 2004

C. CY2004 ANNUAL PROGRAM: OBJECTIVES AND ACTIVITIES

C.1 ODS Phase-out Objectives and Disbursement Allocation

The primary objective of the CY2004 Annual Program is to ensure that CFC production does not exceed **13,176 MT**. The Bank, on behalf of the Government of India, is requesting the release of **US$ 6 million** to achieve this objective, which is to be disbursed as per the following categories:

- US$ 5.85 million will be disbursed to the four beneficiary CFC producing enterprises for reducing production levels in accordance with the annual production quota established for CY2003; and

- US$ 0.15 million for implementation of the TA component.

C.2 Enterprise-Level CFC production phase-out targets (MT)

In accordance with the Production Quota Order, the four CFC producers have submitted applications for the CY2004 quota. Given that CFC production is well within the CY2003 quotas, quotas will be issued to each enterprise by January 31, 2004, as follows:

Name of company	2004 Quota (MT) (before trades)
SRF Limited	3,875
Gujarat Fluorochemicals	4,705
Navin Fluorine (Mafatlal)	3,472
Chemplast Sanmar Limited	1,124
Total	**13,176**

C.3 Policy Measures

Activity	Key Actions	Target Dates
Production Quota license	Applications for a CY2004 Production Quota license received from all four CFC producers will be examined by MoEF for issuance of licenses.	To be issued by January 31, 2004.
Renewal of registration of producers	Applications for renewal of registration of each CFC producer, as required by the Ozone Rules, will be examined by MoEF and processed.	As and when required
Implementation of other provisions of ODS Rules.	• Applications for registrations from sellers, stockists, dealers and buyers of CFC will be examined and submitted to Ozone Cell, MOEF. • Applications for import and export of CFCs will be examined by PMU after which the Ozone Cell will submit recommendations for issuance of bulk licenses for export by CFC producers and licenses for import to DGFT.	July 2004 Throughout the year for import and export license, as and when received
Review of existing regulations	▪ A review of the existing Rules to determine regulatory changes needed for facilitating implementation of CTC phaseout and RACSSS	February 2004

C.4 Technical Assistance Activities

Proposed technical assistance activities to be undertaken during 2004 are summarized in the following table. These activities have been decided based on the priorities of the Government of India with regard to national ODS phase out.

Given the advanced stages of implementation of CFC phaseout program in India and the implementation support needed for other sectoral phaseout activities (e.g., CTC phaseout strategy, Refrigeration and air-conditioning service sector strategy etc.), it is expected that the ODS III program will offer necessary support to implement these projects.

Activity	Key Actions	Target Dates	Budget (US$ '000)
Awareness of ODS phaseout	▪ Targeted awareness programs at clusters of CTC and CFC consumption on phaseout activities and use of alternatives.	Jan-Dec.2004	100

Activity	Key Actions	Target Dates	Budget (US$ '000)
	▪ Awareness programs on CTC phaseout and implementation modalities for CTC phaseout projects.	Feb – Oct 2004	
Assessment of illegal trade	▪ Further to regional workshop being organized by UNEP, undertake activities to assess quantum of illegal trade and measures to promote its control ▪ National Action plan will be prepared to monitor and control illegal trade.	April – May 2004	20
Training/ Capacity building	▪ Capacity building and training for information dissemination on ODS phaseout and Montreal Protocol implementation in high CFC and CTC consumption pockets. ▪ Regional training sessions for officials of State Government, Pollution Control Board, local authorities, SISIs and other stakeholders for implementation and enforcement of ODS Rules. ▪ DCSSI to organize a national interactive session for all 28 small and medium scale enterprises institutes (SISIs) and their beneficiaries on ODS phaseout. This session will include issues such as registration of small units under ODS Rules and implementation and monitoring of ODS phase out projects ▪ Finalize a concept note on establishment of national networking system at zonal level, based on feedback received from state level workshops	Feb – June 2004 April – November 2004 May 2004 June 2004	20
Operations of PMU	▪ Half-yearly technical audits of CFC producing enterprises. ▪ An internal assessment of effectiveness of the half yearly technical audit will be carried out. ▪ Performance Audit of PMU	July 2004 January 2005 August 2004 January – April	115

Activity	Key Actions	Target Dates	Budget (US$ '000)
		2004	
	▪ Meetings with CFC producers to discuss findings and recommendations from annual audit and other issues.	April 2004	
	▪ Monitoring of CFC production phaseout project and other ODS phase out projects in RAC and solvent sectors.	Feb – Oct 2004	
	▪ Support in implementation of CTC phaseout plan.	Jan – Dec 2004	
MIS Operation	▪ Development of MIS vision and roadmap - to support all ODS phaseout activities.	Feb 2004	20
	▪ MIS review and upgradation to take care of all ODS phaseout projects.	Feb – May 2004	
	▪ Development of e-based outreach technology pilot program for information dissemination on illegal trade and ODS phaseout activities.	November 2004	
	▪ In-house development of database of import-export data on ODS, based on license, exemption certificates etc.	Feb 2004	
	▪ Development of technology roadmap for communication infrastructure, processes and organization	November 2004	
	▪ Completion of state-of-art report from 1999-2002 on ODS phase out program	June 2004	
Studies	▪ Initiation and Completion of existing studies under progress.	Feb – August 2004	75
	▪ Based on ODS supply-demand study undertaken in 2003, define roadmap for managing material balances of ODSs for CFCs and CTC	April 2004	
	▪ Assessment of information awareness activities and their impact	October 2004	
Total			**350**

C.5 Monitoring and Reporting Activities

The monitoring and reporting schedule for CY2004 will be undertaken in accordance with the reporting mechanism specified in Section B.5 above.

ANNEX I

ANNUAL PRODUCTION PHASEOUT TARGETS AND ANNUAL GRANT TRANCHES

CY	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production ceiling (ODP MT)	22,588	20,706	18,824	16,941	15,058	13,176	11,294	7,342	3,389	2,259	1,130	0
Grant Tranche (US$ million)	12.0	11.0	11.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0
Of which: TA	0.29	0.27	0.27	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.12	0

INDIAN CFC PRODUCTION VERIFICATION REPORT FOR THE CALENAR YEAR 2003

JANUARY 2004

Deloitte Touche Tohmatsu India Private Limited

Indian Institute of Technology, Delhi

Executive Summary

CFC production sector gradual phaseout project for India (ODS III) is aimed at assisting the Government of India (GOI) to meet its international obligation under the Montreal Protocol, which requires India to phaseout production of Chlorofluorocarbons (CFCs) by 2010. The Project was approved by the Executive Committee of the Multilateral Fund in 1999. The project provides for a gradual phaseout of CFC production, ahead of the specified time frame provided by the Montreal Protocol.

There are four beneficiary enterprises under ODS III project, namely:

- Chemplast Sanmar Limited.
- Gujarat Fluorochemicals Limited.
- Navin Fluorine.
- SRF Limited.

The disbursement of funds under this project to these beneficiary enterprises is contingent on independent verification of CFC production by these enterprises and confirmation that the production levels are within the annual quota allocated.

The verification team from Deloitte Touche Tohmatsu India Private Limited along with Indian Institute of Technology, Delhi, visited the four CFC producing enterprises between 5 – 11 January 2003 to perform verification of CFC production of the year 2003.

The verification methodology for CFC production has been detailed later in this report. The verification was carried out based on data provided by the enterprises and the relevant operational and statutory records maintained by the enterprises. Random checks and laboratory tests were also carried out for verification.

Based on the above tests, results of the CFC production verification for the year 2003 is given in the table below.

Particulars	Chemplast Sanmar Limited	Gujarat Fluorochemicals Limited	Navin Fluorine	SRF Limited	Total
Quota	1284	5377	3968	4429	15058
Opening Stock	26	39	127	67	259
Gross Production	1280	5418	3985	4422*	15104
Losses	1	47	42	Not rep.	90
Net salable Production	**1279**	**5371**	**3943**	**4422**	**15015**
Acquired Stock	0	129	-	19	150
Sales	1302	5461	3996	4457	15216
Closing Stock	3	78	74	51	207
Percentage of Quota	99.61%	99.87%	99.37%	99.84%	99.71%

** Losses for the year 2003 have not been reported and hence gross and net production levels are reported to be the same.*

The net saleable production level of CFC production for the calendar year 2003 aggregates to 15,014 MT.

1. Background

The manufacture and use of CFCs is controlled under provisions of Montreal Protocol. As substances categorized under Annexure A Group I, production and consumption of these substances have to be completely phased out by Article 5 paragraph 1 parties by 1 January 2010. India is a signatory to the Montreal Protocol and CFC production is regulated by the Ozone Cell, Ministry of Environment and Forests.

There are four CFC producers in India, namely:

- Chemplast Sanmar Limited.
- Gujarat Fluorochemicals Limited.
- Navin Fluorine.
- SRF Limited.

The four CFC producers formed an association namely Refrigerant Gas Manufacturers Association (REGMA) and this association represents the interests of CFC producing enterprises with other stakeholders.

CFC production sector gradual phaseout project for India (ODS III) is aimed at assisting the Government of India (GOI) to meet its international obligation under the Montreal Protocol, which requires India to phaseout production of Chlorofluorocarbons (CFCs) by 2010. The Project was approved by the Executive Committee of the Multilateral Fund in 1999. The project provides for a gradual phaseout of CFC production, ahead of the specified time frame provided by the Montreal Protocol. World Bank is the implementing agency which monitors implementation of this project. Funds are disbursed through Industrial Development Bank of India (IDBI), which is the financial intermediary.

CFC production control, as per the above agreement, is implemented through a Quota Order issued by the Ozone Cell. The production levels of each of the enterprises for a particular year are defined through this quota order and the enterprises monitor and control CFC production based on these CFC production levels. Production is defined as “Net saleable production”, this definition having been agreed between REGMA, MoEF and the Ozone Cell in January 2001.

2. CFC production process

All four enterprises adopt the same manufacturing process for producing CFCs. Carbon tetrachloride (CTC) and Anhydrous hydrogen fluoride (AHF) or

hydrogenfluoride (HF) are reacted in the presence of antimonychlorofluoride catalyst. This reaction results in a mixture of CFC-11 and CFC-12, commonly referred to as CFC crude. The crude is distilled to separate CFC-11 and CFC-12. Each plant has minor differences in plant layout and raw material manufacturing or procurement process.

HCFC-22 is produced by a similar process in which chloroform (CFM) and HF are reacted. In India, all plants that produce CFCs are designed to produce HCFCs. Such change in production is referred to as "swing operation".

Navin Fluorine produces CFC-113 using HF and Perchloroethylene (PCE). The production operations are carried out in a separate plant in the same premises as CFC production facilities. CFC-113 is distilled and its isomer, CFC-113a, is produced.

3. Verification Methodology

The verification methodology includes examination of data maintained by the enterprises and physical verification based on sample checks and walkthroughs. The verification did not include verification of HCFC-22 production data and data of other products using the same raw materials as CFCs (i.e., HF and CTC).

The data examined include:

- Raw material purchase and issues records both from the statutory procurement records, information systems and data maintained in their production logs.
- Production logs, statutory records maintained for recording manufacturing products and production records.
- Quality control and analysis records.
- Stock transfer and sales records, to the extent found necessary.

Depending upon the operational pattern of the plant, dates were selected at random for both CFC and HCFC production periods. The production logbooks and laboratory and analytical records were correlated for the sample days to assess whether the records are appropriately maintained for products produced. Further, samples from the existing stocks were taken for gas chromatograph analysis.

In addition to this, discussions were held with the plant personnel to primarily to verify whether there were any major changes in the plant designs which can result in augmentation / expansion of production capacities, any significant

abnormalities/events / accidents which affected production of CFCs and raw material consumption for the same. Based on their responses, subsequent checks, if found necessary, are conducted on the records.

4. Observations and results

The results of verification process for the enterprises are presented in the sections below.

CHEMPLAST SANMAR LIMITED

Enterprise	Chemplast Sanmar Limited (CSL)
Office Addresses	8 Cathedral Road, Chennai – 86. Tel No. 044-8273333 Fax No. 044-
Plant Address	Plant No.1, Mettur Dam
Contact Person	J.Suresh
CSL Personnel:	S.Vasudevan Palaniappan
Verification Team:	Mr. N.Balaji/Dr.Agarwal/Mr. T.R.Venkatesh
Date:	5 January 2004

Plant overview

CFC and AHF production facilities in the plant were established in 1988 on an existing CSL site at Mettur Dam, Tamil Nadu, India. In addition to CFCs, CSL produces other chemicals at their facility in Mettur Dam. CTC and CFM are procured from the neighbouring site. AHF is procured from a domestic supplier.

The plant is a swing plant i.e., is capable of producing CFCs and HCFCs. While the reactors for CFC and HCFC production are different, the down stream purification and distillation process is common for CFC and HCFC. For achieving the swing, the raw material feeds for one product are stopped, purification and distillation systems are purged and raw material feed from the other reaction system are started.

Production details

A summary of production of CFCs of CSL is given below.

Particulars	**2002**	**2003**
Production quota for the year	**1445 MT**	**1284 MT**
Production quota traded in the year	Nil	Nil
Plant operation days - CFC-11/12 - HCFC-22 - Not operating	 231 92 42	 195 58 112
Production of CFCs - CFC-11 - CFC-12	**1440 MT** 284 MT 1156 MT	**1279 MT** 138 MT 1141 MT
Percentage of quota used	**99.66%**	**99.53%**

Raw material consumption ratio

	CFC-11	**CFC-12**
Carbontetrachloride (tons/ton of product)	1.205	1.387
Hydrogenfluoride (tons/ton of product)	0.170	0.377

The details of the production of CFCs, as per Decision 32/70, is presented in Annexure A.

Registration and licenses for operation

CSL has obtained a registration certificate valid upto 17 April 2005 from Ozone Cell for production of CFCs at their plant. Though CSL has applied for a renewal of consent to the State Pollution Control Board on 4 April 2003, the renewal has not been yet been received.

Raw material procurement and consumption

Raw materials consumed by the CFC production plant include CTC and HF. While CTC is consumed for CFC production only, HF is consumed for production of CFCs and HCFC-22. CTC is produced from their own unit. HF is procured from TANFAC in containers. The raw materials are stocked at the CFC production plant.

Total CTC procured for the year 2003 aggregates to 1743 MT. 1748 MT was consumed for CFC production and about 2 MT was used during the months of August and November in 2003 as a cleaning agent for cleaning reflux columns in the plant. The plant personnel informed that CSL has decided to stop CTC use for cleaning purposes in the future and propose to use non-ODS alternatives.

HF procured by CSL is issued for CFC or HCFC production. Total HF procured in the year 2003 aggregates to 551 MT and consumption aggregates to 581 MT. Of this, 127 MT was consumed for HCFC-22 production and 454 MT was consumed for CFC production.

Losses

CFC production as recorded in the main product storage tanks is treated as gross production. The gross production is measured based on level differences in the tank recorded between the measurement day and previous day. The total quantity of CFC filled into cylinders (for domestic sale or exports) is cumulated at the end of the month and compared with the gross production levels. The difference between the gross production and quantities filled is treated as filling losses. In the year 2003, CSL has reported 0.038 MT of CFC-11 and 0.659 MT of CFC-12 as filling losses. The losses of CFCs in CSL are low as filling section has a back suction system, which circulates the excess gas into production operations.

Sample analysis

Samples from domestic and HCFC-22 export cylinders were taken and gas chromatograph analysis was carried out on the sample.

On a sample basis, the production of CFCs and HCFCs were checked for:

- raw material inputs,
- production logs,
- storage logs, and
- quality control test report records.

The sample included 5 days of HCFC-22 production and 5 days of CFC-12 production distributed in different months during the year.

The results of such sample verfication were found to be in order.

Others

- During the year 2003, no extraordinary losses or repurchase of smuggled CFCs into the country, were reported by CSL. During the month of October 2003, stock returns of 219 kgs of CFC-12 were reported from one customer.

- The specific consumption of CTC and HF for CFC production for the last four years is given in the table below.

Particulars	**2000**	**2001**	**2002**	**2003**
CTC for CFC-11/12	1.36	1.41	1.45	1.37
HF for CFC-11/12	0.32	0.34	0.35	0.36

  CSL personnel informed that during the year they have taken necessary action to improve the consumption ratios of CTC for CFCs which has resulted in a lower CTC to CFC consumption ratio for the year 2003.

- Except for regular maintenance in the distillation columns to eliminate choking, no modifications/additions were made in the plant.

- CSL uses “Metron” and “Metrosol” brand name for CFC-11, CFC-12 and HCFC-22 sales in the domestic market. For the export market, the company primarily uses generic names i.e., R-11, R-12 and R-22.

Compliance

- With production of 1279 MT of CFCs in the year 2003 against a quota of 1284 MT for the year 2003, CSL is in compliance with the quota of CFC production.

NAVIN FLUORINE

Enterprise	Navin Fluorine (NF)
Office Addresses	Bhestan, Surat – 395023. Tel:0261-8690325-29 Fax:0261-8690288
Plant Address	-do-
Contact Person	P.Roy Chowdhury

	General Manager – Finance and Accounts (Chemicals)
NF Personnel:	D.S.R.Raju M.G.Nakrani P.A.E.S.Srinivas
Verification Team:	N.Balaji/ Dr.Agarwal/ Jatin Bakshi
Date:	7 January 2004

Plant overview

NF have two separate production units, both capable of swing operation between CFCs and HCFCs. The first unit was set up in 1967 at Surat, Gujarat, India. NF informed that given the low level of requirement of CFCs compared to their production capacity, the lines are separately maintained for CFCs and HCFCs. AHF is produced on site for CFC/HCFC production and for sale. CTC and CFM are purchased from both domestic and import sources.

CFC-113 is produced in small quantities in a separate facility at NF. Perchloroethylene and AHF are key raw materials used for producing CFC-113. Some of CFC-113 is isomerised to CFC-113a and used for producing certain other chemicals in their facility.

Production details

A summary of production of CFCs of NF is given below.

Particulars	**2002**	**2003**
Production quota for the year	**4464 MT**	**3968 MT**
Production quota traded in 2003	Nil	Nil
Plant operation days - CFC-11/12 - CFC-113 (Crude production) - HCFC-22	 157 18 Not Available	 143 72 Not Available
Production of CFCs - CFC-11 - CFC-12 - CFC-11/12 mixtures - CFC-113/113a	**4440** 836 3496 73 35	**3943** 716 3077 118 32
Percentage of quota used	**99.45%**	**99.36%**

Raw material consumption ratio

The raw material consumption ratio for CFC-11 and CFC-12 for the year 2003 are given below.

	CFC-11	**CFC-12**
Carbontetrachloride (tons/ton of product)	1.173	1.340
Hydrogenfluoride (tons/ton of product)	0.163	0.368

The raw material consumption ratio for CFC-113 (crude) for the year 2003 is given below.

Hydrogenfluoride (tons/ton of product)	0.477
Perchloroethylene (tons/ton of product)	0.995

The details of the production of CFCs, as per Decision 32/70, is presented in Annexure B.

Registration and licenses for operation

NF has obtained Gujarat State Pollution Control Board Clearance for production of CFCs and other products, which is valid upto 31 May 2004. They have applied for a license from Ozone Cell as required under the Ozone Rules, 2000 for production of CFCs and HCFCs. Their previous certificate of registration was valid upto 18 October 2003.

Raw material procurement and consumption

Raw materials consumed for production of CFCs is given in the table below.

Products	**Raw materials consumed**
CFC-11	Carbon tetrachloride Hydrogen fluoride
CFC-12	Carbon tetrachloride Hydrogen fluoride
CFC-113	Hydrogenflouride Perchloroethylene Chlorine

Note: For production of pure CFC-113 and CFC-113a, crude CFC-113 is used.

NF produces AHF in their own premises. They procure CTC from domestic and international suppliers. Perchloroethylene and chlorine are procured from domestic suppliers. The raw materials are stocked at the production plants and at the port, in case of imported raw materials.

Total CTC procurement of NF for the year 2003 aggregates to 4598 MT. Of this, 909 MT was consumed for CFC-11 production and 4202 MT was consumed for CFC-12 production. In addition, NF has also consumed 29 MT of CTC for producing a product “2kt”, which they claimed is use of CTC as feedstock. These quantities are issued based on loose slips of paper and were not maintained as proper records.

NF has reported 31 MT of CTC losses in transshipment and handling losses. During the verification mission for the year 2003, NF informed that losses upto about 1% of the imports do occur during transportation and transfer of CTC. The losses recorded above aggregate to less than 1% of the total procurement.

Total HF consumption for different products by NF in the year 2003 is given in the table below.

Products	HF consumption MT
CFC-11	126
CFC-12	1154
CFC-113	74
HCFC-22	1933
Others	7923
Total	**11210**

Losses of finished products

CFC production as recorded in the main product storage tanks is treated as gross production. CFC filled into cylinders is treated as net saleable production. The difference between the above is treated as filling and handling losses. NF measures and reports process losses on a monthly basis.

In the year 2003, NF has reported 15 MT of CFC-11 and 27 MT of CFC-12 as filling and handling losses. As a percentage of production, this translates to losses of 1.89% for CFC-11 and 0.71% for CFC-12, respectively.

No losses have been reported in production of CFC-113.

Sample analysis

Samples from domestic and export cylinders of HCFC-22 were taken for analysis and gas chromatograph analysis was carried out on these samples.

On a sample basis, the production of CFCs and HCFCs were checked for:

- raw material inputs,
- production logs,
- storage logs, and
- quality control test report records.

The sample included 5 days of HCFC-22 production and 5 days of CFC-12 production distributed in different months during the year. Production records for CFC-113 were also reviewed.

The results of such sample verfication were found to be in order.

Others

- The specific consumption of CTC and HF for CFC production for the last four years is given in the table below.

Particulars	**2000**	**2001**	**2002**	**2003**
CTC for CFC-11	1.181	1.184	1.180	1.173
CTC for CFC-12	1.349	1.342	1.341	1.340
HF for CFC-11	0.163	0.166	0.164	0.163
HF for CFC-12	0.365	0.367	0.368	0.368

  The current year's consumption norms are in line with past trends.

  The specific consumption of HF and PCE for CFC-113 (crude) from 2001 to 2003 are given in the table below.

Particulars	**2001**	**2002**	**2003**
HF for CFC-113	0.426	0.467	0.477
PCE for CFC-113	1.110	0.993	0.995

- Except for regular maintenance, no modifications/additions were made in the CFC-11 and CFC-12 production plants. NF, however, mentioned that there were modifications made in their other production facilities (i.e., non-CFC chemicals) during the year 2003 and for shifting of CFC-113a facility to a location near TFA production facility.

- Due to lower levels of production of CFCs and HCFCs, separate lines are maintained for producing CFCs and HCFCs. Production logs are separately maintained for CFCs and HCFCs.

- NF uses "Mafron" brand name for CFC-11, CFC-12, CFC mixtures, CFC-113 and HCFC-22 sales in the domestic market and export markets. Sometimes, based on customer requests, separate brand names are used for export market consignments.

- NF has reported production of CFC-113 as given in the table below.

Products		**Figures in MT**
Production of CFC-113 crude	A	156
Issues for CFC-113 pure production	B	32
Issues for CFC-113a production	C	127
Total quantity of CFC-113a produced	D	110

Crude CFC-113 produced during the year 2003 aggregates to 156 MT. While 32 MT has been sold as CFC-113 pure for local and international customers, CFC-113a is converted to trifluoroacetic acid (TFA) at the same production facilities and this conversion results in complete chemical transformation of CFC-113a to TFA. During the year 2001, the quantity of CFC-113a used for TFA production was considered to be a feedstock use and was given credit against the production quota. The auditors had recommended that a clear system be laid out for recording and presenting this information for availing this credit.

We were informed that, during the year 2002, NCL, Pune was engaged by Ozone Cell as an agency to verify the process of CFC-113a for use as feedstock at NF. The final report has been received by the Ozone Cell and based on this report, Ozone Cell is expected to certify, amongst others, that CFC-113a use for TFA production is a feedstock use.

The total quantity of TFA produced, as verified from the production records, is 38 MT, thus translating to a ratio of 2.84 MT of CFC-113a to a ton of TFA. NF has claimed that CFC-113a production should be given credit against the quota as the entire production of CFC-113a was used as a feedstock for production of TFA in their premises.

Compliance

- With production of 3943 MT of CFCs in the year 2003 against a quota of 3968 MT for the year 2003, NF is in compliance with the quota of CFC production.

GUJARAT FLUOROCHEMICALS LIMITED (GFL)

Enterprise	Gujarat Fluorochemicals Limited
Office Addresses	ABS Towers, 2nd Floor, Old Padra Road, Vadodara – 390 007. Tel:0265-2330057. Fax:0265-2310312.
Plant Address	Survey no. 16/3, 26, 27, Ranjit Nagar – 389 380.
Contact Person	Deepak Asher Vice President – Corporate Finance
GFL Personnel:	D.K.Sachdeva Joseph Titus Naganath K. Iyer Rajendra Gujjar
Verification Team:	N.Balaji/ Dr. Agarwal/ Mr. Jatin Bakshi
Date:	9 January 2004

Plant overview

Production of AHF, CFCs and HCFCs was established in1989 on a green field site in a rural area in Gujarat, India. All AHF is produced insite for consumption and CTC and CFM were purchased from domestic producers and imported. CFC and HCFC plant has a single reactor feeding into a single purification / distillation system. The reactor is connected to two catalyst tanks, one for CFC catalyst and the other for HCFC catalyst. For changing from CFC production to HCFC production, feed for CTC and AHF are stopped, the catalyst is transferred to the respective holding tank and purging of the system for different products.

Production details

A summary of production of CFCs of GFL is given below.

Particulars	**2002**	**2003**
Production quota for the year 2003	**6050 MT**	**5377 MT**
Production quota traded in 2003	Nil	Nil
Plant operation days - CFC-11/12 - HCFC-22	 111 206	 98 223
Production of CFCs - CFC-11 - CFC-12	**6037 MT** 821 MT 5216 MT	**5371 MT** 321 MT 5050 MT
Percentage of quota used	**99.79%**	**99.89%**

Raw material consumption ratio

The raw material consumption ratio for CFC-11 and CFC-12 are given below.

	CFC-11	**CFC-12**
Carbon tetrachloride (tons/ton of product)	1.178	1.338
Hydrogen fluoride (tons/ton of product)	0.161	0.366

The details of the production of CFCs, as per Decision 32/70, is presented in Annexure C.

Registration and licenses for operation

GFL has obtained consent from the Gujarat State Pollution Control Board (GSPCB) (Reference: Consent order no. 623 dated 30 October 2003) for operations and this consent is valid upto 5 May 2007. GFL has also obtained a certificate of registration from Ozone Cell for production of CFCs and HCFCs, which is valid upto 17 April 2005.

Raw material procurement and consumption

Raw materials consumed for production of CFCs is given in the table below.

Products	Raw materials
CFC-11	Carbon tetrachloride Hydrogen fluoride
CFC-12	Carbon tetrachloride Hydrogen fluoride

GFL produces AHF in their own premises. They procure CTC from domestic and international suppliers. The raw materials are stocked at the production plants and at the port, in case of imported raw materials.

Total CTC procurement and consumption for the year 2003 aggregate to 8510 MT and 7136 MT, respectively. GFL has also reported losses of CTC aggregating to 48 MT, which relates to dormant losses (i.e., losses during transfer of material to port from ship and from port to tankers). These losses account for less than 1% of the total procurement for the year. The net consumption of CTC for CFC production during the year 2003 is thus 7088 MT.

Total HF consumption of GFL for the year 2003 for CFCs and HCFCs aggregates to 6553 MT. Of this, 1901 MT is consumed for CFCs and 4652 MT is consumed for HCFCs. This data was verified from the production records and issue records.

Losses of finished products

CFC production as recorded in the main product storage tanks is treated as gross production. CFC filled into cylinders is treated as net saleable production. The difference between the above is treated as filling and handling losses. These losses are measured and reported on a daily basis.

In the year 2003, GFL has reported handling and filling loss of 5 MT of CFC-11 and 42 MT of CFC-12. This translates to losses of 1.55% for CFC-11 and 0.83% for CFC-12, respectively.

Sample analysis

Samples from domestic and HCFC-22 export cylinders were taken for analysis. For these samples, analysis through gas chromatograph was carried out.

On a sample basis, the production of CFCs and HCFCs were checked for:

- raw material inputs,
- production logs,
- storage logs, and
- quality control test report records.

The sample included 5 days of HCFC-22 production and 5 days of CFC production distributed in different months during the year.

The results of such sample verification were found to be in order.

Others

- During the year 2003, GFL has purchased 11 MT of seized CFC-12 cylinders from Customs Department in months of March and August, 2003, respectively. Such receipts were recorded in the plant stocks and excise records.

- GFL has also reported stock returns of 3 MT of CFC-11 and 79 MT of CFC-12 during the year 2003. These materials were appropriately received at the factory and the relevant customs/excise authorities were informed.
- The specific consumption of CTC and HF for CFC production for the last four years is given in the table below.

Particulars	**2000**	**2001**	**2002**	**2003**
CTC for CFC-11	1.740	1.790	1.162	1.178
CTC for CFC-12	1.334	1.340	1.320	1.338
HF for CFC-11	0.165	0.165	0.161	0.161
HF for CFC-12	0.375	0.375	0.365	0.366

The current year's consumption norms are in line with past trends.

- Except for regular maintenance, no modifications/additions were made in the CFC production plant.

- GFL uses "Refron" brand name for CFC-11, CFC-12 and HCFC-22 sales in the domestic market and export markets. GFL also sells these products unbranded and brand names requested by importers, when specific customer requests arise for the same.

Compliance

- With production of 5371 MT of CFCs in the year 2003 against a quota of 5377 MT for the year 2003, GFL is in compliance with the quota of CFC production.

SRF LIMITED (FLUOROCHEMICALS DIVISION)

Enterprise	SRF Limited (SRF)
Office Addresses	Indian Express Building, Bahadurshah Zafar Marg, New Delhi. Tel:011-2 Fax:011-2
Plant Address	Bhiwadi, Rajasthan.
Contact Person	Ravinder Kaul Senior Vice-President
SRF Personnel:	K. Chalam Pratap Singh
Verification Team:	N.Balaji/ Dr.Agarwal/ Shrikant Pasari
Date:	11 January 2004

Plant overview

Established in 1989 in Rajastan, India, the site produces both AHF and chloromethanes. While AHF is primary used for production of CFCs and HCFCs, CTC from choromethane plant is used for producing CFCs. The refrigerant gases plant has twin reactors, one for CFCs and the other for HCFCs, both feeding into a single purification and distillation system. Thus, only CFCs or HCFCs can be produced at any one time. For changeover, one reactor has to be shut down, the purification and distillation system has to be purged and the other reactor has to be started.

Production details

A summary of production of CFCs of SRF is given below.

Particulars	**2003**
Production quota for the year 2003	**4429 MT**
Production quota traded in 2003	Nil
Plant operation days - CFC-11/12 - HCFC-22	 83 Not Available
Production of CFCs - CFC-11 - CFC-12	**4422 MT** 1376 MT 3046 MT
Percentage of quota used	**99.84%**

Raw material consumption ratio

The raw material consumption ratio for CFC-11 and CFC-12 are given below.

	CFC-11	**CFC-12**
Carbon tetrachloride (tons/ton of product)	1.167	1.326
Hydrogen fluoride (tons/ton of product)	0.163	0.371

The details of the production of CFCs, as per Decision 32/70, is presented in Annexure D.

Licenses

SRF provided a letter of application for renewal of consent to operate their plant dated 25 September 2003. Final consent letter from the pollution control board has not been received. SRF has obtained a registration certificate from the Ozone Cell for production of CFCs at their plant, which is valid upto 17 April 2005.

Raw material procurement and consumption

Raw materials consumed for production of CFCs is given in the table below.

Products	**Raw materials**
CFC-11	Carbon tetrachloride Hydrogen fluoride
CFC-12	Carbon tetrachloride Hydrogen fluoride

SRF produces AHF and CTC in their own premises. They also import CTC from international suppliers. The raw materials are stocked at the production plants and at the port, in case of imported raw materials. In their stock records, SRF declares materials stocked at the plant for the audit purposes.

Total CTC consumption for the year 2003 is given in the table below.

Products	**Consumption in MT**
CTC used for CFC production	5645
CTC sold for other purposes	3893
Total use of CTC	**9538**

Note:

1. SRF declares stock of CTCs at factory and hence, losses of CTC are not shown separately. SRF informed to the audit team that there were CTC losses occurring at port, which is a normal business operation loss and there were no other abnormal losses during the year.

Total HF consumption of SRF for CFCs, HCFCs and others aggregates to 4969 MT. Of this, 1354 MT is consumed for CFCs and 3467 MT is consumed for HCFCs. About 104 MT was consumed for production of dilute hydrofluoric acid, which is also sold by SRF. We were informed that 14 MT was used for R&D purposes.

The total consumption of HF for CFCs was verified from the production logs. Consumption ratio of HF for HCFC production was verified and found to be in order.

Losses of finished products

SRF does not have separate tanks for storage of final products by the plant and for filling cylinders. Hence, SRF does not measure gross production and as a result, SRF has not reported losses of CFCs produced.

For loss measurement, SRF had tried installing flow meters in the filling lines. But flow meter, which was installed, does not operate effectively as the finished product is in dual phase before the filling and the flow meter installed is unable to measure the quantities of finished product filled.

In the current situation, it is not possible to report production losses for SRF. For the year 2003, SRF has not reported filling losses.

Sample analysis

Samples from domestic and HCFC-22 export cylinders were taken for analysis. For these two samples, analysis through gas chromatograph was carried out.

On a sample basis, the production of CFCs and HCFCs were checked for:

- raw material inputs,
- production logs,
- storage logs, and
- quality control test report records.

The sample included 5 days of HCFC-22 production and 5 days of CFC production distributed in different months during the year.

The results of such sample verification were found to be in order.

Others

- During the year 2003, SRF has retained in its safe custody cylinders confiscated by customs department. SRF informed that no documents were provided for storing these cylinders and they are not aware of the contents of these cylinders. The cylinders confiscated in the previous year were still lying at the godown and no action has been taken for their disposal.

- SRF has also reported stock returns of 5 MT of CFC-11 and 19 MT of CFC-12 during the year 2003. These materials were appropriately received at the

factory and the relevant customs/excise records were appropriately maintained.

- The specific consumption of CTC and HF for CFC production for the last four years is given in the table below.

Particulars	2000	2001	2002	2003
CTC for CFC-11	1.173	1.181	1.168	1.167
CTC for CFC-12	1.332	1.341	1.326	1.326
HF for CFC-11	0.161	0.163	0.165	0.163
HF for CFC-12	0.362	0.367	0.372	0.371

The current year's consumption norms are in line with past trends.

- Except for regular maintenance, no modifications/additions were made in the CFC production plant.

- SRF uses "Floron" brand name for CFC-11, CFC-12, CFC-11/12 and HCFC-22 sales in the domestic market and export markets. They also sell products in generic names and brand names of customers on request.

Compliance

- With production of 4422 MT of CFCs in the year 2003 against a quota of 4429 MT for the year 2003, SRF is in compliance with the quota of CFC production.

PROJECT COVER SHEET

COUNTRY:	India
IMPLEMENTING AGENCY:	Germany (Lead) Switzerland, UNDP, UNEP
PROJECT TITLE:	National CFC Consumption Phase-out Plan
PROJECT IN CURRENT BUSINESS PLAN(s):	Included in Business Plans 2002, 2003, 2004
SECTOR/SUB-SECTOR	Refrigeration / Service
ODS USE IN SECTOR [year]:	1502 ODP tons [2001]
PROJECT IMPACT	Total Phaseout of CFC-12 consumption in India Eligible consumption: 847 ODP tons
REMAINING ODS USE IN SECTOR [2010]:	0
PROJECT DURATION:	72 Months
PROJECT COSTS (MLF related part of project):	
Share of remaining tons eligible for funding of consumption in sub-sector	58.34 %
Remaining eligible project cost	US$12,656,670
REQUESTED FIRST TRANCHE:	US$ 1,272,288
LOCAL OWNERSHIP:	100 %
EXPORT COMPONENT:	0%
REQUESTED MLF GRANT:	US$ 12,656,670 (to be released in tranches for the entire sector plan)
IMPLEMENTING AGENCY SUPPORT COST:	US$ 1,201,998 (entire sector plan)
FIRST TRANCHE AGENCY SUPPORT COST:	US$ 120,189
TOTAL COST OF PROJECT TO MLF:	US$ 13,858,668 (entire sector plan)
COST OF FIRST TRANCHE TO MLF:	US$ 1,392,477
OVERALL COST-EFFECTIVENESS (MLF PART)	US$ 8.43/ kg ODP US$ 14.94/kg eligible ODP
ADDITIONAL FUNDING:	Government of Switzerland (task specific) Equivalent services value: US$ 1'250'869
PROJECT MON. MILESTONES INCLUDED:	Yes
NATIONAL COORDINATING AGENCY:	Project Coordinator / Ozone Cell, MoEF

PROJECT SUMMARY

This phase-out plan, being the last MLF funded undertaking dealing with CFC consumption, will support the Government of India in eliminating entirely India's CFC consumption. The remaining consumption in the refrigeration sector will be dealt with in one component of the plan through a number of training and equipment support measures enabling good practice and retrofit. Expected natural retirement of equipment will further support reduction in CFC-12 consumption. Starting with a significant outreach effort, the component implementation will last until 2009. A second component, the policy and customs training strategy, will provide much-needed assistance to the Government of India to ensure optimum outreach of all measures and will be finished in 2007. Any other funding necessities for remaining CFC consumption in India would be covered under this plans through the flexibility provided through the agreements between the Government of India and the MLF.

IMPACT OF PROJECT ON COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS

The project will entirely phase out CFC consumption in India.

Component Service Sector Strategy: Prepared by: S. Sicars, GTZ-consultant (lead), in cooperation with MoEF, Switzerland, UNDP, UNEP, local experts and stakeholders:
Aug. 18, 02, updated April 15th, 03 September 10th, 03 and February 26nd, 04; Reviewed by Martien Janssen, Re/Gent Consultancy, The Netherlands on Aug. 23, 02

Component Policy and Customs Training: Prepared by UNEP in cooperation with MoEF, local experts and stakeholders

INDIA

NATIONAL CFC CONSUMPTION

PHASE-OUT PLAN

Consisting of

Component 1: SECTOR STRATEGY FOR PHASE-OUT OF CFC-12 CONSUMPTION IN THE INDIAN REFRIGERATION AND AIR CONDITIONING SERVICE SECTOR

Including

- **General Information and Impact of the Proposal**
- **Overall budget of the proposal**

Component 2: POLICY AND CUSTOMS TRAINING STRATEGY

PREPARED FOR

OZONE CELL, MINISTRY OF ENVIRONMENT AND FORESTS, INDIA

WITH TECHNICAL ASSISTANCE FROM

GTZ, GERMANY

BUWAL, SWITZERLAND

UNDP

UNEP

September 2003

Component 1

SECTOR STRATEGY

FOR PHASE-OUT OF CFC-12 CONSUMPTION

IN THE

INDIAN REFRIGERATION AND AIR CONDITIONING

SERVICE SECTOR

PREPARED FOR

OZONE CELL, MINISTRY OF ENVIRONMENT AND FORESTS, INDIA

WITH TECHNICAL ASSISTANCE FROM

GTZ, GERMANY

BUWAL, SWITZERLAND

UNDP

UNEP

August 2002 with updates

April 2003, September 2003, January/February 2004

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2 GENERAL INFORMATION

The objective of this refrigeration service sector plan for India is to assist the Government of India to meet its compliance target for the CFC-12 consumption in 2007, and to ensure the complete phase out of India's CFC-12 consumption in the service sector before 2010. A total consumption of 1502 ODP tons (of that 876.2 ODP tons eligible) of CFC-12 will be phased out under this sector plan. This project is the last project dealing with CFC-12 consumption in the refrigeration sector, leading to a complete phase-out of CFC-12 use in the refrigeration sector as well as in all other uses except for MDIs.

Dealing mainly with the refrigeration service sector, this project is the final CFC consumption phase-out project in India. Through the efforts under this phase-out plan and others approved before, India will be able to fully comply with the phase-out of CFC consumption as required by the Montreal Protocol, including consumption phase-out associated with chillers or MDI.

To achieve these objectives, the Refrigeration Service Sector Phase-out Plan proposes

1. To facilitate the CFC-12 phase out in India on the basis of already existing policies and regulations as well as financial support available to this project, and to include within this project the phase-out of CFC-12 consumption in potentially remaining small-scale assemblers of refrigeration equipment.
2. To support responsible use of refrigerant by training, equipment support, recovery and recycling, retrofit and technical assistance activities including replacement of CFCs during equipment repair, in order to minimize, and eventually eliminate, the use of CFCs

The plan includes necessary technical assistance components for strengthening the capacity of the country to carry out investment, regulations and awareness activities. It also proposes an implementation modality, including a monitoring component, to ensure the successful and effective implementation of this Refrigeration Service Sector Phase-out Plan.

The monitoring component is crucial to achieving the overall objective of this Refrigeration Service Sector Phase-out Plan, as the monitoring will ensure effective placement of resources and disbursements will be linked to confirmation of achievement of CFC reduction targets.

The plan is a unique document, developed to a large extent in India, with vivid support from Indian stakeholders, based on an – for MLF projects - unusual amount of data. Networking based on an Indo-Swiss-German project in the refrigeration sector and experience from a Swiss funded refrigeration training support programme formed an important basis for this work, and increased the accuracy and quality of it.

The structure and size of the remaining actors in the Indian refrigeration sector, which are largely small and micro enterprises, have been investigated in detail. The skill and equipment level, the low consumption associated with each company and the limited cooperation within the sector are based on national, often cultural circumstances which can and should not be changed for the implementation of a sector plan.

The refrigeration service sector provides a sizeable amount of jobs for school dropouts, people who have often learned their professions over decades with no or minimum pay associated, now being too old to start this process afresh. The costs of upgrading these entrepreneurs sufficiently that they can continue to earn enough for living belong also to the incremental costs directly associated with CFC phase-out. Both the political determination of the government to avoid placing them out of work as well as the legal aspects disallow for any attempts to force smaller entrepreneurs into larger companies just for the sake of most effective use of funds. Consequently, the challenge of this sector plan is to phase out a considerable amount of consumption in a vast number of enterprises with minimum socio-economic impact. .

The CFC consumption in the Indian refrigeration sector and in particular in the service sector is extremely widespread, and the amount of "low hanging fruits", i.e. enterprises with a sizeable consumption is low; less than 100 companies have a consumption above 500 kg CFC-12 per year, reaching a total of not even 7% of the consumption targeted within this plan. To phase out the first 10% of the CFC targeted in this plan, 250 enterprises have to cease completely to use CFC-12; the next 10% require already another 800 enterprises, and the ratio is worsening. This leads to consequences concerning measures to be implemented. E.g., while recovery and recycling (R&R) plays an important role, it can not be the main thrust under this plan due to the widespread use and the proven limited saving potential of R&R. Instead, responsible use of CFC through a bundle of measures such as minimizing charging weight, proper pressure testing and leak detection, and avoidance of presently frequent failures will minimize CFC consumption. To adhere to such practices is not only a question of awareness or even training; in almost all cases, the necessary tools are not available to adhere to good practices.

A tremendous problem in terms of CFC consumption are the domestic refrigerators in the country. India's production has increased significantly over the past decade, often with rates of about 15% to 20% per year. While the average lifetime of a refrigerator in industrialized countries is estimated at 13 to 15 years, it is typically even longer in a country like India. The older the refrigerators get, the more frequent they have to be repaired. The survey indicates a consumption of more than 800 tons for domestic refrigeration alone, and the average age of the CFC refrigerators is increasing while the number in use will decrease only very slowly due to the small production numbers 15 years ago. A number of good service practices and the supply of the necessary tools will reduce the CFC consumption during the service. At the moment it is estimated that more than 30 million CFC refrigerators being used, their service demand is expected to peak only in 2006 at 22% more than today and decline afterwards slowly. The stop in manufacturing on January 1st, 2003 will lead to a decrease, but only a gradual one, and even in this scenario CFCs for service would be needed until 2017, with 19 million CFC refrigerators still existing in 2010. Given the importance of a refrigerator for food preservation and, thus, public health, and the sizable portion of the annual income of many Indians needed to purchase a refrigerator, the strategy will also focus on establishing the infrastructure in terms of equipment and training needed for conversion and subsequent

service of retrofitted refrigerators, including measures to provide sufficient access to equipment and tools.

The beneficiary will contribute to the efforts by burying a small portion of the training and equipment costs, which will through a revolving mechanism be used to co-finance further implementation measures. Additional support will be provided by Switzerland through the Indoa-Swiss HIDECOR project, carrying out certain implementation related tasks (training, ...) without costs for the Sector Plan.

The intention of service enterprises to acquire und utilize new skills and equipment – independent of the associated costs – is directly linked to the awareness about the issue of ozone depletion and the unavoidable change resulting from the obligations India has under the Montreal Protocol. Consequently, an awareness component has been drafted for this sector plan, increasing the awareness about the service capabilities of service enterprises and thus stimulating demand for equipment and training, but also targeted at the service enterprises directly and the access roads to reach them. A newsletter distributed to those who have been supplied with training and equipment will not only advertise the non-consumption of CFCs, but will also form an incentive for more enterprises to join and, finally, will be the means to continuously influence the target group directly. Finally, important stakeholders, in particular the government structures in the states, are being addressed through workshops, and the important inter-state network capacity for implementation is being strengthened.

In order to effectively implement this project, a strong implementation structure is necessary, which should at the same time not be overly costly. Implementation falls into three different functions: The start up, which includes identifying the necessary access roads, detailing the demand even further, establishing subdivisions in different parts of India. The second function is the ongoing management once the system has been established, and the third is the monitoring of the impact.

In the startup phase, significant additional work is necessary because of the size of the country, the wide variety in cultures within, and the numbers of enterprises dealt with. Local availability of equipment and the control of its quality has to be ensured, an outreach structure needs to be established, suitable training institutes all over India need to be identified. In this phase, the reduction in CFC consumption will be relatively low, while the expenses are significant even assuming the majority of the work being performed in India.

During implementation, the management structure needs to be small and flexible. One responsible project manager reporting to the Director Ozone Cell, Ministry of Environment and Forests, will be sufficient. He will - based on requests from a steering committee headed by said director and consisting inter alia of representatives of the implementing agencies - issue requests for different implementation activities carried out by the implementing / bilateral agencies, keep track of costs spend, and initiate the necessary monitoring activities to be carried out by external experts. In addition, he ensures information exchange with MoEF and other sector plans, in particular the production sector phase-out. The project manager will be supported by one additional person with higher education. This manager will be hired

during 2003 and will stay until the end of 2009 to finalize the reporting duties under this plan. The overall responsibility for the implementation lies exclusively with Ozone Cell, MoEF.

3 IMPACT OF THE PROPOSAL

This proposal will completely phase out the use of CFC 12 in the refrigeration service sector. A total consumption of 1502 tons of consumption (of that 876.2 tons eligible) will be eliminated in this sector, which includes any possibly remaining consumption in the refrigeration assembly sub-sector.

The CFC-12 refrigeration service sector plan is meant to phase out completely the remaining CFC-12 and will be also the last Multilateral Fund project phasing out CFC consumption in India. Parallel to this project, a number of existing projects belonging to the refrigeration sector and targeting other areas of its consumption have been approved and are presently being implemented; intensive coordination between the different projects ensured that they exactly fit into India's need pattern, and that no double counting takes place.

A detailed survey has been carried out to determine the consumption in the enterprises forming the refrigeration service sector, largely consisting of service enterprises and institutionalized large owners of ODS equipment employing their own service technicians. A detailed overview over the use of CFC-12 by segment is provided in the table 5 in chapter 5.9.

India obliges to completely phase out the use of CFC-12 in the refrigeration service sector under this project. In addition, India obliges to completely phase-out CFCs as per Montreal Protocol requirements under this and other already approved Multilateral Fund projects, without the need for any future funding by the Multilateral Fund.

4 DATA COLLECTION AND VALIDATION

4.1 General

In order to obtain a sufficient overview over the refrigeration sector and its consumption, two independent assessments of the consumption have been carried out.

A horizontal census-like survey covered cities inhabited in total by more than 50% of India's urban population, covering all major cities completely as well as representative samples of towns down to as few as 10'000 inhabitants. The survey covered all of India's States. This census-like survey, attempting to identify and visit every refrigeration service providing enterprise in the towns borders, was extrapolated utilizing a classified breakdown of the cities into different classes, as well as the regional patterns found in the survey. The survey covered all of India's States. A detailed questionnaire was used to obtain a variety of information. Due to the magnitude of the survey, the amount of data obtained per enterprise was limited. This survey provides an overview over all enterprises which predominant business is refrigeration or air-conditioning and which could be identified during the off-peak season (survey carried out December-March). It is important to note that the survey did not include the

- roadside technicians working only during the summer time (peak) in refrigeration service, in off-peak time earning their income with other professions
- institutional users of refrigeration equipment which have predominantly other objectives of their operation, which need refrigeration or air conditioning as means for their production and have established their own service department. This group includes e.g. chemical and other manufacturing companies, Indian Railways, State Tourist Boards with a/c buses etc.

A vertical survey gave a detailed assessment of the different sub-sectors, based on expert visits at several company sites, detailed discussions with a number of experts in multiplying organizations (compressor manufacturers, service coordinators of household refrigerator manufacturers, ...), manufacturing data and lifetime information.

Approach and results of both surveys are presented in chapters 4.7 to 4.9 below.

4.2 Responsibility for ODS Phaseout in India

Chlorofluorocarbons (CFCs), among them CFC-12, are mainly used as refrigerants in refrigeration and air-conditioning industry, as blowing agent in polyurethane foams, as solvents in electronic and metal industries, and as aerosol propellants. CFCs are chemically stable, non-toxic and non-inflammable but have an adverse impact on the environment in the long run, depleting the ozone layer and thus allow harmful ultra violet radiations from the sun to reach the earth's surface. The Montreal Protocol stipulates that CFCs are to be completely phased out by 2010 in certain countries, among them India.

The CFC phase out in India is implemented and monitored by the Ministry of Environment and Forests (MOEF) with the Ozone Cell as the nodal unit.

4.3 CFC availability in India

4.3.1 Production of CFCs

As per the Montreal Protocol, Indian Plants producing CFCs will have to completely phase out manufacturing CFCs by the year 2010. Currently, there are four CFC producers in India. The CFC producers are represented jointly by Refrigerant Gas Manufacturers Association (REGMA). As per the agreement between REGMA and MOEF, each enterprise is prescribed an annual quota for the CFC production by MOEF.

As per the agreement under the Montreal Protocol with Multilateral Fund, India has agreed to freeze the country production level of CFCs to that of production in 1999, which is 22,588 Tons and to reduce the production on a linear basis. Details of the annual production, phase out are provided in the table 1 below.

Table 1: India's maximum production obligation for all Annex A Group I substances as per Montreal Protocol and maximum production quota as per agreement with the Executive Committee of the Multilateral Fund

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Maximum production [ODP tons] as per MP obligation	22'588	22'588	22'588	11'294	11'294	3'389	3'389	3'389	0
Production quota [ODP tons] as per agreement with MLF	16'941	15'058	13'176	11'294	7'342	3'389	2'259	1'129	0

4.3.2 Consumption of CFCs

India has been a CFC exporting country for many years, resulting in a lower consumption than production. Consequently, the maximum allowed CFC consumption (based on historical consumption figures) under the Montreal Protocol is smaller than the maximum allowed CFC production and represents therefore the restricting factor in CFC availability in the country. The respective maximum consumption figures are given in table 2.

Table 2: India's maximum consumption obligation for all Annex A Group I substances as per Montreal Protocol

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Maximum consumption [ODP tons]	6'681	6'681	6'681	3'340	3'340	1'002	1'002	1'002	0

4.4 Legal situation

4.4.1 Ozone Depleting Substances (Regulation and Control) Rules 2000

In accordance with the National Strategy for ODS phase-out the Ministry of Environment and Forests, Government of India, has notified the "Ozone Depleting Substances (Regulation and Control) Rules 2000", covering various aspects of production, sale, consumption, export and import of ODS. These Rules were notified in the Gazette of India on July 19, 2000.

Some of the important provisions of the Rules are as follows:

- Authority has been specified to *issue license for all imports and exports of ODS* and products containing ODS. The export of CFCs to Non-Article 5 countries has been banned.
- The Rules *prohibit the use of CFCs in the manufacturing of refrigeration products* as well as various other products from *1.1.2003* onwards. Exempted are use in metered dose inhalers and for other medical purposes. HCFCs can be used as interim substitute to replace CFC, these are allowed to be used up to 1.1.2040.
- The Rules also provide for *compulsory registration of* ODS producers, *manufacturers of ODS based products, as well as importers, exporters, stockist and sellers of those*, the same provision being *applicable to manufacturers, importers and exporters of compressors.* They are also *required to maintain records and file periodic reports* for monitoring production and use of ODS.
- In addition to agreements between the beneficiaries of MLF (Multilateral Fund) projects and the government, enterprises which have received financial assistance from the MLF

for switchover to non-ODS technology have to register the date of completion of their project and declare that the equipment used for ODS has been destroyed. *Creation of new capacity or expansion of capacity of manufacturing facilities of ODS and ODS based equipment has been prohibited.*

- The Rules define the phase-out dates for the consumption of ODS in India as provided in table 3.

Table 3: Phase-out dates as per ODS rules

Name of Activity	**Phase-out Date**
Manufacture of Aerosol products or pressurized dispensers (excluding metered dose inhalers for medicinal purpose).	1-1-2003
Manufacture of polyol for foam products	1-1-2003
Manufacture of foam products including foam part of Domestic Refrigerator.	1-1-2003
Manufacture of Fire Extinguishers or Fire Extinguishing Systems.	1-1-2001
Manufacture of Mobile Air-Conditioners and charging at Automobile industry	**1-1-2003**
Manufacture of other Refrigeration and Air-Conditioning products (excluding compressors – repair market)	**1-1-2003**
Servicing of fire extinguishers and fire extinguishing systems.	1-1-2010
Manufacture of Metered Dose inhalers for medicinal purposes.	1-1-2010
Manufacture of different products using HCFC	**1-1-2040**
Use of methyl bromide except preshipment & quarantine	1-1-2015

4.4.2 Relation to Policy and Customs Training Strategy

The Policy and Customs Training Strategy/Project prepared by UNEP and submitted jointly with the Service Sector Plan foresees a number of measures which will be coordinated with the Service Sector Plan.

Contrary to the situation in most countries, the coordination between Service Sector Plan and the Policy and Customs Training Strategy/Project does only to a smaller extent refer to the customs training planned. India's situation as one of the leading CFC-12 producers with no legal CFC-12 imports decreases the significance of reporting procedures for the Service Sector Plan in comparison to those countries where imports are used to cater the consumption needs of the service sector. Enforcement on the borders is nevertheless necessary to preserve

the relatively high CFC-12 price level in the market, since illegal imports threaten that price level and would subsequently complicate the efforts to minimize CFC-12 use.

The Service Sector Plan is highly interlinked with the structures of the Government of India and the State Governments. Consequently, the related officials and their superiors need to be informed about the overall objective of ODS phase-out, but also about some basics information about chances and responsibilities under the Service Sector Plan. This is the basis which the Service Sector Plan will use for sustainable monitoring of implementation, CFC consumption reductions etc., but also for improvements in the availability of alternatives and for a more widespread availability of information. The following departments being addressed under the Policy and Customs Training Strategy/Project are especially important for the implementation of the Service Sector Plan:

- The Ministry of Chemicals and Petro-chemicals is responsible for implementation of the Petroleum Act, 1934 and Petroleum Rules 1976 etc. which have provisions relating to handling of various classes of petroleum products, some of which are substitutes to CFC-12. The responsibility of the Ministry for inputs on logistics associated with petrochemical products is a further link with potential CFC-12 replacements.
- The Explosives Office is responsible for dealing with potentially hazardous substances used as non-OD substitutes. This department needs to be sensitized to the need for conversion to CFC-12 alternatives and related policies, similar to the ministry of Chemicals and Petr-chemicals above.
- The State Pollution Control Boards (SPCBs) will fulfill some roles in the monitoring of the implementation of the Service Sector Plan, in particular from 2005 onwards when the implementation reaches a large scale.
- Similarly, officials of the Industries Department can monitor implementation of the Service Sector Plan in small, medium and large industries.
- Information and publicity departments play important roles in creating public awareness through newspapers, radio, T.V, and other means of mass communication, and need to be aware of national and state contact institutions for the Service Sector Plan.
- In order to ensure that ODS use is minimized in existing defense related refrigeration systems, it is necessary to train some officials.
- The Industrial Training Institutes under the Ministry of Labour are already reorienting their training contents to ensure that trainees are advised in the adequate use of CFC-12, recovery and recycling, retrofit and CFC-12 substitutes. The related authorities in the States need urgently further input to provide the necessary leeway for the ITI principals to fully support the Service Sector Strategy.

The timing of the training foresees training of officials of central ministries, state governments and district officials from mid of 2004 until end of 2006. This allows training of those officials in parallel to the increase of activities under the Service Sector Plan, ensuring

optimum preparation and responsiveness of the officials for the needs of and tasks under the Service Sector Plan.

Both UNEP as a project partner of the Service Sector Plan as well as the Ozone Cell in its coordinating role will ensure that the information needs of the Service Sector Strategy will be reflected in the respective activities of the Policy and Customs Training Strategy/Project.

Specific information dissemination, task assignment and monitoring of the activities of officials performed under the Service Sector Plan are addressed under that plan. The awareness component under the Service Sector Plan (see chapter 5.6) addresses specifically only the awareness of refrigeration technicians and their supply chain.

4.4.3 Measures supporting introduction of alternative technology

The Government of India has decided to grant full exemption from payment of Customs and Excise duties on capital goods required for ODS phase out projects funded by the Multilateral Fund already in 1995. The Government extended the benefit of Customs and Excise duty exemptions for ODS phase-out projects which were eligible for funding under the Multilateral Fund, whether or not such enterprises actually sought assistance from the fund. The benefit is available subject to the condition that enterprises give clear commitment to stop using ODS in all future manufacturing operations after the projects are implemented.

The benefit of duty exemption has been extended for new capacity with non-ODS technology as early as 1997; in the same year, Indian financial institutions have decided not to finance/re-finance new ODS producing/consuming enterprises. This provided an early incentive to establish new ODS-alternative manufacturing capacity in the country and helped to facilitate the ODS-phase-out in the manufacturing of goods.

It is planned that these benefits will be extended to the Refrigeration Service Sector under similar conditions, thus supporting the acquisition of servicing equipment over and above what can be supported by a MLF funded project.

4.5 General remarks about the structure of the refrigeration sector

The consumption of CFCs in refrigeration occurs during manufacturing (and/or assembly) and subsequent servicing needs. Depending on the population of the equipment, service quality and age of the products, service needs can be significantly higher than the CFC needs in the manufacturing sector. The Indian refrigeration sector comprises of the following sub-sectors:

a) Domestic Refrigeration
b) Commercial Refrigeration
c) Unitary air conditioning (typically uses HCFC-22 only in such equipment)
d) Mobile Air-conditioning (MAC) . This may be subdivided into four sub-sections as follows:
    - Car AC servicing
    - Bus AC Servicing

- Train AC Servicing
- Passenger Ships/ Boats AC Servicing

e) Transport Refrigeration
f) Cold storage and Food Processing Equipment
g) Industrial Refrigeration Servicing.
h) Large size (Industrial Chillers) Equipment

The service sector provides supports to all of those segments. In most cases, the enterprises service several of these segments, being nevertheless focused mainly on one. A higher skill and equipment level is needed for the service of larger and more complex systems, which are also by far less widespread. The above list is sorted approximately by required skill/equipment level, the lowest level being a), the levels f) to h) being almost identical in terms of requirements.

4.6 Situation in the refrigeration equipment manufacturing sector

4.6.1 Domestic refrigeration industry

This industry in India is about 35 year old. Considered as luxury item, with limited sales of about 0.2 million up to early 80's, the domestic refrigerator industry really started growing from 1980-81. At present there are 6 major players and the established capacity of the industry is about 3.8 million but about 2.5 million units were manufactured in 1997-98. At present the domestic refrigerator industry produces about 3 million units annually. Some of the refrigerator manufacturers are fully integrated manufacturing both appliances and compressors; others outsource their compressors.

All these manufacturers were using CFC-11 as foam blowing agent for insulation and CFC-12 as refrigerant. With funding from the MLF most of them have changed to non-ODS foam blowing agent and have chosen cyclopentane as the alternative foam blowing agent.

All the domestic refrigerator manufacturers were using CFC-12 as refrigerant and have already or are presently converting to non-ODS substitutes. Most of them have chosen HFC-134a as the alternative refrigerant. One manufacturer, Godrej, has opted for hydrocarbon substitute for CFC-12.

Certain other factors concerning this sub-sector needs to be mentioned as they influence local design changes.

Refrigerators manufactured in India range in capacities from 65 litres to 380 litres. Refrigerators with semi-automatic defrost system are more common. No frost refrigerators have made recent appearance particularly in large size models. Refrigerators with single door, single evaporator, two temperature type with out side condensers are more common. Two or more door refrigerators with skin type condenser have made their appearance but only in larger sizes. They have to function sometimes at very high ambient temperature of more than 45°C over sustained periods. The supply voltage fluctuates widely (range 150 V to 280 V) and

although over size motors and voltage stabilizers (built in) attempts to minimize effects, burn outs are quite frequent.

Refrigerators are common only in urban areas, penetration level in rural areas is very low. There is rapid growth in the industry and it is undergoing a major change in structure.

The complete refrigerator manufacturing industry within the country is converting before January 1st, 2003 as per ODS Rule 2000 requirement.

4.6.2 Commercial refrigeration industry

The Commercial Refrigeration sector was a large consumer of ODS consisting of small and medium enterprises manufacturing visi coolers, water coolers, chest freezers, display cabinets, ice candy machines, soda fountains etc. often designed as per customers requirement. This sector consists of both organized and unorganized sub-sectors in varied proportions. They use both hermetic and open type compressors from indigenous sources.

This sector was using CFC-11 for foam insulation and CFC-12 as refrigerant but are rapidly changing over to R-141b as interim foam blowing agent and R-134a as refrigerant assisted by MLF funding.

So far 29 projects in Commercial Refrigeration have been identified including three group projects in this sub-sector and with a total of 43 enterprises and their ODS phase out involving a total of 460.8 MT of ODP were approved. Out of these, 20 projects are completed and the remaining are under implementation and will be completed soon. Final umbrella projects are under preparation for the complete phase out of ODS from this sector, to be submitted to the 38th ExCom by UNIDO and UNDP. .

4.6.3 Mobile Air Conditioner (MAC) industry

In India, mobile air conditioners have been popular mainly in the urban areas but the market for MACs has been growing rapidly. Traditionally, CFC12 has been used as a refrigerant in Car ACs in the country. For the last few years, HFC134a refrigerant is being used in most of the recently introduced cars in India. However, Maruti, a leading car manufacturer has still been using CFC12 refrigerant in car ACs in its popular car models, namely, *Maruti 800, Zen and Esteem.*

There are currently three major manufacturers of MACs in India, with combined capacity of 250,000 MAC units per year. The MAC sector has been using CFC 12 as a refrigerant but is also gradually phasing out the CFC and instead using HFC 134a..

4.6.4 Other uses

There are a variety of other uses in the refrigeration sector which also require service, in particular larger refrigeration equipment in industry, food processing, storage etc. The chillers used in India will be covered under the "India Chiller Sector Strategy" by The World Bank.

4.7 Horizontal Survey Service Sector

4.7.1 Scope and objective

The broad objectives of the survey include:

- Identification of agencies/units, both formal and informal, which service RAC equipment.
- Understand the preparedness of these service units in managing phase out in the RAC service sector and to adopt new non-ODS technology.
- Understand the support required for managing the phase out.

The scope of work to achieve the objectives listed above is detailed below.

- Assessment of agencies/units, both formal and informal, which service RAC equipment in terms of:
    - Identification of servicing units
    - Geographic distribution including spread into large cities and urban areas
    - Type of operations (whether service only, service cum assembly etc.)
    - Types of customers catered to by the enterprises (individuals, businesses, factories etc.)
    - Status of registration.
- Profile and scale of operations and profile of individual servicing units
- Servicing practices followed
- Tools used by the agencies
- Fees charged for different types of services
- Procurement of refrigerant (ODS and non-ODS)
- Credit and financing mechanisms used for the business
- Training programs attended/skill development mechanisms for technicians
- Whether equipment based on ODSs is retrofitted with non-ODS technologies
- Level of awareness of the Montreal Protocol and its impact on servicing sector
- Awareness on ODS regulations and its expected impact
- Servicing skills with use of non-ODS alternative refrigerants
- Training requirement for better practices and servicing equipment based on non-ODS alternatives.
- Intention of the firm to upgrade equipment to meet market demand through good skills and practices.
- Other key issues faced.

The above information has been captured through structured questionnaires. A professional organization for market research, ORG-MARG, carried out the survey.

4.7.2 Geographic coverage

The survey was carried out India wide in all towns up to class-I (classification see table 4) i.e. with a population of more than 500'000. The rest of towns i.e. up to class-IV was selected by

random sampling technique keeping in mind the demography of the state. The coverage of the survey is shown in table 4. This is evident that base metro, metro and class I towns contribute more than 70% of the total population of any kind of consumer durable, such as refrigerators. In case of base metro, metro and class I, census survey was carried out and the level of confidence was 99% plus (with respect to information coverage and listing of RAC unit), referring to the area surveyed, i.e. within the city limits, and the enterprises visible during the survey time, i.e. off-season. In case of class IA to class-IV, census survey approach was taken amongst representative sample towns and the outcome would be projected to the universe of those representative sample towns and the level of confidence would be in the tune of 90% plus in case of towns other than metro and class-I (as this projection is based on sample survey). Sample towns were selected within the state due to homogeneity in demographic profile in consultation with Ozone Cell, Ministry of Environment and Forests, Government of India.

Table 4: Survey coverage

Town Class	Universe	Coverage (% of total)	Coverage (nos)
Base metro	6	100%	6
Metro	17	100%	17
Class – I	32	100%	32
Class – IA	245	50%	122
Class –IA-a	Population more than 300'000 to 500'000		38
Class –IA-b	Population between 100'000 to 299'000		85
Class – II	344	10%	36
Class – III	944	10%	95 (89)
Class – IV	2108	5%	105 (82)
Total	3696		414

The survey identified 20,735 RAC units both including formal and informal units in 385 selected towns where 37% of the service unit population are confined into 6 base metros only and 57% of service units are within first 23 high pop-strata towns.

4.7.3 Methodology for projecting to a national level

The survey has been carried out both by census and sample survey approach with respect to town class. In a second step the data has to be projected to get realistic picture at national level. It is also observed that 29 towns do not have any RAC units amongst surveyed town (414) and this fact has to be taken into account while projection. It is important to mention that linear projection has not been made to keep / maintain the trend of RAC units availability of lower pop-strata towns. Therefore, proportionate projections of identified RAC units have been made with respect to particular state and thereby, tuned with national level. Thus the projected results;

Total RAC units extrapolated: 39'259 (of that 20'735 identified in survey)

Total CFC-12 consumption extrapolated: 1'235'989 kg (of that 725'826 kg identified in survey)

This projection does not include the CFC consumption by institutional customers with their own service personnel, such as e.g. the Indian Railways etc.

The horizontal survey did provide detailed sub-sector specific information. The total amount of information provided cannot be displayed and discussed in this phase-out plan because of its magnitude. Nevertheless, the data used has formed the background for the underlying principles of the phase-out plan as well as for determination of the infrastructure needed and the deliverables. This takes especially into account the regional distribution found, showing significant differences in the character and density of enterprises between the different states.

It should be noted that the above number of enterprises is rather conservative out of two reasons:

- The survey had to be conducted through the off-season (wintertime) in order to allow for relatively complex survey questionnaires. In the peak season, the sector is so busy with repair work that such a survey could not have been carried out simply because the entrepreneurs and technicians are not willing to spare the time needed. Conducting it in off-season excludes by default all those entrepreneurs that are not present in that season. These are typically , having some business throughout the year and offering refrigeration equipment service only during the peak season.
- The survey was confined to the city limits. There are probably several (predominantly larger) service companies providing their service from premises in industrial areas outside city limits without formal representation within the cities (in case of a representation there they would have been identified in the survey). Typical customers of such enterprises are those industries being present in industrial areas and the neighboring cities, and users of commercial refrigeration equipment. The very low amount of service companies working

in certain sub-sectors (industrial refrigeration, fishing vessel equipment, ...) identified in the survey indicates that this is a likely scenario.

4.8 Vertical survey

4.8.1 General

The vertical survey was carried out for all segments (domestic refrigeration, commercial refrigeration, ...) mentioned in chapter 4.5, taking also into account small scale manufacturing or assembly taking place in some of the enterprises on an opportunity driven basis. Each segment was investigated concerning the following aspects:

- Characteristics — informing about type of enterprises carrying out the service, their size, equipment, number of technicians, other business, customers and workshop characteristics
- Servicing practices — informing about servicing habits, typical faults, practice followed and tools used, handling of alternative refrigerants, recovery
- Know-how supply — informing about the education background, typical ways to upgrade know-how, willingness to participate in courses, ...
- Financial means — informing about turnover and income of the firms, view to and capabilities for investments, ...
- Possible access roads — informing about means how to reach out to service companies in this specific sector
- Development in recent years — providing a basis to understand the dynamics in the sector.

The know-how established was used as a basis for the development of the strategy.

4.9 Compiled consumption data by sub-sector

In order to obtain a good picture of the situation in service sector enterprises and small assemblers of refrigeration equipment, the horizontal survey was cross-checked with results from the vertical survey. In addition, compressor manufacturers and other experts assessed the data and found it congruent with their own information.

The vertical survey did also fill the gaps concerning institutional owners of refrigeration equipment, which were not covered by the horizontal survey. Data obtained by manufacturers of CFCs does actually very closely resemble this consumption. An overview is given in table 5.

Table 5: ODS consumption and number of enterprises / internal workshops in the different segments and industries

	Main business	**ODS consumption [ODP tons]**	**Service entreprises**
Refrigeration / a/c enterprises	Domestic and commercial	824	27517
	Automotive	227	2509
	Bus / truck	6	44
	Window AC (mainly through servicing dometic, commercial)	117	4197
	Other	63	2078
	Subtotal	1237	36345
	Business	**ODS consumption [ODP tons]**	**Internal workshops / departments**
Institutional owners	Indian Railways	110	52
	State Tourist Boards	60	20
	Food Industry	40	28
	Chemical Industry	55	45
	Subtotal	265	145
Total		**1502**	**36'490**

The deviation between use shown in this table and the eligible consumption as being defined for this project according to ExCom decision 35/57 is due to the differences between use and consumption, e.g. stockpiling and similar measures, as well as because of the uncertainties related to determining the eligible consumption. [1]

[1] The actual no. of (extrapolated) firms is 39259. Out of these 39259, the number of (extrapolated) firms with zero consumption is 2914 (e.g. consumption only in HCFC, HFC or no consumption in the previous years). Thus, (39259-2914 = 36345) firms are being accounted above, plus an additional 145 service departments of institutional owners. With that, the total amount of service sector firms or departments comes to 36'490.

5 STRATEGY AND PLAN OF IMPLEMENTATION

5.1 Overview

The objective of the strategy is to support India in it's the complete phase-out of ODS in the refrigeration service sector.

India has through a number of measures ensured compliance with the Montreal Protocol, among them

- The ratification of the Montreal Protocol and all its amendments related to CFC phaseout schedule, with that agreeing to a consumption and production phase-out schedule
- The production sector phase-out plan and the related agreement with the MLF, reducing the amount of CFCs produced
- The notification of the "Ozone Depleting Substances (Regulation and Control) Rules 2000", whereby
    - A licensing system has been established controlling the CFC supply in the country fulfilling India's obligations under the Montreal Protocol,
    - Manufacturing of ODS containing equipment has been forbidden from January 1st, 2003 onwards, reducing not only CFC demand in manufacturing but also future CFC demand in the service of refrigeration products.

Through these steps, both the availability of as well as the dependence on CFCs have already been reduced and will be reduced further. It should be noted that so far India has fulfilled its obligations under the Montreal Protocol always ahead of time, and intends to continue this practice wherever feasible.

Having determined through these largely supply oriented measures the pace of CFC phase-out in the country in line with India's obligations under the Montreal Protocol, this sector plan is concentrating on the incremental efforts necessary for India's vast refrigeration service sector to change over to non-ODS technology. This service sector – at least in the domestic and small commercial segments - is largely comprised of technicians being school drop-outs, having undertaken many years to achieve basic understanding of the directly refrigeration appliance related problems with minimum background knowledge. Due to non-existing alternative work opportunities for these people as well as because of the need for affordable refrigeration service throughout the country, any sector plan has to focus on keeping this part of the service infrastructure largely intact. The objective of this plan is therefore to minimize the socio-economic impact of the phase-out of CFCs on the service sector by supporting enterprises in the sector through skill development and equipment support. The sustainability of this effort is ensured through the already existing Rules and phase-out agreements reducing the supply of CFC for the sector.

The sustainability in development terms is achieved through the strong, coordinating role associated with the project coordinator reporting to the Ozone Cell, as well as with the significant involvement of the decentralized administration structures available, in particular

referring to the State Governments with their environment ministries and the existing small-scale enterprise support structure. The roles of these will be to a certain extent supporting the directly phase-out related efforts like identification of eligible firms, outreach etc., but to a larger extent the monitoring of the activities and results achieved. A monitoring structure will collect the inputs and back them up through independent monitoring missions. The outcomes will be

- Reported on a continuous basis to the Project Coordinator and the Ozone Cell for direct implementation control,
- Summarized in semi-annual reports for the Steering Committee to allow adjustment of implementation measures where necessary
- Used as a basis for the annual reporting to the MLF.

The sector plan is based on a number of basic understandings:

- The use of CFCs for refrigeration purposes by small assemblers which might not have been targeted through Multilateral Fund projects will be dealt with under this sector plan
- This sector plan is not targeting the consumption of CFC-11 in chillers. The phase-out of chillers is supported through a World Bank project.
- Equipment supply is coordinated with training in a way requesting training as a precondition. The equipment will be delivered soon after the training is being conducted.

On this basis, the sector plan foresees a number of well-coordinated measures to achieve the phase-out. The phase-out of Indias CFC-12 consumption will be ensured by three different approaches to reduce the consumption (see also chapter 9):

- Natural retirement of CFC-based equipment reaching the end of its natural life. As per India ODS rules 2000, no new equipment containing CFC is to be manufactured after 1.1.2003.
- Better practices in the service sector, including recovery or recovery and recycling will reduce the consumption without being able to achieve a complete phase-out.
- The existing refrigeration equipment remaining in the year 2010 and the following will have to be converted when there is the need for service. The last systems to be converted will undergo this procedure probably before 2015. This service sector plan provides the necessary infrastructure to carry out such conversions.

The backbones of the implementation are training and equipment supply measures. Both are targeting reductions in CFC consumption through better practice, capability to convert equipment (in particular domestic refrigerators) to non-CFC technologies, continuous service of converted equipment and recovery and recycling. The outreach to about 40'000 enterprises with more than 70'000 technicians with typically little transportation and networking means is a complex problem that requires a sound infrastructure both for delivering the training as well as the equipment. For example, a total of 80 organizers are to be established under this plan to directly address the potential beneficiaries, determine their eligibility and organize

training and equipment supply. The total number of such organizers and of the subsequent training cells has been determined on the basis of the geographical reality in India, with its 28 States and 7 Union Territories, where actually more than 20'000 enterprises are located in more than 3500 smaller cities, each with less than 500'000 inhabitants.

Both training as well as equipment will only be supplied if the related enterprises display a genuine interest. The Indian Ozone Regulations with their phase out of CFC based production of refrigeration equipment in 2003 will increase the awareness and interest of service companies already considerably above the present level. In order to further increase the awareness and the perception of need in the target group, an awareness program is established, commencing activities shortly after project approval. The awareness program will also include interaction with and through the refrigerant/parts supply structure and the Indian administrative institutions (Ministries of Environment, Technology Institutes, Pollution Control Boards) associated with the sector plan activities and monitoring.

The logistics needed to deliver this sector plan and to monitor it will require considerable time to be established across India, especially because of the size and diversity of the country. The most important driving force for efforts within the enterprise will be the known decrease of CFC availability, expected to be known to the sector in 2004/2005 and to be felt in the sector in 2007. Sufficient capacities are needed to ensure that a considerable portion of the service sector has gained support before the availability of CFC ceases at the end of 2009. Consequently, efforts of establishing the infrastructure and creating awareness have to commence as soon as possible. First technicians, coming from OEM service centers or franchisees already today informed about the change in technology and interested in phasing out CFCs, will be trained and subsequently equipped as early as 2004, with steadily increasing numbers in 2005 and 2006 while the infrastructure is being fully developed.

5.2 Efficient minimization of CFC consumption

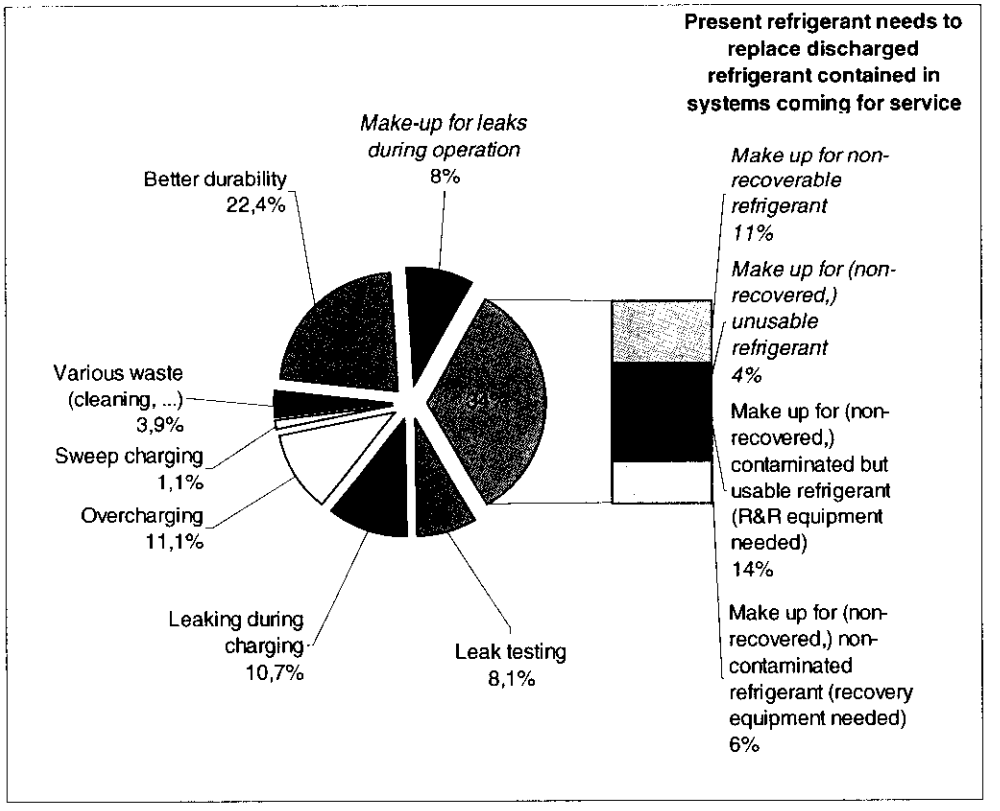
5.2.1 Cause for refrigerant use in service sector

As part of this strategy preparation, an investigation has been carried out on the CFC use pattern in the service sector in terms of what type of CFC losses in this sector are causing the CFC demand. Experts from Indian OEM and compressor manufacturers with a long experience in the service sector repairs have assessed this pattern. This type of study, never undertaken before, was looking at the different type of repairs performed, the condition of the refrigeration equipment before being repaired by the service, the refrigerant use pattern during service, and the service quality in terms of service patterns inherently leading to a higher number of repairs in the future. In a second round, it was assessed how many of the latter could be remedied through the measures which can be undertaken by the service sector plan.

According to the horizontal survey, the predominant CFC use in the service sector in India is related to service of domestic and small commercial refrigeration appliances. As per the results of the horizontal survey, the aggregated CFC use in domestic refrigeration by all service sector enterprises in India (i.e. also the use of those enterprises which service

domestic refrigerators "on the side" with the main business being something else) amounts to 872 tons. 73% of this consumption (640 tons) is actually associated with companies predominantly active in the domestic and commercial segment. Consequently, the CFC use pattern of the domestic and small scale commercial refrigeration sector is dominating the overall assessment. Nevertheless, also the use patterns in other segments have been assessed, e.g. in the commercial, the industrial and the MAC segments. The different assessments have been combined using the consumption-weighted average of the horizontal survey.

Graph 1 shows a breakdown of the refrigerant use in India.



Graph 1: Refrigerant use in the Indian refrigeration service (weighted average of all sectors)

From the numbers provided in it, technically realistic assumptions of reduction in CFC use through different measures can be derived; technically realistic refers in this case to reductions which are technically possible with training and equipment means proposed in this sector plan. Given that the majority of these measures actually benefit the enterprises in a directly recognizable way, it is assumed that those potentials can largely or completely be utilized.

The uses given in italics are unavoidable if CFCs are used in the system; they amount to about 15%. While the relative use of refrigerant will remain approximately constant, the absolute

number will decrease in any case because of the gradual decrease in CFC refrigerators. Nevertheless, a substantive number of these systems remain to be operational in 2010 and beyond (expected is a bank of 19 million remaining CFC refrigerators in 2010), which service needs can only be fulfilled if they are converted to non-CFC.

13.6%, presently equivalent to annually 119 tons of refrigerant could be recovered and recycled (of that, typically 60% need recycling because of significant moisture levels; due to lack of moisture identification kits, that actually requires full recycling capacities). The savings related to better durability (20%) actually refer to improvements in service practice leading to less frequent repairs. The absolute potential is here much larger, at around 60%, but it is expected that with the limited means of the sector plan and only limited incentives for optimum practice, 1/3rd is the reduction achievable under this plan. This reduction is mainly associated with less overcharging (which is not only consuming more refrigerant than necessary, but also causing frequent failures) and better brazing techniques (reducing the frequency of small leaks, which actually leads to around 12% of all repairs).

A very considerable amount of refrigerant is lost because of sweep charging (avoiding the use of a vacuum pump), overcharging (not using measurement techniques for determining the amount to be charged) and losses during charging (because of improper valves, manifolds, hoses). Without a vacuum pump on location, sweep charging is difficult to avoid. Using sweep charging, efficient measurement of the amount of refrigerant charged is, to say the least, difficult, independent of the availability of equipment for measuring the amount. Consequently, this consumption might be tackled to a large part by vacuum pump equipment, better manifolds, and equipment to determine the amount of refrigerant being charged.

The refrigerant use during leak testing is also considerable, amounting presently to 38 tons in the domestic segment alone. This use might only be reduced by nitrogen leak testing. Finally, various waste includes a number of poor practices (e.g. cleaning using CFC similar to compressed air), but to a large extent also losses due to the frequent non-professional decanting of CFCs etc.

In addition, the large cylinder sizes associated with the rules are also an impediment for gradual introduction of new refrigerants, since the costs of a large cylinder filling (to be paid upfront by the service enterprise) in relation to the time needed for recovering these costs. Assuming an enterprise uses 25% alternative refrigerant, more than 85% of the enterprises (using about 50% of the CFC) need more than one year to use up one "legal" cylinder of that refrigerant. The up-front costs – especially in case of the more expensive alternatives - and the associated time needed to recover these costs are almost prohibitive. In case of HFC-134a equipment to be serviced, this promotes re-conversion to CFC. The strategy will therefore engage in refrigerant logistics and discussions with the relevant authorities in India.

The above use of refrigerant is largely associated with the domestic and small commercial equipment service. In other segments, in particular MACs, the share of the types of losses is quite different. While leaks and potential for recovery and recycling play a more important role, losses associated with charging and lower service quality are smaller.

5.3 Outreach and Training

This chapter outlines the strategy for training of service technicians in the sector to meet the challenges of CFC phase-out process. Various issues concerned with training have been examined in the chapter. These include appraisal of the target group and their training needs, as well as an appraisal of the existing training providers. Finally, it highlights key guiding principles for developing the recommended approach leading to the outreach strategy.

5.3.1 Appraisal of the Target Group

According to the projections made in the National Survey of RAC Servicing Sector, the total no. of RAC servicing firms in the entire country is estimated as 39,259, plus the service department in institutions; in addition, some enterprises have not been identified being outside the borders of the survey (city limits) or being non existent during the survey (entrepreneurs servicing RAC in peak season only). Assuming that these will not change the structure of the sector significantly, the phase-out plan has been built on the basis of the survey results plus institutional owners. On this basis, the total number of skilled service technicians for the country has been projected as nearly 77,000. Based on the vast majority of enterprises in the service sub-sector compared to service departments of institutional owners, the design of the sector plan concentrates on the former and integrates the latter during implementation.

More than 50% of the servicing firms are concentrated in the five top ranked States (Uttar Pradesh including Uttranchal, Maharashtra, Andhra Pradesh, Tamil Nadu and Gujarat). In the next ten States following another 47% of the total number of firms have been identified. Accordingly the top 15 states account for 97% of servicing firms and also nearly 97% of the number of skilled technicians. In the remaining eleven States and four Union Territories, RAC servicing firms and skilled technicians do not have a substantial presence (3%). Below table 5 (chapter 4.9) displays that the most prominent main business types reported are domestic refrigeration followed by window and split AC service (the firms with this HCFC-22 based main business retain a CFC-12 based side business). Car AC follows on the third rank by number of firms, on the second on basis of CFC consumption. These survey findings underscore the key role played by the service of domestic refrigerators.

The CFC consumption distribution of the servicing firms, as projected for the entire country has been placed at table 6. According to this survey, about 82 % of the servicing firms have a CFC-12 consumption below 50 kg per annum. Nearly 17.50% have a CFC consumption between 51 to 500 kg per annum, and the rest 0.48% have a CFC consumption above 500 kg per annum. The average CFC consumption is 31.48 kg. per annum per firm (accounting also for those with zero CFC consumption reported).

Table 6: Distribution of Firms according to CFC Consumption Range

CFC consumption range in kg.	No. of firms in the country	Percentage to total
0	2'914	7.42%

1-50	29'288	74.60%
51-500	6'867	17.50%
Over 500	190	0.48%
Total	39'259	100.00%

In India, failures of refrigeration equipment, in particular in the domestic and commercial sub-sectors, are to a large degree connected to faulty electrical components, such as starters, relays etc. Because of the poor power supply conditions in particular related to unstable voltage, electrical components fail frequently and are, according to national technical experts, the by far dominating cause for refrigeration equipment failures (between 80% and 95% of all repairs). Again in the vast majority of these cases, the refrigeration cycle does not need to be opened. Consequently, the refrigeration cycle itself is only opened in case of about every 10^{th} repair.

5.3.2 Appraisal of Training Providers

There are four broad categories of training providers, namely

a) ITIs and affiliated private training institutes of the Directorate General of Employment & Training (DGET), Government of India

b) Small Industry Service Institutes (SISIs) of the Development Commissioner Small Scale Industries (DCSSI)

c) Non-affiliated private training institutes/NGOs offering private diploma, and

d) Industry as training provider

In addition, independent consultants and research institutions such as IIT Delhi and NCL Pune have played a key role in standardization of training materials and quality assurance in Training of the Trainers workshops under the HIDECOR project.

ITIs are training institutes set up under the Craftsmen Training Scheme (CTS) of DGET. These include Government-owned ITIs and private-owned ITCs (Industrial Training Centres) affiliated to DGET. ITIs/ITCs conduct craftsmen training courses of two years duration for high school pass-outs. The syllabi of these courses are uniformly prescribed in all ITIs/ ITCs all over the country by the National Council of Vocational Training (NCVT), a tripartite non-statutory advisory body at the national level. It is mandatory for all ITIs/ ITCs to follow the prescribed syllabi. Besides, trade testing and certification is also centrally administered by NCVT for all trades. Regulation of the day-to-day administration of ITIs however, vests with the respective State Government Directorates of Vocational Training. The number of ITIs offering craftsmen training in the RAC trade is 423 (285 Govt. and 138 private), with an estimated seating capacity of 8000 trainees/course (4000 trainees per year). There are nearly 400 RAC instructors in various ITIs/ ITCs. Nearly 28% of service technicians working with servicing firms are ITI pass-outs. Strengthening of training provided by these training

institutes can therefore be expected to significantly contribute to preparing service technicians for the future with appropriate know-how and skills in coping with non-CFC technology.

SISIs are training institutes set up under DCSSI. There exist 28 SISIs (and 30 branch SISIs) in the country, and their activities include upgrading the skills of workers and managerial capabilities of small-scale industrial units. Training is provided by SISIs in most conventional trades, but not in RAC. DCSSI has also set up a special Ozone Cell, headed by Director (ODS) to oversee implementation of Montreal Protocol in the small-scale sector. SISIs have been designated to have available information for small enterprises on all matters related to ODS phase-out, and to receive project reports from small enterprises seeking financial assistance for adoption of new technologies and to act as registration authorities for small scale manufacturers of CFC-based appliances and compressors, under ODS Regulation 2000. Unlike ITIs, the SISIs have no direct role in training of future technicians.

Private training schools and NGOs provide training in various fields including that of RAC. Typically, they offer admission to high school pass students and school drop-outs, unable to or not eligible for admission to ITIs. These training providers don't follow any standard curricula prescribed by the NCVT, nor are their students eligible for appearing in the All India Trade Tests conducted by NCVT; hence, they don't receive any nationally recognised certificates. The duration of courses offered by the private training institutes ranges from six months to three years. Pass-outs of these training institutes seek self-employment in the country or wage employment in the overseas labour market.

Industry is another important training provider. Most domestic refrigerator manufacturers have in-house training activities to impart training to their own service technicians. In addition, they provide opportunity for on-the-job training to them. In most cases, training of service personnel of the franchisees and authorised service centres is also taken up by the industry on a periodic basis, along with their own employees. Under the statutory Apprenticeship Act, most of the industrial units provide seats to apprentices for one year on-the-job training.

5.3.3 HIDECOR Initiatives

Skill training methodologies for RAC service sector have been developed since 1998 under the Indo-Swiss HIDECOR initiative. This initiative does aim at the skills of micro and small enterprises for coping with the non-CFC technologies available in India in the domestic and commercial refrigeration service sector. The methodologies, capacity and infrastructure built will, however, facilitate an early start-up of CFC phase-out based training activities under this strategy. CFC12 good practice and retrofit elements can be integrated into these trainings in a cost effective manner. The Swiss co-financing, which will support the implementation of this strategy, is displayed separately in the cost calculation. Under HIDECOR the potential of several training providers to become a training cell under this strategy has been assessed.

ITIs/ITCs

Several RAC instructors in various ITIs/ ITCs have received training in the field of new refrigerants under HIDECOR. In close cooperation with the DGET an effort was undertaken

to revise the syllabus for RAC trade under CTS. The draft-revised syllabus specifically deals with issues of (i) refrigerants, handling, safety, leak testing, evacuating and charging, and good practice; (ii) recovery/ recycling of CFC systems with replacement refrigerants; and (iii) servicing and retrofitting of appliances with non-CFCs. This has been submitted to DGET for approval and implementation. The project has also agreed to support (a) revision of syllabus for apprenticeship training; (b) development of Instructional Media Package (IMP).for RAC trade; and (c) upgrading of two Advanced Training Institutes (ATIs) of DGET for instructor training.

In the HIDECOR pilot phase, training programmes of two days duration for MSE (Small & Micro-enterprises) technicians have been conducted at a few selected ITIs and one ATI, thereby providing training to nearly 100 service technicians. Additionally, in the main phase, training to MSE technicians has been provided by a private ITC in Delhi. A few more Govt. ITIs and private ITCs are likely to become engaged as training cells up to 2004. Across the country 15 to 20 ITIs could qualify as training cells.

SISIs

Under the HIDECOR pilot phase, four Small Industry Service Institutes (SISIs Delhi, Mumbai, Chennai and Kolkata) have been provided training equipment. At SISI Kolkata, Mumbai and Delhi, one training programme each was conducted during the pilot phase to train service technicians, achieving mixed results. A constraint with SISIs is the lack of own RAC trainers. SISIs are therefore not considered as training cells under this strategy. However, they can collaborate with industry training providers (see below) by acting as agencies for mobilisation of training participants.

Private Training Providers

A number of private training providers have been selected as training cell under HIDECOR to impart training to technicians from RAC servicing firms in the States cooperating under the project. These identified institutes have been imparting such training successfully. Important selection criteria were the entrepreneurial orientation and the flexibility of these institutions to deliver when the training demand arises during the off season.

Industry as Training Providers

In HIDECOR pilot phase, two domestic refrigerator manufacturers, one compressor manufacturer and one medium-scale commercial appliance manufacturer are so far key partners in organizing training programmes for service technicians. These included participants from their own servicing network as well as from independent servicing firms. Participants form independent firms are fully funded, technicians from the industry's own service network participate in a self-sustained manner. Two domestic refrigerator manufacturers have contributed to skill training of technicians, in particular towards addressing skills for handling new refrigerants. Two additional industry partners have committed to join the initiative, as from 2002 onwards. The industry from the domestic and commercial subsector has committed its interest to continue its association with training under the India RAC SSS project

5.3.4 Specific Training Needs

Above, the various sub-sectors in RAC servicing and their key profile were identified (chapter 4.5). The key training needs, in order to cope with the challenges of CFC phase-out, can be broadly categorized as follows:

a) Best practices in servicing of CFC-based appliances to minimize CFC consumption in servicing of such appliances. These include practices such as brazing/ debrazing, flushing, leak testing, evacuation and charging of refrigerants using proper tools & equipment.

b) Best practices in retrofitting of appliances using non CFC refrigerants, and service of the retrofitted equipment. This training for best practices in servicing and retrofitting will be relevant for sub-sectors where the potential use of alternative refrigerants appears to be significant, particularly in domestic and commercial refrigeration sub-sectors as well as for some institutional owners. There will still be 19 million CFC refrigerators left in 2010, which will to a large extent need retrofitting.

c) Recovery and "Recovery & Recycling" (R&R) of CFC refrigerant. Recovery of refrigerant, being a low cost option, is relevant for small er equipment and for smaller enterprises connected through a centralized R&R machine used jointly. R&R will be relevant for sub-sectors in which charge quantity of CFC refrigerant is quite substantial, and/or where large quantities are handled at one location.

The above identified training needs are for those handling CFC refrigerants. It is apparent that the number of target group for training under (a) and (b) above will be much higher than for (c) above.

Instructors of training cells are an important target group for training. The trainers for instructors of ITI in different States will be trained through joint efforts of the Indo-Swiss HIDECOR project in cooperation with the Government of India in the context of the syllabus revision. These instructors play an important role in the formal vocational training system for regular students undergoing pre-employment training (future technicians).

Awareness cum training of State Government officials, responsible for monitoring of implementation of the project in their respective States, will be another important activity featuring a largely non-technical content. This effort will be implemented through the awareness part of the project.

5.3.5 Guiding Principles for developing a Training Approach

The approach to training suggested in this chapter is based on the following guiding principles.

a) The training activities are seen as a tool to achieve sustainable development while phasing out CFCs. They shall mitigate adverse socio-economic impacts of the CFC phase out on the businesses of small scale enterprises largely located in the informal sector. In order to achieve sustainability the efforts under this strategy shall be mainstreamed with the processes and networks established in the sub-sector to enhance skills considering

multiple options of possible training providers. The training efforts shall lead to build capacities with institutions capable to deliver training through market based mechanisms.

b) Identify training cells as training providers in each State on a nation-wide standardized set of well-established criteria. The number of training cells allocated shall be based on number of servicing firms using CFCs.

c) In the initial years (2004/2005) priority should be given to identify and train service technicians from firms with higher CFC consumption (above 100 kg per annum), as they are often already now aware of the issues, interested in upgrading their skills, and providing greater scope to reduce CFC consumption by applying good practices.

d) Though firms with lower CFC consumption offer relatively lesser scope to achieve reductions in CFC12 consumption in aggregate, the importance of imparting training to these firms results for the Government of India from socio-economic considerations, with the general eligibility of such undertakings being determined by the "Indicative List of Categories of Incremental Costs", in particular para (c) i, ii and, especially, iii. The priority in targeting smaller firms in the informal sector shall increase from 2006/7 onwards as and when the shortage in supply starts manifesting in the market.

e) Public private partnerships shall, to the extent possible, contribute to training for the direct target group on a self-sustaining basis. Private training providers strengthened under the strategy shall offer training responding to demand on a market basis. It is projected that a part of the concerned target is prepared to pay a nominal to realistic participation fee for good quality certified training.

f) Full funded training thus might be considered to target firms in the lower ranges of CFC consumption of 50 kg per annum and below. These firms may not come forward to attend training against a substantive participation fee. Training the informal sector technicians is a challenge because a majority of them may fall below meaningful threshold levels, and yet may have to be imparted training on a full funding basis, owing to their inadequate paying capacity. Co-financing option becomes extremely important for this category of servicing firms.

g) Training strategy should build upon experiences of HIDECOR, UNEP, GTZ and other such bodies. A number of HIDECOR initiatives have been successful in making training responsive to country's needs, both for training of direct users and for instructors of training providers. At the same time, insights gained through not-so-successful concepts (such as mobile training units) can also contribute in a realistic assessment of the success factors of training strategies.

h) The core competencies of implementing agencies to be engaged in the project should be understood and effectively made use of. These include: Swisscontact/INFRAS (implementing HIDECOR on behalf of Switzerland) , GTZ, UNDP and UNEP.

i) The IIT Delhi and research institutes such as NCL, experienced national and international experts as well as the regional organizations mandated with the management of the

training programme have a key role in this project in assuring continuity and quality assurance through training of the trainers monitoring and internal evaluation.

j) Efforts should be made to involve additional IITs and/or engineering colleges to enhance the national capacity for retraining and non-CFC technology dissemination in the long run.

5.3.6 Identification of Training Cells

A model similar to the one followed under HIDECOR project for training of service technicians through identified training cells is proposed for the Service Sector Plan. These training cells will be selected from ITIs/ ITCs, private training institutes/ NGOs, or industry; the criterion of their selection as training provider would be their technical and administrative capability to provide requisite training, as well as their ability to conduct training on a self-sustaining basis. The project would have to contract Indian regional agencies for training project management, for selection of training cells, for organizing training of the trainer workshops and for program supervisions and controlling. The support to be provided by regional agencies to training cells will, in addition to training their instructors through ToT programmes, consist in providing them guidance through hand-held training and monitoring of their training activity.

Considering that each training cell will be in a position to impart training to one technician each from nearly 400-450 servicing firms during the implementation stage, the number of training cells required to be created for covering all the nearly 36,500 CFC12 consuming servicing firms has been computed at table 7. The training cell need is computed on the basis of the overall need for training, of which the Service Sector Plan covers only a part. The costs for several of the training cells will be spby the Swiss HIDECOR project, as shown in chapter 6 "incremental costs".

It is seen from table 7 that a significant number of training cells shall be established. All 80 cells including those to be established under HIDECOR project, shall have the capability to train the base course in domestic & commercial refrigeration. From among these cells, 11 training cells shall get additional trained to acquire the capability to train good practices in car AC servicing. 5 training cells additionally acquire the capability to train good practices in other specialized sub-sectors (namely, cold storage & food processing, industrial refrigeration, and chillers). All these 16 specialized training cells shall also get the capability to conduct training in Recovery & Recycling (R&R).

Training cells, upon training their RAC trainers, are to be equipped with requisite training equipment. The needed training material is to be developed or updated based on existing training material from the implementing/bilateral agencies in 2003/2004 and to be translated into the 12 major local languages. It is planned to have the training courses certified by the All India Council of Technical Education, AICTE, which is highly regarded in India and will further increase reputation and inherent value of the training and thus the interest of service enterprises to participate in the programme early.

Table 7: State-wise Training Cells

State	No. of training. Cells needed as per target group distribution	Already existing/ likely under HIDECOR	Additional training cells required in the State	No. of special training cells for MAC	No. of special training cells for others	Total no. of special Training. Cells
Maharashtra	11	3	8	2	1	3
Uttar Pradesh (+Uttranchal)	12	0	12	1	1	2
Delhi	5	2	3	1	1	2
AP	6	2	4	1	1	2
Gujarat	6	2	4	1	1	2
TN	6	2	4	1	0	1
West Bengal	5	1	4	1	0	0
Karnataka	4	2	2	1	0	1
Punjab*	3	0	3	1	0	1
Kerala	3	0	3	0	0	0
Rajasthan	4	0	4	0	0	0
Madhya Pradesh	5	0	5	1	0	1
Chhatisgrah	1		1			
Haryana	2	0	2	0	0	0
Bihar (+ Jharkhand)	4	0	4	0	0	0
Orissa	1	0	1	0	0	0
North East	1	0	1	0	0	0
Remaining States	1		1			
TOTAL	80	14	66	11	5	16

* Even though Chandigarh is not included above, it may be considered as a joint geographical area along with Punjab & Haryana.

Considering the different background and qualification of trainers, the training of the trainer courses (ToT) shall include teaching/instruction techniques as well. Hand held training sessions organized with training cells following the ToT, are an important element of quality assurance. Training materials and methodologies will be standardized throughout the country. All trainers shall receive the base course training in domestic and commercial refrigeration. 16 cells will participate in additional TOT for specialized sectors. These TOTs would also be standardized across the different implementing agencies providing the funding.

The identification of training cells will be based on an assessment of the potential training providers based on pre-defined criteria. Respective guidance will be received form the steering committee. The selection criteria may include technical qualifications of the instructors, the entrepreneurial skills and mindset of the training cell key staff, quality of tools and equipment available with the training provider, quality of teaching facilities available and ease of access for the target group.

The types of training programmes to be provided by different training cells in a State will be based on the presence of main business in the State. According assessments have been carried out during the preparation of this Sector Plan.

5.3.7 Role of Regional Management Organizations and Organizers

Regional Management Organizations responsible for training and outreach, RMOs, will be selected. Those will be local organizations to be contracted by the respective Implementing/Bilateral Agency, to identify suitable Training Cells and Organizers (see below), perform training quality management and handle the fund flow to both Organizers as well as Training Cells.

Along with training cells "Organizers" shall be recruited. The Organizer is throughout implementation of training as well as equipment supply the project's interface for interaction with the enterprises. This includes recruiting and determination of eligibility of the enterprise, program information dissemination as well as collecting, assembling and reporting of monitoring information to the State Departments of Environment. A coherent selection process for those organizers will be formulated, decided upon by the Steering Committee and subcontracted to RMOs. It is forseen that each organizer will work with 1 to 2 training cells depending on the local circumstances, in particular the envisaged distribution of training cells.

5.3.8 Training the Informal Sector Service Technicians

74.6% of the surveyed firms use from 1 to 50 kg of CFC per annum. Almost all of these are micro- and small enterprises or informal sector firms. The service technicians in these firms are poorly educated with negligible English language skills. The service sector strategy has to be sensitive to the needs of this sector, and innovative solutions to reach out with training to this sector need to be developed and implemented. Effort has to be made in developing training

material that is easily comprehensible for this target group. Under the HIDECOR project, an exercise was undertaken to develop such an easily comprehensible training material for domestic and commercial refrigeration sector; and presently, the same is being translated into three local languages. The materials available form HIDECOR will have to be updated and similar exercises will have to be undertaken to make available training material related to other sub-sectors, namely, MAC servicing, cold storage and food processing equipment servicing, transport refrigeration servicing and industrial refrigeration servicing/small-scale manufacturing / assembling. The training cells operating under HIDECOR project have been mainly targeting informal sector servicing firms, and have been able to successfully meet the training needs of the domestic and commercial sub-sector. An important limitation identified is that the service technicians from the informal sector are willing to join the training programmes during off-season period only. Similar approach shall therefore be made effective in this sector plan as well.

5.3.9 Equipment Support for Govt. Training Institutes

Since ITIs/ITCs are the key training institutes concerned with training of future technicians, it is vital that these institutes develop the capability to impart training in the areas identified above for all servicing sub-sectors. HIDECOR project has already supported/ is supporting them through RAC syllabus revision, instructional material development, and training of their master trainers; however, it is not providing training equipment support to the ITIs. Provision of this support through the Service Sector Plan will enable these institutes to effectively deliver training for future technicians, with that activity actually contributing significantly to the technology change in the overall technician population. The importance of these institutions for having a sufficient share of trained technicians within the overall technician population is demonstrated in table 8 "Bridging the skill gap ..." (chapter 5.3.11). This table is actually showing the important impact of 20'000 technicians to be trained by the ITIs.

5.3.10 Other Training related Investments

To launch the training strategy a significant effort in terms institutional development will be required. The institutions built up for training purposes (RMO's; Organizers) will also have a role to play in identification of firms for equipment support and the recovery recycling programme.

Presently, market forces determine whether training provided by the training institutes has value or not. Development and implementation of a simple certification system be a key instrument to establish credibility of training. Certification shall thus be an effective way to ensure the sustainability of one time effort undertaken now. Presently it is envisioned that this certification scheme should be on a non-mandatory basis, proving to the customer of the service enterprise the principle ability of this enterprise to provide adequate service based on both skills developed and equipment available. Details of the certification process shall be established during the initial years of programme implementation.

The build up of a monitoring system as specified will influence the costs associated with the implementation of training. In particular, the necessary interaction with the State level through the Organizers will absorb resources and capacities also on the side of the institutions directly involved in training implementation (Organizers as well as the next management levels above, i.e. Implementing/Bilateral Agencies and RMOs).

5.3.11 Model of Skill Formation through the Service Sector Plan

A spreadsheet model of skill formation through training under the Service Sector Plan in addition to training from other sources is presented in table 8. According to this model, 52% of all RAC service technicians will be trained by the year 2009. The model makes the following assumptions:

a) Base level of no. of service technicians is taken as 77,000 (as per horizontal survey projections)

b) New entrants to the labour market every year will include ITI pass-outs, pass-outs from private training institutes and unskilled persons elevated as full-fledged technicians.

c) It is known that several of the ITI pass-outs pick up other avocations than RAC servicing.

d) It is known there is a natural attrition from the servicing business and on the other hand an inflow of trained personnel from the larger appliance manufacturers.

e) The turn-out from ITIs per year is taken as 4000 (based on training capacity of ITIs)

f) HIDECOR main phase – under Swiss co-financing - shall train about 1750 persons per year with a dedicated focus on new refrigerant related skills including one session on retrofitting in domestic/commercial sub sector (7000 over 4 yrs).

g) Training through the sector plan will start from the year 2004 onwards, and will gradually gain momentum

h) A few private training providers and/or industry will on their own initiative start training activities at a modest level

i) It is projected that totally 32,000 persons will get trained under the sector plan, in addition to those trained under e, f and h. Nearly 27,000 of these will be trained under good practices: CFC, and the rest for specialized training (MAC R&R etc.)

j) Training for nearly 21,000 persons will be fully-funded through the sector plan. The remaining 11,000 will be trained on a self-sustained training basis (market-based outreach).

The model can be further refined during the implementation stage.

Table 8: Bridging the Skill Gap for CFC Phase-out in RAC Servicing Business

Year	2002	2003	2004	2005	2006	2007	2008	2009
Total numbers (January 1st)	77000	74800	76020	73918	75226	76403	77463	78417
Existing no of technicians already trained(January 1st)	0	1750	3629	6242	12156	21345	32607	46760
Existing no of technicians yet to be trained (January 1st)	77000	73050	72391	67676	63070	55058	44856	31657
Percentage of technicians trained	0%	2%	5%	8%	16%	28%	42%	60%
New untrained entering trade								
New untrained added from ITIs	0	4000	0	0	0	0	0	0
New untrained added from other sources - e.g. unskilled workers, apprentices getting elevated; pass-outs of private training institutes	5500	5371	5237	5036	4611	3963	3185	2220
Untrained leaving trade								
Attrition due to retirement/ change of business of existing technicians (10% of existing technicians)	7700	7480	7602	7392	7523	7465	7384	7218
Fresh ITI pass-outs opting for other businesses (20% of ITI pass-outs each year)	0	800	0	0	0	0	0	0
New trained entering trade								
Trained by ITIs (For new labour market entrants from 2003 onwards)	0	0	0	4000	4000	4000	4000	4000
New trained added from other sources - e.g. unskilled workers, apprentices getting elevated; pass-outs of private training institutes	0	129	263	464	889	1537	2315	3280
Existing being trained								
Trained through HIDECOR	1750	1750	1750	0	0	0	0	0
Trained under sector plan - fully funded	0	0	400	1400	3500	4600	5500	5500
Trained by sector-plan funded training providers - self funded	0	0	200	350	1100	1600	3000	5000
Trained by private providers/industry etc.	0	0	0	500	500	500	500	500
Trained leaving trade								
Attrition due to retirement/ change of business of existing technicians (10% of existing technicians; earliest 3 a after training)	0	0	0	0	0	175	362	624
Fresh ITI pass-outs opting for other businesses (20% of ITI pass-outs each year)	0	0	0	800	800	800	800	800

5.3.12 Approach to Training of Trainers (ToT)

It is envisaged that ToT trainers will be identified from within the country, and groomed through established senior trainers such as IIT Delhi and NCL Pune. Besides, expatriate senior trainers will also be involved in training of ToT trainers for MAC/R&R. Two pools of ToT trainers will thus be formed, who will then be responsible for conducting ToTs in their respective geo-focus areas (North/East; South/West). These pools of trainers have been designated as ToT Cells.

The preparatory activities, before a ToT programme can commence, include:

a) Identification and selection of (technician) training cells and identification of organisers in each State
b) Identification of ToT trainers
c) Training of ToT trainers
d) Provision of equipment to ToT cells
e) Provision of Equipment to technician training cells
f) Conduct of ToTs
g) Conduct of Hand-held training
h) Authorisation to training cells to do autonomous training

Obviously, these preparatory activities have to be done in a phased manner.

The total number of ToTs required is estimated to be 18, considering that one ToT can train 16 trainers, and that each training cell will nominate 3 trainers. Thus, one ToT will prepare trainers for 5 training cells. An attrition rate of 15% for training cells has been considered, i.e., it is assumed that 15% of the training cells may opt out or fail to meet standards of training, despite having been trained. It is envisaged that out of the above 18, four ToTs will be related to MAC, other specialized groups and R&R

Ideally, all ToTs should be conducted at the earliest possible. However, this is unrealistic because the preparatory activities have their own lead time and the key trainers are a limited resource. During the period up to 2007 the ToTs shall be as evenly spread as possible, which will ensure that the preparatory activities can also be suitably phased in accordance with priorities amongst different States. Also, it will be easier for ToT cells to suitably pace their ToT activities. Accordingly, the proposed phasing of ToTs is as per table 9.

Table 9: Proposed phasing of ToTs

Period	No. of CFC-GP ToTs	No. of MAC/ R&R ToTs	Remarks
2003	1	1	The number of ToTs in these time intervals can be adjusted according to the pace of other activities such as identification of training cells, provision of equipment to them etc.
2004	3	1	
2005	3	1	
2006	4	1	
2007	3		
Total	14	4	

5.3.13 Establishment of Technician Training Cells

The establishment of technician training cells will be carried out as shown at table 10 below:

Table 10: Phasing of Training Cells

	2003	2004	2005	2006	2007	Total
Established under Swiss co-financing HIDECOR	11	3				14
TOT cell S/W	2	6	8	9	8	33
TOT cell N/E	2	6	8	9	8	33
To be funded from strategy	4	12	16	18	16	66

This is based on the assumption that 11 training cells under HIDECOR (falling under TOT cell S/W) would be already in operation by the year 2003. In that year, additional 4 training cells can be made operational. These may include one training cell each in certain new States (other than HIDECOR geo-focus) such as Rajasthan, Uttar Pradesh, Punjab, Haryana, West Bengal, Kerala, Madhya Pradesh, Chandigarh and West Bengal. The bulk of the training cells would be made operational during the years 2005, 2006 and 2007.

5.3.14 Other Related Issues

5.3.14.1 Use of the Internet

Even today, the internet provides an excellent platform for information dissemination, also in developing countries like India. This sector plan forsees activities for the next seven years. Depending on the development in intensifying Internet use further, even more widespread access to the Internet is likely. It is planned to simplify distribution of information among the key players of the sector plan, i.e. Ozone Cell, the Implementing/Bilateral Agencies, the Regional Management Offices, the Organizers and the Training Cells through a common simple website. Depending on the status of Internet use penetration in the field, the increasing awareness about the sector plan and need for information dissimination, Internet presence up to an online training tutorial is envisaged through fund reallocation within the available budget. In order to have insights into the development needs in this regard, a very basic website for this sector plan will be established shortly, counting the hits and thus allowing informed decision making if indeed a larger Internet presence is meaningful.

5.3.14.2 Training for State Authorities

The implementation of training strategy will require considerable involvement of State Govt. authorities, namely, State Environment Ministries and State Pollution Control Boards, designated as implementing supporting agencies. These authorities have a variety of functions, besides responsibility for coordinating ODS phase-out efforts at the State level. Currently, the concerned persons of these Boards are being imparted awareness on ODS phase-out issues by MoEF. Additional

training of these personnel for effectively supporting the implementation of this sector plan will be another important activity.

5.3.14.3 Linkage to Certification

Certification linked with training can be an important incentive. The possibility of certifying the training programme under AICTE and further involve public private partnerships (particularly for MAC sectors) needs to be further explored during the implementation stage. This includes the options of linking the certification of servicing firms with labeling efforts in cooperation with industry. It is recommended to approach the issue in a phased manner. Linked with certification is the issue of minimum standards for equipment to be possessed by the certified servicing firms. According measures will be developed based on requests from the Sector Plan Steering Committee.

5.4 Enhancing access to Equipment

The wide spread lack of appropriate equipment and tools among larger segments of enterprises operating in the Indian RAC service sector is seen as a major source of excessive consumption and emissions of CFCs. Wide spread application of inappropriate practices, which can inter alia be attributed to lack of equipment, do include sweep charging, self evacuation, excessive charge line purging, charging by frost line, reverse retrofitting of HFC-systems and venting of refrigerant while opening the system.

The majority of repair and service activities in smaller refrigeration and A/C systems are undertaken by Small and Micro Enterprises (MSEs) in the predominantly unorganized sector with very limited financial resources for upgrading their facilities. In large systems commercial incentives of refrigerant and equipment cost leads to a situation with generally better practices. Strategies enhancing access to equipment are of high relevance in particular for the small scale sector, especially because of its very large share in CFC consumption.

Under the HIDECOR pilot phase project some limited equipment support activities were implemented. Conceptual development for refining these approaches is presently ongoing under the HIDECOR main phase. The HIDECOR project has generated India specific experiences and lessons learnt which are relevant for developing strategies for larger scale equipment support schemes as outlined in the following. This chapter is based on insights gained under ECOFRIG and HIDECOR projects and further inputs received from Indian experts and stakeholders. For R&R aspects the chapter also takes into account international experiences gained under implementation of Refrigeration Management Plans.

5.4.1 Equipment needed by RAC service sector enterprises

5.4.1.1 General considerations

The horizontal survey has identified a number of service enterprises in India in the order of 40'000 units. Following findings have relevance for developing a strategy for enhancing access to equipment:

- The top 15% of enterprises with highest CFC consumption account for an aggregate consumption of almost 60% of the total consumption in the service sector

- The top 50% of the enterprises make up for a share of more than 85% of overall CFC consumption
- Only approx. 150 enterprises report annual CFC consumption above 500 kg
- 50% of enterprises with a consumption above 500 kg/a indicate MAC as main line of business. 25% of enterprises with a consumption above 500 kg/a indicate domestic and small commercial refrigeration as main business
- In the category of domestic and commercial refrigeration the majority of enterprises with consumption above 500 kg/a is found to be associated to franchisee networks
- Approx. 55% of total enterprises report consumption below 20kg of CFC per annum, leading to a consumption of approximately 260 tons. More than 20% of the enterprises consume below 10 kg/a. Most of these enterprises have their main business in servicing small appliances such as domestic refrigerators.

The following are some important hypothesis for strategy development:

- The equipment needs of small enterprises in terms of optimum service and minimum CFC consumption to be achieved have to be balanced against both the efficient use of funds and the equity of smaller vs. larger firms. It would be problematic and probably not even effective to provide small companies for no extra costs new equipment worth several times more than the enterprises annual business turnover. Therefore, the principle of cost effectiveness, being an efficient instrument under the MLF, will be used to limit the support to those enterprises. The lowest support level available to the enterprise is determined by the minimum needs for it to continue to stay in business; these needs are the training needs. Consequently, from this group, only insignificant reductions in CFC use can be expected as an outcome.
- Enterprises consuming more than minimum amounts of refrigerant will receive equipment leading to reduction in CFC consumption, based on their individual level of consumption.
- The large majority of enterprises in each segment may require the same set of equipment. There is only limited need and possibility for scaling the equipment packages according to enterprise specific consumption.
-

5.4.1.2 Existing equipment

While manufacturer owned or controlled service networks are generally equipped with equipment and tools which are adequate for achieving good practice with CFCs and also for handling of alternative refrigerants, this is to a lesser extent true for franchised service units and only to a very limited extent – if at all – for the large number of small service and repair workshops from the informal sector. The present status of existing equipment must be assessed individually for the different segments of the sector.

Generally it can be noted that the deficit in adequacy of equipment is highest for the segments of domestic and small commercial appliances, while the segments which deal with larger and higher

value equipment such as MAC and industrial units in general are today relatively better equipped. This is seen as a result of the specific situation for servicing small appliances where high technical requirements exist (vacuum levels, charge accuracy, flushing due to compressor burnout) while at the same time cost sensitivity of the customers and competition in the market is highest and quality consciousness lowest of all segments.

For enterprises which handle domestic and small commercial appliances portability of the equipment is also a major factor. While servicing at customer site is getting more frequent in these small appliance segments, only recently reasonably portable vacuum pumps and charging equipment have entered the Indian market, and still today the smallest available approved refrigerant and nitrogen cylinders are much too heavy for being moved around easily. For refrigerant it is wide spread field practice to decant into (often contaminated) non-approved small cylinders, with all the risks associated to this practice. For the segments which are handling large RAC units and installations, portability of equipment is not a major constraint as servicing equipment is anyhow heavier and often already parked at the installation site. Under this sector plan the portability issue is most relevant for servicing domestic and small commercial appliances.

Most of the informal sector service workshops do not possess a suitable vacuum pump which is capable reaching vacuum levels required for proper quality and, therefore, low failure rate of repaired equipment. Many use old /discarded hermetic or semi-hermetic compressors for evacuation of refrigeration systems or sometimes use the refrigeration system's compressor itself as a vacuum pump. Balances or stills for accurate measuring-in refrigerant charges are very rarely found. The same applies for nitrogen cylinders for flushing and pressure testing. Here a major constraint for wider use persists in prohibitive cylinder deposit charges of INR 3'000 to 5'000 (70 to 120 USD) which a small informal sector enterprise reluctant to invest. It is today a widespread practice to use LPG blow torches for so-called brazing (although the insufficient heat of these torches may often not be able to do more than the much-lower quality, insufficient soldering). The reason for this is the availability of small cylinders of 2kg capacity (portability) and the affordability of LPG. As the quality of LPG used is cooking gas which provides with a normal torch a flame with only about 900 degrees Celsius, this results in very poor joint quality. The use of Swirl jet technology which provides a temperature of approx. 1100 degrees with Indian cooking gas and provides more uniform heating of the tubes is low, but would provide significantly better brazing results. Use of Oxygen-Acetylene is significantly more costly than LPG and cylinder deposits are again high while smallest cylinder sizes are non-portable. LPG is available at any household, in any cylinder size starting from 0.5 kg and at low cylinder deposits.

A significant use of recovery equipment is today prevalent neither in the informal nor the formal sector service enterprises. While in the MAC sector a certain penetration of recovery & recycling (R&R) equipment can be found, especially with brand specific service centers owned by car manufacturers where such equipment is being made available under multinational corporation (MNC) corporate policies. This R&R equipment is dedicated to recycling of HFC-134a, based on environment / HFC policies of MNCs. R&R field surveys however have shown that - even if R&R equipment is available - it is often not being used due to economic reasons.

Over all, there is a significant need for technology upgradation to meet good practice with CFC and ensure ability to implement retrofit options for CFC based appliances and installations. Specific requirements are further elaborated in the following section.

5.4.1.3 Equipment needs

In chapter 5.2.1, an analysis of the unnecessary losses of CFC is given. On the basis of this assessment, a list of equipment has been developed which provides service enterprises with increasingly better skills to improve the efficiency of CFC use and reduce losses. This list has been prioritized according to CFC phase-out associated, keeping in mind the absolute costs per equipment. It is given in table 11.

Table 11: Approximated relative CFC phaseout associated with different type of equipment, assuming training is being provided; relative to total use

No.	Equipment	Assumed reduction in CFC use
1	Manifolds + hoses	**10.43%**
2	Vacuum pump	**1.55%**
3	Swirl torch	**4.92%**
4	Charging stills (domestic, small commercial)	**14.86%**
5	Recovery equipment minimum, consisting of piercing pliers, 2 recovery bags, 1 manual pump, 1 hose, 1 30lb cylinder (no access to R&R)	**2.28%**
6	Recovery equipment minimum, consisting of piercing pliers, 2 recovery bags, 1 manual pump, 1 hose, 1 30lb cylinder (assuming access to R&R; instead of pos. 5) plus	**4.60%**
6a	Recovery and recycling set (access for recovery users)	**0.00% (4.60%)**
7	Nitrogen regulator, nitrogen cylinder deposit	**7.25%**
8	Oxy/Acetylene brazing kit (instead swirl torch; addtl. costs)	**2.01%**
9	Recovery and recycling set (instead recovery equipment; addtl. costs)	**16.88%**
10	Add. To R&R (not for MAC); Refrigerant ID kit, electronic scale, large cylinder	**1.25%**

5.4.2 Organisation of supply

5.4.2.1 Point of departure

(a) The service sector plan is the final phase out project in the RAC sector. It therefore will have to deal, as regards equipment (and training) with whatever is remaining in the country regarding

smaller and micro scale manufacturing below the threshold serviced by UNIDO/UNDPs "final" commercial umbrella project. Segments such as bus A/C, train A/C or transport refrigeration and a few manufacturers of industrial and commercial refrigeration equipment however may be not or not adequately be covered by manufacturing phase out projects.

(b) For some segments retrofit schemes are being developed. Equipment needs originating from retrofit activities are included under this strategy.

(c) Despite the large disparity in annual CFC consumption ranging from some kg/a to 2'400 kg/a, the analysis of the horizontal survey results gives evidence that equipment needs for smallest scale manufacturing and for good practice in servicing are largely identical.

5.4.2.2 Beneficiaries of equipment support

Basically there are two different approaches for identifying beneficiaries of equipment support:

Equity focus:

This approach provides equal and indiscriminate accessibility to support schemes for any size of enterprise, be it small or big. By this specific needs of the informal sector are addressed with high priority. The criteria for determining the order in which applications are being serviced would e.g. be the sequence of submission combined with a basic eligibility screening. Each company, irrespectively of its consumption and income baseline would be offered identical choice of support packages and identical financial conditions. Under the likely situation of inadequate funding volumes for covering all existing needs, a "first come – first served" approach would provide flexibility to balance the required level of subsidy to achieve responsiveness of beneficiaries and overall funding constraints.

Cost effectiveness focus:

Access to equipment support funds is strictly prioritized according to enterprise specific ODS reduction per USD of equipment support funds received. As a consequence, enterprises with a comparatively larger consumption will be serviced in the first place. Under a likely scenario with limited overall funding for equipment support, smaller informal sector enterprises would be excluded from equipment support.

Combination of cost effectiveness and equity

Both approaches will be implemented in parallel through a two-phased implementation approach:

- An efficiency focus shall be applied in an initial phase for supporting access to servicing equipment. The first years will selectively focus on "low hanging fruits". By this it is ensured that the largest CFC consumers are covered. For selection of operators of centralized recycling stations a tender approach on basis of business plan proposals also can be considered.
- In later years an equity based approach shall apply for enhancing access to basic service equipment and tools. Groups of 2000 companies have been defined based on the results of the horizontal survey. For each group, funding is available based on the achievable CFC phase out in that group. This funding is used first to cover the training needs; whatever is left can be used to supply equipment on a first come-first serve basis, rewarding fast moving enterprises and thus

providing an additional incentive. A fair distribution according to equity criteria is ensured with this approach.

Independent of the type of focus applied for identifying beneficiaries there is a need to establish a set of eligibility criteria for enterprises to get access to incentives from equipment support. This is in order to ensure effective use of funds for equipment support. Eligibility criteria are based on:

- Basic tools and equipment:
    - certificate on completion of training workshop on good practice and handling new refrigerants
    - equipment is used for service activities only, no dealing or trading
    - enterprise is handling CFC12 (not only R22) (possibly with minimum quantity requirement)
    - enterprise agrees to provide access for monitoring purposes
    - etc.
- R&R equipment:
    - certificate on completion of training on R&R equipment use
    - enterprise is handling more than a certain amount of CFC-12 per month
    - agreement to report on use of equipment
    - agreement to sanctions in case of ineffective use
    - etc.

The eligibility will be ensured and agreements with the enterprises reached by the Organizers. The details of the setup are described in chapter 5.3.7. above.

The beneficiaries will have to cover a certain amount of the equipment costs themselves, starting with small levels for very basic equipment and increasing with decreasing priority of the equipment. An exemption is the recovery and R&R equipment, which will be almost fully funded in case of centralized R&R stations providing services to smaller enterprises and recovery equipment for these enterprises. The R&R systems used by single enterprises will be subsidized over-proportional to allow for their (from the position of the enterprise) poor cost effectiveness. The reason for sharing the costs with the beneficiaries is not only the saving of absolute costs, but also the issue of responsible use of the equipment provided. Only a model requesting the beneficiary to show clear interest in the equipment support through partial payment of the costs can minimize that equipment is provided which is not being used.

5.4.2.3 Implementation arrangements

This section deals with different options for different dimensions of the implementation arrangements. The following performance criteria should be considered when finally deciding on any particular implementation model:

- Overhead costs for implementation (efficiency)
- Adequate outreach (effectiveness)
- Attractiveness for target group
- Fund flow requirements

- Accountability and auditability
- Synergies with other activities in the field of ODS-phase out (e.g. registration, certification etc.).

The eligibility check and determination of the level of support is being handled by the organizer. In the first years the organizers will have to be active to identify and convince the potential beneficiaries from the group of low hanging fruits, since awareness will still be relatively low. With increasing awareness and the scarcity of CFC being felt, the organizers will have easier access to the target group, but numbers will grow over-proportional, as will the difficulties of determining eligibility and level of support to be given. Identification and determining of eligibility will predominantly be performed before peak season, with training and equipment being actually provided after that peak season. The data from the eligibility determination will provide an important input for the reporting and next annual implementation plan.

After the level of support has been determined, training and equipment will be provided between peak seasons.

Fund flow arrangements for grant component

Different options will be utilized for handling the grant and arranging the respective fund flow. The solution depends on the target group and the regional circumstances, the actual approaches being defined during implementation.

The following basic options will be considered:

I. Post purchase reimbursement to customer:

Reimbursement of grant component is made to individual customers against proof of purchase. Disbursement can be arranged through banks or any agency involved in fund handling and with sufficient outreach to target group. This approach however has some drawbacks: a) the buyer needs cash for making *full* upfront investment and only later will receive refund. This increases the entry hurdle in case of cash constraints significantly and will make the option unattractive in case of high grant levels. b) the beneficiary will expect full security to receive grant reimbursement retrospectively to the act of equipment purchase. This makes overall budget management more difficult unless a real time clearing system is in place. c) it is a multiple window solution.

II. Post purchase reimbursement to dealers / vendors:

The setup has characteristics which are similar to option I. above, except that the beneficiary will purchase equipment at already discounted costs and thus requires less cash for effecting the purchase. The lowered cash requirement will *significantly* lower the entry barrier for smaller informal sector enterprises. The dealer / vendor will receive reimbursement for the grant component on presentation of proof of sale and proof of eligibility of customer. This exactly similar to the existing credit card operations, where dealers receive funds only against presentation of credit card slips. To minimize abuse of grant funds, the form shall contain the confirmation by the customer for amount of cash paid as well as address and signature of end user. The grant component (plus additional

handling/interest fee for dealer / vendor) will be reimbursed e.g. at bank counter or through bank transfer to dealer/vendor. For the beneficiary this is a "one stop shop".

III. Off-purchase reimbursement to manufacturer / supplier / distributor against proof of delivery / production records:

The manufacturers / suppliers will have to provide equipment to dealers/vendors at discounted costs which then will be sold at fixed and discounted price or provided free of costs (depending on type of equipment and eligibility) to the beneficiaries. The grant element will be reimbursed to the manufacturer / supplier / distributor upon submission of production or sales/handover records. An auditable system is a prerequisite and a mechanism must be installed to prevent that equipment is sold to end users at normal costs, increasing profits of vendors and thus depriving end user of benefit. Another problem consists in stocks which could be piled up at the vendors for which manufacturer already has received grant contributions. A mechanism of linking payment to some sort of proof of purchase/handover and proof of eligibility of end user would again be required.

IV. Direct delivery of equipment

Equipment can be delivered directly to the beneficiary, provided this turns out to be a cost effective solution in terms of administration and shipping efforts for the different kinds of equipment.

For option I and II above it must be ensured that the end user resp. the vendor / dealer will receive the grant component after effecting the physical transaction of the equipment.

5.5 Conversion of existing equipment

The vertical survey assessed also the population of different types of CFC refrigeration equipment in India, both today as well as a projection for the future. The results of this projection are displayed in table 12.

Table 12: Present status of CFC refrigeration equipment and projection into 2010 (without chillers)

	Remaining CFC equipment in 2002 [1000 units]	**Remaining CFC equipment in 2010 [1000 units]**
Domestic refrigeration	42'210	18'910
Refrigerated cabinets	2'100	1'280
Ice candy machines	1'050	640
Other commercial	350	220
MAC (car)	1'900	1'260
MAC (train)	2.203	1.153

It is obvious that there will be still a significant service demand after 2010. For most segments though, a significant amount of equipment reaches the end of life shortly after 2010, in particular commercial equipment and MAC (car). Other types of equipment are longer lasting and service demand has to be expected for several years after 2010; this refers in particular to the domestic refrigerators (typical lifetime above 15 years) and air conditioning systems for trains (typical lifetime 40 years). It is expected that these systems will be retrofitted or otherwise converted shortly before 2010 or during the first service after 2010.

In order to facilitate this conversion and to ensure that the necessary logistics and know how are in place, a pilot incentive program is planned for the domestic refrigeration sector. Studies have shown component costs of approximately 12 USD to be necessary to convert a domestic refrigerator. The said pilot program will support 25'000 conversions annually from 2007 to 2009, i.e. approx 1% of domestic refrigerators serviced. This is seen as a measure which is meant to facilitate the adaptation of such practices by the service sector.

The refrigerator manufacturers shall also be involved for making commitment on conversion of the CFC based refrigerators manufactured by them and being used in the market for appropriate retrofit scheme to convert them to non-CFC technology even after the warranty period.

5.6 Awareness program

5.6.1 Objective

Awareness on

- restrictions on use of CFCs,
- good servicing practices,
- the phase out schedule and
- regulatory aspects

is needed to facilitate and sustain action for a cost effective phase out in the refrigeration and air conditioning servicing sector.

Guiding principles for the development of the awareness-raising strategy

1) Awareness is a precondition to training. Through improved awareness on aspects of phase out, and the need to adapt to substitutes it is possible to sensitize the concerned personnel to respond to the training initiatives more emphatically.

2) Awareness on the sound business sense of proper servicing and maintenance with substitutes in keeping with the overall phase out strategy is critical to motivate action.

3) Awareness raising strategies have to focus on specific information needs of the formal and informal servicing establishments of the Refrigeration and Air-conditioning (RAC) sector, to promote good servicing practices.

4) The media for delivering awareness raising messages to the personnel in the establishments, have accordingly to be developed on the basis of prevailing routes of communication on technical aspects, within and between the formal and informal sectors.

5) The role of the general public in encouraging good servicing practices should also be stressed. Appropriate mechanisms for creating awareness in the public and opportunities for their reaching out to the service sector have to be defined. Nevertheless, general public awareness activities as such will be financed through a different MLF funded project (Production Sector Phaseout)

5.6.2 Information needs

Many enterprises are not aware of the technical and commercial challenges in the context of CFC phase out and are technically under-prepared to carry out good servicing. Awareness on the need to employ good servicing techniques therefore has to be created.

The servicing sector has also to be made aware of the phase out schedule, the regulatory aspects, the support (training and equipment) available to the enterprises and the way how to approach in case the support requested.

The information needs accordingly can be broadly classified as:

(1) technical information

(2) regulatory/legislative aspects
(3) capacity building initiatives.

5.6.3 Methodology

It is important to develop access to the servicing sector on the basis of existing routes of communication and contact within the sector.

Information updates pertaining to servicing per se appear to happen through networking within the industry (largely formal enterprises) and through information flow from the dealers of compressors, other spare parts, refrigerant and tools, on whom the enterprises depend for material supply. It is likely that the formal sector workshops depend on the same set of dealers for their material needs. Presently, information flow may happen either in the form of brochures, or through interactive seminars, organized by the appliance and compressor manufacturers also.

On the one hand, OEMs can play a major role in rapidly reaching to their service centres and their authorized service providers. They can also help reach out to the suppliers and dealers of their equipment to the MSEs. These suppliers and dealers will play a very important role in accessing the enterprises of the service sector. One of the most important tasks of the strategy for reaching out to the servicing sector is to locate the dealers across the country. Information on their presence in different parts of the country can be accessed from some important sources.

Associations such as the ISHRAE, ASHRAE (local chapter), NIRATA and the AIACRA, will also play a useful role in accessing the dealers, suppliers and, to a smaller extent, the enterprises directly. Out of cultural reasons there has been only limited outreach of associations to smaller enterprises in India, and it is seen beyond the capabilities of this sector plan to change this. Thus, associations as direct access road to enterprises are by and large no option for the sector plan.

The network of dealers is a very important stakeholder in the phase-out process because it is the last part of the supply chain, playing a very important role in the availability of refrigerant and spare parts for ODS alternatives. In order to minimize or exclude unwanted incentives for conversion of non-CFC refrigeration equipment back to CFC, the availability of alternative refrigerant(s), suitable refrigeration oils and spare parts is crucial. Thus, the dealers have the two roles of providing early in the implementation awareness access to the service sector enterprises plus ensuring the logistics for supply of alternatives. In order to sensitize the dealers, ensure their support for awareness measures and raise their awareness for supply needs of alternatives, a number of workshops for the dealers are planned.

The State Governments through their Departments of Environment and the Departments of Industry, the State Pollution Control Boards and the district offices are playing an important role in the implementation of the strategy, as explained in detail in chapters 7 and 8. In order to fulfill their role in identifying potential beneficiaries, participate in monitoring and coordinate the activities under this sector plan with other, potentially correlated measures in the States, the States have to receive constantly substantive, detailed and specific information about concept and progress of the sector plan and their changing role in it.

5.6.4 Activities

Based on above considerations, a number of activities are foreseen under the service sector plan. These are summarized in table 13.

Table 13: Awareness activities foreseen under the sector plan

Activity	Explanation	Distribution	Starting	Frequency
Provide 4-Colour Chart at Service Sector enterprise as continuous reminder	Production of 20'000 4-colour chart, 12 languages	Through dealers	2003	Annually for 6 years
Awareness and sensitizing articles in newspapers to reach enterprises	Commissioning articles in major newspapers	3 per year direct to newspapers	2003	Annually for 6 years
Establishing dealer network for information dissemination, support of equipment and refrigerant supply[2]	20 Networking WS across the country for dealers - opening access road	Direct	2004	Semi-annually for 6 years
Information brochure from Sector Plan for States on planned activities in Phaseout, lessons learned, plans for the next years, ...	Emerging legislation announcements	Direct	2004	Annually for 6 years
Workshops with the responsible officers from the States and the Union Government to facilitate exchange of information and experience concerning monitoring and coordination activities, coordination possibilities with other GoI or state government agencies, local legislation and other activities	Awareness workshops for regions/states / information exchange	Direct	2004	Annually for 6 years

[2] The dealer network is meant to open an early channel to the service sector starting immediately as well as reach beyond the training scheme under this sector plan, which is targeted only at a part of the sector. Thus, a second access road to the service sector through the dealer network is being developed.

5.6.5 Complementarity of the present initiative with the production sector strategy and the awareness campaign of the Ozone Cell.

One of the most recent initiatives of the Ozone Cell, Ministry of Environment and Forests, Govt. of India is the development of an intensive awareness campaign on aspects of ODS phase out, focusing on the availability of only non-CFC - based products from 1.1.2003.

This campaign which is in its final stages of planning may emphatically provide information support for the public, potentially including the MSEs. It is also likely that the campaign may awaken the general consumer to the potential participatory role she / he can play in sensitizing the servicing technician, to adopt measures that prevent wanton or inadvertent release of the ODS from older equipment, and ensure that servicing is done with the correct refrigerant in the case of equipment with the ODS-substitute.

The present awareness strategy entirely complements the production sector phase out strategy by attempting to sensitize the servicing sector and end-users to appropriately respond to the phase out.

It is equally important to recognize that the Micro and Small Enterprises (MSE) in particular need greater introductory technical information, in the process of getting sensitized to the need to rise to the opportunities of training that they need to access. Accordingly the need for an intensive technical information based awareness campaign for the servicing sector is justified. It is equally important to ensure a long-term awareness campaign, that covers the whole period of phase out for sustained information support.

6 INCREMENTAL COSTS

An overview over the incremental costs claimed within this project has been established; detailed sub-budgets for the Service Sector component and the Policy and Customs component showing the full incremental costs have been established. Based on the limited remaining eligible tons and the total incremental costs, the eligible incremental costs of the project are 12,656,670 $US.

The budget overview provides the following details:

Customs and policy training	$493.120
Awareness	$773.150
Training of existing technicians	
Train-the-trainers and training activities	$2.367.730
Training equipment	$433.020
Upgrade training of new technicians	
Train-the-trainers	$44.390
Training equipment	$850.160
Technician equipment supply	$5.167.630
Conversion of existing equipment	$723.800
Monitoring and ongoing management	$653.060
Contingency	$1.150.610
Total	**$12.656.670**

As already pointed out in chapter 5, service enterprises are expected to contribute to the capital costs of their skill and equipment upgrade. There are the following reasons to request a certain contribution:

- Maximum support for enterprises within funding limits
- Covering the non-eligible part of the equipment supply
- Increasing sustainability by requiring counterpart commitment, thus increasing the likelihood of appropriate utilization of equipment

It is planned that contributions of beneficiaries in local currency through training fees and equipment co-funding will be used for further measures under the Sector Plan, in particular further training and

equipment, thus operating a revolving fund under the Sector Plan. Depending on the circumstances during implementation, the Government of India reserves the right to utilize the income generated to support enterprises also through credit/loan schemes.

The Sector Plan will receive additional quantifiable support through task sharing with the existing Indo-Swiss HIDECOR project. This project, dealing with refrigeration technician skill development, has already been established and will carry out certain implementation related tasks without MLF funding. These contributions amount to a value of more than 1.250 million USD.

7 MANAGEMENT

The CFC-12 refrigeration sector phase-out plan will be implemented under the direct supervision of the Director Ozone, Ozone Cell, Ministry of Environment and Forests, Government of India.

7.1 Implementing / Bilateral Agencies involved

The project will be implemented as a collaborative effort of four Implementing / Bilateral Agencies. All of those have their specific experiences and areas of excellence to bring to the process. All agencies have close links to India, to the activities under this strategy and have made considerable experience to base their efforts on.

7.1.1 GTZ

GTZ will be the lead agency in the implementation of the project. The work within this project will be financed from the bilateral quota of Germanies contribution to the MLF, which GTZ is implementing. The expertise of GTZ lies in project management, industry cooperation, training and technical advice. GTZ has a local office in Delhi and is well connected through developing aid projects with Ministries and institutions within Delhi, among them the Directorate General for Education and Training, DGET under the Ministry of Labour, the Polution Control Boards under the Ministry of Environment and Forests, and the Indian Railways. In addition, GTZ representatives have been involved in intensive networking in the Indian refrigeration sector since 1995 through active participation in the ECOFRIG project, an Indo-Swiss-German collaborative project focused at technology transfer in refrigeration. All of these activities will optimize the interaction with important Stakeholders during the implementation of the project.

GTZ is actively involved in several ODS phase-out projects. Within its division for Environmental Management, the Programme Proklima assists countries in meeting their Montreal Protocol obligations. Implementation experience includes developing and implementing RMPs including training, recovery & recycling and other related measures for countries in Southern & Eastern Africa. For Brazil, GTZ has just participated in a joint UNDP/GTZ effort in preparation of a strategy for the refrigeration sector phase-out, which has been submitted to the 37th ExCom for consideration. Further implementation in the refrigeration sector includes manufacturer conversions in China and the Philippines.

GTZ will have the responsibilities for overall coordination between the Implementing Agencies.

7.1.2 Switzerland

For Switzerland, the consulting firms INFRAS and Swisscontact were mandated as implementers on behalf of their home country.

INFRAS Consulting Group was entrusted the responsibility of project management for the ECOFRIG project. This project has aimed at establishment of a level playing field between synthetic fluids (e.g. HFCs and HCFCs) and the fully environment-friendly natural fluids such as hydrocarbons in the Indian domestic and commercial refrigeration sector. The project supported the phase-out of CFCs

from production and servicing of domestic and small commercial refrigeration appliances and an assessment of the availability of hydrocarbon refrigerants in the Indian market. The ECOFRIG project provided the platform and the industry contacts to launch the HIDECOR initiative in 1998. INFRAS subsequently also was responsible for project management of HIDECOR pilot phase (1998 to 2000). This project is supported by the Swiss Government with a view to enable Micro and Small Enterprises (MSE) in the manufacturing & servicing sector and relevant training institutions to cope with the new demand (technologies, skills and market) resulting from CFC phase out process under the Montreal Protocol. In March 2002 the ECOFRIG project organised a Conference through IIT Delhi on technology transfer and the experiences gained in public private partnerships for skill development. The event offered opportunities to present the training approaches proposed under this strategy to a wider group of stakeholders. INFRAS acted as a facilitator for this conference as well as lead agency for this training chapter coordinating contributions from CIMI, UNEP, GTZ and Indian experts.

The project management role for the main phase of HIDECOR project (2001-2004) has been entrusted to Swisscontact (alongwith IT Power India). Swisscontact is an NGO, active in the fields of ODS phase-out, vocational education and training, and small & medium enterprise promotion. It has successfully completed an ODS phase-out project in Indonesia, key components of which include information workshops, technician training, and provision of technical expertise. It is at present undertaking similar projects in the Philippines and Sri Lanka.

7.1.3 UNDP

UNDP has carried out a large number of recovery and recycling and RMP projects world wide; among the implementing agencies it is the one with the highest turnover in that field. The capacities of UNDP as a equipment cum service provider have been proven on this basis. UNDP, responsible for R&R and providing also other equipment support, is a well suited partner with the necessary resources available within India to handle the described procurement tasks under the sector plan in a professional, experienced manner.

7.1.4 UNEP

UNEP has acquired considerable experience and expertise in organizing and implementing training courses. It has also developed numerous training tools, including manuals, practical guidelines and modules, together with a comprehensive training strategy to guide all training activities. It has an extensive catalogue of publications and material for awareness raising and information exchange which can be used to enhance training. Its training programs have been effective in establishing and strengthening a network of regional partner institutions and national country teams. The services provided by UNEP go beyond the provision of training alone; it also caters to diverse needs of countries such as training for customs authorities, policy development, institutional strengthening, regional networking, information sharing and assistance with technology transfer.

One of the strengths of the OzonAction Programme lies in its information exchange services. By maintaining, developing and disseminating current and relevant awareness raising material, training and technical documents, decision-makers are assisted in making informed decisions on policies and investments. One of the core capacities of UNEP in the Montreal Protocol has been acting as information clearinghouse and promoting awareness.

With this experience, UNEP is ideally suited to carry out the awareness part of this sector plan, especially because awareness for the general public in India is also supported by UNEP, allowing an optimum interlinkage between the two.

7.1.5 Specific agreements among the Implementing / Bilateral Agencies

The role of each implementing or bilateral agency is to use its specific funding of the implementation according to the annual task allocations proposed by the Technical Committee (for details of implementation structure see 7.2 below). It will be the responsibility of each agency to provide for their respective field of implementation a proposal of activities for the next year, including budget and proposed modality of implementation. The lead agency coordinates this process, is responsible for avoiding doubling of efforts and provides the Technical Committee with a consolidated list of planned activities and an respective budget plan. This budget plan, once recommended for approval by the Technical Committee and approved by the Management Committee, forms the basis for the annual funding request to the MLF.

MoEF on behalf of the Government of India jointly with the bilateral and the implementing agencies decided to follow a very country-driven approach in the implementation management, rather building capacities in the country than using external ones provided the implementation remains cost effective. Consequently, all agencies declared to procure the majority of equipment and services in India to the maximum extent possible. Using this as a basis, it was mutually agreed to separate the tasks from the funding levels, i.e. even if the focus of the project changes, the funding distribution remains as originally agreed.

7.2 Implementation structure

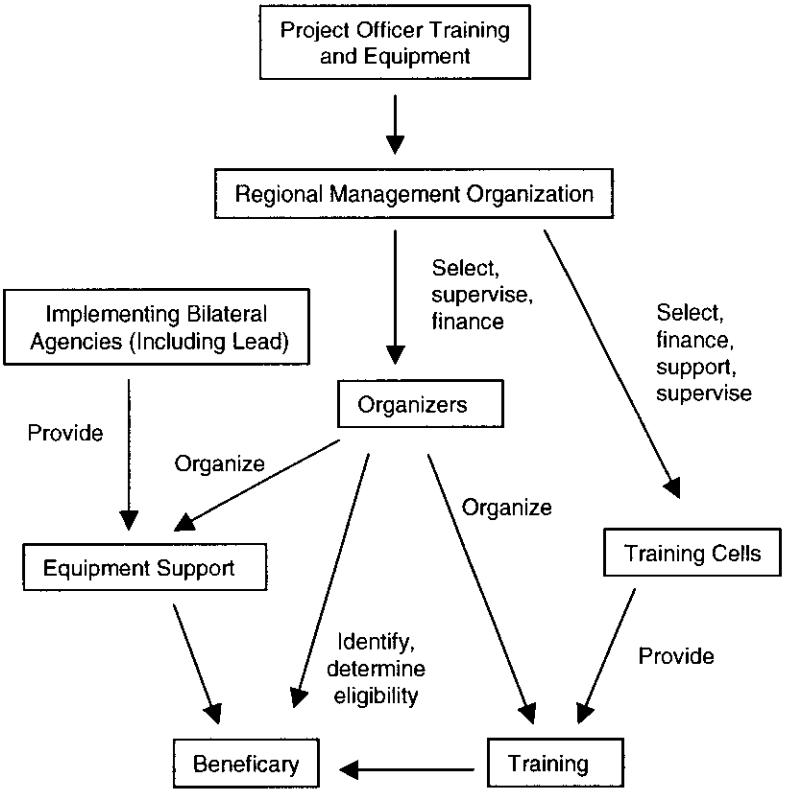
The Ministry of Environment & Forests, Government of India is responsible for implementation of the National Refrigeration and Air-Conditioning Service Sector Plan in India. The Ministry has decided that in general all new ODS phaseout projects/activities are to be operated by a Project Management Unit for Phaseout of Ozone Depleting Substances. All operational activities of the Project Management Unit are supervised by the Management Committee chaired by the Vice-President/Joint Secretary, MOEF. The following description of the implementation structure is only indicative and MOEF shall have the flexibility to change/modify the implementation methodology at the time of implementation.

A separate Technical Committee under the Chairmanship of Vice-President of the PMU will be setup for the Service Sector Plan. This Committee will consist of Director-Ozone Cell, representative of Implementing/Bilateral Agencies, experts and stakeholders. The Technical Committee meets twice a year in September and March. The meeting in September will prepare the annual work plan including the funding requirement for the next calendar year based on the results and decisions of this meeting. The March meeting will review the progress made in the previous year. The annual programme with the approval of the Governing Body of the Project Management Unit will be submitted to the March meeting of the Executive Committee of the Montreal Protocol.

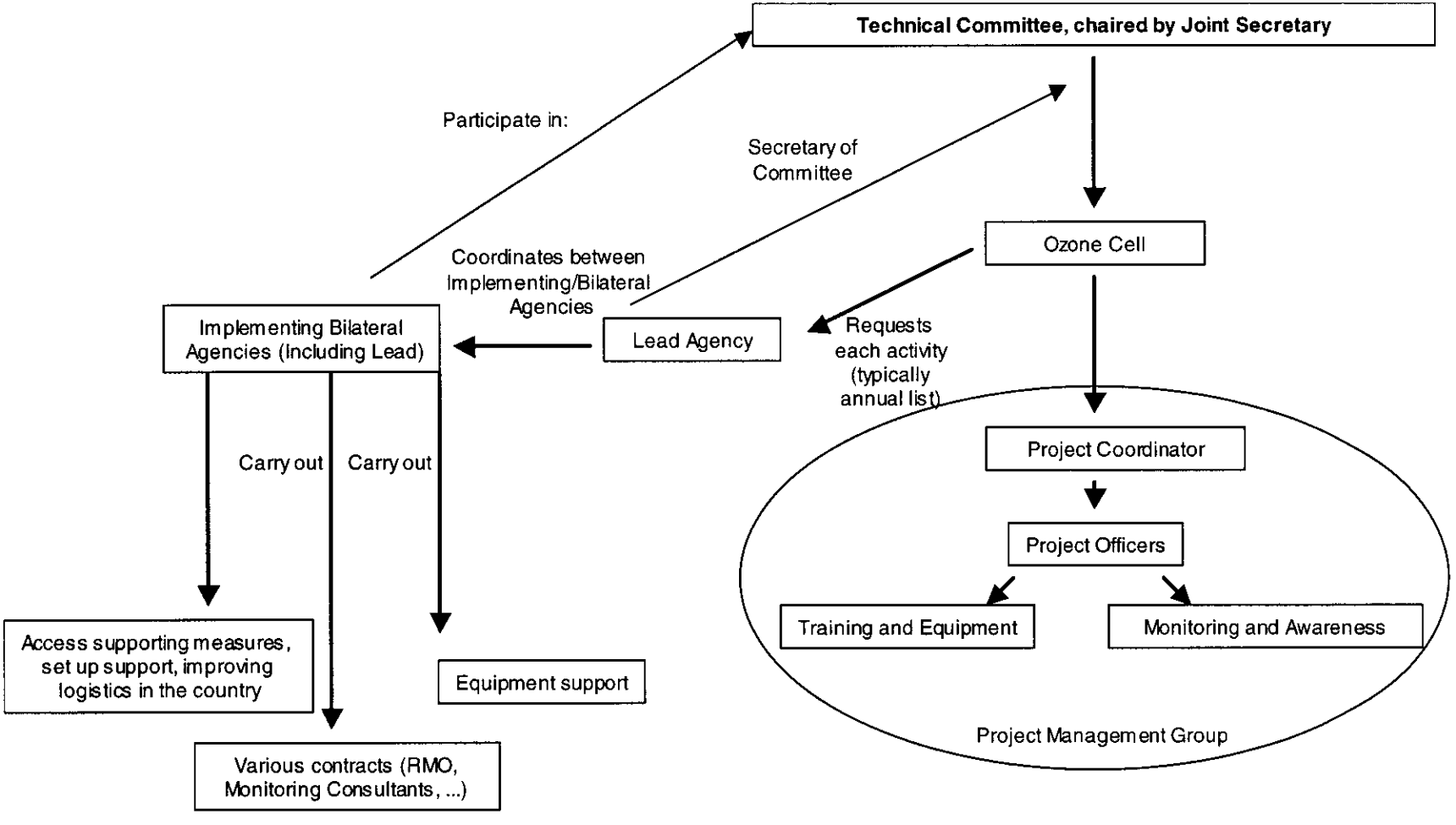
The Project Management Group for implementation of this project will consist of a Project Coordinator, two Project Officers and two support staff. The Project Coordinator will supervise the

activities undertaken for implementation of this project. One project officer will be responsible for training and procurement of equipment and other one will be responsible for monitoring and awareness. Support staff will assist the Project Coordinator as well as the two Project Officers.

The Project Coordinator will coordinate with Implementing Agencies, Technical Committee and report to the Secretary of the Management Committee of PMU. An overview of the Institutional Framework is provided in Graph 2 and 3. The funding for the Project Management Staff will come from the Implementing/Lead Agency to the Project Management Unit for ODS phaseout. The Project Coordinator and other staff members will work under the PMU.



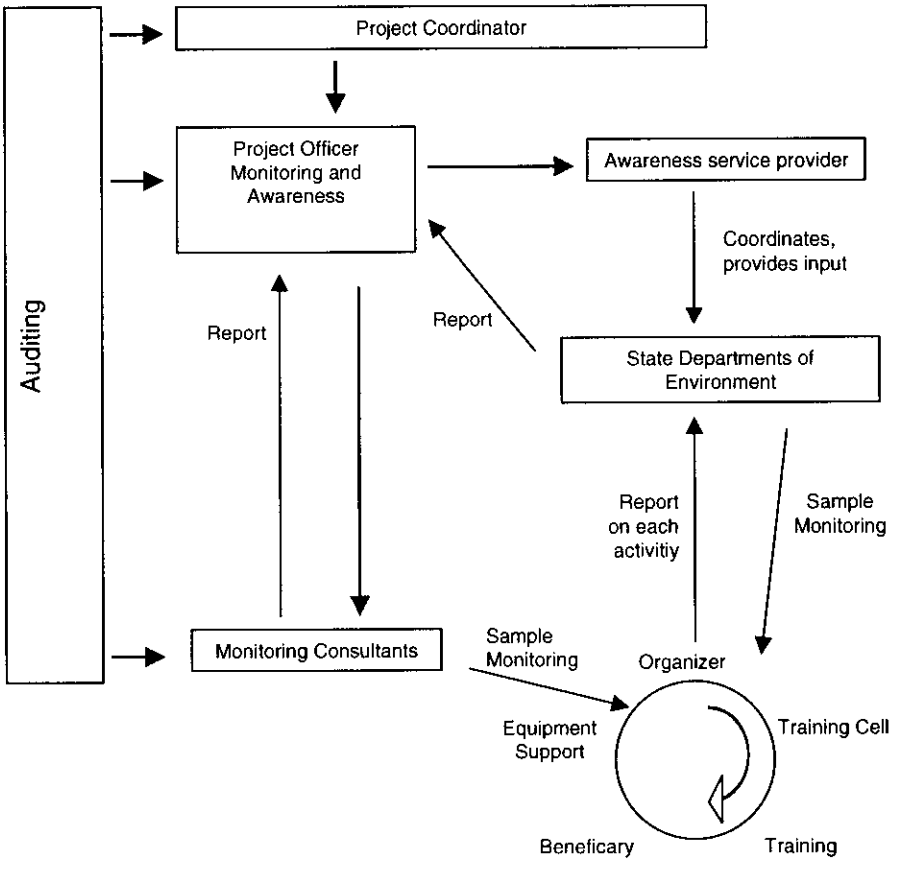
Graph 2: Outreach structure to the beneficiary



Graph 3: General management structure for Sector Plan

8 MONITORING AND EVALUATION

The monitoring of activities and results under this sector plan is carried out by an independent branch of the overall set-up. While the directly phase-out related measures, in particular providing training and equipment to the service sector, is carried out by an implementation structure created or contracted largely for this purpose, the backbone of the monitoring is the State administration. Each Organizer (see chapter 5.3.7) reports the enterprises identified in the off-season (Winter) to the Departments of Environment in the States, who forward that information to the Monitoring and Awareness Officer and perform at the same time random checks. In addition, the Monitoring and Awarenss Officer has one or more monitoring consultants reporting to him, which are hired once a year by the lead agency with the task to perform additional checks. The setup is depicted in graph 4.



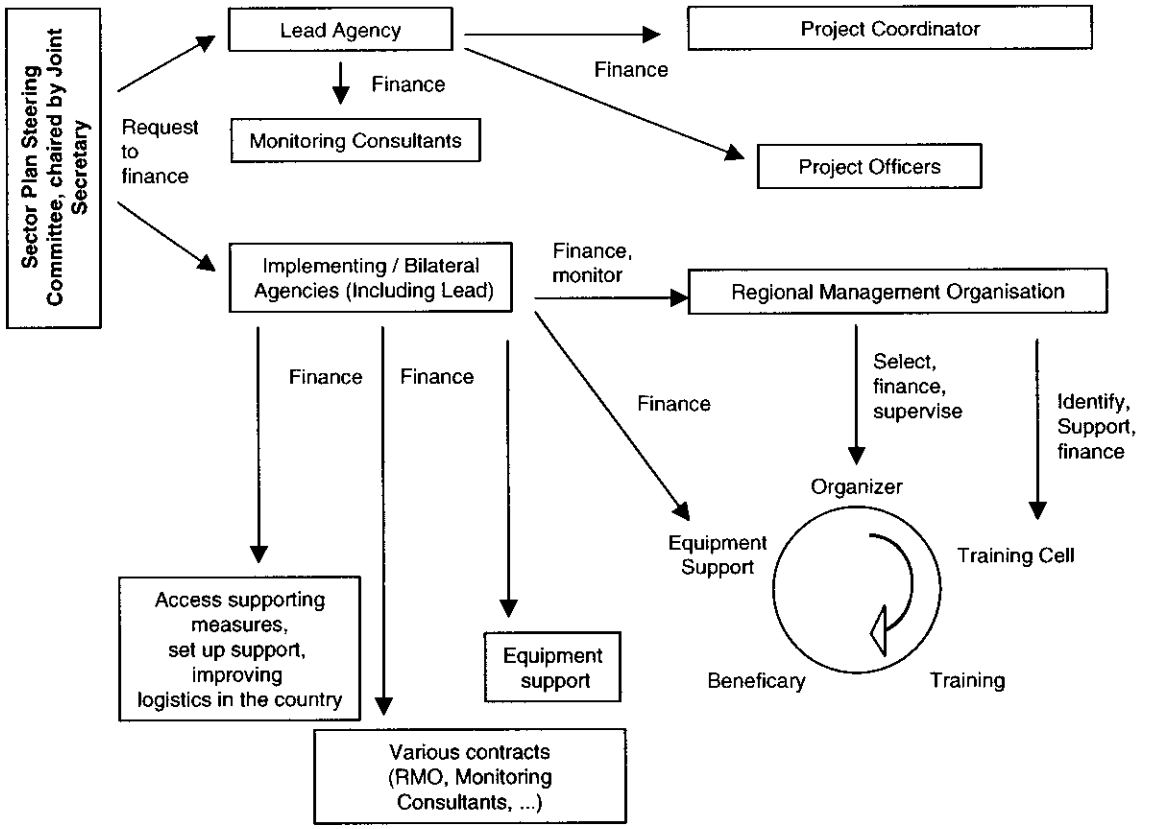
Graph 4: Monitoring and awareness

The monitoring set-up is independent of the implementation set-up and combined only with awareness measures, since for these measures also the State Departments of Environment are deeply involved. While these departments are meant to provide monitoring on a continuous basis and provide input through the Project Officer Monitoring and Awareness, the Monitoring Consultants will undertake specific and targeted monitoring missions. An external auditor will audit the work

undertaken by the monitoring consultants, the Project Officer (including the reports delivered by the States) and the Project Coordinator.

The monitoring data will consist of enterprises identified and proven to be eligible by the Organizers, which represents essentially the business plan for the next off season period. The monitoring data will also consist of trainings and equipment support delivered. Further, the spot checks will provide good indications of how much refrigerant the enterprises consume compared to before the provision of training and equipment. This data will flow into a spread sheet model of the expected reductions achieved through these measures. The resulting information will be correlated with monitoring information from the production sector plan in order to verify the numbers and show the effect of the measures. It should be kept in mind that this sector plan is only focusing on minimizing the impacts, i.e. it is reacting to the change in supply. The sector plan is only to a small extent facilitating actual demand reductions ("consumption phase-out") ahead of the supply reduction.

The fund flow is completely channeled through the implementing / bilateral agencies. A schematic is shown in graph 5.



Graph 5: Fund flow in Sector Plan

The funding is completely implemented by implementing / bilateral agencies upon request from the Steering Committee. This process ensures maximum involvement of the Government of India, at the

same time ensuring that the framework under which Implementing/Bilateral Agencies are working is taken into consideration.

Within their given tasks, the Implementing/Bilateral Agencies are responsible for the implementation according to the request from the Steering Committee. These requests will typically include in several cases already the terms of reference and other detailed information about the services or equipment to be procured and/or provided. The according information, which is based on the specific expertise of the different agencies, will be provided before Steering Committee meetings to allow for informed decision making.

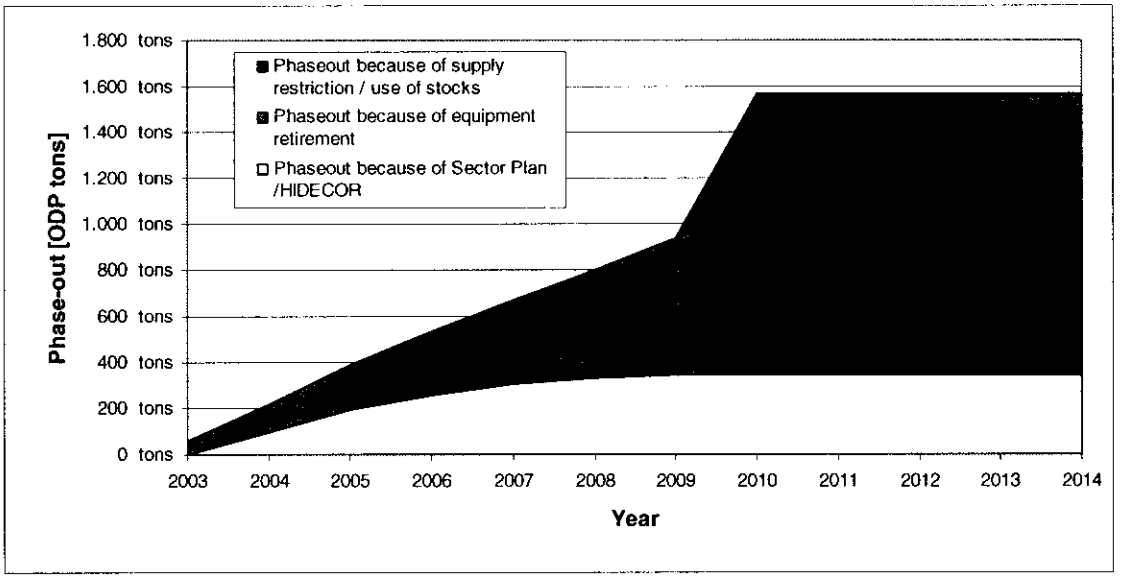
9 PERFORMANCE TARGETS AND DISBURSEMENT SCHEDULE

The monitoring is planned to be performed annually in time for the July meeting of the Executive Committee. The performance of the previous year will be determined and on this basis the tranche for implementation from August until July of the following year will be requested. This timing has been selected to allow careful scrutinizing after the production sector performance audit.

The Sector Plan has been developed on the basis of the existing Ozone Rules 2000, using them and the Indian phase-out commitments as a basis to determine the reductions in CFC-12 supply feasible. The Sector Plan aims at minimizing the impact of the supply reductions and subsequent phase-out. Consequently, the reductions achieved through the plan itself are often small, especially in the early years when abundant supply of CFCs is available. In addition, because of the higher frequency of repairs of old refrigerators compared to new ones and the high importance of refrigerators for India's CFC-12 consumption in the service, the CFC consumption in the service sector is likely to increase for some years before again starting to decrease.

Significant portions of the CFC phase-out are linked with refrigeration equipment reaching the end of its useful life, causing no more CFC consumption, as well as with retrofitting of existing equipment once there is insufficient CFC available. Both lead to phase-out only after the project has almost or completely finished, i.e. in the final years before the total phase-out of CFCs. Contrary to these components of the phase-out, best practice is directly implemented and is likely to provide measurable results in a relatively short time span.

Table 14 and graph 6 show overviews over the different measures leading to the total phase-out in India. The same data has been used for Graph 6 and Table 14. Disbursement schedule and a detailed list of annual targets are given in the draft agreement.



Graph 6: Share of the different measures in the phaseout in the service sector

Table 14 provides an overview over the CFC-12 consumption in India in the years until 2010. Based on the expected CFC-12 consumption figures until 2010, performance targets, performance indicators and a disbursement schedule have been developed. Those are displayed in Table 17. The performance indicators are calculated by using the CFC-12 consumption (reported in the annual reporting under the production sector plan and in the annual reporting to the Montreal Protocol Secretariat) minus the use for MDI. MDI uses are presently 120 ODP tons CFC/a.

Table 14: Actual CFC-12 consumption in India (both eligible and non-eligible)

Year	2003	2004	2005	2006	2007	2008	2009	2010
Various refrigeration projects (see table 2) *	77 tons	67 tons	18 tons	0 tons	0 tons	0 tons	0 tons	0 tons
Aerosol sector excl. MDI**	52 tons	52 tons	0 tons	0 tons	0 tons	0 tons	0 tons	0 tons
MDI use*	120 tons	120 tons	120 tons	120 tons	120 tons	120 tons	120 tons	0 tons ******
Refrigeration manufacturing sector**	155 tons	155 tons	103 tons	52 tons	0 tons	0 tons	0 tons	0 tons
Refrigeration Service Sector	1510 tons	1352 tons	1187 tons	1040 tons	896 tons	767 tons	636 tons	0 tons
Stock piling for service, MDI *****	155 tons	180 tons	210 tons	210 tons	-14 tons	115 tons	246 tons	0 tons
Total (incl. MDI)	2068 tons	1925 tons	1638 tons	1422 tons	1002 tons	1002 tons	1002 tons	0 tons ******
Total (excl. MDI)	**1948 tons**	**1805 tons**	**1518 tons**	**1302 tons**	**882 tons**	**882 tons**	**882 tons**	**0 tons**

* CFC-12 consumption as per MLF Secretariat database "Agency38.mdb"

** CFC-12 consumption as per MLF Secretariat database "Agency38.mdb"

*** Estimate; does not oblige India to any restriction in CFC-12 consumption for MDIs

**** CFC-12 consumption based on MLF Secretariat database "Agency38.mdb" for share CFC-12/CFC-11 and on project agreement UNEP/OzL.Pro/ExCom/38/70 Annex X for total consumption

***** Total of stockpiling equal to Service Sector demand estimate for 2010 to 2014

****** Does not include consumption related to any potential essential use exception

Component 2

POLICY AND CUSTOMS TRAINING STRATEGY

OZONE CELL, MINISTRY OF ENVIRONMENT AND FORESTS, GOVERNMENT OF INDIA

April 2003

1. Background

1.1 Overview of Montreal Protocol Implementation in India

India is a signatory to the Montreal Protocol on phasing out Ozone Depleting Substances. India has ratified the Vienna Convention in 1987 and signed the Montreal Protocol and its London Amendment in 1992. Subsequently, India prepared the Country Programme in 1993, which delineates the roadmap that the country has to adopt for phasing out Ozone Depleting Substances. In early 2003 India also ratified the Copenhagen Amendment and the Montreal Amendment to the Montreal Protocol.

India produces and consumes seven Ozone Depleting Substances namely CFC-11, CFC-12, CFC-113, Halon-1211, Halon-1301, Carbon Tetrachloride and Methyl Chloroform. India has achieved substantial reduction in production and consumption of the above substances in the past few years through implementation of ODS production and consumption phase out projects.

The Ministry of Environment and Forests (MoEF) has been designated as the nodal ministry for implementation of Montreal Protocol. The Ozone Cell is established under MoEF and is responsible for the implementation of projects and support activities for phasing out Ozone Depleting Substances (ODS). The Ozone Cell is assisted by various committees and inter-ministerial groups on specific activities relating to the implementation of Montreal Protocol.

For phasing out ODS, the Government of India has implemented:

- Projects that have provided technical and financial assistance to manufacturing enterprises originally using ODS.
- Awareness and information exchange activities to facilitate and sustain the phase out.
- Policy and regulations for enforcement and monitoring ODS phase out.

1.2 Importance of Policy and Regulations in Ozone Depleting Substances phase out

Enforcement of policy and regulations is critical for implementing ODS phase out activities. The following decisions were taken by the Meeting of Parties for implementing ODS phase out activities and controlling trade in Ozone Depleting Substances.

- Decision IV 24 relating to recovery, reclamation and recycling of Ozone Depleting Substance,
- Decision VI/19 on trade in previously used Ozone Depleting Substances, Decision VII/32 on control of export and import of products and equipment containing substances listed in Annexure A and B of the Montreal Protocol.
- Decision VII/33 and VIII/20 on illegal imports and exports of controlled substance.
- Decision IX/9 of control of export of products and equipment whose continuing functioning relies on Annex A and Annex B substances.
- Decision IX/22 of Customs codes.
- Decision X/9 on establishment of a list of countries that do not manufacture for domestic use and do not wish to import products and equipment whose continuing functioning relies on Annex A and Annex B substances.
- Decision X/18 on Customs codes.
- Decision XI/26 on Recommendations and clarifications of the World Customs Organization concerning customs codes for Ozone Depleting Substances and products containing ozone-depleting substances.
- Decision XII/10 and Decision XIII/12 on Monitoring of international trade and prevention of illegal trade in ozone-depleting substances, mixtures and products containing ozone-depleting substances.
- Decision XIV/7 on Monitoring of trade in Ozone-Depleting Substances and Preventing Illegal Trade in Ozone-Depleting Substances.

The Montreal Amendmentrequires Parties to implement a licensing system for trade in ODS. The focus of these policies is monitoring and controlling ODS trade and supporting the eventual phase out of ODS production and consumption.

Increasingly, international trade of ODS is being observed closely so that illegal trade can be prevented both in developed and developing countries and more controls on monitoring and harmonizing codes for tracking ODS trade are being used. Trade of ODS using second hand equipment is also a cause of concern as it results in higher ODS stocks in the importing countries. Further, trade of used substances is also likely to come under close observation in the coming years for ensuring that disguised use of virgin CFCs as used ODS is eliminated. Therefore, it is imperative that the relevant regulatory authorities are provided appropriate training support to understand and implement regulations for ODS phase out, which would help in controlling and facilitating ODS phase out.

2. Policy and regulations in India

India has provided for protection and improvement of the environment in her Constitution. Article 51-(g) of the Constitution says that it is the duty of every citizen of India to protect and improve the natural environment including forest, lakes, rivers and wildlife and to have compassion for living creatures. The constitutional provisions are implemented through the various environmental protection laws of the country.

Environment is a concurrent subject thus allowing for control by both the State Government and the Central Government on policies, regulations and action plans on specific matters. Over the recent past, the Supreme Court of India has been taking initiatives in passing specific orders for protection of environment and prevention of pollution.

The major steps undertaken by the Government relating to policy and regulatory support for ODS phase out are briefly explained below.

- Licensing system is under implementation since 1995. A ban has been imposed on trade in ODSs with non-Parties. Trade in ODSs with Parties is also under license. Import of equipment using ODS is under license and export of equipment using ODS is allowed only after appropriate labeling.

- Customs duty and excise duty exemptions are available to enterprises which are converting from ODS based technologies to non-ODS based technologies. This benefit has also been extended to enterprises setting up new operations with non-ODS technologies also. Further, to prevent an increase in ODS based technologies, the Reserve Bank of India (RBI) has issued a circular requesting all banks and financial institutions not to finance ODS based technologies.

- A comprehensive set of regulations for phasing out ODSs in India, Ozone Depleting Substances (Regulations and Control) Rules, 2000 have been notified in July 2000. These rules specify controls on production, trade and consumption of ODS and ODS based technologies. These regulations also specify controls on reclamation and destruction technologies.

- The CFC Production Quota Order specified in 2000 details reporting and monitoring requirements for CFC production levels. It also details the penalties for non-compliance with the quota levels specified therein.

The ODS Rules 2000 also contain specific regulations relating to procurement, transport and storage of ODS.

3. Departments associated with implementation of the ODS Rules

India has 28 States and 7 Union Territories. As mentioned in Section 2, the Central Government as well as the State Governments have powers to enact and implement regulations relating to the environment, including Ozone Regulations. All the States and Union Territories have officers working in various departments, managing and controlling activities in their respective geographic areas. In this kind of a structure, it is important to provide training to officers at the grass roots levels to ensure effective implementation of policies and regulations.

The various departments that deal with ODS policy are specified below and their respective roles in implementation are also indicated.

Ministry of Finance

The Ministry of Finance deals with duties to be levied, and exemptions on payment of duties on imports and exports. As far as ODS is concerned, it formulates financial policies from time to time to promote phase out and encourage substitution.

Customs and Excise

The Customs and Excise Department is the most important Government entity dealing with compliance and enforcement. Officers involved in the policy as well as those involved in enforcement require training.

Director General of Foreign Trade

The Director General of Foreign Trade is responsible for issue of licenses for ODS imports and exports. Officers in these Directorates coordinate with the line ministries on management of the licensing system.

Chemicals and Petrochemicals

The Ministry of Chemicals and Petro-chemicals is responsible for implementation of the Petroleum Act, 1934 and Petroleum Rules 1976 etc. which have provisions relating to handling of various classes of petroleum products, some of which are substitutes to ODSs. The licensing needs for the specified categories of Petroleum products are also spelt out in the Petroleum Rules 1976 and the Ministry is responsible for inputs on logistics associated with petrochemical products.

Pollution Control Boards

The Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs) are responsible for collecting information and to ensure quality of environment by taking up measures like monitoring, control, supervision, guidance etc. While the CPCB is responsible for overall policy, planning and decision making, the implementation responsibility is with SPCBs. CPCB also plays a key role in data reporting under Article 7 of the Montreal Protocol-CPCB Chairman being the Chairman of Monitoring and Evaluation Sub-Committee.

Border Security Force, Coast Guard and Police

Forces such as the Border Security Force (B.S.F), Coast Guard, and Police have a role to play in checking illegal trade in ODS transported on land, and through water and the air.

Shipping, Port Trust & Air Port Authorities

The officials of Shipping, Port Trust, Air Port authorities require adequate knowledge on ODS policy, Labeling, and illegal trade issues.

Fire Services Department

The officials of the Fire Services Department have a duty to control the use of halons in fire extinguishers and implement policies for Halon substitutes, products or technology.

Explosives Office and the Explosives Act

This office is responsible for dealing with potentially hazardous substances used as non-OD substitutes. This department needs to be sensitized to the need for conversion to non-OD alternatives and related policies.

Information and Publicity Departments

Information and publicity departments play important roles in creating public awareness through newspapers, radio, T.V, and other means of mass communication.

Industries Department

Officials of the Industries Department can ensure implementation of ODS policy in small, medium and large industries. They are also expected to play a role in the implementation of conversion projects to non-ODS technology.

Science and Technology

In their plans, the staff of the Science and Technology Department work on ODS substitutes. The safety aspects of ODS alternatives

can also be studied. The concerned administrative and non-scientist personnel need to understand the implications of the Protocol while taking their decisions.

State Government Officials

The State government officials especially dealing with Industries, Environment, Pollution Control Board , Transport, Revenue, Panchayat Raj, Tourism , Industrial Infrastructure Corporation, State Financial Corporation, NGOs, Press Reporters , Industry Associations , Chair Persons of Local Bodies etc also need updating of their knowledge on ODS phase out and its implications.

Civil Aviation

Officials working in civil aviation require knowledge of ODS policy and implementation especially international codes etc as they can help inform customs officials of the smuggled goods. Networking and coordination with the customs department would help in efficient identification of smuggled goods. Further, with the Government going in for privatization of certain Civil Aviation related services, it is important for the key decision makers to know the implications of Montreal Protocol on the infrastructure created by them.

Environment and Forests

Officials working in central and state ministries require training in ODS policy and implementation and the need for coordination with other related departments. Ozone Cell works under the Ministry of Environment and Forests and is assisted by committees – both technical and policy related - for implementation of various ODS phase out activities.

Law, Justice and Company Officials

Officials working in these departments also deal with legal matters relating to ODS as part of their overall responsibility and hence they require knowledge of ODS. There is enormous scope for persistent interactions and flow of relevant information to and from the legal framework. Learning from experiences of customs officials will help reinforce legal interactions.

Tourism

With the increase in tourism activity, there is a need to sensitize personnel working in the tourism sector on ODS phase out and non-ODS technology. This is necessary so that in their planning process, ODS phase out is taken care of.

Agriculture

ODS is used in the agricultural sector in applications related to pest control and food storage and processing. It is important that stakeholders associated with the Agriculture Department, industries in food processing and storage etc. are trained to increase their awareness on issues related to ODS phase out.

Defence Production and Research

In order to ensure that ODS are not used in defence production and encourage research on ODS substitutes, it is necessary to train some officials. It is important particularly for use of halons, CFCs in refrigeration and air conditioning and ODS solvents in solvent sector. This ministry should prepare itself for ODS phase out keeping in mind national security and related strategies and technological and market changes relating to Montreal Protocol.

Labour

The Industrial Training Institutes coming under this sector need to reorient their training contents to ensure use of ODS substitutes.

Insurance Companies

Officials from Insurance Companies need to be oriented on ODS phase out and its implications for their products.

NGOs

The representatives of NGOs need to be oriented to create awareness amongst people not to use the ODS. Furthermore, well oriented NGOs can engage in advocacy support sensitizing the

decision makers to realities pertaining to barriers in implementation.

In addition to the above, sensitization has to be done at the political level as well as key opinion makers (such as NGOs) to ensure smooth implementation of regulations and ODS phase out process. Political level sensitization, in the past, has been carried out through various fora where Parliamentarian were sensitized on ODS phase out matters. These fora provided an excellent opportunity for exchange of thoughts and issues relating to ODS phase out (especially the larger picture) and its implications at the political level. Such sensitization will help in credible and useful interventions by the Political system and will help in maintaining the momentum of ODS phase out.

From the above, the following is evident:

- a diverse range of organizations play a role in implementation of ODS phase out policies in India. Therefore, there is a need to provide training to personnel in various departments on ODS phase out policies and implementation needs. Training of these officials can result in effective implementation of regulations and cooperation with other countries in the region to control and monitor trade in ODS.

- organizations both at the Central level and State level play a role in implementation of ODS phase out regulations and policies. Therefore, it is imperative that training be provided to stakeholders at various levels on ODS phase out policies and implementation needs. However, such training programs have to be customized to suit the needs of the stakeholders to ensure cost effective delivery.

- the training programs should also become a part of the regular curriculum of training of key stakeholders, namely customs and excise officials and pollution control board officials to ensure timely implementation.

Training, as explained above, can help in sensitization of stakeholders, effective implementation of policies and regulations and thus, help in maintaining momentum of ODS phase out. With the compliance era already in force, this training activity should be

undertaken on priority and should address all target audience concerned, appropriately.

4. Objective of training for customs and enforcement officials

The objectives of training program for customs and enforcement officials shall include:

- Creating awareness on Montreal Protocol and the effect of Ozone Depletion and imparting knowledge on the policies of Government of India for implementation of ODS phase out

- Training on regulations for ODS phase out that are under implementation in India specifically with reference to ODS trade and trade of equipment using ODSs.

- Training on roles and responsibilities of different stakeholders in implementation of regulations to facilitate ODS phase out.

- Training on specific implementation modalities (e.g., usage of identification equipment, steps to taken up on seizure of illegal consignments, safety related issues etc.)

The depth of training will vary depending upon the category of target audience who will be trained. The training activity will not only increase their understanding of the issue but also communicate the importance of the implementation of regulation to ensure that the Government of India is able to abide by its commitments under the Montreal Protocol.

5. Target Groups for training

The details of the various target groups have been discussed in the earlier section. As indicated earlier, the Target groups for training are classified as follows depending on their training needs.

A segment of target audience need to be sensitized on Montreal Protocol and importance of its implementation. This training will be targeted at Union Ministers, Members of Parliament, Members of Planning Commission, Members of State Legislatures, Senior Bureaucrats, Industries organizations like the Confederation of Indian Industries (CII), the Federation of Indian Chamber of Commerce and Industry (FICCI) and NGOs.

A set of target audience need to be trained as trainers. They will be provided in-depth training on various policies, implementation needs, international cooperation required, usage of identification equipment etc. These trainers will mainly come from Customs and Excise departments, Pollution Control Boards, Directorate General of Foreign Trade, Ozone Cell officials and Revenue Department.

These trainers need to train the key personnel working at the Central level, Regional level (as the Central Government Ministries have regional offices handling specific responsibilities) and the State level on general awareness and key activities to be undertaken relating to implementation of regulations. The target audience for these training activities should also include staff at the district level.

Technical training on servicing is separately addressed through the RAC Service Sector Strategy. The focus of the Customs and Policy Training Strategy is to provide training through the Train the Trainers approach. This training program is expected to be delivered through training cells strategically located in different parts of the country. This training will be carried out in parallel with the customs training strategy proposed in this document as the coverage and the target audience for these training activities are different.

The following are the possible categories of officers and their training needs.

	Categories of trainees	**Overall training content**	**Training program duration**
1.	The officers working at cutting edge (i.e. field personnel at implementation and enforcement level).	Emphasis on policies and regulation implementation. More emphasis on practical aspects dealing with identification of ODS – special information on	3 day program

	Categories of trainees	Overall training content	Training program duration
		methods of smuggling by land, water and air and combating illegal trade. ***Trained as trainers.***	
2.	Desk Officers (Desk Duty)	More emphasis on policy and overall implementation modalities. ***Trained by trainers.***	1.5 day program
3.	All officers on probation	Complete training including Awareness, policies, regulations and implementation modalities. This will form a part of the regular curriculum. ***Trained by trainers.***	To be trained based on training curriculum.
4.	Other personnel (primarily sensitization)	Awareness on Montreal Protocol and general overview of actions taken by Government of India. ***Trained by trainers.***	1 day program

Note: Details of training content will be separately worked out once the Strategy is approved. Experience of Implementing Agencies like UNEP will be used for this.

The number of staff/officers who will be trained through this training program is given in Attachment 1.

The training material used for the programs will include text books and documents published relating to ODS phase out policies and regulations. Audio visual media will also be used for implementation of training programs, wherever found appropriate.

Electronic media will also be used for implementation of training programs. The training materials will be copied onto CD-ROMs that will be prepared and distributed to the participants. Further,

the training materials will also be made available on the internet for easy access by officers working in different parts of the country. Attachment 4 gives details of e-based training that is proposed.

In addition to giving training, equipment support is proposed to be given to the centres that conduct training or centres operating at the cutting edge. It is estimated that about 150 such centres will need to be equipped with equipment.

6. Time plan for implementation of training

The time plan for implementation of training is given in Attachment 2. The training will be conducted by local trainers with inputs from implementing agency on training modules. Organizations like the National Academy for Customs, Excise and Narcotics (NACEN), which have the capacity to carry out such training activities both at national level and at regional level shall be used for implementation of the training program, especially the train the trainers.

- Period for preparing training material and training of trainers in one year is agreed. However, simultaneously training of trainers can be taken up.
- Provision to be made for training new persons coming in the place of persons already trained and transferred.
- Provision to be made for biannual updating of reading material.
- Prioritization in training schedule for persons from more industrially sensitive areas to be made.
- Re-orientation of staff after the complete implementation of the Strategy in 2007 will be done periodically through the existing pool of officers. This will ensure the long-term sustainability of the training.