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COMITE EXECUTIF  
DU FONDS MULTILATERAL AUX FINS  
D'APPLICATION DU PROTOCOLE DE MONTREAL  
Soixante-quatorzième réunion  
Montréal, 18 – 22 mai 2015

**PROGRAMME DE TRAVAIL DE L'ONUDI POUR L'ANNÉE 2015**

## OBSERVATIONS RECOMMANDATION DU SECRÉTARIAT DU FONDS

1. L'ONUDI demande au Comité exécutif d'approuver la somme de 2 997 135 \$US pour son programme de travail de 2015, plus les coûts d'appui d'agence de 238 900 \$US, tel qu'indiqué dans le tableau 1. La demande soumise est jointe au présent document.

Tableau 1: Programme de travail de l'ONUDI pour 2015

Pays	Activité/Projet	Montant demandé (\$US)	Montant recommandé (\$US)
<b>SECTION A: ACTIVITÉS RECOMMANDÉES POUR APPROBATION GLOBALE</b>			
<b>A1: Renouvellement de projets de renforcement des institutions</b>			
Oman	Renouvellement du renforcement des institutions (phase VI)	68 467	68 467
Tunisie	Renouvellement du renforcement des institutions (phase VIII)	247 270	247 270
Turquie	Renouvellement du renforcement des institutions (phase VII)	260 000	260 000
Sous-total pour A1		575 737	575 737
Coûts d'appui d'agence (7 pour cent pour le renforcement des institutions):		40 302	40 302
Total pour A1		616 039	616 039
<b>A2: Préparation de projet</b>			
République islamique d'Iran	Préparation pour des activités d'investissement en vue de l'élimination des HCFC (étape II) (secteur des mousses de polyuréthane)	75 000	75 000
Turquie	Préparation d'un plan de gestion de l'élimination des HCFC (étape II)	90 000	90 000
Sous-total pour A2		165 000	165 000
Coûts d'appui d'agence (7 pour cent pour la préparation de projet):		11 550	11 550
Total pour A2		176 550	176 550
<b>SECTION B: ACTIVITÉS RECOMMANDÉES POUR EXAMEN INDIVIDUEL</b>			
<b>B1: Renouvellement de projets de renforcement des institutions</b>			
Bosnie-Herzégovine	Renouvellement du renforcement des institutions (phase V)	95 333	(95 333)*
Libye	Renouvellement du renforcement des institutions (phase IV)	136 065	(68 033)*
Sous-total pour B1		231 398	
Coûts d'appui d'agence (7 pour cent pour le renforcement des institutions):		16 198	*
Total pour B1		247 596	
<b>B2: Préparation de projets de démonstration sur les technologies de remplacement à faible potentiel de réchauffement de la planète</b>			
Chine	Préparation d'un projet de démonstration sur des solutions de remplacement à faible potentiel de réchauffement de la planète dans diverses applications pour le transport frigorifique (frigorigènes cryogéniques et naturels)	50 000	*
	Préparation d'un projet de démonstration de reconversion, du HCFC-22 au dioxyde de carbone, pour les compresseurs de thermopompes	30 000	*
	Préparation d'un projet de démonstration pour la réduction des fuites dans les équipements de réfrigération de grande taille/industriels	50 000	*
Mondial	Préparation d'un projet de démonstration dans le secteur du montage en réfrigération (Argentine et Tunisie)	60 000	*
Mondial	Préparation d'un projet de démonstration sur le confinement des frigorigènes et la prévention des fuites dans les environnements à température ambiante élevée (Égypte et région du Conseil de coopération du Golfe)	50 000	*
Maroc	Préparation d'un projet de démonstration pour l'utilisation d'équipements compacts de mousse à haute pression en vue de l'introduction sécuritaire de la technologie au pentane dans les PME	40 000	*

Pays	Activité/Projet	Montant demandé (\$US)	Montant recommandé (\$US)
Région: AFR	Préparation d'un projet de démonstration pour garantir les normes de sécurité et la disponibilité sur le marché de frigorigènes de haute qualité (Kenya, Rwanda, Ouganda, République unie de Tanzanie et Zambie)	100 000	*
Région: Amérique latine et Caraïbes	Préparation d'un projet de démonstration pour les activités d'entretien dans la réfrigération et la climatisation de l'étape II du PGEH, mettant l'accent sur les frigorigènes inflammables à faible potentiel de réchauffement de la planète (Bahamas, Grenade, St. Lucie, St. Vincent et les Grenadines, et Suriname)	60 000	*
Arabie saoudite	Préparation d'un projet de démonstration sur l'élimination HCFC par l'utilisation de HFO comme agent de gonflage des mousses dans les applications de mousse pulvérisée pour des équipements de réfrigération dans des environnements à température ambiante élevée	30 000	*
	Préparation d'un projet de démonstration pour promouvoir des frigorigènes à base de HFO et à faible potentiel de réchauffement de la planète pour le secteur de la climatisation dans les environnements à température ambiante élevée	30 000	*
Afrique du Sud	Préparation d'un projet de démonstration sur les avantages techniques et économiques de l'injection assistée sous vide dans une usine de panneaux discontinus, reconvertie du HCFC-141b au pentane	40 000	*
Turquie	Préparation d'un projet de démonstration sur l'élimination des HCFC par l'utilisation de HFO comme agent de gonflage des mousses dans la fabrication de groupes frigorifiques et de remorques de camion	30 000	*
Sous-total pour B2		570 000	
Coûts d'appui d'agence (7 pour cent pour la préparation de projet):		39 900	*
Total pour B2		609 900	
<b>B3: Assistance technique pour une étude de faisabilité</b>			
Égypte	Étude de faisabilité sur le refroidissement urbain	70 000	*
Koweït	Étude de faisabilité sur le refroidissement urbain	70 000	*
Sous-total pour B3		140 000	
Coûts d'appui d'agence (9 pour cent pour l'assistance technique):		12 600	*
Total pour B3		152 600	
<b>B4: Assistance technique pour la préparation d'enquêtes sur les SAO</b>			
Albanie	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Argentine	Enquête sur les solutions de remplacement des SAO au niveau national	120 000	*
Bolivie (État plurinational)	Enquête sur les solutions de remplacement des SAO au niveau national	55 000	*
Bosnie-Herzégovine	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Chili	Enquête sur les solutions de remplacement des SAO au niveau national	80 000	*
Équateur	Enquête sur les solutions de remplacement des SAO au niveau national	55 000	*
Géorgie	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Guatemala	Enquête sur les solutions de remplacement des SAO au niveau national	55 000	*
Honduras	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Mexique	Enquête sur les solutions de remplacement des SAO au niveau national	120 000	*
Monténégro	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Nicaragua	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Niger	Enquête sur les solutions de remplacement des SAO au niveau national	55 000	*
Oman	Enquête sur les solutions de remplacement des SAO au niveau national	80 000	*
Serbie	Enquête sur les solutions de remplacement des SAO au niveau national	80 000	*
Ex-République yougoslave de Macédoine	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Tunisie	Enquête sur les solutions de remplacement des SAO au niveau national	80 000	*

Pays	Activité/Projet	Montant demandé (\$US)	Montant recommandé (\$US)
Turquie	Enquête sur les solutions de remplacement des SAO au niveau national	120 000	*
Ouganda	Enquête sur les solutions de remplacement des SAO au niveau national	55 000	*
Uruguay	Enquête sur les solutions de remplacement des SAO au niveau national	35 000	*
Venezuela	Enquête sur les solutions de remplacement des SAO au niveau national	80 000	*
Sous-total pour B4		1 315 000	
Coûts d'appui d'agence (9 pour cent pour l'assistance technique):		118 350	*
Total pour B4		1 433 350	
Grand total (A1, A2, B1, B2, B3 et B4):		3 236 035	

\*Pour examen individuel

## SECTION A: ACTIVITES RECOMMANDÉES POUR APPROBATION GLOBALE

### A1: Renforcement des institutions

- (a) Oman (phase VI): 68 467 \$US
- (b) Tunisie (phase VIII): 247 270 \$US
- (c) Turquie (phase VII): 260 000 \$US

### Description des projets

2. L'ONUDI a présenté des demandes de renouvellement de projets de renforcement des institutions (RI) pour cinq pays dont la liste figure au tableau 1 et dont trois sont recommandées pour approbation globale. L'Annexe I au présent document contient la description de ces projets.

### Observations du Secrétariat

3. Le Secrétariat a examiné les demandes de renouvellement des projets de RI pour Oman, la Tunisie et la Turquie, soumis par l'ONUDI au nom des gouvernements respectifs, selon les lignes directrices et les décisions pertinentes concernant l'admissibilité et les niveaux de financement. Les demandes ont été vérifiées par rapport au plan de travail original de RI de la phase précédente, au programme de pays et aux données transmises en vertu de l'article 7, au dernier rapport sur la mise en œuvre des plans de gestion de l'élimination de HCFC (PGEH), au rapport périodique de l'agence, et à toute décision pertinente de la Réunion des Parties au Protocole de Montréal. Il a été noté qu'Oman, la Tunisie et la Turquie sont en conformité avec les objectifs d'élimination de SAO aux termes du Protocole de Montréal et que la Turquie a remis les rapports sur la mise en œuvre du programme de pays pour 2013 tandis qu'Oman et la Tunisie ont remis leurs rapports pour 2014.

### Recommandations du Secrétariat

4. Le Secrétariat recommande l'approbation globale des demandes de renouvellement des projets de RI pour Oman, la Tunisie et la Turquie, aux niveaux de financement indiqués au tableau 1. Le Comité exécutif est invité à communiquer aux gouvernements susmentionnés les observations contenues dans l'annexe II au présent document.

## **A2: Préparation de projet pour des plans de gestion de l'élimination des HCFC (PGEH)/projets d'investissement pour l'élimination des HCFC (étape II)**

République islamique d'Iran: Préparation de projet supplémentaire visant des activités d'investissement pour l'élimination des HCFC dans le secteur des mousses de polyuréthane (PU) (étape II): 75 000 \$US

### **Description du projet**

5. L'ONUDI, au nom du gouvernement de la République islamique d'Iran, a présenté une demande de financement supplémentaire pour la préparation de projets d'investissement dans le secteur des mousses PU, au montant de 75 000 \$US, plus les coûts d'appui d'agence de 5 250 \$US. Cette demande s'ajoute au financement de 215 000 \$US pour la préparation de l'étape II du PGEH (incluant 125 000 \$US pour la préparation de projets d'investissement) déjà approuvé à la 72<sup>e</sup> réunion.

### **Observations du Secrétariat**

6. Le Secrétariat a questionné la nécessité d'un financement supplémentaire, prenant note qu'un montant de 75 000 \$US avait déjà été approuvé pour le gouvernement de l'Allemagne en vue de préparer des projets dans le secteur des mousses. L'ONUDI a expliqué que ce financement supplémentaire aurait dû être demandé à la 72<sup>e</sup> réunion mais qu'il avait été omis par inadvertance. Le montant est donc requis pour achever de répondre à l'exigence dans le secteur des mousses.

7. D'après la consommation restante de 279 tonnes métriques, la République islamique d'Iran pourrait recevoir jusqu'à 200 000 \$US pour le volet investissement du PGEH. La demande supplémentaire de 75 000 \$US pour le secteur des mousses PU, si elle est approuvée, entraînerait un financement au taux maximum admissible pour ce pays. La demande se situe donc à l'intérieur des limites fixées par la décision 71/42(d), (f) et (g).

### **Recommandation du Secrétariat**

8. Le Secrétariat du Fonds recommande l'approbation globale de la demande de l'ONUDI pour des fonds supplémentaires, destinés à la préparation de projet pour des activités d'élimination des HCFC dans le secteur des mousses de polyuréthane (étape II) pour la République islamique d'Iran, au niveau de financement indiqué dans le tableau 1.

Turquie: Préparation de projet pour l'étape II du PGEH (stratégie globale): 90 000 \$US

### **Description du projet**

9. L'ONUDI, au nom du gouvernement de la Turquie, a présenté une demande de financement pour la préparation de projet de l'étape II du PGEH pour la Turquie, au montant de 90 000 \$US, plus les coûts d'appui d'agence de 6 300 \$US. Pour la période 2012 à 2017, l'étape I du PGEH pour la Turquie réduira la consommation de HCFC de 86,4 pour cent par rapport à la valeur de référence et elle inclut un volet investissement pour la reconversion complète du secteur des mousses. Le gouvernement de la Turquie sollicite une assistance pour éliminer complètement la consommation de HCFC à l'étape II de son PGEH.

### **Observations du Secrétariat**

10. La demande présentée par l'ONUDI se situe à l'intérieur des limites fixées par la décision 71/42(d), (f) et (g) d'après la consommation restante admissible de la Turquie qui est de 137,6 tonnes PAO, ce qui autorise le gouvernement de la Turquie à recevoir un maximum de 90 000 \$US, plus les coûts d'appui d'agence, pour la préparation de la stratégie globale de l'étape II du PGEH.

11. A l'appui de la demande de préparation de projet, l'ONUDI a fourni la plus récente consommation de HCFC pour 2014 (évaluée à 137,6 tonnes PAO de HCFC-22), une mise à jour sur la mise en œuvre de l'étape I du PGEH et sur les activités qui seront mises en œuvre pour la préparation de l'étape II du PGEH. L'ONUDI a souligné aussi que l'étape II se concentrerait sur le secteur de l'entretien dans la réfrigération.

12. Le Secrétariat a conclu que la demande de fonds de préparation de projet pour la stratégie globale pour la Turquie correspondait aux lignes directrices contenues dans la décision 71/42 et pour les exigences supplémentaires, dans la décision 72/18.

### **Recommandation du Secrétariat**

13. Le Secrétariat du Fonds recommande l'approbation globale de la demande de l'ONUDI pour la préparation de projet pour l'étape II du PGEH (stratégie globale), au niveau de financement indiqué dans le tableau 1.

## **SECTION B : ACTIVITÉS RECOMMANDÉES POUR EXAMEN INDIVIDUEL**

### **B1. Renforcement des institutions**

- a) Bosnie-Herzégovine : (phase V) 95 333 \$US
- b) Libye (phase IV) : 136 065 \$US

14. L'ONUDI a présenté des demandes pour le renouvellement des projets de renforcement des institutions (RI) pour cinq pays dont la liste figure au tableau 1. Le Secrétariat recommande les projets pour la Bosnie-Herzégovine et la Libye pour examen individuel. L'annexe I au présent document contient la description de ces projets.

#### Bosnie-Herzégovine : Renouvellement du projet de renforcement des institutions (phase V) 95 333 \$US

#### **Contexte**

15. L'ONUDI a présenté une demande pour le renouvellement du projet de renforcement des institutions de la Bosnie-Herzégovine à la 74<sup>e</sup> réunion. Le pays a déclaré dans les données remises en vertu de l'article 7, une consommation annuelle de 5,13 tonnes PAO pour les substances du Groupe I de l'Annexe C (HCFC), ce qui le place dans une situation potentielle de non-conformité avec un écart de 0,4 tonnes PAO par rapport à son obligation de gel pour les HCFC au niveau de référence de 4,7 tonnes PAO. La situation de la Bosnie-Herzégovine sera débattue à la 54<sup>e</sup> réunion du Comité d'application au titre de la procédure applicable au non-respect du Protocole de Montréal (ImpCom) en juillet 2015.

16. A la 72<sup>e</sup> réunion, le Comité exécutif a approuvé la seconde tranche de l'étape I du PGEH pour la Bosnie-Herzégovine; toutefois il a appliqué une pénalité de réduction de 10 pour cent du financement de cette tranche puisque la consommation de HCFC de 2013 n'était pas en conformité<sup>1</sup> avec les niveaux autorisés dans l'accord conclu avec le Comité exécutif (décision 72/30).

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<sup>1</sup> La non-conformité à l'accord du PGEH était liée surtout au fait : qu'en janvier 2013 la cargaison de 2 720 tonnes métrique de HCFC-22 a été importée sous le permis d'importation de 2012 ; que l'on ignorait apparemment que le stockage pour de futures exportations était comptabilisé dans la consommation de l'année de l'importation ; et que des quotas ont été émis à un niveau nettement plus élevés que celui de la consommation maximale autorisée. Un autre oubli a consisté à ne pas comptabiliser le HCFC-142b contenu dans les importations de R-406A.

### Observations du Secrétariat

17. Le Secrétariat a pris note de l'adoption, en novembre 2013, par le Conseil des ministres de Bosnie-Herzégovine du projet de loi sur le PGEH et de la mise en place d'un système exécutoire d'autorisation et de quotas pour les importations et les exportations de HCFC, à compter de janvier 2014. Le rapport de vérification sur les HCFC de 2013 et l'évaluation de la tendance de consommation de HCFC effectués en coordination avec l'UNO ainsi que les données sur la mise en œuvre de programme de pays de 2014 indiquent que les mesures de réglementation des HCFC sont appliquées et des progrès ont été réalisés pour respecter les obligations du pays aux termes du Protocole de Montréal. L'ONUDI a indiqué au Secrétariat que la Bosnie-Herzégovine a transmis un chiffre de 3,37 tonnes PAO pour les données de 2014 exigées en vertu de l'article 7.

### Recommandation du Secrétariat

18. A la lumière des informations fournies dans les observations susmentionnées du Secrétariat, y compris le fait que la Bosnie-Herzégovine a déjà été pénalisée pour l'écart du niveau de sa consommation de HCFC pour 2013, la tendance positive indiquée par les données de 2014 sur la mise en œuvre du programme de pays, et le fait que les données soumises pour 2014 en vertu de l'article 7 sont inférieures à la consommation maximale autorisée, le Comité exécutif pourrait envisager approuver la phase V du projet de RI pour la Bosnie-Herzégovine, au niveau de financement de 95 333 \$US, plus les coûts d'appui d'agence de 6 673 \$US, sans porter préjudice au fonctionnement du mécanisme du Protocole de Montréal sur la non-conformité.

#### Libye: Renouvellement du projet de renforcement des institutions (phase IV): 136 065 \$US

19. L'ONUDI a présenté une demande pour le renouvellement du projet de renforcement des institutions de la Libye à la 74<sup>e</sup> réunion.

20. La Libye n'a pas de PGEH approuvé en partie à cause de la situation de sécurité et parce qu'il a été impossible de confirmer si le système d'autorisation est pleinement opérationnel. A la 73<sup>e</sup> réunion, l'ONUDI a signalé que la législation spécifique pour le système d'autorisation et de quotas était sur le point d'être signée; toutefois le processus a été retardé en raison de la situation de sécurité et des changements politiques et du fait qu'à l'heure actuelle il n'y a aucune institution du gouvernement central habilitée à émettre/approuver une nouvelle législation en Libye.

### Observations du Secrétariat

21. Le Secrétariat a pris note que la consommation de référence de HCFC pour la conformité pour la Libye établie à 118,38 tonnes PAO repose sur la moyenne de consommation de HCFC en 2009 et 2010, cette dernière valeur ayant été révisée conformément à la décision XXVI/14 des Parties au Protocole de Montréal. Le Secrétariat a pris note aussi du fait que la Libye a déclaré pour les données exigées en vertu de l'article 7 une consommation annuelle de 144 tonnes PAO pour les substances du Groupe I de l'Annexe C en 2013 qui dépasse la valeur de référence des HCFC pour ce pays. Les données du programme de pays pour 2014 indiquent l'utilisation de 1 585,5 tonnes métriques de HCFC-22 (87,21 tonnes PAO) et 320 tonnes métriques de HCFC-141b (35,2 tonnes PAO), ce qui donne une consommation totale de 122,41 tonnes PAO.

22. Durant les consultations avec l'ONUDI, le Secrétariat a appris que l'UNO de la Libye demande du soutien de RI pour relever plusieurs défis causés par le processus de restructuration dans ce pays. En outre, la prorogation du projet de RI est critique pour s'attaquer au défi de l'élimination des HCFC et obtenir l'approbation législative d'une réglementation libyenne pour contrôler les HCFC. En particulier, l'UNO devra suivre de près les démarches légales qui ont amorcé le processus de signature et l'introduction des quotas d'importation de HCFC (autre que le système d'autorisation). Les activités de

surveillance et de collecte de données concernant la consommation annuelle de HCFC dans les différents sous-secteurs revêtent une importance critique car c'est le secteur de la consommation qui définira la stratégie d'élimination des HCFC pour la Libye. En outre, tout plan d'action pour un retour à la conformité devra être évalué en priorité par le pays, incluant la consultation avec les intervenants pertinents.

### **Recommandation du Secrétariat**

23. À la lumière des informations fournies dans les observations susmentionnées du Secrétariat, le Comité exécutif pourrait envisager approuver le financement de la phase IV du projet de RI pour la Libye pour un an seulement, au niveau de financement de 68 033 \$US, plus les coûts d'appui d'agence de 4 762 \$US, sans porter préjudice au fonctionnement du mécanisme du Protocole de Montréal sur la non-conformité.

### **B2 : Préparation de projets de démonstration sur les technologies de remplacement des HCFC écologiques et éco-énergétiques**

#### **Description des projets**

24. L'ONUDI a soumis 12 demandes de financement pour la préparation de projets qui feraient la démonstration de technologies de remplacement des HCFC écologiques et éco-énergétiques dont la liste figure au tableau 1. Huit de ces demandes concernent des projets dans le secteur de la réfrigération et de la climatisation et quatre, dans le secteur des mousses. Les projets ont été soumis conformément à la décision 72/40. Le montant total des fonds demandés par l'ONUDI pour des activités de préparation de projet s'élève à 570 000 \$US, plus les coûts d'appui d'agence de 39 900 \$US.

25. Chacune des demandes de préparation de projet incluait des informations sur le concept du projet; les activités à entreprendre pendant la préparation de projet et les coûts associés ainsi qu'une évaluation du coût total du projet qui en résulterait. Toutes les demandes de préparation de projet étaient accompagnées de lettres d'endossement des gouvernements respectifs. L'annexe I au présent document contient les détails de chacune des demandes.

#### **Observations du Secrétariat**

26. À la 72<sup>e</sup> réunion, après examen du récapitulatif des projets de démonstration approuvés sur les HCFC et options pour un nombre de projets supplémentaires afin de démontrer des technologies de remplacement des HCFC respectueuses du climat et éco-énergétiques<sup>2</sup> au point 10 de l'ordre du jour, le Comité exécutif a décidé, *entre autres*, d'examiner à ses 75<sup>e</sup> et 76<sup>e</sup> réunions des propositions de projets de démonstration sur des solutions de remplacement des HCFC à faible potentiel de réchauffement de la planète à l'intérieur du cadre établi et il a fourni des critères pour de tels projets (décision 72/40). Les études de faisabilité sur le refroidissement urbains seraient examinées aux 74<sup>e</sup> et 75<sup>e</sup> réunions.

27. À la 73<sup>e</sup> réunion, le Comité exécutif a poursuivi ses discussions sur les projets de démonstration à faible potentiel de réchauffement de la planète et les études de faisabilité sur le refroidissement urbain dans le contexte du plan d'activités général du Fonds multilatéral<sup>3</sup>. A l'issue des discussions, des orientations supplémentaires ont également été fournies afin de s'assurer que les meilleures propositions de projets de démonstration soient présentées<sup>4</sup>.

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<sup>2</sup> UNEP/OzL.Pro/ExCom/72/40.

<sup>3</sup> UNEP/OzL.Pro/ExCom/73/18.

<sup>4</sup> Les suggestions des membres du Comité exécutif se retrouvent au paragraphe 97 du document UNEP/OzL.Pro/ExCom/73/62.

28. Afin d'assister le Comité exécutif dans la sélection des meilleures propositions de projets de démonstration présentées suite à cette décision, le Secrétariat a préparé une analyse de toutes les propositions portant seulement sur leurs concepts et la manière dont ils respectent les lignes directrices du Comité exécutif. Cette analyse est contenue dans le document sur l'Aperçu des questions soulevées pendant l'examen des projets<sup>5</sup>.

### **Recommandation du Secrétariat**

29. Le Comité exécutif pourrait souhaiter:

- a) Examiner les propositions de préparation de projets dans les secteurs de la réfrigération, de la climatisation et des mousses qui feraient la démonstration de solutions de remplacement des HCFC écologiques et éco-énergétiques, dans le contexte de ses discussions sur les propositions de projets de démonstration sur des solutions de remplacement des HCFC à faible potentiel de réchauffement de la planète, telles que décrites dans l'Aperçu sur les questions recensées pendant l'examen des projets (UNEP/OzL.Pro/74/13); et
- b) Approuver les demandes de préparation de projet mentionnées à l'alinéa (a) ci-dessus, pour le cas où le Comité exécutif sélectionne ces propositions.

### **B3: Assistance technique pour une étude de faisabilité sur le refroidissement urbain**

Égypte: Étude de faisabilité sur le refroidissement urbain: 70 000 \$US

Koweït: Étude faisabilité sur le refroidissement urbain: 70 000 \$US

### **Description des projets**

30. L'ONUDI a présenté des demandes pour deux études de faisabilité afin d'élaborer un modèle économique pour le refroidissement urbain en Égypte et au Koweït. L'ONUDI est l'agence principale et le PNUE l'agence coopérante pour les deux études<sup>6</sup>. Les études de faisabilité sur le refroidissement urbain sont contenues dans la pièce jointe au présent document.

31. Les études de faisabilité ont pour objectif de déterminer la viabilité technique et financière de l'élaboration de systèmes de refroidissement urbain et des options pour le financement de la totalité du projet, une fois les études de faisabilité terminées.

32. Pour l'Égypte, les activités suivantes seront mises en oeuvre:

- a) Examen de la documentation pour identifier l'état actuel des technologies de refroidissement urbain à l'aide de refroidisseur hybride fonctionnant au gaz naturel et à l'énergie solaire;
- b) Simuler le profil des charges détaillées de refroidissement dynamique pour un quartier de la zone de la nouvelle capitale du Caire;
- c) Conceptualiser, concevoir, simuler et optimiser les multiples intrants énergétiques intégrés dans le système centralisé de refroidissement urbain, utilisant le gaz naturel et l'énergie solaire comme source d'énergie et l'eau douce comme puits de chaleur;

<sup>5</sup> UNEP/OzL.Pro/ExCom/74/13.

<sup>6</sup> Le volet du PNUE est présenté dans le programme de travail du PNUE de 2015 (UNEP/OzL.Pro/ExCom/74/16).

- d) Analyse des sources d'énergie renouvelable, des obstacles juridiques, des mécanismes d'économie d'énergie et des avantages environnementaux;
  - e) Montage d'une structure financière et d'un régime financier à la fois pour les mécanismes de cofinancement gouvernementaux (incluant la possibilité de réduire les subventions à l'énergie) et pour les entreprises privées productrices d'énergie; et
  - f) Élaborer une ébauche de proposition de projet pour le système de refroidissement de la "Nouvelle capitale du Caire", en soulignant la stratégie de mise en oeuvre et les incitatifs financiers.
33. Pour le Koweït, les activités suivantes seront mises en oeuvre:
- a) Examen de la documentation pour identifier l'état actuel des technologies de climatisation centralisée potentiellement disponibles, telles que le refroidissement libre à l'eau de mer profonde, l'absorption de la chaleur résiduelle et les systèmes d'absorption d'eau refroidis à l'aide de l'énergie solaire;
  - b) Analyse des sources d'énergie renouvelable, des obstacles juridiques, des mécanismes d'économie d'énergie, des avantages environnementaux; et
  - c) Montage d'une structure financière et d'un régime financier à la fois pour les mécanismes de cofinancement gouvernementaux (incluant la possibilité de réduire les subventions à l'énergie) et pour les entreprises privées productrices d'énergie.
34. Le coût total de chacune des études s'élève à 100 000 \$US, plus les coûts d'appui d'agence, comprenant 70 000 \$US, plus des coûts d'appui d'agence de 6 300 \$US, pour l'ONUDI et 30 000 \$US, plus les coûts d'appui d'agence de 3 900 \$US, pour le PNUE.

### **Observations du Secrétariat**

35. Étant donné que les deux études de faisabilité sur le refroidissement urbain sont présentées pour donner suite à la décision 72/40, les observations du Secrétariat sont similaires à celles présentées aux paragraphes 26 à 28 ci-dessus.

### **Recommandation du Secrétariat**

36. Le Comité exécutif pourrait souhaiter:
- a) Examiner les études de faisabilité en vue de l'élaboration d'un modèle économique de refroidissement urbain en Égypte et au Koweït dans le contexte de ses discussions sur les propositions de projets de démonstration sur des solutions de remplacement des HCFC à faible potentiel de réchauffement de la planète, telles que décrites dans l'Aperçu sur les questions recensées pendant l'examen des projets (UNEP/OzL.Pro/74/13); et
  - b) Approuver les études de faisabilité mentionnées à l'alinéa (a) ci-dessus pour le cas où le Comité exécutif sélectionne de telles études.

## **B4: Assistance technique pour la préparation d'enquêtes sur les SAO**

### **Description des projets**

37. L'ONUDI a présenté 21 demandes de financement pour des enquêtes nationales sur les solutions de remplacement des SAO, en réponse au paragraphe 4 de la décision XXVI/9<sup>7</sup>, contenues au tableau 1.

38. Ces enquêtes auraient pour objectif d'aider les pays visés à l'article 5 à mieux comprendre leurs tendances de consommation pour des solutions de remplacement sans SAO et leur répartition par secteur et sous-secteur. Les inventaires des substances de remplacement des SAO peuvent aussi fournir à ces pays un aperçu de leurs marchés nationaux où des solutions de remplacement des SAO ont été (et seront) introduites progressivement, tout en tenant compte des technologies existantes. Les enquêtes évalueront les quantités de chaque substance de remplacement des SAO utilisée actuellement dans le pays, identifieront les solutions de remplacement qui pourraient potentiellement être utilisées à l'avenir pour remplacer les HCFC et les HFC; et prévoient les quantités de chacune des substances de remplacement des SAO utilisées dans le pays actuellement et potentiellement pour la période 2015-2030.

### **Observations du Secrétariat**

39. En réponse à la demande des Parties adressée au Comité exécutif au paragraphe 4 de la décision XXVI/9, le Secrétariat a préparé le document UNEP/OzL.Pro/ExCom/74/53 qui présente le texte de la décision et sollicite des orientations du Comité exécutif sur la manière de traiter cette demande de la Réunion des Parties. La "Note du Secrétariat", jointe au document mentionné ci-dessus, contient de l'information sur la question de fournir du financement supplémentaire pour réaliser des inventaires ou des enquêtes sur les solutions de remplacement des SAO dans les pays visés à l'Article 5 qui sont intéressés.

40. Puisque le Comité exécutif n'a pas pris de décision sur la manière de traiter la demande des Parties, le Secrétariat n'a pas examiné les demandes concernant des enquêtes sur les solutions de remplacement des SAO, soumises par des pays visés à l'article 5. Lors de ses délibérations, le Comité exécutif pourrait souhaiter prendre note du fait que les demandes concernant des enquêtes n'ont pas été incluses dans le plan d'activités de 2015-2017 de l'ONUDI et ne sont pas requises pour atteindre ou accélérer la conformité requise en matière de HCFC dans les pays visés à l'article 5.

### **Recommandation du Secrétariat**

41. Le Comité exécutif pourrait souhaiter examiner les demandes pour mener des enquêtes nationales sur les solutions de remplacement des SAO dont la liste figure au tableau 1 de ce document, dans le cadre de ses discussions au point 12 de l'ordre du jour sur le suivi de la décision XXVI/9 (paragraphe 4) de la Vingt-sixième Réunion des Parties concernant le financement supplémentaire pour réaliser des inventaires ou des enquêtes sur les solutions de remplacement des SAO.

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<sup>7</sup> Les Parties au Protocole de Montréal ont décidé entre autres « de prier le Comité exécutif du Fonds multilatéral d'envisager de fournir un financement supplémentaire pour réaliser des inventaires ou des enquêtes sur les solutions de remplacement des substances qui appauvrissent la couche d'ozone dans les Parties visées au paragraphe 1 de l'article 5 qui sont intéressées, si elles en font la demande ».

**Annex I**

**INSTITUTIONAL STRENGTHENING PROJECT PROPOSALS**

**Bosnia and Herzegovina: Renewal of institutional strengthening**

<b>Summary of the project and country profile</b>		
Implementing agency:		UNIDO
Amounts previously approved for institutional strengthening (US \$):		
Phase I:	Mar-99	110,000
Phase II:	Jul-04	95,333
Phase III:	Nov-11	95,333
Phase IV:	Dec-13	95,333
	Total	395,999
Amount requested for renewal (phase V) (US \$):		95,333
Amount recommended for approval for phase V (US \$):		95,333
Agency support costs (US \$):		6,673
Total cost of institutional strengthening phase V to the Multilateral Fund (US \$):		102,006
Date of approval of country programme:		1997
Date of approval of HCFC phase-out management plan:		2012
Baseline consumption of controlled substances (ODP tonnes):		
Annex B, Group III (methyl chloroform) (average 1998-2000)		1.6
Annex C, Group I (HCFCs) (average 2009-2010)		4.7
Annex E (methyl bromide) (average 1995-1998)		3.5
Latest reported ODS consumption (2013) (ODP tonnes) as per Article 7:		
Annex B, Group III (methyl chloroform)		0.00
Annex C, Group I (HCFCs)		5.13
Annex E (methyl bromide)		0.00
	Total	5.13
Year of reported country programme implementation data:		2014
Amount approved for projects (as at November 2014) (US \$):		4,097,566
Amount disbursed (as at December 2013) (US \$):		3,004,555
ODS to be phased out (as at November 2014) (ODP tonnes):		257.0
ODS phased out (as at December 2013) (ODP tonnes):		309.4

1. Summary of activities and funds approved by the Executive Committee:

<b>Summary of activities</b>	<b>Funds approved (US \$)</b>
(a) Investment projects:	3,191,967
(b) Institutional strengthening:	395,999
(c) Project preparation, technical assistance, training and other non-investment projects:	509,600
Total:	4,097,566

Progress report

2. During phase IV of the IS project, the objective of Bosnia and Herzegovina was to maintain zero consumption of those ODS already phased-out in parallel with the implementation of the country's HCFC phase-out management plan (HPMP). The national ozone unit (NOU) coordinated the implementation of the HPMP and made substantial efforts to prepare stakeholders to meet the HCFC reduction targets agreed under the HPMP through activities including the establishment of a refrigeration and air-conditioning (RAC) association. An enforceable system of licensing and quotas for HCFC imports and exports was put in place allowing for the effective control of HCFC imports from 2014 onwards and the NOU liaised with end-users and importers to ensure their compliance with the quotas. In addition,

training of 113 custom officers in the use of ODS identifiers was organized in April 2013 at nine border entry points. Article 7 data and country programme data for 2014 were submitted to the Ozone and Fund Secretariats, respectively on 13 April 2015. Bosnia and Herzegovina continued to be an active member of the Europe and Central Asia Regional Network.

### Plan of action

3. In the fifth phase of the IS project the NOU is committed to further build capacity at the country level and enhance the ongoing regulatory efforts. The NOU will give priority to the improvement of HCFC controls to ensure the achievement of the 10 per cent reduction target in 2015, and will be responsible for tracking the promulgation and enforcement of policy and legislation for additional restrictions on HCFCs. Efforts will focus on cooperation with the customs authorities in order to prevent illegal trade, and cooperation with the RAC association. International ozone day celebrations are planned and NOU staff will continue to participate in regional network and Montreal Protocol meetings.

### **Libya: Renewal of institutional strengthening**

<b>Summary of the project and country profile</b>		
Implementing agency:		UNIDO
Amounts previously approved for institutional strengthening (US \$):		
	Phase I: Dec-00	157,000
	Phase II: Nov-09	136,065
	Phase III: Dec-13	136,065
	Total:	429,130
Amount requested for renewal (phase IV) (US \$):		136,065
Amount recommended for approval for phase IV (US \$):		68,033
Agency support costs (US \$):		4,762
Total cost of institutional strengthening phase IV to the Multilateral Fund (US \$):		72,795
Date of approval of country programme:		1999
Date of approval of HCFC phase-out management plan:		Not yet approved
Baseline consumption of controlled substances (ODP tonnes):		
Annex B, Group III (methyl chloroform) (average 1998-2000)		0.0
Annex C, Group I (HCFCs) (average 2009-2010)		118.38
Annex E (methyl bromide) (average 1995-1998)		94.1
Latest reported ODS consumption (2013) (ODP tonnes) as per Article 7:		
Annex B, Group III (methyl chloroform)		0.0
Annex C, Group I (HCFCs)		144.0
Annex E (methyl bromide)		0.0
	Total:	144.0
Year of reported country programme implementation data:		2014
Amount approved for projects (as at November 2014) (US \$):		7,080,580
Amount disbursed (as at December 2013) (US \$):		5,901,487
ODS to be phased out (as at November 2014) (ODP tonnes):		1,567.3
ODS phased out (as at December 2013) (ODP tonnes):		866.8

4. Summary of activities and funds approved by the Executive Committee:

<b>Summary of activities</b>	<b>Funds approved (US \$)</b>
(a) Investment projects:	5,782,950
(b) Institutional strengthening:	429,130
(c) Project preparation, technical assistance, training and other non-investment projects:	868,500
Total:	7,080,580

Progress report

5. The implementation of the IS activities in Libya have been delayed due to the political and security situations in the country. In spite of the civil war and governmental restructuring process, NOU technical experts in the central administration remained in charge of coordinating Montreal Protocol country activities and maintained basic functionality of the office with the goal of ensuring the country's compliance with its Montreal Protocol obligations. The NOU supervised ODS imports/exports and consumption and continued to coordinate the conversion and phase-out programme in all sectors. Furthermore, the NOU was instrumental in the establishment of legislative and administrative measures by the Government to promote and accelerate the phase-out of ODS. The review of legislation for HCFC controls initiated during phase II of the IS project was finalized but was not officially adopted due to the transition period in the government. During the current phase of the IS project the country maintained zero consumption of methyl bromide. Furthermore, it submitted the ratification instruments for the Copenhagen, Montreal and Beijing amendments to the Montreal Protocol to the United Nations depositary.

Plan of action

6. During phase IV of the IS project for Libya the NOU will follow up on the regulations for introducing the licensing system and quota system that are currently in the legislative approval process. Priority will be given to liaising with the relevant Governmental institutions in charge of clearing the drafts and publication into the Official Journal of Libya. The NOU will continue monitoring HCFC consumption by sub-sectors, the collection and submission of mandatory data to the Fund and Ozone Secretariats, coordination and consultation with the National Refrigeration Association. The country plans to implement a number of awareness and information exchange activities and to participate in regional network meetings.

**Oman: Renewal of institutional strengthening**

<b>Summary of the project and country profile</b>		
Implementing agency:		UNIDO
Amounts previously approved for institutional strengthening (US \$):		
	Phase I: Dec-00	79,000
	Phase II: Jul-05	68,467
	Phase III: Nov-08	68,467
	Phase IV: Nov-11	68,467
	Phase V: Dec-13	68,467
	Total	352,868
Amount requested for renewal (phase VI (US \$):		68,467
Amount recommended for approval for phase VI (US \$):		68,467
Agency support costs (US \$):		4,793
Total cost of institutional strengthening phase VI to the Multilateral Fund (US \$):		73,260
Date of approval of country programme:		1999
Date of approval of HCFC phase-out management plan:		2011
Baseline consumption of controlled substances (ODP tonnes):		
Annex B, Group III (methyl chloroform) (average 1998-2000)		0.0
Annex C, Group I (HCFCs) (average 2009-2010)		31.5
Annex E (methyl bromide) (average 1995-1998)		1.0
Latest reported ODS consumption (2014) (ODP tonnes) as per Article 7:		
Annex B, Group III (methyl chloroform)		0.00
Annex C, Group I (HCFCs)		20.37
Annex E (methyl bromide)		0.00
	Total	20.37
Year of reported country programme implementation data:		2014

<b>Summary of the project and country profile</b>	
Amount approved for projects (as at November 2014) (US \$):	2,238,188
Amount disbursed (as at December 2013) (US \$):	1,669,612
ODS to be phased out (as at November 2014) (ODP tonnes):	265.1
ODS phased out (as at December 2013) (ODP tonnes):	253.2

7. Summary of activities and funds approved by the Executive Committee:

<b>Summary of activities</b>	<b>Funds approved (US \$)</b>
(a) Investment projects:	784,120
(b) Institutional strengthening:	352,868
(c) Project preparation, technical assistance, training and other non-investment projects:	1,101,200
Total:	2,238,188

Progress report

8. The report for phase V of the IS project for Oman covered activities that were undertaken from December 2013 to March 2015. The IS project allowed for continuation of the successful implementation of ODS phase-out activities in Oman. Oman issued a new regulation to enhance the national ODS regulatory framework and ensure strict monitoring of all HCFC trade. Activities included improvements to the data collection process (inventory of companies dealing with ODS imports/exports as well as import/export of equipment containing ODS); improving cooperation with customs authorities; the development of training modules for customs officers; establishment of the National Ozone Committee and the legal and technical task forces to involve all relevant stakeholders; coordination of the HPMP in order to be in compliance with the 2013 control measure. Public awareness activities focused on key HPMP to increase the awareness on the actions needed for the compliance with the freeze target as well as the 10 per cent HCFC reduction in 2015. Oman participated in regional network and Montreal Protocol meetings.

Plan of action

9. Under the phase VI of the IS project the NOU's priority will be for Oman to achieve and maintain the 10 per cent HCFC reduction target in 2015. The NOU will continue monitoring the licensing system and allocate quotas against the records of customs to achieve full control over the imports of all HCFC. Regulatory control will focus on reducing HCFC-based equipment on the market. Cooperation with custom authorities will be an ongoing activity including training to be implemented over the duration of phase VI. The NOU is responsible for monitoring the implementation of the HPMP and will assist UNIDO, to further develop and implement HPMP activities. Public awareness activities will include celebration of international ozone day and the country plans to participate in regional network and Montreal Protocol meetings. Data reporting requirements to the Ozone and Fund Secretariats will be fulfilled in a timely manner.

**Tunisia: Renewal of institutional strengthening**

<b>Summary of the project and country profile</b>	
Implementing agency:	UNIDO
Amounts previously approved for institutional strengthening (US \$):	
Phase I:	Oct-92 285,312
Phase II:	June-98 186,700
Phase III:	Apr-03 242,667
Phase IV:	Apr-06 247,270

<b>Summary of the project and country profile</b>			
	Phase V:	Jul-08	247,270
	Phase VI:	Jul-10	247,270
	Phase VII	Apr 12	247,270
		Total:	1,703,759
Amount requested for renewal (phase VIII) (US \$):			247,270
Amount recommended for approval for phase VIII (US \$):			247,270
Agency support costs (US \$):			17,309
Total cost of institutional strengthening phase VIII to the Multilateral Fund (US \$):			264,579
Date of approval of country programme:			1991
Date of approval of HCFC phase-out management plan:			2014t
Baseline consumption of controlled substances (ODP tonnes):			
Annex B, Group III (methyl chloroform) (average 1998-2000)			0.1
Annex C, Group I (HCFCs) (average 2009-2010)			40.7
Annex E, (methyl bromide) (average 1995-1998)			8.3
Latest reported ODS consumption (2013) (ODP tonnes) as per Article 7:			
Annex B, Group III (methyl chloroform)			0.00
Annex E (methyl bromide)			6.60
Annex C, Group I (HCFCs)			32.11
			Total:
			38.71
Year of reported country programme implementation data:			2014
Amount approved for projects (as at November 2014) (US \$):			11,359,094
Amount disbursed (as at December 2013) (US \$):			8,382,993
ODS to be phased out (as at November 2014) (ODP tonnes):			1,392.3
ODS phased out (as at December 2013) (ODP tonnes):			1,381.3

10. Summary of activities and funds approved by the Executive Committee:

<b>Summary of activities</b>	<b>Funds approved (US \$)</b>
(a) Investment projects:	7,485,153
(b) Institutional strengthening:	1,703,759
(c) Project preparation, technical assistance, training and other non-investment projects:	2,170,182
	Total:
	11,359,094

Progress report

11. The period covered by phase VII of the IS project was critical for Tunisia to maintain compliance with its Montreal Protocol commitments and was marked by the implementation of the quota system for HCFCs. Regular meetings were organized to update members of the National Ozone Committee to work on different scenarios to address HCFC consumption. The NOU coordinated several activities that were implemented in collaboration with UNIDO including the acquisition and installation of two centres for the recovery, recycling and reclaiming (RRR) of refrigerants, the acquisition of 40 refrigerant identifiers for customs officers, and training of 60 customs managers on ODS identifiers to combat the illicit trade in ODS. In addition the NOU assisted with the preparation of the HPMP and a demonstration project for the final elimination of methyl bromide in fumigation of dates using a phosphine generator. Several awareness activities were conducted including celebration of Ozone day, workshops, and the publication of a film on national efforts to protect the ozone layer. The NOU reported Article 7 and country programme data to the Ozone and Fund Secretariat, and NOU staff have participated in regional network and Montreal Protocol meetings.

Plan of action

12. Phase VIII of the IS project will focus on activities to complete the phase-out of methyl bromide (including coordination of the acquisition and distribution of phosphine generators for the fumigation of dates), as well as starting the operation and monitoring of the RRR centres in order to minimize the imports of HCFCs, and the acquisition of 20 refrigerant recovery units. The period 2015-2017, will also be marked by the continued coordination of implementation of investment projects, training programmes for the air-conditioning manufacturing sector operating with HCFC- 22, the acquisition of a number of equipment and tools for vocational training centres as well as the updating of training programmes for refrigeration technicians and training of customs officers to control imports of ODS. The NOU will also conduct a survey on HFC in collaboration with UNIDO. Tunisia will continue its awareness efforts including seminars for the 30<sup>th</sup> anniversary of the Vienna Convention and participate in regional network and Montreal Protocol meetings.

**Turkey: Renewal of institutional strengthening**

<b>Summary of the project and country profile</b>		
Implementing agency:		UNIDO
Amounts previously approved for institutional strengthening (US \$):		
	Phase I: Oct-92	300,000
	Phase II: Dec-00	200,000
	Phase III: Dec-04	260,000
	Phase IV: Jul-09	195,000
	Phase V: Jul-11	260,000
	Phase VI: Jul-13	260,000
	Total:	1,475,000
Amount requested for renewal phase VII (US \$):		260,000
Amount recommended for approval for phase VII (US \$):		260,000
Agency support costs (US \$):		18,200
Total cost of institutional strengthening phase VII to the Multilateral Fund (US \$):		278,200
Date of approval of country programme:		1992
Date of approval of HCFC phase-out management plan:		2012
Baseline consumption of controlled substances (ODP tonnes):		
Annex B, Group III (methyl chloroform) (average 1998-2000)		37.4
Annex C, Group I (HCFCs) (average 2009-2010)		551.47
Annex E (methyl bromide) (average 1995-1998)		479.7
Latest reported ODS consumption (2013) (ODP tonnes) as per Article 7:		
Annex B, Group III (methyl chloroform)		0.00
Annex C, Group I (HCFCs)		147.02
Annex E (methyl bromide)		0.00
Total:		147.02
Year of reported country programme implementation data:		2013
Amount approved for projects (as at November 2014) (US \$):		51,160,961
Amount disbursed (as at December 2013) (US \$):		43,792,011
ODS to be phased out (as at November 2014) (ODP tonnes):		4,793.0
ODS phased out (as at December 2013) (ODP tonnes):		4,697.5

13. Summary of activities and funds approved by the Executive Committee:

Summary of activities	Funds approved (US \$)
(a) Investment projects:	44,280,563
(b) Institutional strengthening:	1,475,000
(c) Project preparation, technical assistance, training and other non-investment projects:	5,405,398
Total:	51,160,961

Progress report

14. During the period under review the capacity of the NOU was increased with an additional staff from the Ministry of Environment. The NOU managed accomplished several achievements including: a new quota system which regulates the allocation of HCFC imports exclusively for the servicing sector; increased awareness on the phase-out of HCFCs in foam manufacturing sector; a series of dialogues with relevant industry and other stakeholders to find a solution for seized ODS mixtures; effective cooperation with the Ministry of Customs and Trade, Interpol Department under the Directorate General of Internal Security under the Ministry of Internal Affairs; and the NOU's work programme and Montreal Protocol legislative initiatives were integrated in the Ministry's environment programme and work plan. Conversion of the foam manufacturing sector was completed during the current IS phase as part of the HPMP. Awareness activities organized included specific awareness kits for schools and school visits, celebration of international Ozone day in the area where the tragic mining accident took place in May 2014.

Plan of action

15. The extension of IS funding for Turkey will allow the NOU to function effectively and support the new generation of ODS alternatives through trainings and meetings, strengthen monitoring of ODS trade, combat illegal trade of ODS, strengthen ODS data collection and reporting, and targeted awareness to stakeholders. Some of the main activities under the next phase will be focused on the implementation/application of stringent licensing procedures and quota allocation for refrigeration services purposes. The NOU will also continue coordinating the development a national network (refrigerants waste national strategy) as part of the management of seized equipment containing refrigerants (including ODS and HFCs). Turkey plans to increase its visibility in both at the regional and international level through its participation at regional network and Montreal Protocol meetings.

## Annexe II

### POINTS DE VUE EXPRIMÉS PAR LE COMITÉ EXÉCUTIF SUR LE RENOUVELLEMENT DES PROJETS DE RENFORCEMENT DES INSTITUTIONS PRÉSENTÉS À LA 74<sup>e</sup> RÉUNION

#### **Bosnie-Herzégovine**

1. Le Comité exécutif a examiné le rapport final et le plan d'action soumis avec la demande de renouvellement du projet de renforcement des institutions (RI) (phase V) présentée par la Bosnie-Herzégovine et a noté avec satisfaction que le pays est en conformité avec ses obligations de communication de données aux Secrétariats de l'ozone et du Fonds. Le Comité a noté par ailleurs, avec satisfaction, la disponibilité des registres de données détaillées sur la consommation dans le rapport de vérification des HCFC pour 2013, l'évaluation de la tendance de consommation de HCFC effectuée par l'unité de l'ozone (UNO) et qui indiquait que les mesures de réglementation des HCFC sont en vigueur et les données du programme de pays de 2014 qui reflétaient des progrès dans la réalisation des obligations du pays aux termes du Protocole de Montréal. Le Comité exécutif prend note avec satisfaction des mesures immédiates prises par l'UNO pour assurer la conformité du pays aux obligations du Protocole de Montréal. Par ailleurs, le Comité exécutif a pris note que la Bosnie-Herzégovine est un membre actif du réseau régional de l'Europe et de l'Asie centrale et reconnaît la contribution significative du pays à la région en termes d'expertise technique et d'expérience dans la mise en œuvre du plan de gestion de l'élimination des HCFC (PGEH). Le Comité exécutif espère qu'au cours des deux prochaines années, le pays poursuivra la mise en œuvre de son plan de gestion de l'élimination des HCFC avec un succès remarquable afin d'assurer la conformité au calendrier de réduction des HCFC du Protocole de Montréal.

#### **Libye**

2. Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de RI (phase IV) présentée par le gouvernement de la Libye et a noté avec satisfaction les efforts du gouvernement de la Libye pour éliminer sa consommation de SAO. Le Comité exécutif a noté par ailleurs que durant la phase en cours, la Libye a déposé les instruments de ratification pour les amendements de Copenhague, de Montréal et de Beijing au Protocole de Montréal, auprès du Secrétaire général des Nations Unies. Le Comité exécutif a pris note en particulier de l'absence d'un système d'autorisation et de quotas en Libye et du potentiel de non-conformité du pays avec la mesure de réglementation de 2013 du Protocole de Montréal pour les HCFC. Toutefois, le Comité exécutif reconnaît les efforts du gouvernement de la Libye pour obtenir l'approbation de la législation pertinente comme le démontre la ratification récente de tous les amendements au Protocole de Montréal. Le Comité exécutif espère donc qu'au cours de la prochaine phase, le pays sera en mesure d'aller de l'avant avec la législation pour le système d'autorisation et de quotas et de présenter le PGEH pour la Libye aux fins d'examen par le Comité exécutif dans un proche avenir.

#### **Oman**

3. Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de RI (phase VI) présentée par Oman et a noté avec satisfaction que les données du programme de pays de 2014 et les données exigées en vertu de l'article 7 ont été remises respectivement aux Secrétariats du Fonds et de l'ozone dans les délais prescrits. Le Comité exécutif a pris note également des mesures prises par Oman en vue de la réglementation des HCFC. Le Comité exécutif appuie les efforts d'Oman pour atteindre la cible de réduction de 10 pour cent exigée par le Protocole de Montréal et encourage le pays à

continuer de donner la priorité à l'application des efforts de réglementation de la consommation de HCFC. Le Comité exécutif prend note avec satisfaction des efforts et des mesures prises par Oman pour tenir ses engagements aux termes du Protocole de Montréal et espère que le pays poursuivra la mise en œuvre de son projet de RI et ses activités d'élimination des HCFC avec un succès remarquable.

## **Tunisie**

4. Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de RI (phase VIII) présentée par la Tunisie et a pris note avec satisfaction que le pays a remis au Secrétariat de l'ozone les données de 2014, exigées en vertu de l'article 7, indiquant qu'il est en conformité avec le Protocole de Montréal et que des progrès ont été réalisés dans la mise en œuvre des projets en cours visant l'élimination des HCFC. Le Comité exécutif a noté également avec satisfaction que l'UNO avait amorcé la coordination du projet en vue de l'élimination finale du bromure de méthyle en Tunisie. Le Comité exécutif encourage la Tunisie à poursuivre ses efforts pour réglementer et éliminer le bromure de méthyle et les HCFC, assurer la conformité aux mesures de réglementation sur le bromure de méthyle et les HCFC en 2015. Le Comité exécutif prend note avec satisfaction que la Tunisie est un membre actif du réseau régional pour partager avec d'autres membres du réseau son expérience et son expertise en lien avec le Protocole de Montréal et il espère que le pays poursuivra la mise en œuvre de ses activités prévues avec un succès et des progrès remarquables et qu'il maintiendra et consolidera ses réalisations actuelles en matière d'élimination des SAO.

## **Turquie**

Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de RI (phase VII) présentée par la Turquie et a noté avec satisfaction que le pays s'est engagé à respecter le calendrier d'élimination des HCFC contenu dans son PGEH qui est plus rigoureux que les exigences du Protocole de Montréal. Le Comité exécutif prend note avec satisfaction du recrutement d'un nouvel administrateur de l'ozone et apprécie la clarté du mandat donné à l'UNO ainsi que les ressources gouvernementales supplémentaires allouées pour réaliser les engagements d'élimination du pays. Le Comité exécutif encourage la Turquie à maintenir le même niveau d'engagement au cours de la prochaine phase de son projet de RI afin de garantir l'élimination durable des HCFC dans le secteur de fabrication des mousses et à poursuivre la surveillance de la consommation de HCFC dans le secteur de fabrication dans la réfrigération dans la perspective de l'interdiction d'importation de HCFC-22 pour la fabrication des systèmes de réfrigération et de climatisation vendus sur le marché local à partir du 1<sup>er</sup> janvier 2015.



**UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION**

74<sup>th</sup> Executive Committee of the  
Multilateral Fund for the Implementation of the Montreal Protocol

**UNIDO Work Programme**

**74<sup>th</sup> Executive Committee**

## Introduction

The UNIDO Work Programme for the consideration of the 74<sup>th</sup> Ex.Com. of the Multilateral Fund has been prepared following the Government requests as well as based on ongoing and planned activities. The Work Programme will support the implementation of UNIDO's three year Rolling Business Plan 2014-2016.

As a follow up of the Decision 71/42 that approved Guidelines for the preparation of Stage II HPMPs and based on country requests, the UNIDO 74 WPA included preparatory funding for the stage II of HPMP for Chile, Iran and Turkey.

The 74<sup>th</sup> UNIDO WPA is considering several proposed activities in the light of the Decision 72/40 on proposals for demonstration projects for low-GWP alternatives in the refrigeration and air-conditioning and foams subsectors to low-global warming potential (GWP) technologies in order to identify steps required and/or to assess their associated costs. The demonstration proposals are addressing in some cases specific countries or adopting, in other cases, a regional approach.

Institutional strengthening extension proposals are based on the country requests, and the UNIDO 74<sup>th</sup> Work Programme Amendment considered such requests for Bosnia and Herzegovina, Libya, Oman, Tunisia and Turkey

The 74<sup>th</sup> UNIDO WPA is also including one technical assistance activity addressing Methyl Bromide phase-out in dates fumigation sector in Egypt.

The UNIDO Work Programme Amendment for the consideration of the 74<sup>th</sup> Ex.Com. Meeting comprises the following sections:

### Section 1

Gives in a tabulated form by project types and country the consolidated list of activities foreseen for the above requests

Funding is requested as follows:

- preparatory assistance proposals addressing HPMP stage II, amounting \$US 219,350 (including \$US 14,350 representing 7.0 % A.S.C.)
- preparatory demonstration activities in China, Kuwait, Egypt, Saudi Arabia, Turkey, Morocco, South Africa as well as regional proposals and one global activity, totally amounting \$US 767,300 (including \$US 57,300 representing 7.0 %, 9% and 13% ASC respectively).
- technical assistance for methyl bromide phase-out, amounting \$US 197,955 (including 16,345 representing 9.0 % A.S.C.)
- IS extension requests, amounting \$US 863,634 (including \$US 56,499 representing 7.0 % A.S.C.)
- technical assistance addressing surveys of ODS alternatives, amounting \$US 1,433,350 (including \$US 118,350 representing 9.0 % A.S.C.)

**- Total: \$US 3,481,589 \$US (including \$US 262,844 A.S.C.)**

Project concepts indicating details and funding requirements are provided in Section 2. The Feasibility studies addressing district cooling proposed under the demonstration package are provided in Section 3.

## Section 1

Consolidated table giving project preparation and non-investment projects  
in all countries and sectors

Country	Type	Sub-stance	Title of Project	Requested amount USD	A.S.C. USD	Total (incl ASC) USD	A.S.C. %	P.D.	Remarks
<b>Preparatory assistance</b>									
Chile		HCFC	Preparation of HPMP Stage II - Refrigeration Servicing	40,000	2,800	42,800	7	12	
Iran (Islamic Republic of)		HCFC	Preparation of HPMP Stage II -Rigid PU foam component	75,000	5,250	80,250	7	12	
Turkey		HCFC	Preparation of HPMP Stage II - Refrigeration Servicing	90,000	6,300	96,300	7	12	
<b>Subtotal</b>				<b>205,000</b>	<b>14,350</b>	<b>219,350</b>			
<b>Demonstration activities</b>									
China	DEM-PRP	HCFCs	Demonstration project: Transition to low-GWP alternatives in transport refrigeration	50,000	3,500	53,500	7	12	
China	DEM-PRP	HCFCs	Demonstration project: CO2 compressor for domestic heat pumps	30,000	2,100	32,100	7	12	
China	DEM-PRP	HCFCs	Demonstration project: Leak reduction in large refrigeration equipment	50,000	3,500	53,500	7	12	
Kuwait	DEM	HCFCs	Feasibility study on district cooling systems in Kuwait	70,000	6,300	76,300	9	12	UNEP Co-IA
Egypt	DEM	HCGCs	Feasibility Study addressing District Cooling	70,000	6,300	76,300	9	12	UNEP Co-IA
Saudi Arabia	DEM-PRP	HCFCs	Preparatory funding for demonstration: Spray Foam Applications in High Ambient Temperatures	30,000	2,100	32,100	7	12	
Saudi Arabia	DEM-PRP	HCFCs	Preparation of a Demonstration Project on Promoting HFO-based Low GWP Refrigerants for Air-conditioning Sector in High Ambient Temperatures	30,000	2,100	32,100	7	12	
Turkey	DEM-PRP	HCFCs	Preparatory funding: HFOs as Foaming Agents in the Rigid PU Foam Applications	30,000	2,100	32,100	7	12	
Morocco	DEM-PRP	HCFCs	Preparatory funding: Demonstration Project on the use of compact high-pressure foaming equipment for the safe introduction of pentane technology to SMEs	40,000	5,200	45,200	13	12	Bilateral Italy
South Africa	DEM-PRP	HCFCs	Preparatory funding: Demonstration project on the technical and economic advantages of the Vacuum Assisted Injection in discontinuous panel's plant retrofitted from 141b to pentane	40,000	5,200	45,200	13	12	Bilateral Italy
Global (TUN, ARG)	DEM-PRP	HCFCs	Preparatory funding demonstrating needs for REF assembly/installation	60,000	4,200	64,200	7	12	
Regional (Egypt and GCC)	DEM-PRP	HCFCs	Project preparation: Impact of Refrigerant Containment and Leakage Prevention on Reduction of Virgin HCFC Refrigerants in A-5 Countries (servicing sector)	50,000	3,500	53,500	7	12	
Regional (Africa)	DEM-PRP	HCFCs	Demonstration project on the adoption of the best strategy to ensure market availability of high quality refrigerants, including the introduction and update of safety standards on refrigerants (Kenya, Rwanda, Uganda, Tanzania and Zambia)	100,000	7,000	107,000	7	12	
Regional (Caribbean Countries)	DEM-PRP	HCFCs	Demonstration project on HPMP stage II servicing sector activities with focus on service for systems using and being designed for flammable refrigerants (Bahamas; Grenada; St. Lucia; St. Vincent and the Grenadines; Suriname )	60,000	4,200	64,200	7	12	
<b>Subtotal</b>				<b>710,000</b>	<b>57,300</b>	<b>767,300</b>			

<b>Technical assistance</b>									
Egypt	TAS	MB	Technical assistance for the phase-out of MBr in date production	181,610	16,345	197,955	9	12	submitted separately
<b>Subtotal</b>				<b>181,610</b>	<b>16,345</b>	<b>197,955</b>			
<b>Institutional strengthening</b>									
Bosnia and Herzegovina	INS	All	Institutional Strengthening - Phase V	95,333	6,673	102,006	7	12	
Libya	INS	All	Institutional Strengthening - Phase IV	136,065	9,525	145,590	7	12	
Oman	INS	All	Institutional Strengthening - Phase V	68,467	4,793	73,260	7	12	
Tunisia	INS	All	Institutional Strengthening - Phase VIII	247,270	17,309	264,579	7	12	
Turkey	INS	All	Institutional Strengthening - Phase VII	260,000	18,200	278,200	7	12	
<b>Subtotal</b>				<b>807,135</b>	<b>56,499</b>	<b>863,634</b>			
<b>Surveys on ODS alternatives</b>									
Albania	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Argentina	Survey	All	Survey on ODS alternatives	120,000	10,800	130,800	9	12	
Bolivia	Survey	All	Survey on ODS alternatives	55,000	4,950	59,950	9	12	
Bosnia and Herzegovina	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Chile	Survey	All	Survey on ODS alternatives	80,000	7,200	87,200	9	12	
Ecuador	Survey	All	Survey on ODS alternatives	55,000	4,950	59,950	9	12	
Georgia	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Guatemala	Survey	All	Survey on ODS alternatives	55,000	4,950	59,950	9	12	
Honduras	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Macedonia, FYR	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Mexico	Survey	All	Survey on ODS alternatives	120,000	10,800	130,800	9	12	
Montenegro	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Nicaragua	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Niger	Survey	All	Survey on ODS alternatives	55,000	4,950	59,950	9	12	
Oman	Survey	All	Survey on ODS alternatives	80,000	7,200	87,200	9	12	
Serbia	Survey	All	Survey on ODS alternatives	80,000	7,200	87,200	9	12	
Tunisia	Survey	All	Survey on ODS alternatives	80,000	7,200	87,200	9	12	
Turkey	Survey	All	Survey on ODS alternatives	120,000	10,800	130,800	9	12	
Uganda	Survey	All	Survey on ODS alternatives	55,000	4,950	59,950	9	12	
Uruguay	Survey	All	Survey on ODS alternatives	35,000	3,150	38,150	9	12	
Venezuela	Survey	All	Survey on ODS alternatives	80,000	7,200	87,200	9	12	
<b>Subtotal</b>				<b>1,315,000</b>	<b>118,350</b>	<b>1,433,350</b>			
<b>Grand Total</b>				<b>3,218,745</b>	<b>262,844</b>	<b>3,481,589</b>			

## Section 2

### Project Concept

<b>Country:</b>	<b>Chile</b>
<b>Title:</b>	Preparation of HPMP Stage II (refrigeration and air-conditioning servicing sector)
<b>Project Duration:</b>	12 months
<b>Project Budget:</b>	40,000 (including 7% Agency Support Costs)
<b>Implementing Agency:</b>	UNIDO
<b>Coordinating Agency:</b>	Ministerio de Medio Ambiente

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### Project Summary

Chile HCFC-Baseline consumption is 87.5 ODP tonnes.

Stage I HPMP of Chile is focusing on activities related to assist the refrigeration sector, mainly in the supermarket sector. In addition, activities have also been initiated to complete phase-out of about 30 mt (3.3 ODP tonnes) of HCFC-141b used in the cleaning of cooling circuits.

Chile has made commitments with the Executive Committee to comply with the Freeze and the 10% reduction targets in 2013 and in 2015 respectively. The last funding tranche of Stage I HPMP is in 2015. However, as there are some delays, it will be in 2016.

On 28 November 2014, UNIDO received a government request from Chile to be responsible for the Refrigeration Services and Maintenance sector in Stage II HPMP. In the same letter, UNIDO was requested to include in its 2015 Business Plan, project preparation for Stage II in such sector. UNIDO's 2015 Business Plan has been prepared accordingly.

In subsequent letter, implementing agencies were requested to ask for project preparation funding at the 73<sup>rd</sup> Executive Committee for the preparation of Stage II HPMP, for additional phase-out activities in all the sectors, and provide a clear breakdown of the allocation of funds between the three implementing agencies: UNDP, UNIDO and UNEP. The intention of the Government of Chile is to submit the phase-out activities in the all sectors to ensure that Stage II HPMP can be submitted in 2016.

The Executive Committee in its Decision 71/42 approved guidelines for the preparation of Stage II HPMPs, according to which, Chile is fully eligible to request project preparation fund at the 73<sup>rd</sup> Meeting of the Executive Committee.

UNIDO will have to undertake a comprehensive survey for the refrigeration sector to collect updated HCFC consumption data, ownership information, details on where the refrigerants is used as well as the type of equipment. There is a need to hold several stakeholder consultation meetings including the Government to design a proper plan to be incorporated into the overall strategy for this sector.

In cooperation with the Government of Chile, industry and implementing agencies, a Refrigeration Air conditioning refrigeration sector strategy will be prepared to help the Government of Chile to achieve at least the 2020 reduction target in line with the priorities established in the HPMP.

The requested funding level of USD 40,000 is fully in compliance with ExCom Decision 71/42.

## Project Concept

<b>Country:</b>	<b>Islamic Republic of Iran</b>
<b>Title:</b>	Preparation of investment activities for the phase-out of HCFCs in the foam sector, commercial and domestic refrigeration, panel, spray, cool-box and other applications. Preparation of HPMP Stage II (refrigeration and air-conditioning servicing sector)
<b>Project Duration:</b>	12 months
<b>Project Budget:</b>	75,000 (excluding 7% Agency Support Costs)
<b>Implementing Agency:</b>	UNIDO
<b>Coordinating Agency:</b>	NOU Iran

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## Project Summary

Iran's HPMP was approved in the 63<sup>rd</sup> Meeting of the Executive Committee. HPMP included investment activities in RAC sector as well as foam sector and project management component. Total funding that was approved was US \$10.39 million.

Over the last three years, Iran has implemented a range of activities including investment projects, awareness and information outreach activities and regulations for facilitating HCFC phase-out. Agreements were signed with the manufacturing companies covered under HPMP in RAC applications and foam sector including continuous and discontinuous sandwich panels and domestic refrigerators.

In addition to the above, the Government has enacted policies and regulations to control growth of HCFC consumption in the manufacturing sector; implemented licensing and quota system to restrict import of HCFCs to limits specified in the agreement, and carried out training program for service technicians and enforcement officials. The above measures have helped the country in constraining the growth of HCFC-22 and HCFC-141b consumption in Iran.

UNIDO, UNDP, GIZ and UNEP will jointly formulate the stage II of the HPMP in Iran to be submitted at the 76<sup>th</sup> Executive Committee meeting (2016). The objective is to reach 35% phase-out target by 2020.

The sectors to be addressed are: foam sector, specifically: (a) domestic refrigerator, discontinuous panel, UNIDO, and (b) continuous panel, commercial refrigerators and servicing, GIZ; and refrigeration and air conditioning sectors, UNDP.

As UNIDO is the only agency with a permanent and substantial presence in Iran, UNIDO will coordinate the survey for all sectors, domestic refrigerators, panels, commercial refrigerators and RAC for all agencies, with the assistance of GIZ which has a small office with one national staff in Iran.

Once UNIDO will have completed the survey of all sectors, each implementing agency will formulate its component of the HPMP. For such purpose, UNDP has allocated US\$ 20,000 to UNIDO for the survey in the RAC sector, approved at the 72<sup>nd</sup> ExCom.

Furthermore, UNIDO and GIZ will share the 150,000\$ allocated for project preparation in the foam sector; US\$ 75,000 for the GIZ and US\$ 75,000 for UNIDO

The joint development of the HPMP is fundamental to maximize synergies from the early stage of project formulation and later on during implementation. Furthermore, as agreed with the NOU, UNIDO will lead the preparatory phase by carrying out and coordinating the survey for all agencies.

The requested funding level of USD 75,000 for UNIDO for the project preparation in the domestic refrigerator and discontinuous panel, plus US\$ 20,000 allocated by UNDP for the RAC sector, is fully in compliance with ExCom Decision 71/42.

Within the survey, UNIDO will look also at other sectors such as water boilers, cool boxes, spray foam, integral skin, etc. where smaller but yet substantial amount of HCFC-141b are used.

The tables below illustrate the budget allocation for UNIDO, US \$75,000 and the proposed work plan and time schedule.

#### Provisional budget

No.	Items	Unit		No of Consult.	Working Days/ Consult.	Cost (USD)			US\$	
		QTY	Description			Wage/day	DSA	Travel		
1	Companies	Refrigerators, panel and integral skin	300	Companies						
		Others, i.e. spray foam, cool-box, etc.	50	Companies						
2	Survey Refrigerators panel and integral skin	Data collection and follow-up	300	Companies	10	30	100		30,000	
		Data consolidation	300	Companies	10	3	100		3,000	
		Local travel	300	Companies	10	30			40	12,000
		DSA for companies outside Tehran area	130	Companies	10	13		120		15,600
		Flight for companies outside Tehran area	30	Trip					100	3,000
3	Survey Others, i.e. spray foam cool-box etc.	Data Collection on-site	50	Companies	1	10	100		1,000	
		Data consolidation	50	Companies	1	2	100		200	
		Local travel	50	Companies	1	10			40	400
		DSA for companies outside Tehran area	20	Companies	1	5		120		600
		Flight for companies outside Tehran area	5	Trip					100	500
4	International consultants (Home based)	Survey review and alternative technologies inputs			1	10	300		3,000	
		Project document review			1	10	300		3,000	
5	Final Report	Compilation, editing, proof reading			2	14	100		2,800	
		<b>Total</b>							<b>75,100</b>	





## Project Concept

**Country:** Turkey

**Title:** Preparation of HPMP Stage II (servicing sector)

**Project Duration:** 12 months

**Project Budget:** 90,000 (excluding 7% Agency Support Costs)

**Implementing Agency:** UNIDO

**Coordinating Agency:** Ministry of Environment and Urbanization  
Division for the Protection of the Ozone Layer

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## Project Summary

The Twenty-fourth Meeting of the Parties agreed to revise Turkey's baseline from 608.0 to 551.4 ODP tonnes, and the Government was therefore committed to reducing its HCFC consumption by 86.4 per cent by 2017.

Stage I HPMP of in Turkey was focusing on activities related to assist the refrigeration sector, while a separate investment component was approved to tackle all investment activities in the foam sector.

Stage I of the HCFC phase-out management plan (HPMP) for Turkey for the period 2012 to 2017 will reduce HCFC consumption by 86.4 per cent of the baseline, separately approved investment component converting foam sector is completed, and the Government of Turkey is seeking assistance to tackle full ODS phase-out under Stage II of HPMP.

It is also to be underlined that 42,9 % of foreseen reduction plus an additional amount of 31.53 ODP tonnes of HCFC 141b contained in imported pre-blended polyols would be phase-out without any assistance from the MLF (see Decision 68/40 para iv). As an integrated part of the phase-out process envisaged above, the refrigeration manufacturing sector conversion, as per the country policies, is occurring without MLF assistance. This is generating the need for the preparation of the HPMP Stage II to clarify the national phase-out strategy post 2017, addressing the full phase-out. This will enable the country to maintain the momentum achieved as well as the same level of commitment from the counterparts and key stakeholders.

The Stage II of the HPMP preparation have to be achieved, as per the country needs, before completion of the Stage I implementation, to support and draw the scenario to address exclusively and in a sustained manner the servicing-sector phase-out planning post 2017.

This is in line with the Guidelines for submitting a preparatory funding request for the Stage II less than 2 years before completion of the HPMP Stage I, and as per the approved Business Plan.

The remaining eligible consumption for HCFC-22 amounts 137.60 ODP tonnes in servicing sector.

The relevant progress achieved with the HPMP Stage I implementation is demonstrated by the HCFCs consumption level of 2013 that is already below the consumption target set to 360.80 ODP for the year 2014 as per the HPMP MYA Agreement. Also, this is demonstrated by the disbursement level for both the

investment project and for the tranche I of HPMP, that is reaching 91 % and respectively 42 % as of April 2015.

One of the main achievement of the HPMP Stage I in Turkey is the completion of the HCFC 141 b and 142b phase-out in the foam sector at large manufacturer companies (PU and XPS sectors) in 2014 and the full phase-out by end of 2015 of HCFC 141b uses in all other foam applications (including the SH sector and their distribution chains).

The phase-out component of the HPMP addressing the remaining HCFCs consumption in the foam sector (SH downstream uses and other uses) requires small and medium sized enterprises to self-fund phase out effectively, but the system house concept provided technical support, technology transfer and funding of localized trials and testing through the systems houses that supply the downstream users. The objective of the system house concept is to facilitate the phase-out of HCFCs by downstream rigid foam producers in Turkey, by conversion to HCFC-free systems in the manufacture of polyether and polyester based polyols and to establish facilities for customizing, trials, evaluation and validation of HCFC-free chemical systems for rigid polyurethane foam at five polyurethane system houses, located Turkey. Six eligible System Houses operating in Turkey was invited to bi-lateral meetings and site visits was organized in 2014. The concept of the technical support and technology transfer was constituted and specific activities are on-going through each SH producer.

The refrigeration manufacturing sector is not addressed by a specific component of approved funding of the HPMP; however, the conversion it is occurring and progressed as per the Government Policy and in line with the commitment of the sector, outlined by the Ex.Com. approval Decision 68/40.

Under the emissions reduction/good practice programme component of the HPMP below outcomes were achieved:

- the regulations for up-grading the national certification system for the technicians has been drafted and it is subject to the endorsement by relevant institutions. The system is not limited to the HCFCs, but will also introduce introducing mandatory certification for handling HFCs, in an integrated manner with the requirements for the HCFCs, and specific modules for addressing flammable refrigerants. The new certification system in Turkey will be in line with the requirements currently in place for the EU market.
- with respect to the good practices programme, trainer the trainer component was achieved by cooperation with UK training center specialized in certification for the EU market. 2 core groups of 12 trainers each, belonging to different technicians training centers in Turkey and Refrigeration Associations were specialized and have the responsibility of replicating the training needs by introducing and following the new certification system in Turkey.
- the main certification activities funded under the HPMP are scheduled under the second tranche of the HPMP starting with 2015, at the time when the new regulation will come into place.

It is to be noted also that the main funding for investment activities in servicing sector is scheduled, as per the HPMP MYA Agreement to be release under the tranches II and II, and were not subject of the tranche I, envisaged to prepare the frame for the implementation of the good practices policies in the service sector.

Customs training component in tranche I of the HPMP was implemented with United Nations Environment Programme (UNEP). The training programme was established along with the Ministry of Customs and Trade and UNEP, with the main objective of providing the customs and enforcement officers of Turkey with the necessary practical skills and knowledge to identify HCFCs and HCFCs containing equipment. MoEU established 6 specialized customs border points to deal with the importation of ODSs in Turkey (imports are taking place through limited No. of customs offices). The trainings were realized with the participation of customs officers from concerned specialized customs between 25-27 February 2015 and 2-3 March 2015.

The Executive Committee in its Decision 71/42 approved guidelines for the preparation of Stage II HPMPs, according to which, Turkey is fully eligible to request project preparation fund at the 74<sup>th</sup> Meeting of the Executive Committee.

UNIDO will have to undertake a comprehensive survey for the servicing refrigeration sector to collect updated HCFC consumption data, ownership information, details on where the refrigerants is used as well as the type of equipment. There is a need to hold several stakeholder consultation meetings including the Government to design a proper plan to be incorporated into the overall strategy for this sector.

The current HCFCs consumption in Turkey for the year 2013 is summarized in the table below:

	2013		2014**	
	Manuf*	Servicing	Manuf*	Servicing
HCFC 22 (MT)	1,374	1,299	951	1,300
	2,673		2,251	

*Note: \*The amount quoted is including HCFCs 22 used in assembly activities, the verification report will clarify the amount subject to be considered as belonging to the servicing sector, since the national definition for reporting the assembly charges in Turkey is including such quantities under the manufacturing sector.*

*\*\*The data are preliminary data under validation process and slow changes are possible*

*HCFC 141b and 142b consumption was zero, thus it is not showed into the table.*

Stage II of HPMP will be based on data collected over implementation of Stage I, however, deeper assessment is required for such data in servicing sector and for ensuring relevant contribution from stakeholders.

The following activities shall be undertaken for the preparation of stage-II HPMP to be prepared from the proposed funding:

- Data Collection and Surveys
  - Collection, verification and validation of HCFC consumption in both sectors (Refrigeration and Foams) through survey of Government departments, traders, distributors, importers and manufacturers to assess the distribution of HCFC consumption (update previous data collection)
- Develop a plan for implementation of the servicing related activities to be integrated in the overall strategy
- Evaluate the climate co-benefits
- Prepare a project document

In accordance with the guideline 71/55 the preparatory funds are requested for UNIDO, as follows:

Activities	Total
Preparation of Refrigeration Servicing strategy post 2017	
Survey to update consumption all over the country	15,000
Survey to update alternative technologies in RAC manufacturing sectors, to adapt the servicing sector strategy for downstream users	15,000

National Stakeholders consultation meetings (public institutions)	20,000
Private sector consultations meetings	25,000
Consultancy (national and international consultant)	15,000
Preparing document	4,000
TOTAL PRP II	90,000

The requested funding level of USD 90,000 is fully in compliance with ExCom Decision 71/42.

## Project Concept

<b>Country</b>	China
<b>Project title:</b>	Preparation of demonstration project: low-GWP alternatives in various applications for transport refrigeration: cryogenic and natural refrigerants
<b>Preparatory Project budget</b>	USD 50.000 (excluding ASC)
<b>Estimated project budget</b>	USD 800.000
<b>Estimated duration</b>	18 months (inclusive of 6 months for project preparation)
<b>Implementing agency</b>	UNIDO and Italy as bilateral executing agency Ministry of Environmental Protection (MEP), Foreign Economic Cooperation Office Ministry of Environmental Protection of China (FECO)
<b>Coordinating agency</b>	

### Project preparation funding request

#### I. Introduction

Transport refrigeration covers various modes of transportation such as rail, road, and ship and is of great importance to the supply chain of chilled (or frozen) safe, high-quality perishable goods such as foodstuffs, flowers, chemical products or pharmaceuticals.

These goods can be transported in refrigerated road vehicles, railcars, containers and marine vessels. Currently, there are about 4 million road transport refrigeration units and 950,000 marine containers in operation.<sup>1</sup>

In developing countries transport refrigeration mainly relies on chemical refrigerants such as HCFC-22 that have a negative impact on the environment. The total amount of HCFC-22 banked in transport refrigeration is estimated at 27,200 tonnes and, depending on the application, the annual leakage rate between 20-40%.<sup>1</sup>

Currently, the most direct alternative to HCFCs used for this application is hydrofluorocarbon (HFC) such as HFC-134a and HFC-404A. Due to their high global warming potential (GWP), however, it is advised to focus on development and promotion of more environmentally friendly options that offer climate benefits in terms of low-GWP and energy efficiency.

#### a. Why this particular project is relevant and necessary to HCFC phase-out

Transport refrigeration is a sub-sector currently being un-addressed under the current HPMP. ODS use in the cold chain; of which refrigerated transport is part; will need to be addressed under future stages of HPMP in China.

#### b. Justification/description of project replicability

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<sup>1</sup> 2010 TOC Refrigeration, A/C and Heat Pumps Assessment Report

Activities in relation to the cold chain is a global issue; and hence, results from current project can be replicated in a large number of other A-5 countries.

II. Brief project summary (no more than 2-3 paragraphs)

UNIDO is planning to analyse the current status and logistics of the refrigerated transport sector in various cities in China.

The survey, aimed to municipalities, relevant associations, industry (e.g. chain supermarkets, delivery companies) is expected to provide information mainly on:

- a) Overall logistic of refrigeration transportation such as locations of centralized distribution and storage centres; number and size of vehicles and containers used to transport refrigerated goods; times of operation and daily distances; kind of transported products; frequency of visits; operating temperatures; etc.;
- b) Refrigeration technology used so far such as type and the amount of refrigerant; maintenance frequency; etc.;
- c) Potentiality for application of:
  - cryogenic technology such as availability of the cryogenic fluid suppliers; local providers and companies producing liquid CO<sub>2</sub> or N<sub>2</sub> as a by-product of their activities; related costs;
  - natural refrigerant technology;
- d) Interest and willingness of potential counterparts such as chain supermarkets or delivery companies to participate in a demonstration project;
- e) Potential for the involvement of the technology providers to participate as partners;
- f) Existing legislation for transport refrigeration and safety standards.

Starting from the outcome of the survey UNIDO, in partnership with the NOU, will select optimal settings including location, alternative technology/ies, scope of its/their application, main counterparts, etc. and will develop a strategy to be implemented during Project Implementation.

III. Project objectives (summarized in bullet form)

The aim of this project is to:

- a) Demonstrate the potential of natural refrigerant and cryogenic based-systems in refrigerated transport sector;
- b) Increased awareness and confidence in the potential of low-GWP and energy efficient alternatives for road transport refrigeration;
- c) Facilitated compliance with reduction targets set by the Montreal Protocol by minimizing the HCFC-22 emission;
- d) Increased potential for cooperation between municipalities and stakeholders, enhancing transfer of technologies in refrigerated transport sector;
- e) Increased national and international community will in addressing challenges of the global concern;
- f) Increased potential for inclusion of alternatives to transport refrigeration in future HCFC Phase-out Management Plans (HPMPs).

IV. Expected demonstration results (no more than half a page)

To sustain the future of transport refrigeration sector, in-kind and not-in-kind alternative systems such as those based on hydrocarbons (HCs) – isobutane (R600a) or propane (R290) - or other natural refrigerant such as NH<sub>3</sub> and CO<sub>2</sub>, and on cryogenic liquids - nitrogen (N<sub>2</sub>, R-728), water (H<sub>2</sub>O, R-718) or carbon dioxide (CO<sub>2</sub>, R-744) - should be considered.

In view of the above, UNIDO proposes to develop a demonstration project for the demonstration of:

- a) Natural refrigerant technology for the long-distance transportation in refrigerated containers
- b) Cryogenic technology for transportation of goods within metropolitan areas

UNIDO, in partnership with MEP/FECO, proposes to develop a project that will demonstrate the technical, economic and environmental advantages of the most suitable alternative for road transport refrigeration, mainly focusing on road vehicles (trucks, trailers) and/or containers.

The actual choice of the technology and the scope of its application will be based on the outcome of the analysis of the logistics of the cold chain in particular region/s of the country. This analysis will provide information on how perishable goods are exported, imported and distributed to warehouses and shops.

V. Institutional arrangements

- a. Brief information on legal and regulatory support for the demonstration project

The demonstration project will be implemented with full support and cooperation with MEP/FECO who is overseeing transformation of the refrigeration transport sector.

- b. Description of implementation approach

Under the preparatory project, UNIDO will use consultancy services as well as interact with the experts from the beneficiary to fine-tune the interventions.

- c. Government commitment to complete project in 12 months

The Letter of Endorsement by the NOU is attached to the request for project funding.

VI. Company Information

- a. Company letter of commitment

With regard to the main project partners, the project will be implemented with the Snowkey Group. The Snowkey Group, located in Fuzhou, is one of biggest manufactures of the refrigeration system of the containers. The piston compressor with R22 and its system are produced to supply the cold transportation. It is planned to convert the line to adapt the production of the piston compressor with NH3 or hydrocarbons. The performance system and the lab will also be converted.

With regard to the demonstration of the cryogenic system, the application of the technology will involve a supermarket chain in an urban area.

Letter of commitment from companies will be provided together with the project document.

- b. Summary of HCFC consumption, at least for the last three years

Table below indicates the amount of HCFC-22 consumption over the last three years in China, with an indication of HCFC-22 used in the relevant sector targeted by the present DEMO project (i.e. transport refrigeration).

Year	Annual HCFC-22 consumption (estimated, metric tons)	
	Total	Transport Refrigeration
2012	457	104
2013	434	98
2014	349	95

**Project Concept**

<b>Country:</b>	China
<b>Title:</b>	Demonstration project for the conversion from HCFC-22 to CO <sub>2</sub> heat pump compressors
<b>Project Duration:</b>	12 months
<b>Project Preparation Budget:</b>	US\$ 30,000 (Excluding 7 % ASC)
<b>Demonstration Project Budget:</b>	US\$ 1,500,000 (estimated)
<b>Implementing Agency:</b>	UNIDO
<b>Partner Agencies:</b>	MEP/FECO

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## I. Introduction

The Executive Committee in decision 72/40 agreed to consider proposals for demonstration projects for low-GWP alternatives and invited bilateral and implementing agencies to submit a limited number of demonstration projects for the conversion of HCFC in the refrigeration and air-conditioning subsectors to low-global warming potential (GWP) technologies in order to identify all the steps required and to assess their associated costs.

The Executive Committee noted the limited introduction of several of the low GWP technologies available to date in Article 5 countries, the need to validate them and optimize their use in the light of the local conditions prevailing in Article 5 countries, and the wide variation in costs of replacement equipment and raw materials.

China is the single biggest air-conditioning manufacturer of the world. For this reason, any change in the adopted technology will have significant global impact. China has to phase-out over 18,000 MT of HCFC-22 from the RAC and heat pump sector by 2020, which is a daunting task. For this reason, there has to be a careful analysis of the various sub-sectors in the RAC sector, which could be considered for the introduction of low-GWP alternatives. The room air-conditioning sector has its challenges with the introduction of emerging technologies, mainly because of the flammability issues and in particular in the bigger applications.

The domestic heat pump sub-sector is a relatively new sub-sector, however, has grown rapidly in China in recent years. In order to avoid further increase of HCFC-22 in that sub-sector and since the potential for the introduction of CO<sub>2</sub> for heat pumps is high, HCFC-22 phase-out in the heat pump sector has the potential to be successfully implemented and entered to the global markets, making replication of the technology absolutely feasible in the medium term and avoiding the increase of large HFC-based inventories in developing countries.

Furthermore, having a compressor line converted to CO<sub>2</sub> technology can facilitate the adoption of this technology at the heat pump manufacturers. In addition, since the 2020 HCFC phase-out target is very close, such demonstration project could accelerate Stage II project implementation.

## II. Brief Project Summary

The demonstration project will assist the compressor re-design and production line conversion as follows:

Design Work for the CO<sub>2</sub> compressor:

There is a need to assure reliability of the operation of the compressors. For this reason, there is a need to select suitable lubricating oil and the design for the lubrication system needs to be optimized. The compressor structure needs to be modified to assure proper operation at the excess pressures of CO<sub>2</sub>. Furthermore, the CO<sub>2</sub> compressor requires higher demand on wear-resistance compared to compressors with other refrigerants due to the high load on the vane in CO<sub>2</sub> compressor

In order to ensure performance and to keep the cooling capacity unchanged, the displacement of CO<sub>2</sub> needs to be reduced and the appropriate compressor body size needs to be identified and optimized.

#### Reconstruction Work for Production Line:

The CO<sub>2</sub> compressor's oil viscosity exceeds the allowable range of the existing oil filling machine, which needs to be replaced.

The lower muffler of the HCFC-22 compressor cannot meet CO<sub>2</sub> refrigerant's pressure requirement, and new equipment is required to press the muffler. With the change of the muffler, the bolt tightening torque increases, that requires a new bolt tightening machine.

After optimization of the compressor body structure, the corresponding tooling and fixture for pump body production equipment cannot be used, retrofitting or purchase of new equipment is necessary.

The dimensions of parts of the new compressor are not compatible with the HCFC-22 compressors, for this reason, new parts need to be purchased/produced for the matching instrument.

Welding equipment for shell and upper cover shell cannot be used for CO<sub>2</sub> compressors. In order to ensure the safety of the compressor, new welding machines are required.

More details on the required changes will be specified in the full project proposal.

### **III. The Project Objectives**

The objective of the demonstration project is to re-design the HCFC-22 compressor for operation with CO<sub>2</sub> as well as modify the affected operations in the production area to allow for mass production of the CO<sub>2</sub> compressor.

### **IV. Expected Demonstration Results**

The demonstration project will determine the necessary design changes needed to convert a compressor from HCFC-22 to CO<sub>2</sub>; however, given the specifics of the compressors manufactured at the beneficiary.

Also, the demonstration project will provide clarity on the impact on the production line/process of such change of technology.

### **V. Institutional arrangements**

#### a. Legal and regulatory support

The demonstration project will be implemented with full support and cooperation with MEP/FECO who is overseeing transformation of the air-conditioning and heat pump sector.

#### b. Description of implementation approach

Under the preparatory project, UNIDO will use consultancy services as well as interact with the experts from the beneficiary to fine-tune the interventions both on compressor design as well as in the manufacturing processes.

- c. Government commitment to complete project

The Letter of Endorsement by the NOU is attached to the request for project funding.

## VI. Company Information

Shanghai Hitachi Electrical Appliances Co., Ltd. (hereafter referred to as SHEC) was founded in January 1993. SHEC is a joint venture invested by Shanghai HIGHLY Group (a listing Corporation, A shares Code: 600619; B code: 900910) under Shanghai Electric and Japan HITACHI air-conditioning, Household Appliances, Inc. 75% share is held by HIGHLY and 25% share is held by HITACHI. SHEC designs, produces and sales professional home-use refrigeration compressors. The total capital of SHEC is 573.8 million US Dollars and the annual capacity is 20 million units (including subsidiary). It covers an area of 230 thousand square meters in Pudong Jinqiao Development Zone in Shanghai.

SHEC's mission is to "*improve people's living environment, protect human living environment*", and formulated a sustainable development strategy to achieve "*the leading technology, the largest scale, performance optimization*".

In the past twenty years, SHEC has become the global second enterprise in air-conditioning compressors' R & D. By June 2010 SHEC's accumulated production and sales exceeded more than 100 million air-conditioning compressors.

SHEC main customers are from the industry, and have established solid supplier relationships with the ten world's largest air conditioner manufacturers. SHEC has created the first independent brand "highly /HIGHLY" in air-conditioning compressor industry. SHEC has won, among others, the "*China famous brand*" products, the Ministry of Commerce "*the most market competitive products*", "*Chinese famous trademark*" titles.

SHEC has the industry's only state-level enterprise technology center and the National Laboratory Accreditation with the technology and equipment of international advanced level.

SHEC established the enterprise technology center in 1997. In 1998, the technology center was identified as state-level enterprise technology center by the State Economic and Trade Commission and became the only state-level technology center in the air-conditioning compressor industry. The technology center has a multi-level research and development team, tracking the latest trends of international compressor, developed all kinds of new types of compressors and related products.

SHEC took the lead in the domestic launch of CO<sub>2</sub> compressor used in the heat pump water heater. At present, more than 10 patents have already been authorized.

SHEC has established CO<sub>2</sub> test platform, including a 1-3 HP performance testing platform, a 1-3 HP reliability test platform, CO<sub>2</sub> oil and material analysis laboratory, which sets a solid foundation for the research and development of CO<sub>2</sub> compressors.

Based on the development of CO<sub>2</sub> compressors, SHEC also has conducted research on application technology of CO<sub>2</sub> heat pump system, designed and mounted several sets of CO<sub>2</sub> heat pump systems, and laid a good foundation in the application technology, thus, providing powerful technical support for the CO<sub>2</sub> heat pump compressor for the market.

SHEC began the research and development of CO<sub>2</sub> compressor and associated technology independently in 2010. Since then, SHEC has carried out the development of refrigerant oil used in CO<sub>2</sub> compressor; the design of the CO<sub>2</sub> compressor structure; CO<sub>2</sub> compressor performance optimization; compressor reliability study; research of CO<sub>2</sub> heat pump water heater system etc. Through the project, SHEC will reconstruct the A/D series production line to make it able to produce CO<sub>2</sub> compressor.

Production of HCFC-22 based compressors at the selected production line in 2012-2013

2013 (No. of units)	700,000
2012 (No. of units)	1,100,000
<b>Average (No. of units)</b>	<b>900,000</b>

The company is interested and committed in participating in the demonstration project. Since the compressor manufacturing does not entail any refrigerant charges, there will be no direct phase-out attached to the conversion. However, after successful conversion and once CO<sub>2</sub> compressors become available, indirect phase-out will be facilitated through the production of CO<sub>2</sub> based heat pumps.

## VII. Budget

The table below presents the budget allocation for the implementation of the preparatory project

Activity	Costs [US\$]
Critical Assessment of the changes required to compressor as well as production processes	20,000
Preparation of the full investment project	10,000
<b>TOTAL</b>	<b>30,000</b>

The above activities include expert fees and cost of organization of a stakeholder's meeting for achievement of the project objectives.

## Project Concept

<b>Country:</b>	China
<b>Title:</b>	Preparation of a Demonstration Project on Leakage reduction of large/industrial refrigerating appliances
<b>Preparatory Project Duration:</b>	12 months
<b>Preparatory Project Budget:</b>	US\$ 50,000 (excluding ASC)
<b>Demonstration Project Budget:</b>	US\$ 450,000 (estimated)
<b>Implementing Agency:</b>	UNIDO
<b>Partner Agencies:</b>	Ministry of Environmental Protection (MEP), Foreign Economic Cooperation Office Ministry of Environmental Protection of China (FECO)

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### 1. Background and Justification

In 2007, the Parties to the Montreal Protocol agreed to accelerate the phase-out of the hydrochlorofluorocarbons (HCFCs) as the main ozone depleting substances largely because of the substantive climate benefits of the phase-out. In the following years, Parties operating under the Montreal Protocol's Article 5 (mostly developing countries) have formulated their HCFC Phase-out Management Plans (HPMPs) for implementation under financial assistance from the Multilateral Fund for the implementation of the Montreal Protocol (MLF).

The Executive Committee in decision 72/40 agreed to consider proposals for demonstration projects for low-GWP alternatives and invited bilateral and implementing agencies to submit a limited number of demonstration projects for the conversion of HCFC in the refrigeration and air-conditioning subsectors to low-global warming potential (GWP) technologies in order to identify all the steps required and to assess their associated costs.

### 2. Aim of the project

Innovative approaches and activities are required to address and reduce the HCFC consumption in the refrigeration servicing sector during stage II and III HPMP's. The overall objective is to facilitate the transformation of existing inventory to low-GWP technologies through a combination of: a) containment and recovery/re-use; b) retrofit; and c) replacement at end-of-life. Stage I of the HPMP's focus mainly on capacity building activities such as certification schemes for RAC workshops/technicians, establishment of recovery, recycling and reclamation (RRR) schemes as well as promotion programmes for alternative refrigerants. All these are medium- to long term solutions and it is difficult to estimate and predict their impact in real life conditions of an A-5 country.

Leakage of refrigerants from large/industrial refrigeration and air conditioning (RAC) systems (charges above 100 kg refrigerant) is contributing substantially to direct emissions of refrigerants into the atmosphere and thus contributing to ozone layer depletion and global warming. Under the regulations adopted in A-2 countries (such as the EU F Gas Regulations) operators of RAC systems are required to perform regular leak testing and must not add more refrigerant without first identifying and repairing the source of the leak. There are also strict requirements on recovery of refrigerant from systems, recording of refrigerant use and labelling of equipment. Such regulations are expected to be adopted by A-5 countries hence it is needed to ensure operators of RAC systems in A-5 countries will be able to comply with the regulations and reduce potential and actual sources of refrigerant leakage.

The proposed demonstration project will promote a proactive approach to refrigerant containment and leakage reduction through case studies/projects in 3 selected sub-sectors as well as provide guidelines for leakage

reduction of larger/industrial refrigerating systems. The sub-sectors targeted - all characterized by large refrigerant charge and large leakage rates - are:

- Industrial process cooling;
- Retail cooling/freezing (supermarket); and
- Central Air Conditioning systems.

### **3. Description of Methodology**

The methodology to be used by the demonstration project will be:

- Selection of 3 project beneficiaries in above referenced sub-sectors;
- Analysis of current states of the refrigerating appliances including their leakage rates;
- Definition of necessary measures to reduce leakages and implement these at the 3 beneficiaries;
- Assess results; including cost impact; and
- Based on lessons learned draft a generic methodology on leakage reduction and cost impact.

All activities will be implemented in close cooperation with relevant stakeholders.

### **4. Target Beneficiaries**

Owners of large/industrial refrigerating equipment will be direct beneficiaries of the project. Dissemination of results from the demonstration project will also provide benefits to the entire community of A-5 parties to the Montreal Protocol, as well as the MLF Executive Committee and MLF Implementing Agencies.

### **5. Workplan**

Under the preparatory project, UNIDO – in cooperation with MEP/FECO and industry stakeholders – will select the 3 project beneficiary sites as well as do a preliminary analysis of the leakage reduction potentials and estimated costs for actual implementation of the required measures. This will be done through local and international experts on maintenance of larger refrigerating systems.

### **6. Expected Results of the Demonstration Project**

The following outputs will be direct results of the demonstration project:

- Implemented leak reduction measures at 3 selected beneficiaries in 3 different sub-sectors all characterized by large refrigerant charges and large leakage rates;
- Cost implications for leakage reduction measures; including impact on costs for future servicing;
- Generic methodology for leakage reductions from larger/industrial refrigerating systems.

### **7. Replication Potential**

The demonstration project will result in increased awareness of the effectiveness and cost-efficiency of refrigerant containment and leakage reduction approaches in China. Its replication will provide capacity and local expertise in other A-5 countries to conduct similar activities for refrigerant containment and leakage reduction and eventually incorporate these into stage II HPMPs.

## 8. Budget

Table 1 below presents the budget allocation for the implementation of a preparatory project

**Table 1.**Tentative budget allocation per activity

<b>Description</b>	<b>Costs [US\$]</b>
Selection of 3 project beneficiaries and assessment of their refrigerating systems in terms of required measures for leakage reduction and cost impact for such	40,000
Formulation of full demonstration project	10,000
<b>TOTAL</b>	<b>50,000</b>

The Letter of Endorsement by the NOU is attached to the request for project funding.

## PROJECT CONCEPT

<b>Country:</b>	Saudi-Arabia
<b>Title:</b>	Preparation of a Demonstration Project for the Phase-out of HCFCs by Using HFO as Foam Blowing Agent in the Spray Foam Applications in High Ambient Temperatures
<b>Project Duration:</b>	12 months
<b>Preparatory Project Budget:</b>	US\$ 30,000 (excluding ASC)
<b>Demonstration Project Budget:</b>	US\$ 240,000 (estimated)
<b>Implementing Agency:</b>	UNIDO

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### I. Introduction

In 2007, the Parties to the Montreal Protocol agreed to accelerate the phase-out of the hydrochlorofluorocarbons (HCFCs) as the main ozone depleting substances largely because of the substantive climate benefits of the phase-out. In the following years, Parties operating under the Montreal Protocol's Article 5 (mostly developing countries) have formulated their HCFC Phase-out Management Plans (HPMPs) for implementation under financial assistance from the Multilateral Fund for the implementation of the Montreal Protocol (MLF).

The Executive Committee in decision 72/40 agreed to consider proposals for demonstration projects for low-GWP alternatives and invited bilateral and implementing agencies to submit a limited number of demonstration projects for the conversion of HCFC in the refrigeration and air-conditioning subsectors to low-global warming potential (GWP) technologies in order to identify all the steps required and to assess their associated costs.

Spray foam is used to insulate, provide air sealing and improve structural strength in buildings. The insulation potential of spray foam is dependent upon the insulating gas in the cells of the polyurethane foam. In addition to the insulation performance, polyurethane foams used for the insulation purpose require inherently superior dimensional stability and resistance to fire.

The current zero ODP options for replacement of HCFC-141b in foam applications include hydrofluorocarbons (HFCs) and hydrocarbons. Both HFCs and hydrocarbons are characterized by increased thermal conductivities compared to the HCFC, resulting in inferior insulation performance.

Few alternatives exist for replacing 141b in spray foam. Hydrocarbons are not a viable alternative for spray foam, and HFC-245fa and HFC-365, while viable, have high global warming potential (GWP). Also, the low boiling point of HFC-245fa and the flammability of hydrocarbons and HFC-365mfc present significant challenges to refrigerants processing and handling that are critically important in spray foam applications. On the other hand, foam blowing agents HFO-1233zd(E) and HFO-1336mzz(Z) have very low GWP, both less than 5, and HFO-1233zd (E) is claimed to be even less than 1. These molecules are also non-flammable and stable liquids at ambient temperatures. The HFO-1233zd(E) is already commercialized and HFO-1336mzz(Z) will be commercially available from the year 2016.

### II. Brief Project Summary

Replacing HCFC-141b in spray foam in the Kingdom of Saudi Arabia (KSA) presents an opportunity and technical challenge, making it worthy of a demonstration project. The preliminary 2014 HCFC consumption estimates show that 600 MT of HCFC-141b or 66 ODP tonnes were consumed in 2014 for spray foam in Saudi Arabia (these figures include import of pre-blended polyurethane systems). Also in 2014, the Ministry of Municipal and Rural Affairs of KSA has made thermal insulation compulsory for all new buildings in the 24

districts of the country covering 80% of the populations. The addition of thermal insulation in new building is expected to reduce 40% of energy use in air conditioning. Today, air conditioners account for 70% of electricity consumption in the region and with 1.5 M new homes needed to keep up with the population growth, energy demand is anticipated to double by 2030 if energy conservation measures are not put in place.

The HFOs have higher boiling point and lower vapour pressure which improves handling and yields smoother foam surfaces. Due to the very low thermal conductivity, less than 10,7 mW/mK, which is comparable to the HCFC-141b's same of approximately 10 mW/mK, the HFOs provide a substitute chemical for the HCFC-141b with lower GWP.

The foam-blowing agent HCFC-141b will be replaced by the HFOs at the chemical supplier's systems house with the foaming processed at the end user facility as previously with HCFC-141b.

The demonstration project could also test the option of having a premixing operation practiced at the end-user's (a spray foam company) facility. The premixing unit could be required due to a shorter shelf-life of the HFO-pre-blends compared to the pre-blended systems containing HCFC-141b. This option will be evaluated during the demo project formulation.

It is expected that these HFO-foam blowing agents will be based on high content of physical foaming agent and lesser amount of a chemical blowing agent ((water based (CO<sub>2</sub>)). The adherence to the high content of the physical blowing agent in the foam systems will result in lower viscosity of foam systems and lower thermal conductivity of the foams even with foam densities up to 65 kg/m<sup>3</sup>. Another important role of the physical foaming agent would be to act as an exothermic sink/absorber for the foaming process and avoidance of the foam produced scorching, splits or losing its physical dimensional stability.

The HFOs will be tested at a spray foam contractor, which has close connections to a systems house. The latter will act as a mixing and formulation place for new foam formulations and as a hub for the future distribution of this kind of spray foaming technology.

There are four other systems houses in Saudi Arabia that reported total consumption of about 1,100 MT of HCFC-141b in 2013, out of which about 600 MT is estimated consumption for the spray foam applications. The foaming technology selected for the demonstration project will be replicated within short future in the other spray foam providers in Saudi Arabia and elsewhere. Further it is to be noted that this technology can be applied in the other polyurethane insulation manufacturing operations such as domestic and commercial appliances, production of sandwich panels for the high performance insulation requirements.

### **III. The Project Objectives**

For the spray foam applications, there are currently no proven low GWP alternatives for replacement of HCFC-141b. The best available alternatives are HFCs such as HFC-245fa and HFC-365mfc that have relatively high global warming potentials (GWPs near 1,000). For this reason the Executive Committee of the MLF in its decision to approve the HPMP for Saudi Arabia has requested the implementing agencies...

*“ not to implement any conversion to HFC-245fa in the spray foam subsector prior to 1 January 2016 and to actively pursue establishing low-GWP alternatives for that subsector prior to this date.”*

(ExCom Decision 68/37(h)).

The primary aim of the project will be to demonstrate that the HFOs will be able to meet the same or similar high functional foam requirements as obtained with HCFC-141b and HFC-245fa.

As an effort to actively pursue user friendly low-GWP alternatives for the spray foam applications, UNIDO proposes to conduct a demonstration project for spray foam application using HFOs such as HFO-1233zd(E) or HFO-1336mzz(Z). HFO-1233zd(E) has had a considerable success in the US and Japan in the past two years, where it has shown benefits other than low GWP, such as: a) higher yields of 10% (lower raw material costs); b) higher insulation performance of 6-8%, and c) better overall processability.

Demonstrating the viability of HFOs in spray foam applications will provide benefits such as a technology alternative for Article-5 countries and specifically those with high-ambient temperature conditions as well as sizeable impact on reduction of ODS consumption. Furthermore, the proposed demonstration project will provide a solution to improve the energy efficiency of new buildings in Saudi Arabia using products with low climate impact.

**IV. Expected Demonstration Results**

The demonstration project will produce the following outputs:

Expected Outcomes	Expected Outputs
<p>Awareness of and increased confidence for use of HFOs as low GWP refrigeration systems amongst all stakeholders in Article 5 countries</p> <p>Increased capacity and local expertise in Article 5 countries to use handle low GWP refrigerants</p> <p>Increased interest of HFO producers to market the HFOs in Article 5 countries</p> <p>Increased interest of system houses, and importers in Article 5 countries to import and stock HFOs</p> <p>Increased interest of system houses and spray foam companies in Article 5 countries to use HFOs as substitutes for HCFC-141b blowing agent</p>	<p>Test results of use of HFOs in spray foam sub-sector in selected Article 5 countries</p> <p>Real case data on performance of HFOs in systems formulations in selected Article 5 countries collected and evaluated</p> <p>Selection/use guidelines for HFOs in rigid foam applications elaborated</p>

**V. Institutional arrangements**

- a. Legal and regulatory support

The demonstration project will be implemented with full support and cooperation with the National Ozone Unit of Saudi Arabia who is overseeing transformation of the domestic refrigeration and air-conditioning sector.

- c. Description of implementation approach

The project will be based on partnership with local systems houses that will formulate spray foam solutions with local raw materials and the tested HFOs. Apart from the demonstration of feasibility of using HFOs in spray foam it will demonstrate benefits other than lower GWP, such as some of the benefits seen in other countries (higher yields, higher insulation performance, etc.). The project results will be disseminated within the KSA and in the region of West Asia through reports, articles and conference presentations.

Under the preparatory project, UNIDO will use consultancy services for analysis of information available on HFOs as blowing agents (such as results of tests conducted with HFO conducted in A-2 countries). Based on this analysis and in consultation with the participating systems houses the consultant will elaborate a programme of testing of HFO blowing agents in the participating systems houses and their clients.

- c. Government commitment to complete project

The Letter of Endorsement by the NOU is attached to the request for project funding.

**VI. Company Information**

Two systems houses from KSA agreed to participate in the project.

B.N.Jundi Polyurethane Systems has been selected as the partner enterprise for the demonstration project. The company is 100% national (Saudi) owned and was established in 1998. It provides polyurethane systems for a wide range of applications, including production of panels ( continuous and discontinuous), spray insulation as well as refrigeration and air-conditioning industry.

The company’s consumption of HCFC-141 b in recent years is as follows:

Consumption in years	2010	2011	2012	2013
HCFC-141 (MT)	200	220	400	480

<b>Systems Chemicals in 2013</b>	<b>Panel Continuous</b>	<b>Panel discontinuous</b>	<b>Spray Foam</b>
<b>HCFC-141 (MT)</b>	300	130	50

Saptex Insulation Products Factory produces a wide range of products such as polyurethane boards for floor, wall and roof insulation, products for pipe, duct & vessel insulation (low, medium & high density), chemical systems for injection, spray & other applications as well as facility for injection doors & panels with PU foam.

The company's consumption of HCFC-141 b in recent years is as follows:

<b>Consumption in years</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>HCFC-141 (MT)</b>	380	395	515	515

<b>Systems Chemicals in 2013</b>	<b>Boards/Slabs</b>	<b>Injection Applicat.</b>	<b>Spray Foam</b>
<b>HCFC-141 (MT)</b>	267	134	134

## **VII. Preparatory Project Budget**

The table below presents the budget allocation for the implementation of the preparatory project.

<b>Activity</b>	<b>Costs [US\$]</b>
Analysis compilation of information available on HFOs as blowing aagents	10,000
Elaboration of a Selection of the alternative refrigerant and preparation of the investment project	20,000
<b>TOTAL</b>	<b>30,000</b>

The above budget include expert fees and travel as well as organization of consultation meetings with national stakeholders.

The foreseen capital expenditure for the main project is shown below

<b>Item</b>	<b>Cost (US\$)</b>
Retrofit of foaming machine	30,000
Premixing unit	60,000
Purchase of materials	40,000
Testing of end product physical properties	50,000
Evaluation of Trials	40,000
Workshop	20,000
Contingencies	24,000
<b>TOTAL</b>	<b>240,000</b>

It is assumed that the costing for future "standard" investment project, for HFOs blowing, will be similar or even identical as for HFC 245fa blowing (Executive Committee Decision 55/47 – Guide for Costing).

## PROJECT CONCEPT

<b>Country:</b>	The Kingdom of Saudi Arabia
<b>Title:</b>	Preparation of a Demonstration Project on Promoting HFO-based Low GWP Refrigerants for Air-conditioning Sector in High Ambient Temperatures
<b>Project Duration:</b>	12 months
<b>Preparatory Project Budget:</b>	US\$ 30,000 (excluding ASC)
<b>Demonstration Project Budget:</b>	US\$ 1,800,000 (estimated)
<b>Implementing Agency:</b>	UNIDO
<b>Local Partners:</b>	Alessa for Refrigeration and Air-conditioning; National Ozone Unit (NOU) of KSA

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### III. Introduction

The Executive Committee in decision 72/40 agreed to consider proposals for demonstration projects for low-GWP alternatives and invited bilateral and implementing agencies to submit a limited number of demonstration projects for the conversion of HCFC in the refrigeration and air-conditioning subsectors to low-global warming potential (GWP) technologies in order to identify all the steps required and to assess their associated costs.

The Executive Committee noted the limited introduction of several of the low GWP technologies available to date in Article 5 countries, the need to validate them and optimize their use in the light of the local conditions prevailing in Article 5 countries, and the wide variation in costs of replacement equipment and raw materials.

During the preparation of HCFC Phase-out Management Plans (HPMPs) in West Asia, industry representatives introduced their concerns and worries of meeting the freeze and reduction targets where alternatives to HCFC-22 in small/medium size air-conditioning applications not yet introduced and verified by local markets. Additionally, governments started to apply new energy saving requirements for air-conditioning units available in the markets, which disqualify most of the already commercially available alternatives. The main challenges to the promotion of low-GWP alternatives in the region can be summarized as follows:

- Unclear global trend about definite refrigerant for each category of application particularly those suitable to operate in high-ambient conditions.
- Unavailability of components, mainly compressors, that work on low-GWP alternatives and designed for high-ambient conditions.
- The behavior of HVAC systems and their efficiencies are still not clearly determined when operating in high ambient temperature.
- Absence of national/regional codes/standards that can facilitate the introduction of low-GWP alternatives and deal with its flammability characteristics.
- Limitation to introduce applications with flammable characteristics in high-rising buildings which is become notable segment of development in many countries.
- New energy efficiency rating schemes and regulations particularly for A/C systems.
- Expectations for cost implication to adopt low-GWP alternatives to final products particularly price sensitive products.

As of now, there is a situation of uncertainty about which alternative(s) industry will adopt and governments will support due to lack of verified and validated process that lead to fair evaluation and selection of long-term alternatives and ensure leapfrogging higher-GWP options.

The demonstration project will help to overcome several existing barriers (technical, safety, commercial, informational) to wider use of low-GWP refrigerants in production of air-conditioning equipment. It will demonstrate reliable and tested design of a production system using commercially available refrigerants with low GWP values. It will also help to establish a model production facility in a hot climate country, enhance awareness and local knowledge/experience with the use of low-GWP refrigerants and stimulate demand for similar production facilities in the region. This will be crucial for facilitating the conversion of air-conditioning production facilities at high-ambient temperature countries and in particular those where most of their final products being marketed for high-ambient countries.

#### **IV. Brief Project Summary**

The proposed demonstration project will be based on the results of the prototype testing conducted under the framework of the project “Promoting low-global warming potential refrigerants for air-conditioning sectors in high-ambient temperature countries in West Asia” (known as the PRAHA project), that was approved at the 69th MLF ExCom meeting for assessment of suitable alternative technologies to HCFC-22.

Within the PRAHA project, Alessa for Refrigeration and Air Conditioning (ARAC), a Saudi Arabian company manufacturing RAC equipment and supplying domestic, as well as the Middle East and Africa markets with a full range of air conditioners, chest freezers and refrigerators, have been testing several prototypes using three low-GWP HFO blends, namely L-20 (R-444B) and L-41 (R-447A) of the Solstice series produced by Honeywell, and DR-3 of the Opteon series produced by Du Pont, as well as R-32, as alternatives to commonly used HCFCs and HFCs.

Under the preparatory project, a critical evaluation of the results of the prototype testing under the PRAHA project by ARAC will be conducted. The information and data collected will serve as a basis for the design and preparation of an investment project for the conversion of the company’s assembly line, currently using R-22 and HFC blends, to HFO/HFC blends.

#### **III. The Project Objectives**

The aim of the project will be to use the results of the prototype testing conducted under the PRAHA project to further demonstrate low-GWP alternative refrigerants for the air-conditioning sector in high-ambient temperature countries, where air-conditioning constitutes more than 50 per cent of the energy demand. It will also address inter alia: challenges related to the availability of long-term low-GWP alternative refrigerants; technical issues including final products, components, and accessories; assess relevant energy efficiency standards and codes; and identify opportunities for facilitating the transfer of low-GWP technologies.

Under the PRAHA project, Alessa has been building prototypes using Solstice L-20 and Du Pont DR-3 for window units (18 MBH), and Solstice L-41 for decorative split units (24 MBH).

Solstice L-41 offers good performance and a significant (>75%) GWP reduction from HFC alternatives. In addition to the lower GWP, L-41 claims to have excellent energy efficiency and cost effectiveness and can be used in existing HFC equipment designs with minimal changes. At standard ambient temperature, it does not show

significant power consumption increase as compared to HFCs and has lower operating pressures than HFC alternatives. Therefore it enables compact high efficiency systems.

Solstice L-20 can replace R-22 in air-conditioning systems without significant design changes. With a GWP of 350, it reduces significantly the environmental impact and is claimed to perform well at high ambient temperatures. DR-3 has properties similar to L-20.

#### **IV. Expected Demonstration Results**

The principal result of the demonstration projects will be the production line at ARAC converted to low GWP refrigerant technology, based on the results of the prototype testing at ARAC under the PRAHA project.

#### **V. Institutional arrangements**

##### **a. Legal and regulatory support**

The demonstration project will be implemented with full support and cooperation with the National Ozone Unit of Saudi Arabia who is overseeing transformation of the domestic refrigeration and air-conditioning sector.

##### **d. Description of implementation approach**

Under the preparatory project, UNIDO will use consultancy services for critical evaluation of the prototype testing conducted under the PRAHA project in Alessa as well as in other two companies that participate in testing of L-20 and DR-3 for production of window units. The overall results of the prototype testing are expected to be available during 3rd quarter 2015. An international expert in refrigeration and air-conditioning in consultation with Alessa, alternative refrigerant producers, and compressor manufacturers will analyse the results of the prototype testing provided by an independent accredited testing laboratory under the PRAHA project, assess relevant national energy efficiency standards and relevant patent/intellectual property rights. Based on the results of the evaluation, the most suitable alternative(s) of the tested low GWP refrigerant technologies will be selected for conversion of the production line(s) at Alessa. Upon acceptance of the evaluation by the beneficiary company, the expert will prepare an investment project for conversion of the existing production line(s) at Alessa using the low-GWP refrigerants.

##### **c. Government commitment to complete project**

The Letter of Endorsement by the NOU is attached to the request for project funding.

#### **VIII. Company Information**

Alessa for Refrigeration and Air-conditioning Company (ARAC) is one of the largest manufacturers of air-conditioning units and refrigerators in the Kingdom of Saudi Arabia, and the Middle East. ARAC produces a range of air-conditioners window type and split AC units, floor standing units of a cooling capacity of from 9000 BTU/h to 60,000 BTU /h), as well as refrigerators, chest freezers and desert coolers of various size and capacity. The production of the window units constitutes about 80% of the total production of the air-conditioning units, the rest are decorative split units. The company has been participating in the PRAHA project and has expressed its willingness to undertake conversion of the manufacturing of air-conditioning units to the use of low-GWP refrigerants.

The letter of commitment by ARAC is attached to the request for project funding.

**IX. Budget**

The table below presents the budget allocation for the implementation of the preparatory project

<b>Activity</b>	<b>Costs [US\$]</b>
Critical Assessment of the prototype testing under the PRAHA project	20,000
Selection of the alternative refrigerant and preparation of the investment project	10,000
<b>TOTAL</b>	<b>30,000</b>

The above activities include expert fees and cost of organization of a stakeholder’s meeting for achievement of the project objectives.

## Project Concept

<b>Country:</b>	Turkey
<b>Title:</b>	Preparation of demonstration project for the phase-out of HCFCs by means of using HFOs as foam blowing agent in the manufacture of Reefers and truck trailer bodies.
<b>Project Duration:</b>	12 months
<b>Project Budget:</b>	US\$30,000 (excluding 7% Agency Support Costs)
<b>Demonstration project budget:</b>	US\$ 300,000 (estimated budget excluding ASC))
<b>Implementing Agency:</b>	UNIDO
<b>Coordinating Agency:</b>	Ministry of Environment

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## Project Summary

### Introduction for the Trailer truck body manufacturing

The insulation for the reefers and trailer trucks, which are used in the refrigeration industry's transportation equipment and as a part of important cold chains are mainly manufactured by means of polyurethane foam due to its superior thermal insulation properties and structural strength, when used as a core material for the sandwich panels. The outer size of the trailer truck bodies are limited by the road transport legislation up to 2,600 mm, and the interior size is maximized in order to facilitate most economical transportation, and should not be less than two times Euro pallet sizes in width. The polyurethane sandwich panels manufactured for this application need to have strong structural strength and adhesion to the surface materials; good foam flow-ability during the foaming operation and processing; good thermal insulation properties and easy processing of higher foam densities of 65 kg/m<sup>3</sup> and in some cases up to 80 kg/m<sup>3</sup>.

### Method

Polyurethane foams are widely employed for thermal insulation in the appliance and construction industries. Foam expansion agents are critical for providing the processing and insulation performance of these foams. HCFC-141b was once the choice of Montreal Protocol, but its use is now subject to phase out due to its ozone depletion potential (ODP). The current zero ODP options include hydrofluorocarbons (HFCs) and hydrocarbons, but these agents face further challenges. Both HFCs and hydrocarbons are characterized by increased thermal conductivities compared to the HCFCs, resulting in inferior insulation performance, and HFCs such as HFC-245fa and HFC-365mfc have global warming potentials (GWPs) near 1,000. In addition, the low boiling point of HFC-245fa and the flammability of hydrocarbons and HFC-365mfc present significant challenges to processing and handling. With the increased focus on global warming potential and energy efficiency, the industry is looking for a foam-blowing agent that is environmentally sustainable with superior insulation performance.

The characteristics described above are presently obtained by means of HCFC-141b foam blowing agent and high foam density with extremely good adhesion properties to the surface materials. In this demonstration project it is expected that the HFOs, such as HFO-1233zd or HFO-1336mzz(Z) will be able to meet these same high functional foam requirements. The HFO-1233zd is already commercialized and HFO-1336mzz(Z) will be commercially available from the year 2016.

It is expected that these HFO-foam blowing agent will facilitate high content of physical foaming agent and lesser amount of chemical blowing agent ((water based (CO<sub>2</sub>)). The adherence to the high physical foam blowing content foam systems will provide lower viscosity of foam systems with lower thermal conductivity even with foam densities up to 80 kg/m<sup>3</sup>.

The HFO-foam blowing agents HFO-1233zd and HFO-1336mzz(Z) are very low GWP chemicals, both less than 5, HFO-1233zd is claimed to be even less than 1. These molecules are also non-flammable and stable liquids at ambient temperature.

Due to the very low thermal conductivity, less than 11 mW/mK, which is comparable to the HCFC-141b's same of approximately 10 mW/mK, these chemicals provide a substitute chemical for the HCFC-141b with lower GWP.

## **Procedure**

The foam-blowing agent HCFC-141b will be replaced by means of

- a. Replacing equivalent amount of HCFC-141b with HFO /“drop-in method” or
- b. by means of adding HFO-premixing unit for the process.

In the “Drop-in method” the foam-blowing agent is mixed at the Chemical supplier's System House and the foaming is processed at the end user facility as previously with HCFC-141b.

In the case of having the premixing operation practiced at the end-user's facility. The premixing unit is required due to the shorter shelf-live of the HFO-pre-blends compared to the HCFC-141b same ones.

This selected foaming technology will be replicated within in short future to the other similar product manufacturers in Turkey and elsewhere. Further it is to be noted that this technology can be applied in the other polyurethane insulation manufacturing operations such as domestic and commercial appliances, production of sandwich panels for the high insulation requirements and for the spray foaming operations.

## **Counterpart selection**

The selection of the demonstration project counterpart will be from the refrigeration chain, manufacturer of the refrigerated trucks. There are several potential sites for the proposed demonstrations, listed below. Jointly with NOU there will be a selection process to determine the most suitable site for the demonstration. Potential sites are listed below:

1. Company Name:  
TIRSAN TREYLER SANAYI TICARET VE NAKLIYAT AS  
Business Owner: Omer Cetin Nuhoglu  
Employees: Above 1000 People  
Main markets: Eastern Europe, Southeast Asia, Africa, Middle East, Eastern Asia and Western Europe  
  
Contact Person: Mr. Safak Cengelci  
Zip Code: 34887  
Website: <http://www.tirsan.com>  
Address: Osmangazi mah yildizhan CAD, Istanbul, Istanbul, Turkey  
Telephone: 90-216-3118090; Fax: 90-216-3117156
2. Company Name: MAZER MAKINA POLIURETAN KAROSER SAN. Ve TIC. LTD.  
STI. [www.mazermakina.com](http://www.mazermakina.com)  
Contact person: Mr.Huseyin Oturmazer [info@mazermakina.com](mailto:info@mazermakina.com)
3. HAS DORSE FRIGO SAN. Ve TIC. A.S. [www.hastrailer.com](http://www.hastrailer.com)

Contact person: Mr.Emre Biberoglu emre.biberoglu@hasfrigo.com  
Machine: 200 kg. HP

4. PEHLIVAN KAROSER LTD. STI. [www.pehlivankaroser.com](http://www.pehlivankaroser.com)  
Contact: Mr.Adnan Pehlivan adnan@pehlivankaroser.com  
Machine: 200 kg. HP
5. BAYRAK KAROSER IMALAT SAN. Ve TIC. A.S. [www.bayrakkaroser.com](http://www.bayrakkaroser.com)  
Contact: Mr.Taner Bayrak bayrak@bayrakkaroser.com  
Machine: 100 kg. LP
6. KARAOGLAN TREYLER SANAYI - ANTAKYA [www.karaoglan.com.tr](http://www.karaoglan.com.tr)  
Contact person: Mr. Necmettin Karaoglan info@karaoglan.com.tr  
More than 15 years in the business  
Machine: 1 pc. "Cannon A-Compact 100" , 1 pc. "Cannon A-` Compact 200"  
Box dimensions: 60 x120 x 280 cms
7. BRF - ANTAKYA
8. YILDIZ TREYLER [www.yildiztreyleyler.com.tr](http://www.yildiztreyleyler.com.tr)

#### **Further information and ATP-agreement in regards to the trailer trucks**

ATP is an international agreement about equipment for food transport and is an abbreviation for "Agreement on the international carriage of perishable foodstuffs and on special equipment to be used for such carriage". The most used ATP classes are FNA and FRC. The letter F means fridge unit, N normal insulation, R heavy insulation. A covers temperatures +12 °C - 0°C and C +12°C - -20°C.

A type approval is needed to be able to produce ATP approved vehicles. Approved testing houses carry out the type approval tests. ATP approval means a certain insulation value of the body, a minimum effect on the fridge unit and that fridge and body are working together. To test the last mentioned a cool down test is carried out which proves that the fridge and body can pull down temp quick enough.

TIRSAN has a complete set of ATP type approved bodies and trailers with most equipment alternatives.

The ATP certificate is valid for 6 years after which the certificate can be renewed two times in periods of 3+3 years. An FRC body may also after 6+3+3+ years pass the test for an FNA certificate for 3 years. An approved bodies K-value may be maximum 0,70 W/m<sup>2</sup> for FNA. FNA is used for transport of chilled and warm goods that require a stable temperature in the intervall +12 °C - 0°C. Transport of frozen goods require ATP class FRC, with a K-value of maximum 0,40W/m<sup>2</sup>. TIRSAN's FNA- and FRC-solutions is presently weight wise very competitive.

### Expected Incremental Capital Cost (ICC)

The following capital expenditure is expected in the foreseen demonstration project

Activity	Estimated Cost	
	USD	USD
<b>Preparative work</b>		
Project preparation	40 000	70 000
Technology transfer and training	30 000	
<b>Trials</b>		
Purchase of materials	40 000	64 000
Testing of end product foam and sandwich (physical properties)	18 000	
Retrofit of foaming machine	6 000	
<b>Additional equipment</b>		
Premixing unit	60 000	60 000
<b>Trials</b>		
Evaluation Report	12 000	37 000
Workshop	25 000	
Contingencies		23 100
<b>TOTAL</b>		<b>254 100</b>

It is assumed that the costing for future “standard” investment project, for HFOs blowing, will be similar or even identical as for HFC 245fa blowing (see Annex)

### Expected Incremental Operating Cost (IOC)

comparison with current blowing agent and other alternatives.

IOC is calculated based on the price level of HFO (Solstice LBA) 2015. It is expect that the cost of HFO will be reduced by the market demand increase and commercial availability of Duponts’s FEA-1100 starting from the year 2016.

IOC	HCFC-141b			HFO-1233zd			c-pentane			Water-blown / Formic Acid		
	Formula	%	Cost/kg	Formula	%	Cost/kg	Formula	%	Cost/kg	Formula	%	Cost/kg
Polyol	100	38,46%	2,46	100	38,17%	2,46	100	37,45%	2,46	100	37,95%	2,46
B.A	20	7,69%	3,00	22	8,40%	13,00	12	4,49%	2,60	3,5	1,33%	2,46
MDI	140	53,85%	2,18	140	53,44%	2,18	155	58,05%	2,18	160	60,72%	2,18
<b>Total</b>	<b>260</b>	<b>100,00%</b>	<b>2,35</b>	<b>262</b>	<b>100,00%</b>	<b>3,20</b>	<b>267</b>	<b>100,00%</b>	<b>2,30</b>	<b>263,5</b>	<b>100,00%</b>	<b>2,29</b>
<b>Thermal conductivity mW/mK</b>			<b>23</b>			<b>21</b>			<b>25</b>			<b>31</b>
<b>Equivalent cost USD</b>			<b>2,35</b>			<b>2,92</b>			<b>2,50</b>			<b>3,09</b>
Average foam weight kgs of 16 m trailer	916		2153	916		2672	916		2294	916		2827
<b>IOC / trailer USD</b>						<b>519</b>			<b>140</b>			<b>674</b>

## Annex

*Extract from Executive Committee Decision 55/47 – Guide for Costing*

Equipment item	HFC-245fa		Water/CO2		Pentane	
	Low	High	Low	High	Low	High
<b>Production</b>						
Replacement of low pressure with high pressure dispenser	60,000	100,000	60,000	100,000	90,000	170,000
Retrofit of high pressure dispenser	10,000	15,000	10,000	15,000	60,000	100,000
Retrofit of pre-mixing unit (where eligible)	-	10,000	-	10,000		
Replacement of pre-mixing unit	20,000	60,000	20,000	60,000	55,000	85,000
Modification of press					15,000	25,000
Hydrocarbon tank and accessories (piping and pumps, ventilation)					20,000	55,000
Buffer tank for polyol					10,000	15,000
Nitrogen supply system					10,000	40,000
<b>Plant safety</b>						
Ventilation and exhaust system (fans, piping, ductworks, grounding, electrical boards/connections)					15,000	85,000
Heating, ventilation and enclosure for cabinet plant (domestic refrigeration)					40,000	50,000
Heating, ventilation and enclosure for door plant (domestic refrigeration)					40,000	50,000
Gas sensors, alarm, monitoring system for entire plant					25,000	50,000
Fire protection/control system for the plant					-	10,000
Lightning protection and grounding					15,000	25,000
Antistatic floor					-	5,000
Safety audit/Safety inspection & certification					10,000	25,000
Stand-by electric generator					-	15,000
<b>General works</b>						
Civil work/plant modifications					20,000	25,000
Technology transfer/training	10,000	20,000	5,000	10,000	20,000	30,000
Trials and commissioning	10,000	15,000	10,000	20,000	10,000	20,000
<b>Total</b>						
Total retrofit	30,000	60,000	25,000	55,000	375,000	710,000
Total replacement	100,000	195,000	95,000	180,000	385,000	780,000



## PROJECT PREPARATION FUNDING REQUEST

<b>Project title:</b>	Demonstration Project on the use of compact high-pressure foaming equipment for the safe introduction of pentane technology to SMEs
<b>Country</b>	Morocco
<b>Project preparation fund</b>	US\$ 40,000 (excluding ASC) – UNIDO
<b>Estimated project budget</b>	US\$ 250,000 (estimated) – UNIDO and Italy
<b>Estimated duration</b>	12 months (plus 6 months for project preparation)
<b>Implementing agency</b>	UNIDO and Italy as bilateral executing agency
<b>Coordinating agency</b>	NOU

### 1. Background and Justification

In 2007, the Parties to the Montreal Protocol agreed to accelerate the phase-out of the hydrochlorofluorocarbons (HCFCs) as the main ozone depleting substances largely because of the substantive climate benefits of the phase-out. In the following years, Parties operating under the Montreal Protocol's Article 5 (mostly developing countries) have formulated their HCFC Phase-out Management Plans (HPMPs) for implementation under financial assistance from the Multilateral Fund for the implementation of the Montreal Protocol (MLF).

The Executive Committee in decision 72/40 agreed to consider proposals for demonstration projects for low-GWP alternatives and invited bilateral and implementing agencies to submit demonstration project proposals for the conversion of HCFCs to low-global warming potential (GWP) technologies in order to identify all the steps required and to assess their associated costs.

In particular, Par (b)(i)a. of Decision 72/40 indicates that project proposals should propose options to increase significantly in current know-how in terms of a low-GWP alternative technology, concept or approach or its application and practice in an Article 5 country, representing a significant technological step forward.

The design and introduction of compact foaming equipment for the safe introduction of pentane technology to SMEs fully fits the actual ExCom decision on demonstration project proposals as defined in ExCom Decision 72/40.

### 2. Project objectives

- Reduce the breakeven point for the introduction of pentane technology to SME in the manufacturing of PU foam
- Demonstrate the easy applicability of the technology and, consequently, the replicability of the results to SMEs, in particular those currently relying on pre-blended polyol systems

### **3. Project Description**

The use of pentane and other HC has proven to be the most accepted alternative technology for the replacement of HCFC-141b in the manufacturing of PU foam products. However, initial investment costs are critical for its introduction and limit the feasibility of the choice only to those large manufacturing companies, ensuring a stable, continuous and intensive manufacturing process.

SMEs are therefore usually excluded from the selection of pentane units, despite pentane would be the most suitable technical choice with regard to their final products.

The object of this proposal is to demonstrate the possibility of reducing the initial investment costs of the high-pressure pentane foaming equipment by designing a compact system to use HC pre-blended polyols.

The project aims at testing one high pressure polyurethane dosing unit ready for pentane formulation. The machine has been designed with the target to offer a simple, cheap, reliable and easy handling unit which could be considered as a solution for customers who do not have high production rate, in particular SMEs.

In order to allow the safe use of pentane formulation, the unit will include all necessary safety elements of the wet part, including dedicated safety system which will permit to detect and control the possible dangerous conditions that might occur in the normal utilization of the unit.

The project results will be extremely relevant for those beneficiaries to be largely covered under Stage II of HPMP, meaning those companies currently relying largely on pre-blended polyol systems.

### **4. Description of Methodology**

During the project preparation phase, UNIDO, in coordination with the NOU, will identify the most suitable beneficiary among those companies using pre-blended polyol systems in Morocco and listed as eligible companies in HPMP-I Stage.

The Project preparation will identify the main engineering components for the development of a

compact unit for the use of pentane in pre-blended polyol system.

The machine will be compliant with main safety directives (e.g. CE Directive 2006/42/CE, or similar) and it will be requested to be provided with necessary conformity declaration (e.g. Declaration of Conformity type B, according to the Annex II of CE Directive, or similar).

The design of the services to be provided includes:

- Isocyanate Line, including Pneumatic pump for isocyanate loading into machine day tank, tank group and dosing group
- Polyol+Pentane line, including pneumatic pump for polyol/cyclopentane loading into machine day tank, tank group and dosing group
- Control Panel
- Dedicated Mixing Head, inclusive of hydraulic unit for mixing head operation to run the high pressure mixing head
- Engineering support to cover (among others) engineering for chimneys and canalizations, civil works for ventilation system for the dry area, electrical drawings and electrical lay-out, safety report, manuals on correct and safe use of the machine (operation and maintenance)
- Sensors and ventilation for the wet part
- Safety electric control panel
- Installation, start-up and training

## **5. Expected demonstration results**

The compact pentane technology is supposed to contribute significantly to allow the technology to penetrate among SMEs, in particular those currently using pre-blended polyol systems.

Considering that the pentane technology allows significant savings in operational costs, the demonstration project may provide the Multilateral Fund with a technical option for a cheap conversion of SMEs.

## 6. Institutional arrangements and Company Information

The DEMO project will be fully implemented in coordination with the NOU and in full coordination with the activities implemented under the HPMP-I stage and the beneficiary will be selected among those in the list of eligible companies using pre-blende polyol systems.

## 7. Budget

Table 1 below presents the budget allocation for the implementation of a preparatory project

**Table 1.**Tentative budget allocation per activity

Description	Costs [US\$]
Selection of 1 project beneficiary	30,000
Formulation of full demonstration project	10,000
<b>TOTAL</b>	40,000

The Letter of Endorsement by the NOU is following in the shortest time possible. Preliminary endorsement by verbal communication was received on 19 March 2015.



## PROJECT PREPARATION FUNDING REQUEST

<b>Project title:</b>	Demonstration project on the technical and economic advantages of the Vacuum Assisted Injection in discontinuous panel's plant retrofitted from 141b to pentane
<b>Country</b>	South Africa
<b>Project preparation fund</b>	US\$ 40,000 (excluding ASC) – UNIDO
<b>Estimated project budget</b>	US\$ 400,000 (estimated) – UNIDO and Italy
<b>Estimated duration</b>	12 months (inclusive of 6 months for project preparation)
<b>Implementing agency</b>	UNIDO and Italy as bilateral executing agency
<b>Coordinating agency</b>	NOU

### 1. Background and Justification

In 2007, the Parties to the Montreal Protocol agreed to accelerate the phase-out of the hydrochlorofluorocarbons (HCFCs) as the main ozone depleting substances largely because of the substantive climate benefits of the phase-out. In the following years, Parties operating under the Montreal Protocol's Article 5 (mostly developing countries) have formulated their HCFC Phase-out Management Plans (HPMPs) for implementation under financial assistance from the Multilateral Fund for the implementation of the Montreal Protocol (MLF).

The Executive Committee in decision 72/40 agreed to consider proposals for demonstration projects for low-GWP alternatives and invited bilateral and implementing agencies to submit demonstration project proposals for the conversion of HCFCs to low-global warming potential (GWP) technologies in order to identify all the steps required and to assess their associated costs.

In particular, Par (b)(i)a. of Decision 72/40 indicates that project proposals should propose options to increase significantly in current know-how in terms of a low-GWP alternative technology, concept or approach or its application and practice in an Article 5 country, representing a significant technological step forward.

The use of the vacuum assisted technology for the application of alternatives to HCFCs fully fits the actual ExCom decision on Demonstration project proposals as defined in ExCom Decision 72/40.

## **2. Project objectives**

- Demonstrate benefits from the application of the vacuum assisted injection in replacement of HCFC-141b with pentane in term of insulation properties in the panel's sector
- Demonstrate the easy applicability of the technology and, consequently, the replicability of the results

## **3. Project Description**

Quality of PU panel relies, in most of the application, on the insulation property. Considering the PU physical properties, insulation of final products can be influenced by the Lambda value of the blowing agent and the thickness of the foam.

Therefore, one of the critical points in the retrofitting from 141b to blowing agents with lower Lambda value (e.g. pentane), is the losses in insulation properties. However, the favourable conditions generated by the vacuum during the blowing of the foam allows to increase the insulation performance of the media, allowing a better insulation property of the final product while maintaining the density and thickness of the foam.

Aim of the project is to evaluate the technical advantages of the vacuum assisted injection in discontinuous panel's plant working with pentane, focusing on those applications where insulation is key and thickness is not modifiable. The Vacuum injection technology will give advantages to a pentanized plant in term of:

- Decreased lambda value
- Better foam distribution
- Decreased demolding time of 30%

The above will generate dramatic technical improvements in the final predicts as well as reduction in terms of operation costs (reduction of time for manufacturing as well as reduction of raw materials).

The project results will be extremely relevant for those sectors where insulation property of final products is crucial and thickness of panels cannot be increased (e.g. panels for refrigerated trucks, refrigerated containers, etc.)

#### 4. Description of Methodology

In the selection of the most suitable partner for the application of the vacuum assisted technology, priority will be given to those companies already converted to pentane. If no converted-beneficiaries are suitable for the purpose of the demonstration project, then an eligible beneficiary will be selected and the project will include the implementation of:

- Pentanization of the plant (if needed)
- Retrofitting kit to vacuum injection technology of the existing presses

Should a suitable beneficiary already converted been identifies during the project preparation phase, the project will only focus on the implementation of the retrofitting kit to vacuum injection technology (point 2 above).

- Pentanization of the plant

The pentanization will include: Pentane storage, Premix unit, Dosing unit (retrofit or substitute the existing one), Safeties for the use of flammable blowing agent (safety control panel, gas sensors, ventilators...), engineering services for the pentanization, safety report and White book and certification (TUV or similar).

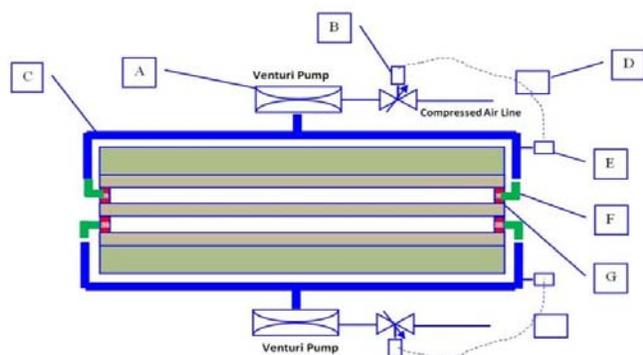
##### 1- Retrofitting kit to vacuum injection technology

The retrofitting kit to vacuum injection technology will include three main components: vacuum unit, vacuum plant and vacuum moulds, (as explained below).

#### VACUUM UNIT

System where the vacuum is generated and controlled.

This includes vacuum pumps, control valves, sensors, control hardware and software. The unit can control the level of vacuum in the cavity, the duration of the process and can store different recipes according to different kind of panel models, with optimized parameters.



#### VACUUM PLANT

This part is to connect the vacuum up to the cavities where PU foam is injected. Objective is to keep the normal movement of the press and the press platens and reduce costs of retrofitting.

## VACUUM MOULDS (SIDE MOULDS OR PROFILES)

Moulds are to define the shape of the panel, especially its external shape and dimensions. The scope of supply considers a complete additional set of molds designed to create the vacuum inside the press cavity.



Each side mold will be equipped with connections for connecting the cavity to the vacuum plant, vacuum distribution in the whole cavity and a dedicated injection holes able to maintain the vacuum level even at the insertion of the injection head.

### **5. Expected demonstration results**

The Vacuum injection technology is supposed to give dramatic technical advantages to a pentanized plant in term of decreased lambda value, better foam distribution and decreased demolding time by 30%.

Furthermore, the technology will allow companies to reduce the use of raw materials by generating thinner panes with same insulation properties.

### **6. Institutional arrangements and Company Information**

The DEMO project will be fully implemented in coordination with the NOU and in full coordination with the activities implemented under the HPMP-I stage. In the selection of the most adequate and cost effective conversion, priority will be given to those beneficiaries already assisted under Stage I of the HPMP.

## 7. Budget

Table 1 below presents the budget allocation for the implementation of a preparatory project

**Table 1.** Tentative budget allocation per activity

<b>Description</b>	<b>Costs [US\$]</b>
Selection of 1 project beneficiary and assessment of their technological status in terms of required measures for the most cost-effective application of the vacuum assisted technology in PU discontinuous panel manufacturing	30,000
Formulation of full demonstration project	10,000
<b>TOTAL</b>	<b>40,000</b>

The Letter of Endorsement by the NOU is following in the shortest time possible. Preliminary endorsement by verbal communication was received on 19 March 2015.

## Project Concept

<b>Target countries:</b>	<b>Tunisia and Argentina</b>
<b>Title:</b>	<b>Concept on demonstration project in the refrigeration assembly sector</b>
<b>Project Duration:</b>	<b>Nine months</b>
<b>Project preparation budget:</b>	<b>US\$ 60,000 (excluding ASC)</b>
<b>Demonstration project budget:</b>	<b>US\$ 1,000,000 (estimated)</b>
<b>Implementation Agency:</b>	<b>UNIDO</b>
<b>Coordinating Agency:</b>	<b>NOU's of Tunisia and Argentina</b>

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## Project Summary

### Background

As explained in UNEP/OzL.Pro/ExCom/72/40, in Article 5 countries a substantial amount of HCFC-22 is used in systems which are charged on-site, such as supermarkets and condensing units. However, since components of supermarket systems and condensing units are not being charged at manufacturing sites, and therefore the related enterprises have no HCFC consumption in manufacturing, the Executive Committee has considered this sector in the refrigeration servicing sector.

As confirmed by ExCom Dec 60/44 and consistent with decision 31/45 of the Executive Committee, incremental operating costs are not considered for enterprises categorized under the refrigeration equipment assembly, installation and charging sub-sector.

### Project rationale

As mentioned above, substantial amounts of HCFC-22 are used in systems which are charged on-site. There are also several countries, which have large newly installed R-22 capacities (after 2010), among others, also due to ban of HCFC-based manufacturing in Article 2 countries.

Currently the main barrier for introducing low-GWP alternatives in this sector in Article 5 countries is the non-availability of components and know-how related to the new technology as well as the initial cost implication. For this reason, even when end-users decides to phase-out HCFC-22 from the installation, the likelihood that they would opt for HFC's (HFC-404A) is rather high as it is the technology that requires the least modification and thus, is the least costly solution. As a result, beyond the phase-out of HCFC-22, it is highly unlikely to gain additional climate and environment benefit (direct and indirect) to the actual HCFC phase-out.

Therefore, it is meaningful and desirable to work out a new project concept that would address the issue of the non-availability of components to low-GWP alternatives as well as related know-how in the assembly sector.

### Proposed technology

We propose to develop a demonstration project to tackle the phase out of HCFC-22 consumed in the refrigeration assembly sector. The project will look into various aspects such as technology viability, incremental operating costs, energy and climate benefits in order to develop an integrated store concept introducing low-GWP alternative technology (in particular CO<sub>2</sub>) and optimizing energy consumption

The project will consider introducing trans-critical CO<sub>2</sub> and/or CO<sub>2</sub>/low-GWP cascade systems in selected supermarkets. In addition to the phase-out of HCFC-22 the project will address long-term, sustainable development taking also into consideration reduction of electricity needs in peak hours. Examples of such activities could be heat recovery or thermal storage; potentially in combination with renewable energy sources.

The R22 quantities used in such systems are large and the use of alternative refrigerants would significantly contribute to the country's compliance

The project could make the related know-how in assembly companies accessible in the medium-term.

We suggest implementing the demonstration project in two different countries namely Tunisia and Argentina in order to generate the highest degree of lessons learned and replicability in various conditions.

It should be noted that in Tunisia, a research team in an academic institution is currently conducting research work on CO<sub>2</sub>-based systems for commercial and industrial applications. The project will benefit from their work and will help them have an application to it.

### **Outline of proposed project activities**

The proposed demonstration project requires a two-phase deployment:

Phase I: Project Preparation Phase

Phase II: Implementation of Demonstration Project.

The preparatory phase during which the demonstration project will be designed is to last nine months.

The activities to be carried out during this first phase are shown in Table1:

**Table 1.** Phase I activities

<b>Activities</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>
Data and information collection in the retail sector			
Design of an integrated store concept			
Development of terms of references for the selection of a pilot supermarket			
Project design			
Project document preparation			

### **Expected outcome**

- The implementation of the proposed demonstration project is expected to make the know-how in the assembly sector available
- Replacement of HCFCs will facilitate the country's compliance with reduction targets set by the Montreal Protocol
- Validation of technical, economic and environmental viability of CO<sub>2</sub> technologies in the retail sector in various ambient conditions

- Possible future conversion to CO2 technologies of other retail companies in different countries.

**Tentative budget**

Table 2 below presents a tentative budget allocation (US\$ 60,000) for Phase I: Project preparation activities.

**Table 2.** Tentative budget allocation per activity within the Phase I activities

Description	Costs [US\$]
International consultants	20,000
National consultant	5000
Travel costs	20,000
Preparation of project document	15,000
<b>TOTAL</b>	60,000

The budget for the second phase, i.e. the implementation of the demonstration project in Argentina and Tunisia is tentatively estimated to US\$ 1,000,000.

## Project Concept - Preparation Funding Request

<b>Country:</b>	Egypt (phase I) and GCC region (Phase II)
<b>Title:</b>	Preparation of a Demonstration Project on Refrigerant Containment and Refrigerant Leakage Prevention in High Ambient Temperatures
<b>Preparatory Project Duration:</b>	12 months
<b>Preparatory Project Budget:</b>	US\$ 50,000 (excluding ASC)
<b>Demonstration Project Budget:</b>	US\$ 150,000 (estimated for phase I + phase II)
<b>Implementing Agency:</b>	UNIDO
<b>Partner Agencies:</b>	National Ozone Units

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### II. Introduction

In 2007, the Parties to the Montreal Protocol agreed to accelerate the phase-out of the hydrochlorofluorocarbons (HCFCs) as the main ozone depleting substances largely because of the substantive climate benefits of the phase-out. In the following years, Parties operating under the Montreal Protocol's Article 5 (mostly developing countries) have formulated their HCFC Phase-out Management Plans (HPMPs) for implementation under financial assistance from the Multilateral Fund for the implementation of the Montreal Protocol (MLF).

The Executive Committee in decision 72/40 agreed to consider proposals for demonstration projects for low-GWP alternatives and invited bilateral and implementing agencies to submit a limited number of demonstration projects for the conversion of HCFC in the refrigeration and air-conditioning subsectors to low-global warming potential (GWP) technologies in order to identify all the steps required and to assess their associated costs.

Leakage of refrigerants from industrial refrigeration and air conditioning (RAC) systems is contributing substantially to direct emissions of refrigerants into the atmosphere and thus contributing to ozone layer depletion and global warming. Under the regulations adopted in A-2 countries (such as the EU F Gas Regulations) operators of RAC systems are required to perform regular leak testing and must not add more refrigerant without first identifying and repairing the source of the leak. There are also strict requirements on recovery of refrigerant from systems, recording of refrigerant use and labelling of equipment. Such regulations are expected to be adopted by A-5 countries hence it is needed to ensure operators of RAC systems in A-5 countries will be able to comply with the regulations and reduce potential and actual sources of refrigerant leakage.

### III. Brief Project Summary

There are currently no immediate and wholesale alternatives for replacement of HCFC-22 and other HCFCs in the refrigeration and air-conditioning sector in A-5 countries. That is why the bulk replacement of HCFCs in RAC sector is not being addressed under Stage I of the in HPMP projects but will be addressed under subsequent stages to be implemented from 2015 onwards. For stage I of the HPMP projects, the beneficiary countries proposed to achieve some reduction of HCFC refrigerants by activities such as certification schemes for RAC

workshops, establishment of recovery, recycling and reclamation (RRR) schemes as well as promotion programmes for alternative refrigerants. All these are medium- to long term solutions and it is difficult to estimate and predict their impact in real life conditions of an A-5 country.

The methodology to be used by the demonstration project will be based on the results of the Refrigerant Emissions and Leakage Zero project (REAL Zero) in order to achieve reductions in refrigerant leakage through improved awareness, education and training. It is a structured methodology for undertaking site surveys and assessing and minimizing leakage potential, together with an e-learning training scheme, software tools and guidance notes. A particular benefit for countries with less well developed RAC training schemes is that it can help them to achieve a more rapid and effective implementation, by learning from the experience of more advanced partner countries.

The combined environmental and financial impact of refrigerant leakage is significant. It is therefore no wonder that end users are beginning to change the way they think about refrigerants. Until recently, refrigerants have been regarded as a consumable and regular expenditure item. However, end users are now starting to value their refrigerant stock as part of their asset base, which needs to be protected. Operators of RAC equipment, RAC service workshops and NOUs in participating A-5 countries will be direct beneficiaries of the project. Dissemination of results from the demonstration project will also provide benefits to the entire community of A-5 parties to the Montreal Protocol, as well as the MLF Executive Committee and MLF Implementing Agencies.

#### **IV. The Project Objectives**

The proposed demonstration project will promote a proactive approach to refrigerant containment and leakage reduction through education and awareness as well as application of best practices in service/maintenance of RAC equipment as a short-term measure and demonstrate achievable impact on the extent of reduction virgin refrigerant use. The demonstration project will result in increased awareness of the effectiveness and cost-efficiency of refrigerant containment and leakage reduction approaches in A-5 countries. Its replication will provide capacity and local expertise in other A-5 countries to conduct site surveys for refrigerant containment and leakage reduction. The project methodology would be easily replicated in other A-5 countries and eventually incorporated into stage II HPMPs in several A-5 countries.

#### **V. Expected Demonstration Results**

The following outputs will be direct results of the demonstration project:

- Trained advisors able to conduct site surveys for refrigerant containment and leakage reduction
- Results of site surveys of RAC equipment in industrial/commercial installations in Egypt compiled and evaluated
- Real case data on impact of refrigerants containment and leakage reduction in RAC service sector industrial/commercial systems available for calculation of environmental impact
- E-learning module with guidelines for conduct of site surveys for refrigerant containment and leakage reduction elaborated
- Raised awareness of relevant stakeholders and their understanding of achievable impact on reduction of refrigerants consumption through refrigerant containment and leakage reduction

#### **VI. Institutional arrangements**

b. Legal and regulatory support

The demonstration project will be implemented with full support and cooperation with the National Ozone Unit of Egypt who is responsible for transformation of the domestic refrigeration and air-conditioning sector. The demonstration project will be complementary to recovery and recycling activities implemented under the HPMP.

c. Description of implementation approach

Under the preparatory project, UNIDO will use consultancy services for preparation of a methodology suited for Article-5 countries. The methodology will consist of the following main elements:

- Training programme on site surveys and inspection methodology for developing leakage reduction strategies, with templates for data capture, analysis and reporting
- Logbooks for RAC systems with mandatory regular leak testing and identification/repair of the leak source before adding more refrigerant
- E-module with guidance for data collection and calculation templates for demonstration of achievable impact on reduction of consumption of virgin HCFC/HFC refrigerants through leakage monitoring and reduction

d. Government commitment to complete project

The Letter of Endorsement by the NOU is attached to the request for project funding.

## VII. Company Information

The MLF-funded Regional Demonstration Project for Replacement of CFC Chillers identified a number of at that time CFC chiller operators in Egypt who either with the assistance of the UNIDO project or at their own initiative recently installed new chillers. It is suggested to target the owners of the newly installed chillers as they are known to the NOU and the implementing agency as well as other known owners of relevant RAC industrial and/or commercial installations. In phase I, the demonstration project will be implemented in Egypt only. After evaluation of the results, phase II will target owners of RAC installations in the countries in West Asia region, such as Saudi Arabia, Kuwait, Oman, Qatar and Bahrain.

## VIII. Budget

Table 1 below presents the budget allocation for the implementation of the preparatory project.

**Table 1.** Budget allocation per activity of the preparatory project

Description	Costs [US\$]
Design of a training programme for site surveys on refrigerant containment and leakage reduction	10,000
Development of an e-learning module with guidances on data collection and calculation templates	10,000
Pilot testing of the training programme and the e-learning	30,000
<b>TOTAL</b>	50,000

## Project Concept

<b>Country:</b>	Regional (Kenya, Rwanda, Uganda, Tanzania and Zambia)
<b>Title:</b>	Demonstration project to Ensure Safety Standards and Market Availability of High Quality Refrigerants.
<b>Project Duration:</b>	12 months
<b>Project Preparation Budget:</b>	US\$ 100,000 (20,000 per Country), excluding ASC
<b>Demonstration Project Budget:</b>	<i>US\$ 750,000 (150,000 per Country)</i>
<b>Implementing Agency:</b>	UNIDO
<b>Partner Agencies:</b>	National Ozone Units (NOU) and Natural Resources and National Bureau of Standards.

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### I. Introduction

#### a. Low quality refrigerants availability

The quality of refrigerants available in the many African countries is of major concern in relation to the development of the refrigeration servicing sector and the proper adoption of best practices. The problem is more severe in particular LVCs, where fake refrigerants are being distributed. In general the purity of virgin refrigerant is not questioned, and most technicians assume the refrigerant in a cylinder is "pure enough" unless the RAC system is having failures or shows cooling problems. Furthermore, even if a technician suspects the refrigerant is somehow contaminated, there is no proper mechanism/strategy to detect or avoid low quality refrigerant.

Beyond the drop in cooling capacity and consequent lowering of energy efficiency of equipment; contaminated, mixed or recovered refrigerants may damage the compressor and could end vented to the atmosphere increasing the consumption as well.

#### b. Safety standards for alternative refrigerants

In parallel, use of new refrigerants or technologies is introduced, among other, hydrocarbons (HC), hydrofluorocarbons (HFC) and hydrofluoroolefins (HFOs). However, since some of the alternatives are flammable, these refrigerants and the technologies using them may need specific standards on safety and environmental requirements in order to allow their commercialization and marketing. In January 2014 the members of the International Standard Organization (ISO) approved a relaxation of the requirements on the use of some of these flammable substances; so-called A2L refrigerants. Based on this new classification ISO 817.2, the amendments introduced in ISO 5149 establish new standard requirements for the use of these lower flammable refrigerants.

#### c. Why this particular project is relevant and necessary to HCFC phase-out

The distribution of fake refrigerants and the promotion of the alternatives with lower flammability and specific standards should be tackled in parallel to avoid the potential introduction of fake or mixture of A2L class refrigerants in the future. The influence of these factors on the overall success of HCFC phase-out management

plans is significant, particularly in Africa where distribution chains of high-quality refrigerants are less developed and international safety standards are not applied, or only to a limited extent. UNIDO believes that the results and the lessons learnt of this demonstration project could contribute largely to the strategies of stage II HPMPs in Africa.

d. Justification/description of project replicability

The HCFC-22 available in some countries is cheap and in many cases fake refrigerant including mixture of recovered refrigerants and hydrocarbons. The cylinders usually have all the requirements including CAS and UN numbers but containing different blends or just recovered refrigerant that potentially ends being vented and adding more consumption. Good quality refrigerant and good refrigeration practices ensure lower HCFC consumption and reduce the emissions. Furthermore, the adoption to low-global-warming-potential alternatives and further reduction of the environmental impact of HCFC phase-out calls for additional assistance from the side of the implementing agencies. The flammability of potential ozone-and climate-friendly alternatives necessitates specific standards on safety and environmental requirements in order to allow their commercialization and marketing.

This situation is common in several African countries and therefore the lessons learned with this demo project can be replicated through the Continent and be adapted to the requirements of each country.

## **II. Project summary**

The project implementation includes two main activities: to ensure the refrigerant quality in the market and to introduce safety standards on refrigerants. In both cases a survey for market assessment to evaluate the actual situation, identify all stakeholders that may be involved and define the best strategy for the project implementation is planned. The project will assess the status of the market at the beginning of project implementation to map the situation and collect concerns and identify opportunities. Thus the survey includes assessment of national capacity to implement the ISO standards on safety and environmental sound handling of refrigerants, such as laboratories and resources available for testing and purity checking of the refrigerants, presence of certification and monitoring, etc.

For the implementation of the quality assurance NOUs and UNIDO will adopt, on a trial basis, the identified certification and monitoring scheme to ensure the refrigerant-quality check on the marketed refrigerants. It is planned to make the refrigerant importers and distributors responsible for the quality of the refrigerant and work out a scheme for requiring certification of the quality to the suppliers. This will force importers and distributors to ensure refrigerant quality refrigerants. Stakeholders will be informed on the project at large, including custom authorities, importers, technicians and main end-users. Enough advanced refrigeration identifiers kits will be provided, according to the selected strategy, and certification scheme will be put in place. UNIDO and NOU will also establish a scheme to monitor the refrigerant market to identify whether the project has caused or stimulated any changes in the refrigerant quality.

The present status of the technology and tools used both in the manufacturing and service sector will be analyzed, as well as the countries' possible earlier involvement in the implementation of ISO standards. For this a demonstration of one of these low GWP technologies at an end-user would be carried out. The objective will be to demonstrate different technologies in all the countries. This assessment will provide UNIDO with a clear picture on what is necessary to build on in each country in order to fully introduce and implement the revised ISO standards on proper handling of refrigerants and refrigeration technologies.

### III. Project objectives

- Identify the proper strategy for LVCs in Africa to ensure that refrigerant quality is properly tested before refrigerants are placed on the local market;
- Foster the market availability of high-quality refrigerant;
- Increase the awareness among technicians and end-users on the benefits to the RAC performances from the use of high-quality refrigerants;
- Assisting Article 5 countries in fully adopting low-global-warming-potential alternatives and further minimizing the environmental impact of the HCFCs phase-out
- To provide technical, strategic and coordination support to relevant national authorities to implement these new ISO standard requirements and, eventually, more stringent measures.
- Identify and overcome main barriers to commercialization of flammable refrigerants and technologies.

### IV. Expected demonstration results

Thanks to the technical, strategic and coordination support that UNIDO provides to relevant national stakeholders, the beneficiary countries should be able to use better quality refrigerants under the appropriate safety and environmental standards.

The project targets the below main results:

- Pre-implementation analysis

In synergy with the HPMP and the implementation of the servicing sector, all stakeholders identified may be involved in the national strategy for the adoption of a monitoring and certification scheme. National capacities will be assessed to implement the ISO standards on safety and environmental sound handling of refrigerants, such as laboratories and resources available for testing and purity checking of the refrigerants, presence of certification and monitoring, etc. Furthermore, a market research will be carried out and the technologies and tools used will be also assessed.

- Regional Expert Group Meeting on Safety and Environment Standards

An expert group meeting, composed of international experts from the private sector, the academia, the government and the international standards bodies, like the East African Standards Committee (EASC), ISO and the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), will be called at regional level to propose technical aspects relates to standards on refrigerants and their safe handling in light of the identified national needs. The scope of the Expert Group Meeting is to provide the national relevant authorities (i.e. NOU and Bureau of Standards) with useful recommendations to support the consideration of the revision of the national standards.

- Create a certification and monitoring scheme and implement on a trial basis

The identified certification and monitoring scheme of the “refrigeration quality” strategy will be adopted on a 3-month-trial basis, to ensure the refrigerant-quality check on the marketed refrigerants.

- Elaboration of lessons learned and dissemination of project results

UNIDO and NOU will also establish a scheme to monitor the changes of the refrigerant market and the refrigerants’ quality. The results from the project will be assessed and compiled with the aim of adopting a strategy on refrigerant quality as part for the II stage HPMP.

## V. Tentative budget

Table 1 below presents the budget allocation (US\$ 20,000/Country) for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

Description	Costs [US\$]
Pre-implementation analysis	4,000
Regional Expert Group Meeting on Safety and Environment Standards	6,000
Create a certification and monitoring scheme and implement on a trial basis	8,000
Elaboration of lessons learned and dissemination of project results	2,000
<b>TOTAL</b>	<b>20,000</b>

## VI. Institutional arrangements

### a. Brief information on legal and regulatory support for the demonstration project

The proposal is supported by the National Ozone Units of the target countries and is consistent with the long-term strategies of the beneficiary Governments and will be implemented in full synchrony with the ongoing HPMPs. National authorities, such as Customs and Bureau of standards will also be involved in the project implementation.

### b. Description of implementation approach

The project will be implemented by the appointed UNIDO project manager in close cooperation with the below national stakeholders:

- National Ozone Units;
- Refrigerant importers
- Vocational schools;
- Customs authorities;
- National Bureau of Standards.

In regard to the safety and environmental standards, UNIDO will rely on its in-house expertise and involve the Trade Capacity-Building Branch.

### c. Government commitment to complete project in 12 months

Commitment letters from the Governments are attached.

## Project Concept

<b>Countries:</b>	Bahamas; Grenada; St. Lucia; St. Vincent and the Grenadines; Suriname
<b>Title:</b>	Demonstration project on HPMP Stage II refrigeration and air-conditioning servicing sector activities, with focus on low-GWP flammable refrigerants
<b>Project Duration:</b>	12 months
<b>Project Preparation:</b>	US\$ 60,000 (excluding ASC)
<b>Demonstration Project:</b>	US\$ 613,000 (Estimated)
<b>Implementing Agency:</b>	UNIDO
<b>Cooperating Agency:</b>	NOU's

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## Project Summary

### 1. Background

The phase-out of hydrochlorofluorocarbons (HCFCs), specifically in the refrigeration and air-conditioning sector, has brought about a broader discussion on suitable long-term alternatives. The readily available refrigerant alternatives, such as hydrofluorocarbons (HFCs) e.g. R410A and R407C however, have high global warming potentials (GWPs). The refrigeration and air-conditioning manufacturing sectors worldwide, are thus gearing towards the use of low-GWP alternatives, such as hydrocarbons and novel refrigerant formulations, such as R32 and HFOs (hydrofluoroolefins), which are designed to have short atmospheric lives.

Therefore, countries in the Latin-American and Caribbean (LAC) region with significant R&A/C service sectors, such as: The Bahamas; Grenada; St. Lucia; St. Vincent and the Grenadines; and Suriname, must be well trained and equipped to cope with the installation and maintenance demands of next-generation appliances. HCs, as well as HFOs, have zero ODP and low-GWP properties; however, both refrigerant groups are flammable. HCs, such as propane, are classed as "A3"-highly flammable. R32 and known HFOs are classified with A2L flammability –mild flammability with slow propagation.

In addition to the anticipated new appliances, the retrofit and 'drop-in' service work also needs to be considered. Although not recommended from a technical and safety standpoint, these practices have been adopted and are on the rise in the region. Readily available HCFC-22 alternatives such as hydrocarbons (i.e. propane, LPG and hydrocarbon mixtures) have been used during service operations, where the flammability of the refrigerants has not always been taken into account. Furthermore, while hydrocarbons may be technically acceptable for some applications, 'drop in'- as well as retrofitted systems, have significant energy losses, which are not always noted.

Hence it is important to increase the know-how and confidence of technicians with regards to using flammable low-GWP refrigerants when installing new units or servicing old units. In order to facilitate the introduction of low-GWP refrigerants in the servicing sector, the demonstration project aims to (i) upgrade the training of technicians, training of trainers and upgrade the training curriculum at vocational centers and (ii) upgrade the equipment at the centers. The planned activities under the project are linked to the

respective HPMPs. The use of flammable refrigerant alternatives is covered to varying extents in the HPMPs, as described in Section 2.2 below. Therefore, regional, as well as country-specific activities are required to bring about a more comprehensive approach that would enable the countries to transition to flammable low-GWP refrigerants in a safe manner, as proposed in the project and described in more detail below. Moreover, it is vital that these activities are carried out as soon as possible, such that current HC service practices are conducted safely, in light of the concerns pointed out under Decision 72/17.

## **2. Outline of proposed project activities**

The participating countries: The Bahamas; Grenada; St. Lucia; St. Vincent and the Grenadines; and Suriname, have significant servicing sectors, but have proportionally-limited funding under the HPMPs. The project strategy includes a regional activity and country-specific activities. A regional training workshop will be undertaken to encourage a common approach towards training on flammable refrigerants.

*Regional activity:*

### **1) “Train the trainers” Workshop**

The 5-day workshop will be hosted at a training facility in one of the participating countries. Association representatives and nominated trainers from existing vocational training institutions will be invited to the regional workshop. Trainers will be certified on flammable refrigerants and related technology, and will receive theoretical and hands-on training, as follows:

- Containment of refrigerant during installation and maintenance operations. In the case of flammable refrigerants, leakages will be handled with rigorous safety considerations. This component will extensively focus on assembly techniques, in particular brazing.
- Required modifications if hydrocarbons are to replace HCFC-22. As hydrocarbons are not drop-in substitutes, appliances that are to be converted need careful examination to eliminate safety risks. This component will also focus on the energy-efficiency issues related to hydrocarbon retrofits.

The following topics will also be discussed at the workshop with associations and the National Ozone Units (NOUs):

- Design of uniform (national, regional) and certified training programme, which is modelled from international certification schemes, e.g. Germany’s annual training programme; certification of technicians trained under the project and those trained after.
- Upgrade of training scope and material
- Specifications of equipment required at training facilities (e.g. demonstration units, safety installations and tools, etc.)
- Specifications of equipment required for service technicians (e.g. brazing equipment, charging machines, safety tools – venting hose, leak alarm, etc.)

*Country specific activities:*

**The Bahamas** - The Refrigeration Service Engineers and Society (RSES) and the Bahamas Technical and Vocational Institute offer universal certification and specialized training on a regular basis. Under

Stage I of the HPMP, RSES conducted 2 six-week training classes for 30 technicians on R410A for students in New Providence. Further training on R410A safety and handling is planned for students on other islands. Toolkits were purchased and distributed (leak detectors for flammable refrigerants and HC manifold gauges were included in these), and further kits are to be purchased to enable the set-up of a refrigerant recovery and reclamation center.

The current training programme, training facility and toolkits are suited for R410A (a high pressure refrigerant). In order to accommodate the anticipated increase in the use of hydrocarbons, mainly through the retrofit of current A/C systems, the activities shown in Table 1 below are proposed under the project.

**Grenada** – Stage I of the HPMP includes training and certification of technicians on good practices, wherein a demonstration component was added to show how HCFC R&A/C equipment can be converted to non-HCFC. Due to the prevalence of R410A as a feasible alternative to HCFC-22, the activities under Stage I are focused on its use. However, as hydrocarbons are increasingly being used in the country, necessary upgrades have to be in place to facilitate the move to flammable low-GWP alternatives. Please refer to Table 1 below.

**St. Lucia** – Under Stage I of the HPMP, main training center at the Sir Arthur Lewis Community College in Castries, and a small training center in Anse La Raye were equipped with refrigerant recovery and servicing tools, no equipment specific to training on flammable refrigerants was provided. After completing the certified training courses at these centers, technicians were provided with toolkits (leak detectors with flammable toolkits were included in these). Retrofitting of domestic A/C systems to the use of propane is planned, however the activities under Table 1 are required.

**St. Vincent and the Grenadines** - Unlike the other countries participating in the project, the HPMP on St. Vincent and the Grenadines is based on a single-stage approach to achieve complete phase-out of HCFCs by 2020 with a 2.5% servicing tail to 2025. Tools and equipment were provided to training centers and service workshops, these included flammable gas labels, charging stations and manifold gauges and leak detectors suitable for flammable refrigerants. Training for technicians also included the handling of hydrocarbon refrigerants. A pilot project within the HPMP aims at encouraging conversion to hydrocarbon refrigerants via retrofits of HCFC units.

**Suriname** – The NOU and the Air-conditioning, Refrigeration & Ventilation Association Suriname (ARVAS) established a training programme in line with the guidelines set by the Caribbean Vocational Quality (CVQ) Standards. As of May 2013, all local technicians and members from ARVAS have gone through the training. Training of technicians on HCFC alternatives, R407C and R410A have been conducted. Toolkits were purchased and distributed for technicians who have completed the course; these toolkits did not contain any HC, flammable- specific equipment. In addition to the ARVAS training, two Cuban trainers were invited in October 2013 to train 55 local technicians and ARVAS members on hydrocarbon technology. To increase the focus on flammable refrigerants, the activities shown in Table 1 are proposed under the project.

**Table 1 – Country-specific activities**

<b>Activity</b>	<b>The Bahamas</b>	<b>Grenada</b>	<b>St. Lucia</b>	<b>St. Vincent and the Grenadines</b>	<b>Suriname</b>
i) Upgrade of training facility – purchase of brazing installations (propane/oxygen); purchase of R-290 demonstration units (mobile and/or split room A/C); ensure training site is well ventilated	5 sets @ one/two sites	2 sets @ one site	2 sets @ one site	2 sets @ one site	4 sets @ one/two sites
ii) Training of technicians on flammable refrigerants. To be conducted by trainer/s who attended regional workshop under the project. Upgrade and certification of training programme.	3x	2x	2x	2x	2x
iii) Upgrade of toolkits: provision of hydrocarbon specific tools to add to toolkits (leak detector for flammable refrigerants; electronic charging scales with 0-2000g measuring range; brazing set (propane/oxygen); set of manifold pressure gauges for HC refrigerants; portable HC charging set)	50	20	20	10	40

*Regional Activity:*

- 2) **Dissemination of results** – the results of the project will be shared with other countries, specifically the LAC and AFR regions.

**3. Expected outcomes**

- i) Increased know-how and confidence in the use of flammable refrigerants during service operations.
- Trainers and service technicians trained on how to install and service A/Cs charged with flammable refrigerants, and how to handle flammable refrigerants safely.
  - Vocation center curricula upgraded.
  - Equipment at centers and workshops upgraded.
- ii) ODS use during service operations phased-out. Introduction of new low-GWP technologies facilitated in respective countries and region.
- Activities of demonstration project are linked to respective HPMPs.
  - Sustainable interventions on flammable refrigerants assessed (e.g. costs, availability of refrigerants, components, as well as final products, and other resources).
  - Activities replicated in other countries in the region.

#### 4. Tentative budget

##### *Indicative Project Budget Breakdown*

<b>Activity</b>	<b>Estimated cost/US\$</b>
<i>Regional</i>	
International Experts	30,000
Regional Workshop (incl. training manuals)	120,000
Dissemination of project results	20,000
<i>By Country</i>	
The Bahamas	149,000
Grenada	66,000
St. Lucia	66,000
St. Vincent and the Grenadines	46,000
Suriname	116,000
<b>Total</b>	<b>613,000</b>

##### **Project Preparation Funds:**

<b>Activity</b>	<b>Estimated cost/US\$</b>
International Experts	30,000
Needs Assessment	30,000
<b>Total</b>	<b>60,000</b>

## Project Concept

Country:	Bosnia and Herzegovina
Title:	Extension of Institutional Strengthening for the implementation of Montreal Protocol in Armenia – Phase IV
Project Duration:	24 months (March 2016 – March 2018)
Project Budget:	95,333 (excluding 7 % Agency Support Costs)
Implementing Agency:	UNIDO
Coordinating Agency:	Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, National Ozone Unit of Bosnia and Herzegovina

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## Project Summary

Bosnia and Herzegovina is an active member of the ECA Regional Ozone Network for Europe and Central Asia. All efforts have been made by Bosnia and Herzegovina to prepare the stakeholders to meet the HCFCs phase-out management plan targets. HPMP was approved in April 2012 at 66 ExCom meeting. The strategic objective under the phase IV was maintaining zero consumption for already phased-out chemicals in parallel with development of an accelerated phase-out schedule for the HCFCs.

The National Ozone Unit of Bosnia and Herzegovina is responsible for monitoring the implementation of the HCFCs National phase-out plan. The NOU is coordinating the promulgation and enforcement of policy and legislation with a specific focus on HCFCs management and will assist UNIDO, to further develop the appropriate activities in view of finalization of the HPMP and the implementation of needed measures in RAC sector

Under the current phase, the Government of BiH was supported through increased capacity building of the NOU, by achieving a smooth implementation of the HPMP activities, including finalizing the NoPP. New legal procedures for controlling the HCFCs are in legislative approval procedures

The NOU is further committed to build up capacity at country level in view of compliance with the HCFCs consumption phase-out targets and it is expected that the ongoing regulatory efforts will be further enhanced by the implementation of new phase of IS.

The NOU will follow-up with priority the improvement of the HCFCs control, while it is expected that the country will achieve the 10% reduction target in 2015.

The National Ozone Unit of Bosnia and Herzegovina will be responsible for tracking the promulgation and enforcement of policy and legislation with a specific focus on HCFCs additional restrictions (as a working group has been set-up to develop further regulatory measures on HCFCs placing on the market), special focus will be given to the cooperation with the customs authorities sector in order to prevent illegal trade and to the cooperation with the RAC Association.

## Project Concept

Country:	The Socialist People's Libyan Arab Jamahiriya
Title:	Extension of Institutional Strengthening for the implementation of Montreal Protocol in Libya – Phase IV
Project Duration:	24 months (December 2015 – November 2017)
Project Budget:	136,065 (excluding 7 % Agency Support Costs)
Implementing Agency:	UNIDO
Coordinating Agency:	National Ozone Unit of Libya

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## Project Summary

NOU was maintained during the transition. The NOU is integrated in the administrative structure of the Environmental General Authority; it is supervised by the General Commission of the Environmental General Authority and it is supervised by the Director General and the Minister.

NOU operates in coordination with other public institutions through bilateral follow up meetings, inter-ministerial meetings and steering committees. The Libyan National Committee for Climate Change and Ozone Depletion includes members from Ministry of Industry, Ministry of Meteorology, National Oil Company, Environmental General Authority and Ministry of Agriculture.

The implementation of the Institutional Strengthening Phases II and III was delayed totally 3 years due to the political and security situation in the country arising during the implementation. In spite of the civil war and governmental restructuring process, NOU technical experts in the central administration remained in charge of coordinating Montreal Protocol country activities, maintaining the basic functionality of the office and committing to ensure the country compliance with the Montreal Protocol obligations.

The NOU has supervised ODS imports/exports and consumption and continued to coordinate the conversion and phase-out programme in all sectors covered by the Montreal Protocol. Furthermore, the NOU was instrumental in the establishment of legislative and administrative measures by the Government and to promote and accelerate the phase-out of ODSs. The legislation review with a specific view to HCFCs control was initiated during phase III. Sector specific public awareness programmes were developed and carried out and, through the sector-specific projects, training workshops were organized for manufacturing companies, farmers and customs.

The NOU is further committed to build up capacity at country level in view of compliance with the HCFCs consumption phase-out targets and it is expected that the ongoing regulatory efforts will be further enhanced by the implementation of new phase of IS.

The NOU will follow-up with priority the improvement of the HCFCs control, while it is expected that the country will achieve the 10% reduction target in 2015.

IS extension Phase IV will be critical for achieving the HCFCs full control as well as for the coordination of the Libya HPMP. The NOU Libya will finalize the legislative review process for better HCFCs control at the level of end-users, by subsectors. The legislative amendments were initiated under current phase and will require follow-up during the next 2 years.

## Project Concept

Country:	Sultanate of Oman
Title:	Extension of Institutional Strengthening for the implementation of Montreal Protocol– Phase V
Project Duration:	24 months (January 2015 to December 2017)
Project Budget:	68,467 (excluding 7 % Agency Support Costs)
Implementing Agency:	UNIDO
Coordinating Agency:	Ministry of Environment and Climate Affairs / Ozone Layer Protection Section (NOU)

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## Project Summary

The project aims at institutional strengthening and capacity building of the National Ozone Unit and will ensure helping the Government meet its obligations under the Montreal Protocol on the substances that deplete the Ozone Layer.

Sultanate of Oman had achieved compliance status in regard of ODS phase-out targets. It is expected that the ongoing regulatory efforts will be further enhanced by the implementation of new phase of IS, as well as through the coordination of the HPMP implementation

Sultanate of Oman is an active member of the Regional Ozone Network. All efforts have been made by Sultanate of Oman to finalize its HPMP and initiate the process of HCFCs consumption freeze and the future phase-out commitments. The strategic objective under the phase V will be compliance with the 2013 HCFCs consumption freezing target and preparation of the consuming sectors for the 10 % reduction in HCFCs consumption, in 2015.

The NOU is responsible for monitoring the ODS import and consumption data which is defined by regulation at State level and entities level with clear division of responsibilities and it will be further improved and harmonized.

The NOU will follow-up with priority the issue of initiating measures to improve the HCFCs control and to achieve the 10% reduction target in 2015.

The National Ozone Unit of Sultanate of Oman is responsible for monitoring the implementation of the HCFCs National phase-out plan. The NOU will specifically focus on HCFCs management and will assist UNIDO, to further develop the appropriate activities for the HPMP implementation. Regulatory process will envisage control of HCFCs containing equipment, with the scope to reduce the HCFCs consumption market request.

This project proposal will support the government structure responsible for ODS phase-out, the Ozone Unit (OU) for a period of 2 years of operation, to enable better control on the HCFCs phase-out process

## Project Concept

Country:	Tunisia
Title:	Extension of Institutional Strengthening for the implementation of Montreal Protocol– Phase XII
Project Duration:	24 months (January 2015 to December 2017)
Project Budget:	247,270 (excluding 7 % Agency Support Costs)
Implementing Agency:	UNIDO
Coordinating Agency:	National Agency for Environmental Protection (ANPE) National Ozone Unit (NOU)

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## Project Summary

The project aims at institutional strengthening and capacity building of the National Ozone Unit and will ensure helping the Government meet its obligations under the Montreal Protocol on the substances that deplete the Ozone Layer.

The NOU structure was maintained during the implementation of the IS extension Phase VII.

The National Ozone Unit (ANPE) is an autonomous entity operating directly under the General Director of the ANPE. It operates under the auspices of the Ministry of Environment and Sustainable Development. It's the Focal Point of the Montreal Protocol and Vienna Convention; and it's responsible for the implementation of the Montreal Protocol. As a consequence, its main mission comprises:

- National and international focal point for the Montreal Protocol and Vienna Convention
- Tracking and implementing decisions of the Parties to the Montreal Protocol
- Data collection concerning the use and importation of ODS, on an annual basis
- Preparation and dissemination of annual statistical data for the Ozone Secretariat and the MLF Executive Committee
- Identification, execution and supervision of ODS elimination projects
- Continued control and monitoring of ODS-consuming enterprises and converted enterprises by NOU technical staff and controllers
- Preside over the National Ozone Committee to allocate quotas for HCFCs
- Represent Tunisia in international meetings – meetings of the Parties, open-ended working group meetings; and UNEP ozone officer network meetings
- Preparation and putting into place legislation in regards to implementing the Montreal Protocol and preparing amendments where needed for eventual Government adoption
- Carrying out awareness raising campaigns (press releases, interviews, radio and television spots, conferences, etc.).

Phase VIII will be devoted to activities concerning the coordination for final phase out of methyl bromide in the country, as well as initiation of the monitoring of the refrigerant recovery, recycling and reclaiming centers

For the period 2015-2017, will also be marked by the continued implementation of investment projects, namely the conversion of industrial manufacturers in air conditioning sector operating with HCFC- 22,

It is expected that the ongoing regulatory efforts will be further enhanced by the implementation of new phase of IS, as well as through the coordination of the HPMP implementation

The NOU will follow-up with priority the issue of initiating measures to improve the HCFCs control and to achieve the 10% reduction target in 2015.

This project proposal will support the government structure responsible for ODS phase-out, the Ozone Unit (OU) for a period of 2 years of operation, to enable better control on the HCFCs phase-out process

Country:	Turkey
Title:	Extension of Institutional Strengthening for the implementation of Montreal Protocol in Turkey Mexico – Phase VII
Project Duration:	24 months (July 2015 to June 2017)
Project Budget:	260,000 (excluding Agency Support Costs)
Implementing Agency:	UNIDO
Coordinating Agency:	Ministry of Environment and Urbanization of Turkey

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### **Project Summary**

National Ozone Unit (Division for the Protection of the Ozone Layer) is located under Climate Change and Air Management Department / Directorate General of Environment Management of the Ministry of Environment and Urbanization of Turkey (herein after referred as the Ministry). Having been designated as the National Ozone Unit vis-a-vis the Ozone Secretariat, Division for the Protection of the Ozone Layer has been accordingly serving as the Focal Point. Activity of the Turkish NOU is supervised by the Deputy Undersecretary of the Ministry.

The NOU is the main coordination and enforcement body, in charge of carrying out the follow-up and coordination of national and international activities related the Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer and controlling consumption and production of Ozone Depleting Substances (ODSs) and phasing them out within the country phaseout schedule. The Unit is in charge of the national coordination of all policies, regulations, projects and activities with the objective of implementation of the Vienna Convention and Montreal Protocol. The NOU is also responsible for ensuring the cooperation and coordination at country level and contributes to the work of the implementing agencies of the Montreal Protocol and other relevant governmental institutions, NGOs as well as other specific stakeholders.

The project aims at institutional strengthening and capacity building of the National Ozone Unit in Turkey and will ensure helping the Government meet its obligations under the Montreal Protocol on the substances that deplete the Ozone Layer.

The OU will follow-up with priority the issue of initiating measures to improve the HCFCs control, to achieve the 10% reduction target in 2015 and to implement projects and quota system to allow meeting the the advanced phase-out schedule in 2017, as per the approved HPMP Stage I.

### **Surveys on ODS alternatives**

## Project Concept

<b>Country:</b>	<b>Albania</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### **VII. Introduction**

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### **VIII. Project summary**

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### **IX. Project objectives**

The objective of this proposal is to conduct a detailed national survey on Albania's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### **X. Expected demonstration results**

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Albania.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Albania's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **XI. Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Albania and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations

- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
<b>TOTAL</b>			<b>35,000</b>

## Project Concept

<b>Country:</b>	<b>Argentina</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 120,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### **XII. Introduction**

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### **XIII. Project summary**

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### **XIV. Project objectives**

The objective of this proposal is to conduct a detailed national survey on Argentina's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### **XV. Expected demonstration results**

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Argentina.

OUTPUTS		ACTIVITIES
Data Collection	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>Collect import (and export as applicable) data for the substances for the previous years;</li> <li>Correlate the substances with possible end-use in various sectors;</li> <li>Establish estimated alternatives use by sector.</li> </ul>
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>Review the historical use data of the substances;</li> <li>Review and forecast growth for various applications;</li> <li>Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>Compile data on available low-GWP alternatives for various applications;</li> <li>Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>Make use of the available linkage to Argentina's HPMP.</li> <li>Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## XVI. Institutional arrangements

### a. Brief information on legal and regulatory support for the demonstration project

The proposal is supported by the National Ozone Unit of Argentina and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### b. Description of implementation approach

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits

- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

**XVII. Tentative budget**

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (5 w/m)	20,000
		International Expert (2 w/m)	30,000
		Local Travel	20,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (3.8 w/m)	15,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	10,000
	<b>TOTAL</b>		<b>120,000</b>

## Project Concept

<b>Country:</b>	<b>Bolivia</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 55,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### **XVIII. Introduction**

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### **XIX. Project summary**

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### **XX. Project objectives**

The objective of this proposal is to conduct a detailed national survey on Bolivia's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### **XXI. Expected demonstration results**

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Bolivia.

OUTPUTS		ACTIVITIES
<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Bolivia's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## XXII. Institutional arrangements

### a. Brief information on legal and regulatory support for the demonstration project

The proposal is supported by the National Ozone Unit of Bolivia and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### b. Description of implementation approach

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations

- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (4 w/m)	12,000
		International Expert (1.4 w/m)	20,000
		Local Travel	5,000
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications		
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	5,000
	<b>TOTAL</b>		<b>55,000</b>

## **Project Concept**

<b>Country:</b>	<b>Bosnia and Herzegovina</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### **Introduction**

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### **Project summary**

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### **Project objectives**

The objective of this proposal is to conduct a detailed national survey on Bosnia and Herzegovina's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### **Expected demonstration results**

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Bosnia and Herzegovina.

OUTPUTS		ACTIVITIES
<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Bosnia and Herzegovina's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Bosnia and Herzegovina and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits

- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
<b>TOTAL</b>			<b>35,000</b>

## **Project Concept**

<b>Country:</b>	<b>Chile</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 80,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### **Introduction**

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### **Project summary**

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### **Project objectives**

The objective of this proposal is to conduct a detailed national survey on Chile's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### **Expected demonstration results**

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Chile.

OUTPUTS		ACTIVITIES
<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Chile's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Chile and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

**Tentative budget**

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (3 w/m)	12,000
		International Expert (1.2 w/m)	18,000
		Local Travel	10,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (2.5 w/m)	10,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	5,000
	<b>TOTAL</b>		<b>80,000</b>

## Project Concept

<b>Country:</b>	<b>Ecuador</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 55,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Ecuador's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Ecuador.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
<b>Data Assessment</b>	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Ecuador's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Ecuador and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

### Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (4 w/m)	12,000
		International Expert (1.4 w/m)	20,000
		Local Travel	5,000
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications		
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	5,000
<b>TOTAL</b>			<b>55,000</b>

## Project Concept

<b>Country:</b>	<b>Georgia</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Georgia's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Georgia.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Georgia's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Georgia and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits

- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

### **Tentative budget**

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
<b>TOTAL</b>			<b>35,000</b>

## Project Concept

<b>Country:</b>	<b>Guatemala</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 55,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Guatemala's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Guatemala.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
<b>Data Assessment</b>	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Guatemala's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Guatemala and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

### Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (4 w/m)	12,000
		International Expert (1.4 w/m)	20,000
		Local Travel	5,000
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications		
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	5,000
<b>TOTAL</b>			<b>55,000</b>

## Project Concept

<b>Country:</b>	<b>Honduras</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Honduras' industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Honduras.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
<b>Data Assessment</b>	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Honduras' HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Honduras and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
	<b>TOTAL</b>		<b>35,000</b>

## Project Concept

<b>Country:</b>	<b>Macedonia, FYR</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Macedonia's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Macedonia.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Macedonia's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Macedonia and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

**Tentative budget**

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
<b>TOTAL</b>			<b>35,000</b>

## Project Concept

<b>Country:</b>	<b>Mexico</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 120,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Mexico's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Mexico.

OUTPUTS		ACTIVITIES
<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Mexico's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Mexico and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

**Tentative budget**

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (5 w/m)	20,000
		International Expert (2 w/m)	30,000
		Local Travel	20,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (3.8 w/m)	15,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	10,000
<b>TOTAL</b>			<b>120,000</b>

## Project Concept

<b>Country:</b>	<b>Montenegro</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Montenegro's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Montenegro.

OUTPUTS		ACTIVITIES
<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Montenegro's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Montenegro and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
	<b>TOTAL</b>		<b>35,000</b>

## Project Concept

<b>Country:</b>	<b>Nicaragua</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Nicaragua's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Nicaragua.

OUTPUTS		ACTIVITIES
<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Nicaragua's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Nicaragua and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
	<b>TOTAL</b>		<b>35,000</b>

## Project Concept

<b>Country:</b>	<b>Niger</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 55,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Niger's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Niger.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Niger's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Niger and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (4 w/m)	12,000
		International Expert (1.4 w/m)	20,000
		Local Travel	5,000
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications		
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	5,000
	<b>TOTAL</b>		<b>55,000</b>

## Project Concept

<b>Country:</b>	<b>Oman</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 80,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Oman's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Oman.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Oman's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Oman and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

### Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (3 w/m)	12,000
		International Expert (1.2 w/m)	18,000
		Local Travel	10,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (2.5 w/m)	10,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	5,000
	<b>TOTAL</b>		<b>80,000</b>

## Project Concept

<b>Country:</b>	<b>Serbia</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 80,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Serbia's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Serbia.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
<b>Data Assessment</b>	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Serbia's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

### **Institutional arrangements**

#### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Serbia and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

#### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

### **Tentative budget**

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	<b>Description</b>		<b>Costs [USD]</b>
<b>Data Collection</b>	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert  (3 w/m)	12,000

		International Expert (1.2 w/m)	18,000
		Local Travel	10,000
<b>Data Assessment</b>	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (2.5 w/m)	10,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	5,000
		<b>TOTAL</b>	<b>80,000</b>

## Project Concept

<b>Country:</b>	<b>Tunisia</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 80,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Tunisia's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Tunisia.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
<b>Data Assessment</b>	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Tunisia's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Tunisia and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

### Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (3 w/m)	12,000
		International Expert (1.2 w/m)	18,000
		Local Travel	10,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (2.5 w/m)	10,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	5,000
	<b>TOTAL</b>		<b>80,000</b>

## Project Concept

<b>Country:</b>	<b>Turkey</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 120,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Turkey's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Turkey.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Turkey's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Turkey and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (5 w/m)	20,000
		International Expert (2 w/m)	30,000
		Local Travel	20,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (3.8 w/m)	15,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	10,000
<b>TOTAL</b>			<b>120,000</b>

## Project Concept

<b>Country:</b>	<b>Uganda</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 55,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Uganda's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Uganda.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Uganda's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Uganda and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (4 w/m)	12,000
		International Expert (1.4 w/m)	20,000
		Local Travel	5,000
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications		
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	5,000
	<b>TOTAL</b>		<b>55,000</b>

## Project Concept

<b>Country:</b>	<b>Uruguay</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 35,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Uruguay's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Uruguay.

OUTPUTS		ACTIVITIES
<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Uruguay's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Uruguay and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits

- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (1.5 w/m)	5,000
		International Expert (0.8 w/m)	12,000
		Local Travel	2,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (1.5 w/m)	5,000
		Technical Meetings	8,000
		Outreach Activities & Miscellaneous	3,000
<b>TOTAL</b>			<b>35,000</b>

## Project Concept

<b>Country:</b>	<b>Venezuela</b>
<b>Title:</b>	<b>Demonstration Project for Preparation of National Survey on Alternatives to ODSs</b>
<b>Project Duration:</b>	<b>12 months</b>
<b>Budget:</b>	<b>USD 80,000 (excluding ASC)</b>
<b>Implementing Agency:</b>	<b>UNIDO</b>

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### Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

### Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

### Project objectives

The objective of this proposal is to conduct a detailed national survey on Venezuela's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

### Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Venezuela.

<b>OUTPUTS</b>	<b>ACTIVITIES</b>
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<b>Data Collection</b>	Establish current consumption of HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed;</li> <li>• Collect import (and export as applicable) data for the substances for the previous years;</li> <li>• Correlate the substances with possible end-use in various sectors;</li> <li>• Establish estimated alternatives use by sector.</li> </ul>
<b>Data Assessment</b>	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	<ul style="list-style-type: none"> <li>• Review the historical use data of the substances;</li> <li>• Review and forecast growth for various applications;</li> <li>• Establish growth patterns in use by substance/sector.</li> </ul>
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	<ul style="list-style-type: none"> <li>• Compile data on available low-GWP alternatives for various applications;</li> <li>• Identify opportunities and challenges for applying low-GWP alternatives for various applications;</li> <li>• Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO<sub>2</sub> emission reduction targets by 2020;</li> <li>• Make use of the available linkage to Venezuela's HPMP.</li> <li>• Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.</li> </ul>

## **Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The proposal is supported by the National Ozone Unit of Venezuela and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

### **b. Description of implementation approach**

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

## Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

**Table 1.** Tentative budget allocation per activity

	Description		Costs [USD]
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (3 w/m)	12,000
		International Expert (1.2 w/m)	18,000
		Local Travel	10,000
Data Assessment	<ul style="list-style-type: none"> <li>- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance</li> <li>- Identify challenges and opportunities for transition to low-GWP alternatives for various applications</li> </ul>	National Expert (2.5 w/m)	10,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	5,000
<b>TOTAL</b>			<b>80,000</b>

**Section 3**  
**Feasibility Studies addressing district cooling**

<b>PROJECT COVER SHEET</b>	
<b>PROJECT TYPE TITLE</b>	Feasibility Study addressing hybrid solar and gas thermal driven absorption chiller in the New Capital (Cairo)
<b>COUNTRY NAME</b>	The Arab Republic of Egypt
<b>LEAD IMPLEMENTING AGENCY</b>	UNIDO
<b>COOPERATING IMPLEMENTING AGENCY</b>	UNEP
<b>NATIONAL COUNTERPART</b>	National Ozone Unit / the Egyptian Environmental Affairs Agency
<b>SECTOR</b>	Air-Conditioning
<b>SUB-SECTOR</b>	Central Air-Conditioning (CAC)
<b>PROJECT STAKEHOLDERS</b>	<ul style="list-style-type: none"> <li>- Ministry of Planning</li> <li>- General Authority for Investment</li> <li>- Housing &amp; Building National Research Centre (HBNRC)</li> <li>- New &amp; Renewable Energy Authority (NREA)</li> <li>- Energy Research Centre at Cairo University</li> <li>- Egyptian Organization For standardization &amp; Quality</li> <li>- Egypt ASHRAE Chapter</li> </ul>
<b>PROJECT COSTS</b>	\$ 100,000
<b>MLF REQUESTED FUNDING</b>	\$ 100,000
<b>UNIDO FUNDING ALLOCATION</b>	\$ 70,000
<b>UNIDO SUPPORT COSTS @ 9%</b>	\$ 6,300
<b>UNEP FUNDING ALLOCATION</b>	\$ 30,000
<b>UNEP SUPPORT COSTS @ 13%</b>	\$ 3,900
<b>TOTAL PROJECT COSTS</b>	\$ 110,200
<b>PROJECT DURATION</b>	12 Months
<b>PROJECT SUMMARY</b>	
<p>The feasibility study objective is to provide a detailed technical, financial as well as environmental and energy assessment / road map for the government of Egypt, in the development of district cooling systems.</p> <p>The focus of the feasibility study will be undertaken in connection to the establishment of the New Cairo Capital currently under design. The feasibility study will focus on 1 district of The new capital, which will have a span 700sq km and have 21 residential districts and 25 dedicated districts. Within the new capital there will be 663 hospitals and clinics, 1.1m homes hosting at least 5 million residents, 1 international airport. Furthermore, the new capital will foster the relocation of parliament, governmental ministries and foreign embassies.</p> <p>The deliverables of the feasibility study are:</p> <ol style="list-style-type: none"> <li>1. Assessment of the most suitable district cooling technology,</li> <li>2. Assessment renewable energy source,</li> <li>3. Assessment legalization barriers,</li> <li>4. Assessment energy saving mechanisms,</li> <li>5. Assessment environmental benefits</li> <li>6. Develop a financial structure and financial scheme for both, Governmental Co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies.</li> <li>7. Develop a draft project proposal for district cooling system in the “New capital, Cairo”, highlighting implementation strategy, financial incentives and the direct assessments listed under points 1 to 6 shown above.</li> </ol>	

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## The Need of District Cooling in Egypt

Power consumption has been increasing in Egypt due to the increase in population, urbanization and industrialization. Power conservation and management have been investigated by many researchers in Egypt in order to meet the high and increasing demand of electricity. Different measures have been proposed in different sectors in order to conserve the energy consumption. In Egypt approximately 50 % of the total power consumption relates to air-conditioning and refrigeration during summer time. Hence, improving the performance of A/C units has been a subject for investigation; however due to lack of a centralized coordination the overall improvement has been hindered. Hence, Egypt needs urgently assistance and advice on energy conservation; and district cooling is one of the solutions especially for newly established cities or for large residential compounds.

Whereas district heating is very common, distributed energy (heating and/or cooling) is now being implemented with very good results in terms of energy savings. District cooling can provide a reduction in energy consumption as high as 40 %, compared to individual and stand-alone A/C installations. Also, district cooling gives the opportunity of thermal storages, which will allow for operation during low electricity demand periods (night). In addition, district cooling systems have a longer lifespan than stand-alone A/C units and are more reliable and easier to maintain.

Within the implementation of the High-Ambient testing project, by UNEP and UNIDO, a specialized symposium for the potentialities of District Cooling systems to reduce dependency on HCFC and high-GWP alternatives was organized in Kuwait in May-2014, the event that gathered key-experts from the region and worldwide concluded and emphasized the important role of District Cooling industry in reducing domestic energy demand for A/C applications plus promoting long-term alternative technologies. The event also concluded that there are shortages of the specialized focused studies in this regards that can deeply investigate options, suggest solutions and recommend policy measures.

## Project Impact

On behalf of The Government of Egypt, UNIDO and UNEP are requesting Project Funds to undertake a comprehensive feasibility study to assess and make provided technical and economical evidences to be disseminated to government officials as well as private investors.

In line with the commitment of UNIDO and UNEP is to assist the Government Egypt in phasing-out ozone depleting substances while providing additional benefits both for the climate and energy sectors.

The proposed feasibility study supports the efforts of the Government of Egypt and complements its activities under the HPMP. Further, it provides crucial technical assistance and capacity building measures assuring the country's compliance with obligations under the MP. At the same time it makes an important contribution to the ongoing efforts towards:

- Mitigation of climate change by reducing greenhouse gas (GHG) emission into the atmosphere; and
- Achieving energy efficiency.

## Project Objective

The focus of the feasibility study will be undertaken in connection to the establishment of the New Cairo Capital currently under design. The feasibility study will focus on 1 district of the new capital.

The new capital will span 700sq km and have 21 residential districts and 25 “dedicated districts. Within the new capital there will be 663 hospitals and clinics, 1.1m homes hosting at least 5 million residents, 1 international airport. Furthermore, the new capital will foster the relocation of parliament, governmental ministries and foreign embassies.

The main objective of the feasibility study will be to model and simulate centralized district cooling system with a hybrid solar and gas thermal driven absorption chiller. The study will produce a detailed technical, financial as well as environmental and energy assessment / road map for the government of Egypt, in the development of district cooling systems.

## Project Deliverables

The deliverables of the feasibility study are summarized below:

1. Conduct a literature review to identify the current status of district cooling technologies with hybrid natural gas and solar assisted heat driven chiller,
2. To approximate and simulate the detail dynamic cooling loads profile of one district of the New Capital Cairo area,
3. Conceptualize, design, simulate and optimize multiple energy inputs integrated centralized district cooling system powered by natural gas, solar thermal as energy source and fresh water as heat sink,
4. Assessment renewable energy source,
5. Assessment legalization barriers,
6. Assessment energy saving mechanisms,
7. Assessment environmental benefits,
8. Develop a financial structure and financial scheme for both, Governmental Co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies,
9. Develop a draft project proposal for district cooling system in the “New capital, Cairo”, highlighting implementation strategy, financial incentives.

## Feasibility Study Methodology

District cooling is an essential utility for sustainable economic and urban development. District cooling has been a commercial alternative to traditional A/C and refrigeration technologies since the mid-90s. Various definitions, classifications and applications of district cooling and heating are discussed and implemented including elements of a district energy system, which are widely available in Europe. District cooling is a superior alternative to conventional air conditioning as it helps reduce energy consumption and costs to both customers and governments alike, while also protecting the environment by cutting carbon dioxide emissions. Some of the advantages district cooling has over traditional air conditioning include:

- 40% less energy consumption
- Decreases energy costs, whilst it is noted that initial capital investment is higher, however, in the long run the investment costs are covered and financial gains are made.
- Annual maintenance costs are substantially lower
- Can store up to 30% of potential output by holding chilled water in reserve, therefore easily meeting demands in seasonal variations

- Equipment needs to be replaced only every 30 years – as compared to 15 years for traditional air conditioning
- Greater reliability due to the high standard, industrial equipment utilized and back-up chillers on stand-by
- Protects the environment by reducing CO2 emissions due to lower energy consumption
- District cooling systems are remotely located and therefore enhance real estate value by freeing up space for other uses
- Phase-out of refrigerants HCFC, less refrigerant is needed for the same end-user demand for cooling comfort.

## Solar Renewable Energy

The primary source of all renewable energies except geothermal energy is solar radiation. Solar energy is mainly harvested in two ways. It can be converted into either heat or electricity. Converting solar energy into heat is possible by using solar thermal energy technologies. Converting solar energy directly to electricity is achievable by using photovoltaic cells.

In solar thermal systems there are several advantages (European Solar Thermal Industry Federation, ESTIF, 2006)

- ✚ Reduces the dependency on imported fuels
- ✚ Saves natural resources
- ✚ Save CO2 emission
- ✚ Curbs urban air pollution
- ✚ Is immediately available
- ✚ Creates local jobs
- ✚ Inexhaustible

The feasibility study will emphasize district cooling by using hybrid solar and gas thermal driven absorption chiller, as will be illustrated in the study's literature review.

## Refrigeration System

Refrigeration systems can be categorized into two types to the energy type that are used as energy inputs.

- ✚ Electrically driven refrigeration systems
- ✚ Thermally driven refrigeration system

Due to the electricity constraints on Egypt, as described in Annex 2 the feasibility study will focus hybrid solar and gas thermal driven absorption chiller.

## Solar Thermally Driven Refrigeration Cycle

Thermal driven cooling systems are usually feasible when a low temperature and / or cost efficient heat sources are available. In general, solar energy is the most widely available heat source for solar driven cooling applications. There are four major solar thermal driven cooling systems, these are absorption, adsorption, desiccant and ejector cooling system. Analysis's indicates that absorption systems have a comparatively higher COP than other technologies. The feasibility study will undertake that analyses and conclude on the most suitable solar driven cooling system to be recommended for this site.

## Absorption Cooling System

Absorption cooling system dates back to the 1700s, and the first ammonia-water refrigeration system was patented by Ferdinand Carre in 1859.

The main difference of the absorption refrigeration cycle from the vapour compression cycle is the replacement of the compressor with a thermally driven absorption mechanism. The absorption cooling system consists of an absorber, pump, regenerator, generator, expansion valve, condenser and evaporator. The working fluid of the absorption refrigeration cycle is a solution of two or more fluids. Usually lithium bromide – water or ammonia – water is used.

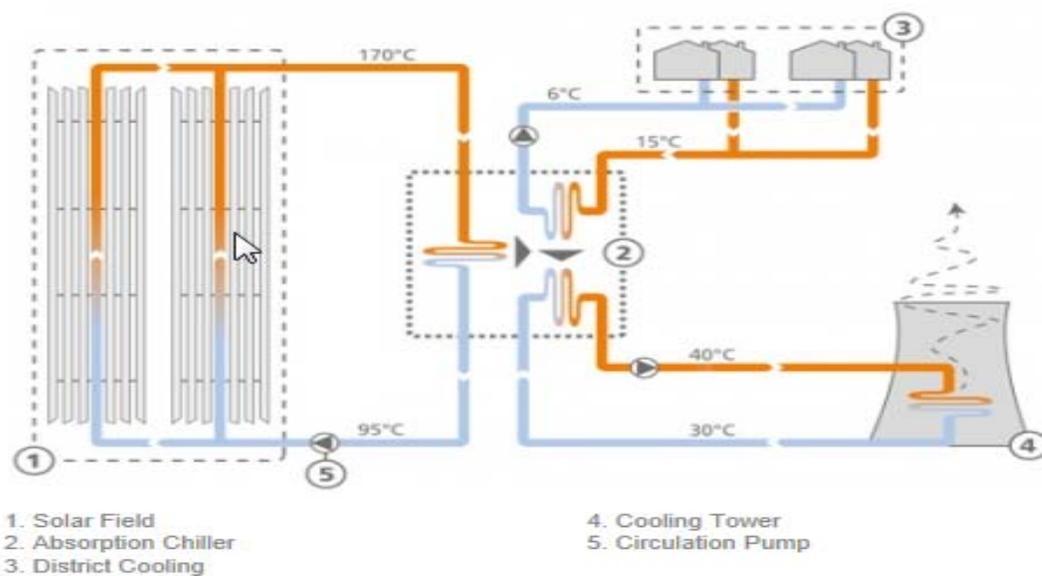
In ammonia – water system water is the absorbent and ammonia is the refrigerant. Since the freezing point of ammonia is  $-77^{\circ}\text{C}$  the system is possible to use for the low temperature applications. In the case of lithium bromide – water, the absorbent is lithium bromide and water is the refrigerant. The lithium bromide – water cycle are widely used in air conditioning applications since it has a freezing point of  $0^{\circ}\text{C}$ .

There are three types of lithium bromide – water absorption refrigeration cycles available namely single effect, double effect and triple effect. Single and double effect refrigeration cycles are commercially available whilst triple effect is currently under research and is not available commercially available.

The feasibility study will analyze the most suitable fluid. Furthermore and detailed analyzes is to be provided in the case if lithium bromide – water is to be recommended, between single and double effect absorption refrigeration cycles.

## Designing of Solar Assisted District Cooling System

The feasibility study will develop a draft modeling of the solar assisted district cooling system. The design should include both single and double effect if lithium bromide – water system is recommended in order to analyze separately and to identify most suitable configuration. In each case consideration have to be in cooperated include option of hybrid solar and gas thermal driven absorption chiller. Fresh water condensers heat rejection technology options are considered for the configuration.



The increasing requirement for cooling can be produced most economically by district cooling systems with a correspondingly large solar field. The cooling energy is carried to the respective consumers in transmission line networks. District cooling systems are becoming the popular choice in high temperature locations including the Middle East. Novatec Solar's system provides the sustainable solution to the district cooling and refrigeration demands of these regions.

## Assessment of Financial impact

The feasibility study will undertake a financial assessment on the total costs related to the development of a solar district cooling system, to cover the area of one district in the New Capital Cairo area. The assessment should include but not be limited to:

- + All Capital costs, excluding land
- + Labor costs
- + Investment / Returns
- + Energy Saving
- + Maintenance and repair costs
- + Distribution Costs
- + Revenue Scenarios
- + Possible Investors

## Assessment of the Infrastructure and Regulatory Framework

The feasibility study will cover a full analysis on Infrastructure and Regulatory Framework, which will include:

- + Current and future energy labelling programs or building codes that likely to be enforced within the country strategic development plan and its implication to the selection of technologies.
- + Applicability to market specific needs:
  - a. Types of buildings/establishments i.e. residential, government, public, commercial, etc.
  - b. Infrastructure required to promote particular options (e.g. district cooling, absorption systems, others)

- ✚ National relevant institutional framework needed promote new technologies including policies, regulations and standards/codes.
- ✚ Potential incentives and disincentives measures that can be adopted for promoting the outcomes of the study
- ✚ Relevant standards and guidelines that need to be considered to each type of alternative technology(s) that will be offered by the study.
- ✚ Technical capacities needed to introduce new technologies including educational, training, specialized awareness.

## Partners and Stake Holders

The studies intend to involve key governmental, research and industry partners Egypt. In order to ensure that inputs from all relevant stakeholders are incorporated and that the outcomes will be acceptable/implementable.

For Egypt, the following stakeholders are considered for direct and indirect involvement in the project:

- ✚ Ministry of Planning
- ✚ General Authority for Investment
- ✚ Housing & Building National Research Centre (HBNRC)
- ✚ New & Renewable Energy Authority (NREA)
- ✚ Energy Research Centre at Cairo University
- ✚ Egyptian Organization For standardization & Quality
- ✚ Egypt ASHRAE Chapter

## Dissemination of Results

The results of the final assessment of the feasibility study will be presented in a three-way approach:

- ✚ A high level coordination meeting with the ministries of Urban Planning, Environment, Energy, Trade and Finance.
- ✚ A stakeholder coordination meeting, with project developers, main energy suppliers companies, and appropriate associations, and development banks.
- ✚ A publication of the assessment will be developed and circulated through the ministries of energy, environment and urban planning.

## Feasibility Study Budget

Description	Activities	Responsible agency	Costs in (USD)
International Expert	<ol style="list-style-type: none"> <li>1. Conduct a literature review to identify the current status of district cooling technologies with hybrid natural gas and solar assisted heat driven chiller.</li> <li>2. To approximate and simulate the detail dynamic cooling loads profile of one district of the New Capital Cairo area.</li> <li>3. Conceptualize, design, simulate and optimize multiple energy inputs integrated centralized district cooling system powered by natural gas, solar thermal as energy source and fresh water as heat sink.</li> <li>4. Develop a financial structure and financial scheme for both, Governmental Co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies,</li> <li>5. Develop a draft project proposal for district cooling system in the “New capital, Cairo”, highlighting implementation strategy, financial incentives.</li> </ol>	UNIDO	35,000
National Consultation Meetings and a consultancy service by a regional expert	Legalization Barriers	UNEP	30,000
	Development terms of reference for comprehensively assessing the governmental Co-financing mechanism, including the possibility of reducing energy subsidies		
Preparation and Dissemination of final	Develop through lesson learned a check-list	UNDIO	10,000



## Annex 1. Background

The Montreal Protocol on Substances that Deplete the Ozone Layer (MP) was adopted in 1987 to phase-out Ozone Depleting Substances (ODSs) as a result of the agreement established under the Vienna Convention for the protection of the environment from adverse effects of ozone depletion. To date, the MP has been effective and successful in reducing the impact of human activities on the global environment and therefore described as one of the most successful environmental treaty.

One of the reasons for this success is the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) that, since 1991, provides financial assistance to Article 5 countries, or developing countries, to help achieve their phase-out obligations under the MP. Since 1992, UNIDO, as one of the implementing agencies of the Montreal Protocol, assists countries in developing and implementing projects with the aim to phase-out ODSs. So far, UNIDO has implemented over 1217 projects, which contributed to the phase out of 70,287 Ozone Depleting Potential tones (ODPt) of the world's total consumption of ODSs.

In September 2007, the Parties to the MP took a historical decision to accelerate the phase-out of Hydrofluorochlorocarbons (HCFCs)<sup>2</sup>, ODSs used as interim substitutes to Chlorofluorocarbons (CFCs). While phasing-out HCFCs, the Parties agreed to promote the selection and adoption of alternatives that have low impact on the environment, in particular, on climate, and that meet other health, safety and economic standards. Therefore, the Executive Committee of the MLF (ExCom), when developing and applying funding criteria for the HCFC phase-out strategy, gives priority to alternatives that have low Global Warming Potential (GWP) and that are able to ensure energy efficiency.

Since 1993, UNIDO has been assisting the Government of Egypt, through the Egyptian Environmental Affairs Agency (EEAA), to comply with its commitments as signatory party of the Montreal Protocol carrying out projects that aim to phase-out ODSs in various industrial sectors and, at the same time, to improve their economic and environmental performance. UNIDO is currently engaged with the Government of Egypt in the implementation of the 1<sup>st</sup> Stage of the HCFC Phase-out Management Plan (HPMP) and in the preparation of the strategy for its 2<sup>nd</sup> Stage.

Meanwhile, given the importance of inclusive and sustainable industrial development, UNIDO seeks opportunities to go beyond the MLF funded activities and create linkages to expand the scope of Montreal Protocol projects in Egypt. Despite the Egypt's on-going efforts and success in phasing-out ozone depleting substances, there are other challenges and environmental issues that could be tackled at the same time.

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<sup>2</sup> Decision XIX/6

## Annex 2. Energy Sector Overview

Egypt has been depending on oil imports since 2008 to meet its domestic energy demand: Egypt's total oil production averaged 660,000 (bbl/d), of which approximately, 540,000 bbl/d was crude oil. Crude oil production continues to decline. At the same time, new natural gas field production came on stream. Egypt oil consumption is estimated to be 710,000 bbl/d.

Egypt had a total installed electricity generating capacity of 23.4 GW in 2008, according to EIA data. 20.3 GW was conventional thermal generation capacity, 2.8 hydroelectric and 0.3 GW of almost 88% of the total generated electricity in Egypt still originates from fossil sources, a rate which is set to increase in the future due to continuing high rates of demand growth.

The Egyptian electrification rate is 99.4%, according to the International Energy Agency (IEA); this rate is among the highest in Africa. However, ageing infrastructure and rising demand have led to intermittent blackouts mainly associated with the high cooling demands during the summer months.

According to the African Development Bank (AfDB), Egypt's total primary energy demand has grown at an average annual rate of 4.6% during the last two decades. In order to meet the increasing energy needs, mainly thermal power plants have been built. As a result, Egypt ranks among the 11 countries in the world showing fastest growing GHG emissions according to the AfDB.

Industry is the most significant energy-consuming sector in Egypt. The sector is expected to further grow due to high demand and rapid expansion of industrial production. The energy productivity in Egyptian industry is way below the international average, where the energy consumption per unit of output in Egyptian industries is 10 to 50% higher in Egypt compared to the international average. Other users including commercial sector (hotels, offices, shopping malls, etc.) and residential buildings are also excessively growing and consuming more and more energy particularly for air conditioning and water heating, etc. Industrial process, large buildings and tourism facilities are typical major users of electricity for air conditioning and heating purposes.

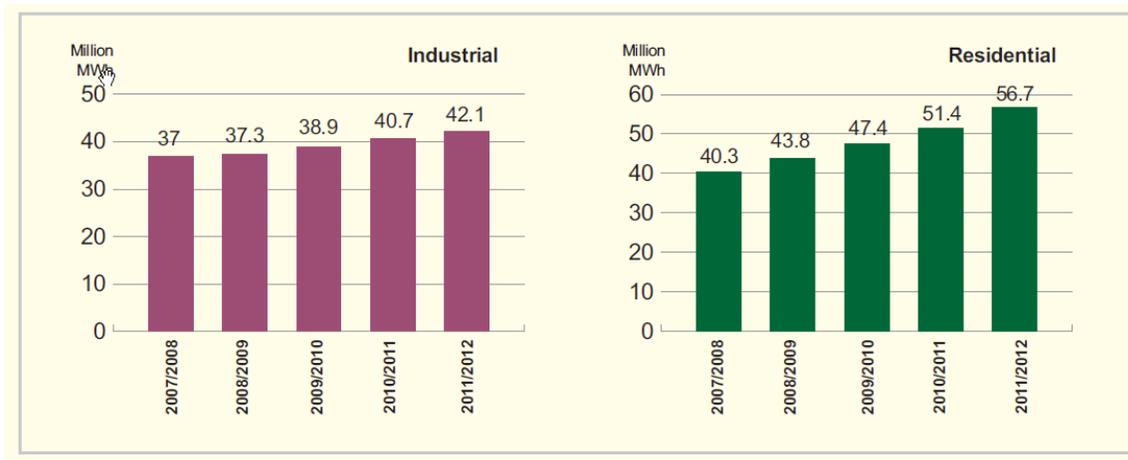
According to the Minister of Electricity and Energy, air conditioning consumers around 50% of the maximum productive capacity of power stations and that the number of air conditioning units have risen from 700,000 in 2006 to over 3 million in 2010. In winter a comparable percentage is used for heating purposes especially in the commercial sector. Therefore rational use of energy and deployment of renewable energy technologies for cooling and heating purposes in these two sectors would contribute to moderate the growing demand for energy in Egypt and reduce the GHG emissions resulting from these activities.

Egypt is a rich country with renewable sources. These sources include; wind, solar and biomass. Atlases for both wind and solar energies have been developed. Two thirds of the country's area has a solar energy intensity more than 6.4 kWh/m<sup>2</sup> day, between 2000 kWh/m<sup>2</sup>/y at the north and 3200 kWh/m<sup>2</sup>/y at the south with an economic potential 73656 TWh/Y. Duration of sun shine ranges between 9-11 h/day from north to south, with very few cloudy days. Wind speed approaches 10 m/sec and higher in some areas especially around the Red sea coast with 8 to 10 m/s in average in the Suez Gulf Zone. So far mainly hydropower facilities have been developed and it is believed that the most cost effective hydro sites have already been exploited. Consequently, solar and wind energy have to be used as clean and indigenously available energy in order to support Egypt's economic growth and increasing energy demand. Otherwise these energy needs will be met by building conventional energy based-facilities. The tables below highlight the distribution of sold electric energy by purpose of use covering the period of (04/05-11/12).

"Unit: G.W/H"

Item	12/11	11/10	10/09	09/08	08/07	07/06	06/05	05/04
<b>Total</b>	<b>135 592</b>	<b>126 654</b>	<b>119 916</b>	<b>112 617</b>	<b>107 226</b>	<b>98 812</b>	<b>92 859</b>	<b>85 781</b>
Industry	42 098	40 702	38 916	37 273	37 045	34 569	32 701	30 284
Agriculture	5 560	4 927	4 834	4 617	4 209	3 789	3 719	3 460
Utilities &Public Lighting	12 547	11 945	12 605	11 696	11 139	10 881	10 695	9 930
Governmental authorities	6 385	5 977	5 443	5 563	5 691	5 562	5 054	4 710
Houses &Housing Companies	56 664	51 370	47 431	43 811	40 271	36 596	33 900	31 311
Shops and others	10 715	10 238	9 674	8 754	8 240	7 046	6 016	5 393
<b>Total</b>	<b>133 969</b>	<b>125 159</b>	<b>118 903</b>	<b>111 714</b>	<b>106 595</b>	<b>98 443</b>	<b>92 085</b>	<b>85 088</b>
<b>Percentage distribution</b>								
Industry	31.4	32.5	32.7	33.4	34.8	35.1	35.5	35.6
Agriculture	4.2	3.9	4.1	4.1	3.9	3.8	4.0	4.1
Utilities &Public Lighting	9.4	9.5	10.6	10.5	10.4	11.1	11.6	11.7
Governmental authorities	4.8	4.8	4.6	5.0	5.3	5.6	5.5	5.5
Houses & Housing Companies	42.3	41.0	39.9	39.2	37.8	37.2	36.8	36.8
Shops and others	8.0	8.2	8.1	7.8	7.7	7.2	6.5	6.3
%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Sales of linking countries<sup>(1)</sup> and BOOT</b>	<b>1 623</b>	<b>1 495</b>	<b>1 013</b>	<b>903</b>	<b>631</b>	<b>369</b>	<b>774</b>	<b>693</b>
%	<b>1.2</b>	<b>1.2</b>	<b>0.8</b>	<b>0.8</b>	<b>0.6</b>	<b>0.4</b>	<b>0.8</b>	<b>0.8</b>

The considerable growth in the housing loads in comparison with industry is due to the expansion of residential compounds and new communities in addition to widespread use of domestic appliance especially air conditioners. It is further estimated that within the housing sector 50% of the energy consumption is directly linking to Air conditioning.



### Electricity Is Heavily Subsidized

Subsidies have been enabled most people in Egypt to be able to afford electricity. The country's electrification rate is 99%. Electricity tariffs in Egypt are subsidised both at the end-user level and for fuel input to power production. In the fiscal year 2009/10, subsidies for electricity were 7.5 Billion Egyptian Pounds (EGP) not including the underlying fuel subsidy, and EGP 16.5 with the fuel subsidy. Tariffs were unchanged from the early 1990's to 2003 and actually decreased due to inflation during these periods averaging around 6.9% per year. However, demand has grown and costs have increased, and Egypt needs to address different options to provide the required level of power with a reduction to their subsidies.

<b>PROJECT TYPE TITLE</b>	Feasibility Study addressing Central AC sectors
<b>COUNTRY NAME</b>	State of Kuwait
<b>LEAD IMPLEMENTING AGENCY</b>	UNIDO
<b>COOPERATING IMPLEMENTING AGENCY</b>	UNEP
<b>NATIONAL COUNTERPART</b>	National Ozone Unit at Environmental Ministries/Authorities of Kuwait
<b>SECTOR</b>	Air-Conditioning
<b>SUB-SECTOR</b>	Central Air-Conditioning (CAC)
<b>PROJECT STAKEHOLDERS</b>	<ul style="list-style-type: none"> <li>• General Secretariat of the Supreme council for Planning and Development</li> <li>• Kuwait Institute for Scientific Research (KISR)</li> <li>• Kuwait Foundation for the Advancement of Science (KFAS)</li> <li>• Kuwait University</li> <li>• Kuwait ASHRAE Chapter</li> </ul>
<b>PROJECT COSTS</b>	\$ 100,000
<b>MLF REQUESTED FUNDING</b>	\$ 100,000
<b>UNIDO FUNDING ALLOCATION</b>	\$ 70,000
<b>UNIDO SUPPORT COSTS @ 9%</b>	\$ 6,300
<b>UNEP FUNDING ALLOCATION</b>	\$ 30,000
<b>UNEP SUPPORT COSTS @ 13%</b>	\$ 3,900
<b>TOTAL PROJECT COSTS</b>	\$ 110,200
<b>PROJECT DURATION</b>	12 Months

<b>PROJECT SUMMARY</b>
<p>The feasibility study objective is to provide a detailed technical, financial as well as environmental and energy assessment / road map for the government of Kuwait, in the development of Central A/C systems.</p> <p>The focus of the feasibility study will be to undertake a full analysis between three main technologies namely Deep Sea Water free cooling, Waste heat absorption and Solar assisted chilled water absorption systems. In line with the three technologies that study will make clear assessments of the below deliverables</p> <p>The deliverables of the feasibility study are:</p> <ol style="list-style-type: none"> <li>8. Assessment of the most suitable non-conventional (non-vapour compression) technologies for Central A/C systems</li> <li>9. Assessment renewable energy source,</li> <li>10. Assessment legalization barriers,</li> <li>11. Assessment energy saving mechanisms,</li> <li>12. Assessment environmental benefits</li> <li>13. Develop a financial structure and financial scheme for both, Governmental Co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies.</li> </ol>

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## The Need of Central A/C in Kuwait

### Electricity sector

Kuwait's electric sector capacity has been slow to expand despite rapidly rising consumption rates over the past decade and persistent power shortages during peak demand periods. In this respect, the Gulf Cooperation Council is developing an interconnected power grid to meet the increasing electricity demand.

Kuwait relies on fossil fuels, namely oil and natural gas, to generate its electricity. The country struggles to produce and import sufficient natural gas to meet peak electricity demand in the summer months, and as a result, depends on more expensive and heavy fuel oil and crude oil. In 2011, oil accounted for more than 70% of Kuwait's power generation in 2011, while natural gas made up about 28.

Power-plants with capacity of 15.7 gigawatts (GW) have been installed with a 44% efficiency factor, resulting in an average output of nearly 7 GW. Peak demand in 2013 was 12.1 GW and has been increasing each year since 2004. The rate of growth of power generation capacity is not keeping pace with the rate of growth in demand which has averaged around 5% annually over the past decade.

Kuwait's increasing population and gross domestic product levels and low electricity tariffs over the past decade have led to higher demand in the residential sector. According to the World Bank, Kuwait was the world's fourth-largest electricity consumer on a per capita basis in 2011. In the past decade, the development of Kuwait's electricity sector has stalled because of political factors and a lack of investment. The country is perpetually in a state of electricity shortage and experiences frequent blackouts and brownouts each summer.

### Electricity subsidies

The Kuwaiti government provides these basic utilities at a very low cost. Historically, the price of electricity had some links with the cost of production, but this link has been broken, and rather than raising electricity prices, the government has reduced them over time. Since 1966 the government set the price at 2 fils/kWh (0.7 US cents) for ordinary consumers and 1 fils/kWh (0.35 US cents) for industrial companies, very low even by regional standards. This tariff structure is still in force today, though for chalets/villas, the price of electricity has been raised to 10 fils/kwh (3.5 US cents).

Due to these low prices, there is a wide gap between production costs and the selling prices of electricity. In the early 1980s, the average cost of electricity production was estimated at 26 fils/kWh, while the price, as above mentioned was administratively set at 1–2 fils/kWh (Al-Qudsi and Al-Shatti, 1987).

## Project Impact

On behalf of The Government of Kuwait, UNIDO and UNEP are requesting Project Funds to undertake a comprehensive feasibility study to assess three technologies and make the necessary recommendations as the most suitable for Kuwait. Additionally the study will provide technical and economical evidences to be disseminated to government officials as well as private investors.

The overall objective of UNIDO and UNEP with this initiative is to assist the Government of Kuwait in phasing-out ozone depleting substances while providing additional benefits both for the climate and energy sectors.

The proposed methodology supports the efforts of the Government of Kuwait and complements the activities under their HPMP's. Further, it provides crucial technical assistance and capacity building measures assuring the countries compliance with obligations under the MP. At the same time it makes an important contribution to the on-going efforts towards Mitigation of climate change by reducing greenhouse gas (GHG) emission into the atmosphere and Achieving energy efficiency.

## Project Objective

The focus of the feasibility Study is to assess and provide technical and economical evidences to be disseminated to government officials as well as private investors. This feasibility study will address:

- Use of non-conventional (non-vapour compression) technologies
- Central A/C technology options;
- Legalization Barriers;
- Energy saving mechanisms;
- Governmental Co-financing mechanisms, including the possibility of reducing energy subsidies.

## Project Deliverables

The deliverables of the feasibility study are summarized below:

10. Conduct a literature review to identify the current status of Central A/C technologies namely
  - I. Deep Sea Water free cooling,
  - II. Waste heat absorption, and
  - III. Solar assisted chilled water absorption systems
11. Assessment renewable energy source,
12. Assessment legalization barriers,
13. Assessment energy saving mechanisms,
14. Assessment environmental benefits,
15. Develop a financial structure and financial scheme for both, Governmental Co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies,

## Feasibility Study Methodology

Central A/C systems are an essential utility for sustainable economic and urban development. Central A/C has been a commercial alternative to traditional A/C and refrigeration technologies since the mid-90s. Various definitions, classifications and applications of Central A/C and heating are discussed and implemented including elements of a district energy system, which are widely available in Europe. Central A/C is a superior alternative to conventional individual air conditioning units as it helps reduce energy consumption and costs to both customers and governments alike, while also protecting the environment by cutting carbon dioxide emissions. Some of the advantages Central A/C has over traditional air conditioning include:

- 40% less energy consumption
- Decreases energy costs, whilst it is noted that initial capital investment is higher, however, in the long run the investment costs are covered and financial gains are made.
- Annual maintenance costs are substantially lower
- Can store up to 30% of potential output by holding chilled water in reserve, therefore easily meeting demands in seasonal variations, or utilizing electricity during low demand periods
- Equipment needs to be replaced only every 30 years – as compared to 15 years for traditional air conditioning
- Greater reliability due to the high standard, industrial equipment utilized and back-up chillers on stand-by
- Protects the environment by reducing CO2 emissions due to lower energy consumption
- Central A/C systems are remotely located and therefore enhance real estate value by freeing up space for other uses
- Phase-out of refrigerants HCFC, less refrigerant is needed for the same end-user demand for cooling comfort.

## Central A/C technologies

Distributed energy (heating and/or cooling) has proven to be an effective mean to reduce the overall energy consumption and, despite the fact that the energy distribution systems typically use vapour compression technologies for generating cold water, there are also several non-vapour compression technologies introduced over years in many locations around the world.

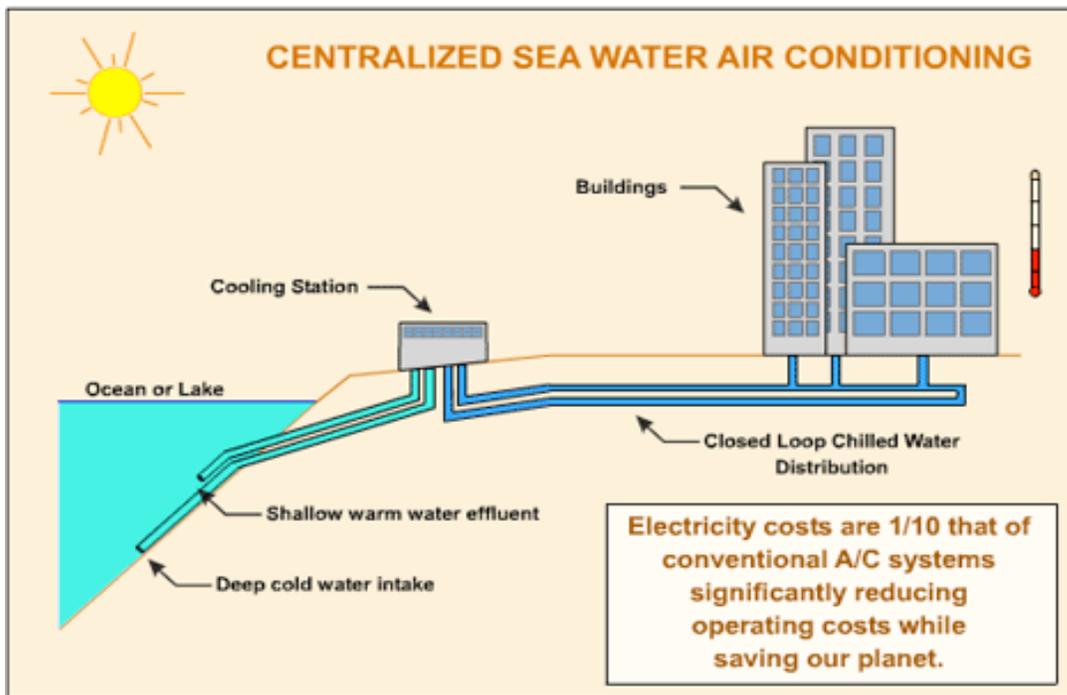
The adoption of any technology to widely contribute to the respective sectors relies on many factors:

- Economics of the technology (initial and operation) compared to conventional ones;
- Energy Saving;
- Availability of natural and/or renewable resources i.e. Solar, Natural gas, etc.;
- Availability of local/regional technical support and competent service providers;
- Availability of national relevant supporting policies, standards, norms;

Therefore, the feasibility study will seek answers to above elements aiming at making the outcomes of the project feasible and appealing to governments and decision makers of the buildings sector and related energy distribution systems. Accordingly, the project will basically examine the deployment of such technologies and their potentiality in Kuwait, below technologies will be the focus of the study but others can be also examined during the preparation.

## Deep Sea Water Free cooling

Cold seawater air-conditioning is a process in which seawater from the ocean's depths is pumped up to a heat exchanger to handle the cooling load of a large building. Cold seawater air-conditioning can be competitive with more conventional forms of meeting large air conditioning loads such as the use of vapour-compression chiller units. The use of cold seawater air conditioning is most competitive in tropical island areas, where air-conditioning demands are high and the physical distance to cold seawater is at a minimum. This technology is suitable to projects near the sea in locations where the continental reef is relatively steep. In those locations reasonable depths are achievable at distances not too far from shore. The technique uses directional drilling techniques to pump sea water from depths near the sea bottom and use this water to cool a secondary chilled water loop. This technology can achieve saving in operating expenses in excess of 50% when compared to mechanical vapour compression.



## Waste heat and absorption technology

One of the primary advantages of distributed electricity generation is the possibility of waste heat recovery, which will lead to the reduction of energy costs and the emissions of greenhouse gases (CO<sub>2</sub>).

Waste heat obtained from an industrial process can be used to generate steam or hot water. This is achieved by using heat recovery boilers and heat exchangers. Absorption chillers use heat energy instead of mechanical energy to provide refrigeration, so they can be powered by lower cost fuel or waste heat. Heat required for the chiller is typically provided by steam or water from a boiler or combustion turbine, but can also be provided by an integral, direct gas-fired heater. Other energy use occurs in pumping fluids around the process, pumping condenser water, and driving cooling tower fans. Cooling towers are larger with absorption chillers than with electrical chillers because they have to reject the cooling load plus the input heat to drive the process.

Absorption chillers involve a complex cycle of absorbing heat from a driving source to create chilled water. Steam or hot water from a boiler or from a heat recovery unit is used to boil a solution of refrigerant/absorbent, with most systems using water/lithium bromide for chilling and ammonia/water for refrigeration as the working solutions. The absorption chiller then captures the refrigerant vapor from the boiling process, and uses the energy in this fluid to chill water after a series of condensing; evaporating, absorbing steps are performed. This process is essentially a thermal compressor, which replaces the electrical compressor in a conventional vapor compression chiller. In doing so, the electrical requirements are significantly reduced, requiring electricity only to drive the pumps that circulate the solution.

Annual cooling costs are heavily dependent on fuel and electrical costs. Facilities with 1,500 hours per year or more of air conditioning loads, low fuel costs, high peak demand costs, and waste heat sources should consider installing an absorption chiller.

Absorption chillers can be used to reshape the thermal and electric profile of a facility by shifting cooling from an electric load to a thermal load. The shift can be very important for facilities with time-of-day electrical rates or high cooling season rates.

The operating saving obtained by this technique is between 60 and 70 % when compared to a similar capacity mechanical vapour compression system.

## Solar assisted chilled water absorption systems

Solar cooling technologies use solar thermal energy provided through solar collectors to power absorption cooling machines. As many cooling applications, such as air conditioning, have a high coincidence with the availability of solar irradiation, the combination of solar thermal and absorption cooling obviously has a high potential to replace conventional cooling machines based on electricity. Larger solar cooling systems have been successfully demonstrated and smaller machines, which could be used in (small) residential and office buildings, are entering the market.

In this system part of the refrigeration capacity of a system is obtained by the use of a hot water or steam fired absorption chillers. Solar collectors are used to produce this hot water or steam. The system can utilize single, double or triple effect absorption chillers, according to the firing temperatures obtained by the solar

collectors. The system is one of the most proven and can achieve operating saving in the range of 25 to 40 % when compared to traditional mechanical vapour compression systems<sup>3</sup>.

## Solar Renewable Energy

The primary source of all renewable energies except geothermal energy is solar radiation. Solar energy is mainly harvested in two ways. It can be converted into either heat or electricity. Converting solar energy into heat is possible by using solar thermal energy technologies. Converting solar energy directly to electricity is achievable by using photovoltaic cells.

In solar thermal systems there are several advantages (European Solar Thermal Industry Federation, ESTIF, 2006)

- ✚ Reduces the dependency on imported fuels
- ✚ Saves natural resources
- ✚ Save CO<sub>2</sub> emission
- ✚ Curbs urban air pollution
- ✚ Is immediately available
- ✚ Creates local jobs
- ✚ Inexhaustible

The feasibility study will assess the three technologies with the view to provide the most suitable technologies to assist the government of Kuwait in meeting its environmental and energy obligation whilst insure the reduction of the reliance of HCFC's

## Assessment of Financial impact

The feasibility study will undertake a financial assessment on the total costs:

- ✚ All Capital costs, excluding land
- ✚ Labor costs
- ✚ Investment / Returns
- ✚ Energy Saving
- ✚ Maintenance and repair costs
- ✚ Distribution Costs
- ✚ Revenue Scenarios
- ✚ Possible Investors

## Assessment of the Infrastructure and Regulatory Framework

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<sup>3</sup> Regarding renewable energies, Kuwait plans to generate 5% of its electricity from renewable sources by 2020 and 15% by 2030, primarily by using the country's solar and wind potential. To achieve the goals, Kuwait is employing more private capital through public-private projects (PPP), as well as independent water and power projects (IWPP).

The feasibility study will cover a full analysis on Infrastructure and Regulatory Framework, which will include:

- ✚ Current and future energy labelling programs or building codes that likely to be enforced within the country strategic development plan and its implication to the selection of technologies.
- ✚ Applicability to market specific needs:
  - c. Types of buildings/establishments i.e. residential, government, public, commercial, etc.
  - d. Infrastructure required to promote particular options (e.g. district cooling, absorption systems, others)
- ✚ National relevant institutional framework needed promote new technologies including policies, regulations and standards/codes.
- ✚ Potential incentives and disincentives measures that can be adopted for promoting the outcomes of the study
- ✚ Relevant standards and guidelines that need to be considered to each type of alternative technology(s) that will be offered by the study.
- ✚ Technical capacities needed to introduce new technologies including educational, training, specialized awareness.

## Partners and Stake Holders

The studies intend to involve key governmental, research and industry partners, in order to ensure that inputs from all relevant stakeholders are incorporated and that the outcomes will be acceptable/implementable.

For Egypt, the following stakeholders are considered for direct and indirect involvement in the project:

- ✚ General Secretariat of the Supreme council for Planning and Development
- ✚ Kuwait Institute for Scientific Research (KISR)
- ✚ Kuwait Foundation for the Advancement of Science (KFAS)
- ✚ Kuwait University
- ✚ Kuwait ASHRAE Chapter

## Dissemination of Results

The results of the final assessment of the feasibility study will be presented in a three-way approach:

- ✚ A high level coordination meeting with the ministries of Urban Planning, Environment, Energy, Trade and Finance.
- ✚ A stakeholder coordination meeting, with project developers, main energy suppliers companies, and appropriate associations, and development banks.
- ✚ A publication of the assessment will be developed and circulated through the ministries of energy, environment and urban planning.

## Feasibility Study Budget

Description	Activity Type	Responsible agency	Costs in (USD)
International Expert	Assessment of suitable technologies	UNIDO	35,000
	Energy saving mechanisms		
National Consultation Meetings and a consultancy service by a regional expert	Legalization Barriers	UNEP	30,000
	Development terms of reference for comprehensively assessing the governmental Co-financing mechanism, including the possibility of reducing energy subsidies		
Preparation and Dissemination of final Feasibility Study	Develop through lesson learned a check-list	UNDIO	10,000
	Dissemination of final feasibility study		
Technical Assistance	Technical Assistance Through expert group meeting/workshop, to present feasibility study and its results and recommendation	UNIDO	25,000
<b>Total</b>			<b>100,000</b>



## Annex 1. Background

The Montreal Protocol on Substances that Deplete the Ozone Layer (MP) was adopted in 1987 to phase-out Ozone Depleting Substances (ODSs) as a result of the agreement established under the Vienna Convention for the protection of the environment from adverse effects of ozone depletion. To date, the MP has been effective and successful in reducing the impact of human activities on the global environment and therefore described as one of the most successful environmental treaty.

One of the reasons for this success is the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) that, since 1991, provides financial assistance to Article 5 countries, or developing countries, to help achieve their phase-out obligations under the MP. Since 1992, UNIDO, as one of the implementing agencies of the Montreal Protocol, assists countries in developing and implementing projects with the aim to phase-out ODSs. So far, UNIDO has implemented over 1,217 projects, which contributed to the phase-out of 70,287 Ozone Depleting Potential tones (ODPt) of the world's total consumption of ODSs.

In September 2007, the Parties to the MP took a historical decision to accelerate the phase-out of Hydrofluorochlorocarbons (HCFCs)<sup>4</sup>, ODSs used as interim substitutes to Chlorofluorocarbons (CFCs). While phasing-out HCFCs, the Parties agreed to promote the selection and adoption of alternatives that have low impact on the environment, in particular, on climate, and that meet other health, safety and economic standards. Therefore, the Executive Committee of the MLF (ExCom), when developing and applying funding criteria for the HCFC phase-out strategy, gives priority to alternatives that have low Global Warming Potential (GWP) and that are able to ensure energy efficiency.

## Annex 2. Energy Sector Overview

Kuwait is one of the world's top producers and net exporters of petroleum and other fossil fuels. The country holds the world's sixth-largest oil reserves (104.5 billion barrels) and is one of the top 10 global producers and exporters of total petroleum liquids.

Kuwait's domestic consumption has been increasing, but a majority of its oil production is exported to Asia, being South Korea and India the largest importers. This country maintains refining and marketing interests in Europe and looks to expand into Asia, particularly China, Vietnam, and Indonesia.

According to OPEC, Kuwait exported 805,000 bbl/d of petroleum products in 2013, the highest level among OPEC members. However, domestic oil consumption has been steadily increasing, partially as a result of increased petroleum-fired electricity generation.

Regarding natural gas, Kuwait recently became a net importer of this energy source, leading the country to focus more on natural gas exploration and development for domestic consumption.

Kuwait's natural gas sector, like the petroleum and other fossil fuels sector, is managed by Kuwait Petroleum Corporation.

The country plans to increase dry natural gas production to 3 billion cubic feet per day by 2030 to satisfy increasing domestic consumption and reduce dependence on natural gas imports during peak summer months.

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4 Decision XIX/6.

