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COMITÉ EXÉCUTIF
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D'APPLICATION DU PROTOCOLE DE MONTRÉAL

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Point 9(c) et (d) de l'ordre du jour provisoire¹

PROGRAMME DE TRAVAIL DU PNUD POUR L'ANNÉE 2024

¹ UNEP/OzL.Pro/ExCom/94/1

Les documents de présession du Comité exécutif du Fonds multilatéral aux fins d'application du Protocole de Montréal sont présentés sous réserve des décisions pouvant être prises par le Comité exécutif après leur publication.

OBSERVATIONS ET RECOMMANDATION DU SECRÉTARIAT DU FONDS

1. Le PNUD demande au Comité exécutif d'approuver le montant de 2 323 773 \$US, plus les coûts d'appui de l'agence de 163 865 \$US, pour son programme de travail de 2024, présenté dans le tableau 1. La demande est jointe au présent document.

Tableau 1: Programme de travail du PNUD pour l'année 2024

Pays	Activité/Projet	Montant demandé (\$ US)	Montant recommandé (\$ US)
SECTION A: ACTIVITÉS RECOMMANDÉES POUR APPROBATION GLOBALE			
A1: Renewal of institutional strengthening projects			
Cuba	Renouvellement du projet de renforcement des institutions (phase XIII)	394 965	394 965
Indonésie	Renouvellement du projet de renforcement des institutions (phase XIV)	718 693	718 693
Panama	Renouvellement du projet de renforcement des institutions (phase XI)	396 115	396 115
Trinité-et-Tobago	Renouvellement du projet de renforcement des institutions (phase XII)	180 000	180 000
Total partiel pour A1		1 689 773	1 689 773
Coûts d'appui de l'agence		118 285	118 285
Total pour A1		1 808 058	1 808 058
A2: Préparation de projet pour un plan de mise en œuvre de l'Amendement Kigali sur les HFC (KIP)			
Belize ^a	Préparation d'un KIP (stage I)	39 000	39 000
Total partiel pour A2		39 000	39 000
Coûts d'appui de l'agence		2 730	2 730
Total pour A2		41 730	41 730
A3: Préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et de plans pour la collecte, le transport et l'élimination de ces substances²			
Chili	Préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et du plan	90 000	90 000
Panama	Préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et du plan	90 000	90 000
Total partiel pour A3		180 000	180 000
Coûts d'appui de l'agence		12 600	12 600
Total pour A3		192 600	192 600
SECTION B: ACTIVITÉS RECOMMANDÉES POUR EXAMEN INDIVIDUEL			
B1: Préparation de projet pour un plan de mise en œuvre de l'Amendement Kigali sur les HFC (KIP)			
Chine	Préparation d'un KIP (phase I)	250 000	*
Total partiel pour B1		250 000	*
Coûts d'appui de l'agence		17 500	*
Total pour B1		267 500	*
B2: Assistance technique pour préparer un rapport de vérification sur la consommation de HCFC			
Angola	Rapport de vérification pour la phase II du PGEH	30 000	*
Sri Lanka	Rapport de vérification pour la phase II du PGEH	30 000	*
Total partiel pour B2		60 000	*
Coûts d'appui de l'agence		5 400	*
Total pour B2		65 400	*
B3: Préparation d'un projet pilote visant à maintenir et/ou améliorer l'efficacité énergétique des technologies de remplacement et des équipements dans le contexte de la réduction progressive des HFC			
Chine	Préparation d'un projet pilote visant à maintenir et/ou améliorer l'efficacité énergétique dans la climatisation des centres de données	25 000	*
Total partiel pour B3		25 000	*
Coûts d'appui de l'agence		1 750	*

² Désigné ici comme préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et du plan.

Pays	Activité/Projet	Montant demandé (\$ US)	Montant recommandé (\$ US)
Total pour B3		26 750	*
B4: Préparation d'un projet pilote mondial visant à maintenir et/ou améliorer l'efficacité énergétique des technologies de remplacement et des équipements dans le contexte de la réduction progressive des HFC			
Mondial	Préparation d'un projet pilote visant à faire la démonstration du recours à des outils numériques de surveillance et de gestion pour améliorer l'efficacité énergétique et réduire les émissions de gaz à effet de serre dans les secteurs de la climatisation et de la chaîne du froid en Colombie, au Liban, au Panama, au Sri Lanka, et à Trinité-et-Tobago	80 000	*
Total partiel pour B4		80 000	*
Coûts d'appui de l'agence		5 600	*
Total pour B4		85 600	*
Total pour A1, A2, A3, B1, B2, B3, B4		2 323 773	1 908 773
Coûts d'appui de l'agence pour A1, A2, A3, B1, B2, B3, B4		163 865	133 615
Total		2 487 638	2 042 388

^a PNUE comme agence d'exécution principale

* Recommandé pour examen individuel

SECTION A: ACTIVITÉS RECOMMANDÉES POUR APPROBATION GLOBALE

A1: Renouvellement des projets de renforcement des institutions

Description du projet

2. Le PNUD a soumis des demandes de renouvellement des projets de renforcement des institutions pour les pays mentionnés dans la section A1 du tableau 1. La description de ces projets figure à l'Annexe I au présent document.

Observations du Secrétariat

3. Le Secrétariat a examiné les demandes de renouvellement de quatre projets de renforcement des institutions, soumises au nom des gouvernements concernés, à la lumière des lignes directrices³ et des décisions pertinentes relatives à l'admissibilité et aux niveaux de financement. Les demandes ont été vérifiées par rapport aux plans de travail initiaux pour la phase précédente, aux données du programme de pays et aux données exigées en vertu de l'article 7, au dernier rapport sur la mise en œuvre des plans de gestion de l'élimination des HCFC (PGEH), au rapport périodique de l'agence et à toutes autres décisions pertinentes de la Réunion des Parties. Il a été noté que ces pays ont soumis les données de leurs programmes de pays de 2023 qui sont conformes aux cibles de contrôle fixées dans le Protocole de Montréal, et que la consommation annuelle de HCFC déclarée par chacun, n'excède pas la consommation annuelle maximale autorisée dans leurs Accords de PGEH avec le Comité exécutif. En outre, toutes les demandes soumises incluaient une évaluation des indicateurs de performance, des risques du projet et de sa pérennité, et de l'atteinte des objectifs de renforcement des institutions, conformément à la décision 91/63 (b).

Recommandation du Secrétariat

4. Le Secrétariat recommande l'approbation globale des demandes de renouvellement des projets de

³ Décision 91/63 : (b) D'approuver le format révisé des rapports finaux et des demandes de prolongation du financement des projets de renforcement des institutions, et les indicateurs de performance correspondants; et (c) demander aux pays visés à l'article 5, par l'intermédiaire des agences bilatérales et d'exécution, d'utiliser le format révisé mentionné à l'alinéa (b) ci-dessus pour toutes les demandes de renouvellement des projets de renforcement des institutions à partir de la première réunion du Comité en exécutif en 2023.

renforcement des institutions pour Cuba, l'Indonésie, le Panama et Trinité-et-Tobago, aux niveaux de financement indiqués dans la section A1 du tableau 1 du présent document. Le Comité exécutif pourrait adresser aux gouvernements des pays mentionnés ci-dessus, les observations contenues à l'Annexe II au présent document.

A2: Préparation de projet pour un plan de mise en œuvre de l'Amendement de Kigali sur les HFC

Description du projet

5. Le PNUD a soumis une demande pour la préparation de la phase I d'un KIP pour un pays, à titre d'agence de coopération et avec le PNUE comme agence principale, tel qu'indiqué dans la section A2 du tableau 1. Le PNUE, à titre d'agence d'exécution principale pour le Belize, a demandé 91 000 \$US, plus des coûts d'appui de l'agence de 11 830 \$US, dans son programme de travail pour 2024.⁴

Observations du Secrétariat

6. Le PNUE, à titre d'agence d'exécution principale pour le Belize, a présenté une description des activités requises pour la préparation du KIP et les coûts correspondants de chaque activité dans son programme de travail;⁵ les observations du Secrétariat y sont également incluses.

Recommandation du Secrétariat

7. Le Secrétariat recommande l'approbation globale de la préparation de projet pour la phase I du plan de mise en œuvre de l'Amendement de Kigali sur les HFC (KIP) pour le Belize, au niveau de financement indiqué dans la section A2 du tableau 1.

A3: Préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et de plans pour la collecte, le transport et l'élimination de ces substances

Description du projet

8. Le PNUD a soumis des demandes pour la préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et d'un plan pour deux pays, à titre d'agence d'exécution désignée, tel qu'indiqué dans la section A3 du tableau 1.

Observations du Secrétariat

9. Lors de l'examen de ces demandes, le Secrétariat a tenu compte des critères énoncés dans la décision 91/66 pour la préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et d'un plan; des activités proposées pour la préparation du projet et de leurs liens avec les plans nationaux d'élimination et de réduction progressive (PGEH ou KIP) dans ces pays. Le Secrétariat a constaté que chaque demande de financement est conforme à la décision 91/66.

10. Le PNUD, à titre d'agence d'exécution désignée, a fourni une description des activités requises pour la préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et d'un plan pour le Chili et le Panama ainsi que les coûts correspondants de chaque activité, en utilisant les formulaires de demande prescrits pour les propositions de projet.

11. Les activités énoncées dans les demandes de financement pour les deux pays incluaient la préparation de l'inventaire national, du plan d'action et du rapport final; l'identification des parties prenantes; des consultations et des ateliers avec les parties prenantes concernées; une analyse de

⁴ UNEP/OzL.Pro/ExCom/94/19

⁵ Ibid

l'équipement en service et les taux de fin de vie; une évaluation technique et économique des options pour la manipulation et l'élimination des substances réglementées indésirables; une évaluation des options pour l'élimination définitive des frigorigènes indésirables dans les pays; l'élaboration d'un plan de communication et de vulgarisation; et des considérations sur l'intégration de l'égalité des genres.

Recommandation du Secrétariat

12. Le Secrétariat recommande l'approbation globale de la préparation d'un inventaire national des banques de substances réglementées ayant déjà servi ou indésirables et d'un plan pour la collecte, le transport et l'élimination de ces substances pour le Chili et le Panama, au niveau de financement indiqué dans la section A3 du tableau 1.

SECTION B: ACTIVITÉS RECOMMANDÉES POUR EXAMEN INDIVIDUEL

B1: Préparation de projet pour un plan de mise en œuvre de l'Amendement de Kigali sur les HFC

Description du projet

13. Le PNUD a soumis une demande pour la préparation de la phase I d'un KIP pour un pays visé à l'article 5, à titre d'agence d'exécution désignée, tel qu'indiqué dans la section B1 du tableau 1.

Observations du Secrétariat

14. Lors de l'examen de la demande, le Secrétariat a tenu compte des lignes directrices pour la préparation des KIP contenues dans la décision 87/50, des activités proposées pour la préparation du projet et de leurs liens avec des activités de facilitation et autres projets reliés aux HFC dans le pays.

15. Le PNUD, à titre d'agence d'exécution désignée, a décrit les activités requises pour la préparation d'une stratégie générale pour le KIP de la Chine, en utilisant le format de demandes pour la préparation d'un projet de KIP. La demande incluait des données sur la consommation de HFC et de mélanges de HFC en 2022. Les activités de préparation de projet incluaient une analyse historique de la production, de l'importation, l'exportation et l'utilisation des HFC; une enquête et une analyse sectorielle; une recherche sur les technologies de remplacement des HFC à l'échelle nationale et internationale; une évaluation des technologies de remplacement; une recherche sur les règlements et politiques; et l'élaboration d'une stratégie générale pour la réduction progressive des HFC et sa validation par les parties prenantes. Le Secrétariat a pris note que le gouvernement de la Chine a accepté l'Amendement de Kigali⁶ et remis une lettre d'endossement indiquant son intention de prendre des mesures pour la réduction progressive des HFC. Le Secrétariat a pris note aussi qu'en raison de sa valeur de référence pour les HCFC supérieure à 2 000 tonnes PAO⁷, le niveau de financement sera déterminé au cas par cas selon la décision 87/50(c).

16. À la suite d'une demande de clarification, le PNUD, au nom du gouvernement de la Chine, a mentionné la priorité du pays de commencer par un examen minutieux des approches générales pour les secteurs et sous-secteurs et qu'avec des informations plus détaillées, le gouvernement prévoit soumettre une demande de préparation de projet pour des plans dans le secteur de la fabrication, à la 95^e réunion.

Recommandation du Secrétariat

17. Le Comité exécutif pourrait envisager l'approbation de la préparation de projet pour une stratégie générale pour la phase I du plan de mise en œuvre de l'Amendement de Kigali sur les HFC (KIP) pour la Chine, au montant de 250 000 \$US, plus des coûts d'appui de l'agence de 17 500 \$US, pour le PNUD.

⁶ Date d'acceptation de l'Amendement de Kigali : 17 juin 2021

⁷ La valeur de référence de la Chine pour les HCFC est de 57 818,7 tonnes PAO

B2: Assistance technique pour préparer un rapport de vérification sur la consommation de HCFC

Description du projet

18. Conformément à la décision 61/46(c),⁸ le Secrétariat a pris un échantillon de 15 pays visés à l'article 5, à faible volume de consommation (PFV), et de deux pays qui ne sont pas des PFV mais qui sont financés comme des PFV⁹, afin de vérifier la conformité à leurs Accords pour les plans de gestion de l'élimination des HCFC (PGEH). La liste des pays sélectionnés figure au tableau 5 du document UNEP/OzL.Pro/ExCom/94/14 sur l'Aperçu des questions recensées pendant l'examen des projets. Le PNUD, à titre d'agence d'exécution principale, demande du financement pour la vérification de la phase II des PGEH pour l'Angola et le Sri Lanka.

Observations du Secrétariat

19. Le Secrétariat a indiqué que les demandes de financement étaient conformes aux fonds approuvés pour des vérifications similaires lors de réunions précédentes et il a ajouté que les rapports de vérification doivent être soumis au moins dix semaines avant les réunions applicables du Comité exécutif lors desquelles la prochaine demande de financement pour le PGEH est présentée.

Recommandation du Secrétariat

20. Le Comité exécutif pourrait envisager l'approbation de l'assistance technique pour la préparation du rapport de vérification pour la phase II du plan de gestion de l'élimination des HCFC (PGEH) pour l'Angola et le Sri Lanka, au montant de 30 000 \$US, chaque, plus des coûts d'appui de l'agence de 2 700 \$US, pour le PNUD, étant entendu que les rapports de vérification doivent être soumis au moins dix semaines avant les réunions applicables du Comité exécutif lors desquelles les prochaines tranches de financement pour les PGEH sont présentées.

B3: Préparation d'un projet pilote visant à maintenir et/ou améliorer l'efficacité énergétique des technologies de remplacement et des équipements dans le contexte de la réduction progressive des HFC

Description du projet

21. Le PNUD, à titre d'agence d'exécution désignée, a soumis une demande pour la préparation d'un projet pilote visant à maintenir et/ou améliorer l'efficacité énergétique pour la Chine, tel qu'indiqué dans la section B3 du tableau 1. La demande a été présentée conformément à la décision 91/65.

22. La demande porte sur la préparation d'un projet pilote pour l'utilisation d'une technologie offrant une solution de refroidissement par un liquide d'immersion, pour remplacer les systèmes de refroidissement à compression de vapeur à base de HFC-134a et de R-410A, utilisés dans les centres de données, avec une estimation conservatrice de 5 500 tonnes métriques pour la capacité installée de systèmes de climatisation. Le projet évaluerait la réduction de la consommation de HFC pour une capacité de refroidissement comparable et ferait le suivi des gains en efficacité énergétique avec des solutions de refroidissement par un liquide d'immersion dans un centre de données. On estime que la Chine compte environ 74 000 centres de données, avec 2,44 millions de racks de données standard en 2019 et leur nombre a atteint 7,6 millions en 2023. Le refroidissement peut représenter jusqu'à 30 à 50 pour cent de la consommation totale d'énergie d'un centre de données. Selon les résultats du projet, la technologie pourrait être appliquée dans d'autres

⁸ Le Secrétariat a été chargé de remettre, à la première réunion de chaque année, une liste représentant 20 pour cent des pays dont la consommation de base de HCFC est inférieure ou égale à 360 tonnes métriques et avec un PGEH approuvé, afin que le Comité exécutif puisse approuver le financement en vue de la vérification de la conformité du pays à son accord de PGEH pour l'année en question.

⁹ Burkina Faso et Gabon

centres de données, et améliorée conjointement avec des sources d'énergie renouvelable et un système de récupération de la chaleur perdue afin d'améliorer les gains d'efficacité énergétique.

23. Les activités de préparation de projet incluent la collecte de données sur les HFC et le profil des équipements dans les applications des centres de données, des estimations de la croissance de la demande de refroidissement et de l'impact relatif sur la consommation globale des substances ciblées par rapport à la consommation globale de HFC; un examen des normes et règlements sur la performance de refroidissement dans les centres de données et les politiques d'efficacité énergétique pertinentes pour ce secteur; et une évaluation des informations de référence sur les solutions de refroidissement par un liquide d'immersion pour les centres de données, conjointement avec l'utilisation de sources d'énergie renouvelable dans de tels centres de données et des systèmes de récupération de la chaleur perdue. Le financement demandé couvrirait la collecte de données (7 000 \$US); l'évaluation de la technologie et les services de consultants afférents (13 000 \$US); et la consultation des parties prenantes (5 000 \$US).

Observations du Secrétariat

24. Le Secrétariat a examiné la proposition de projet en fonction des critères énoncés dans la décision 91/65 et constaté que la demande pourrait entrer dans le cadre du paragraphe (b)(i)c. pour des activités d'assemblage et d'installation de gros équipements commerciaux et industriels de réfrigération, de climatiseurs et de pompes à chaleur.¹⁰

25. Le Secrétariat a demandé si cette technologie est utilisée actuellement en Chine, quel serait le liquide sélectionné pour l'évacuation de la chaleur, si la démonstration serait associée au remplacement de la technologie dans une installation existante consommant des HFC et la taille envisagée (à savoir, capacité et demande d'électricité) de chaque unité de refroidissement immersif. Le PNUD a confirmé que le projet de démonstration serait réalisé dans un nouveau centre de données. Le PNUD a indiqué aussi que la plupart des centres de données existants utilisent des systèmes de refroidissement à base de HFC; ainsi, ce projet éviterait l'utilisation d'un volume élevé de HFC dans un nouveau centre de données. En outre, tandis que la puissance énergétique est inférieure à 10 kW par rack pour les systèmes de refroidissement à l'air, la technologie de refroidissement à phase unique par immersion peut traiter une densité énergétique allant jusqu'à 60kW par rack. Le refroidissement par liquide est une technologie utilisée en Chine; toutefois il en existe de nombreuses variétés selon les différents liquides de refroidissement qui constituent l'aspect essentiel de cette technologie. Le liquide de refroidissement le plus populaire en usage dans le pays est un liquide électronique fluoré qui présente des risques pour la santé et l'environnement. Par conséquent, l'aspect innovateur de ce projet pilote est de proposer la démonstration d'un liquide de refroidissement émergent à base d'hydrocarbures, appelé "Ice Core 797", qui est encore au stade du développement mais qui a le potentiel d'éliminer les risques pour la santé et l'environnement associés au liquide de refroidissement. La taille d'une unité de refroidissement par immersion pour un centre de données dépend de plusieurs facteurs, incluant la taille du centre, la charge thermique générée par l'équipement et la capacité de refroidissement désirée.

26. Le Secrétariat a posé des questions sur la conception et les exigences pour l'installation d'une solution de refroidissement par un liquide d'immersion, le frigorigène utilisé pour refroidir l'eau utilisée pour refroidir le fluide frigorigène à phase unique, la technologie qui sera utilisée pour absorber la chaleur perdue rejetée par l'unité de distribution du refroidissement et sur l'inclusion de l'élaboration de normes d'efficacité énergétique pour ce secteur, dans le projet. Le PNUD a expliqué que l'utilisateur final serait sélectionné durant la préparation du projet et que l'équipement doit être conçu sur mesure et installé par des entrepreneurs spécialisés. Le projet vise à récupérer la chaleur pour la livrer aux secteurs industriel et

¹⁰ Activités d'assemblage et d'installation de gros équipements commerciaux et industriels de réfrigération, de climatiseurs et de pompes à chaleur c. Des projets d'assistance technique pour l'assemblage et l'installation d'équipements qui entraîneraient l'adoption de technologies visant à maintenir et/ou améliorer l'efficacité énergétique durant la conversion des HFC et qui pourraient être répliquables et évolutifs dans le pays ou la région seraient considérés en priorité.

agricole. Le projet pilote se concentrera sur des solutions de remplacement avec utilisation de la chaleur perdue, telles que des pompes à chaleur écoénergétiques à base de CO₂ ou de R-290. Le choix du type de pompe à chaleur sera adapté au scénario d'application pour garantir une performance optimale et la pérennité. Les normes actuelles d'efficacité énergétique pour les centres de données en Chine s'appuient sur des technologies traditionnelles et les résultats de ce projet pilote serviront à des mises à jour de ces normes pour faciliter l'adoption de la technologie; et un examen des normes d'efficacité énergétique existantes pour les centres de données fera partie du projet.

27. En réponse aux observations du Secrétariat, le PNUD a expliqué qu'une partie de la préparation de projet consisterait à estimer le coût du projet pour l'installation d'un tel système de refroidissement. Le PNUE a signalé, en outre, qu'au moment de soumettre la demande complète de financement, le pays s'assurera d'avoir satisfait aux exigences de la décision 91/65(b)(iv).

Recommandation du Secrétariat

28. Le Comité exécutif pourrait envisager l'approbation de la préparation d'un projet pilote visant à améliorer l'efficacité énergétique et accélérer le retrait des HFC par une solution de refroidissement par immersion en une seule phase pour un centre de données intelligentes en Chine, au montant de 25 000 \$US, plus des coûts d'appui de l'agence de 1 750 \$US, pour le PNUD.

B4: Préparation d'un projet pilote mondial visant à faire la démonstration du recours à des outils numériques de surveillance et de gestion pour améliorer l'efficacité énergétique et réduire les émissions de gaz à effet de serre dans les secteurs de la climatisation et de la chaîne du froid

Description du projet

29. À la 93^e réunion, le PNUD a soumis une demande pour la préparation d'un projet pilote mondial visant à soutenir cinq pays pour tester des outils numériques de surveillance et de gestion des systèmes de climatisation et de la chaîne du froid.¹¹ Le Comité exécutif avait décidé¹² de reporter à la 94^e réunion, l'examen de la demande pour la préparation d'un projet pilote visant à faire la démonstration du recours à des outils numériques de surveillance et de gestion pour améliorer l'efficacité énergétique et réduire les émissions de gaz à effet de serre dans les secteurs de la climatisation et de la chaîne du froid en Colombie, au Liban, au Panama, au Sri Lanka et à Trinité-et-Tobago, qui devait être affinée pour tenir compte des observations du Comité exécutif sur la proposition soumise à la 93^e réunion.¹³

30. Conformément à la décision 93/37, le PNUD a soumis une proposition révisée pour la préparation d'un projet mondial visant à soutenir cinq pays pour tester des outils numériques de surveillance et de gestion afin de réduire les émissions de gaz à effet de serre et d'améliorer l'efficacité énergétique de la technologie utilisée dans les secteurs de la climatisation et de la chaîne du froid, à titre d'agence d'exécution désignée, tel qu'indiqué dans la section B4 du tableau 1.

31. La nouvelle proposition indique que le PNUD serait en mesure de fournir un cofinancement si le concept du projet est approuvé. Les raisons suivantes décrivent les liens avec la réduction progressive des HFC pour chaque pays, comme suit :

- (a) Le gouvernement de la Colombie prévoit soumettre la phase I de son KIP à la 95^e réunion. Il est prévu que la phase I du KIP porte sur les secteurs de la chaîne du froid dans l'alimentation et l'agro-industrie, en fournissant une assistance technique pour favoriser l'introduction de technologies écoénergétiques, sans SAO et à faible PRP, qui seraient soutenues par des solutions numériques.
- (b) Le gouvernement du Sri Lanka a soumis la phase I de son KIP et un projet concernant

¹¹ UNEP/OzL.Pro/ExCom/93/35

¹² Décision 93/37

¹³ Observations présentées aux paragraphes 153 à 157 du document UNEP/OzL.Pro/ExCom/93/105

l'efficacité énergétique à la présente réunion.¹⁴ Ce projet propose de promouvoir l'efficacité énergétique dans les secteurs de la climatisation et de la réfrigération commerciale, en faisant la démonstration de 90 unités super efficaces à faible PRP, utilisant des modules de lecture avec des besoins énergétiques limités, dans un tiers des unités installées. Le projet proposé est donc conçu pour soutenir le Sri Lanka dans l'accélération du déploiement d'outils énergétiques numériques qui utiliseraient potentiellement des lecteurs de moindres coûts et par le développement d'un logiciel libre de contrôle énergétique, avec des capacités mobiles additionnelles. De telles expériences pourraient aussi bénéficier aux entreprises locales de fabrication qui pourraient les incorporer dans la conception des nouveaux équipements de réfrigération commerciale qui doivent être convertis au R-290.

- (c) Le gouvernement du Liban prévoit soumettre la phase I de son KIP à la 95^e réunion qui devrait inclure la promotion de l'utilisation de solutions de remplacement à faible PRP dans le secteur de la chaîne du froid. Ce projet soutiendrait les concepteurs et installateurs locaux pour accéder à des outils numériques de moindre coût, intégrer des caractéristiques de conception qui alignent la surveillance en ligne de la performance avec la sécurité du système. Ceci pourrait aboutir à l'adoption de technologies visant à maintenir et/ou améliorer l'efficacité énergétique durant la conversion pour l'abandon des HFC.
- (d) Le projet proposé au Panama accroîtrait le déploiement d'outils énergétiques numériques dans différents secteurs de la réfrigération et de la climatisation (RAC). Les leçons tirées de la mise en œuvre de ce projet seraient intégrées dans la mise en œuvre de projets de démonstration pour la promotion de nouvelles technologies et l'introduction de systèmes de RAC écoénergétiques sans SAO et à faible PRP, prévus dans le cadre de la deuxième tranche du KIP approuvé (mise en œuvre en 2026-2028).¹⁵
- (e) Le projet proposé à Trinité-et-Tobago et les activités approuvées dans le cadre de la phase I de son KIP¹⁶ se complèteront. L'activité prévue dans le KIP pour constituer un registre des moyens et gros utilisateurs de HFC dans le secteur RAC servira dans ce projet à identifier les utilisateurs chez lesquels des solutions numériques peuvent être appliquées. Inversement, les résultats du projet seront utilisés pour contribuer aux activités de sensibilisation dans le cadre de la mise en œuvre du KIP, pour motiver les parties prenantes vers une transition technologique et une amélioration de l'efficacité énergétique.

32. Les activités de préparation de projet incluent un examen des systèmes d'automatisation et de contrôle appliqués aux équipements de RAC dans les pays pilotes; l'assistance technique concernant les technologies numériques appliquées aux équipements de climatisation et de la chaîne du froid, incluant celles utilisées pour la surveillance et la déclaration de la consommation énergétique; des enquêtes locales, la collecte de données sur le terrain et un examen des exigences spécifiques du projet au niveau national; et l'élaboration d'une stratégie de projet et d'activités spécifiques. Le financement demandé couvrirait le recrutement de consultants internationaux en RAC et technologie de la chaîne du froid (20 000 \$US), des experts en technologie numérique (20 000 \$US), des consultants nationaux (12 000 \$US), et des frais de déplacement (28 000 \$US).

Observations du Secrétariat

33. Le Secrétariat a posé des questions sur le coût potentiellement élevé du projet et les raisons de la sélection de ces cinq pays (et non pas d'un plus petit nombre). Le PNUD a expliqué que les cinq pays ont

¹⁴ UNEP/OzL.Pro/ExCom/94/54

¹⁵ Décision 93/72

¹⁶ Décision 93/74

été sélectionnés en fonction de la géographie, de la diversité climatique, des différents stades d'adoption de la technologie et des diverses applications, de la répliquabilité, et du soutien apporté par le gouvernement national. Cette approche vise à créer une vaste base de connaissances et une série solide de pratiques exemplaires qui pourront être reproduites dans divers contextes à travers le monde.

34. Le Secrétariat a demandé aussi plus d'information sur la durée de vie escomptée des outils technologiques et la manière dont ils seront gérés et mis à jour après l'achèvement du projet. Le PNUD a précisé que le matériel disponible pour la surveillance et la gestion de l'efficacité énergétique et des émissions de frigorigène (tels que capteurs, thermostats, régulateurs etc.) est généralement conçu pour répondre aux normes industrielles actuelles et reste pertinent pour une période considérable et que, selon un fabricant de telles pièces, leur durée de vie peut aller jusqu'à 15 ans.¹⁷ Les appareils peuvent être mis à jour souvent avec un nouveau logiciel pour améliorer leurs fonctionnalités, sans nécessiter le remplacement de tout le système. Après l'achèvement du projet, l'utilisation continue et l'amélioration de ces outils seront gérées par la formation de techniciens locaux et des parties prenantes sur l'entretien et le fonctionnement de ces outils numériques qui sera incluse dans les activités de projet et par leur intégration dans les KIP des pays respectifs.

35. Quant à la contribution de ce projet à la réduction progressive des HFC et à la volonté des pays participants de s'engager à concevoir des politiques qui feront uniquement la promotion de solutions de remplacement à faible PRP dans leurs pays si le projet est approuvé, le PNUD a expliqué que les liens du projet avec la réduction progressive des HFC se trouve dans sa capacité d'améliorer la gestion de l'équipement existant et de démontrer les avantages d'une transition vers des solutions de remplacement écoénergétiques à faible PRP. Avec la surveillance des taux de fuites de frigorigène et de l'efficacité énergétique, le projet permet des mesures correctives immédiates qui non seulement aident à maintenir l'efficacité opérationnelle mais préviennent aussi des émissions potentielles de frigorigènes à PRP élevé dues aux fuites, réduisant ainsi la demande de frigorigènes; le projet facilitera aussi l'adoption de pratiques exemplaires pour le fonctionnement écoénergétique de l'équipement avec de faibles fuites de frigorigène. Les données recueillies et analysées à la suite du déploiement de ces outils numériques devraient contribuer à accroître la sensibilisation des parties prenantes et les inciter à favoriser l'équipement utilisant des frigorigènes à faible PRP. Le PNUD a confirmé que les gouvernements des pays participants se sont engagés à concevoir des politiques qui feront la promotion des solutions de remplacement à faible PRP dans le cadre de leurs KIP.

Recommandation du Secrétariat

36. Le Comité exécutif pourrait envisager l'approbation de la demande de préparation d'un projet pilote mondial visant à faire la démonstration du recours à des outils numériques de surveillance et de gestion pour améliorer l'efficacité énergétique et réduire les émissions de gaz à effet de serre dans les secteurs de la climatisation et de la chaîne du froid, en Colombie, au Liban, au Panama, au Sri Lanka et à Trinité-et-Tobago, au montant de 80 000 \$US, plus des coûts d'appui de l'agence de 5 600 \$US, pour le PNUD.

¹⁷ www.winsen-sensor.com exemple module capteur du frigorigène ZRT510

Annex I
INSTITUTIONAL STRENGTHENING PROJECT PROPOSALS¹

Cuba: Renewal of institutional strengthening

Summary of the project and country profile		
Implementing agency:		UNDP
Amounts previously approved for institutional strengthening (US \$):		
Phase I:	Jun-93	194,354
Phase II:	Nov-98	129,573
Phase III:	Jul-01	129,573
Phase IV:	Jul-03	160,246
Phase V:	Nov-05	160,246
Phase VI:	Nov-07	160,246
Phase VII:	Nov-09	160,246
Phase VIII:	Nov-11	160,120
Phase IX:	Dec-13	159,467
Phase X:	Nov-15	204,159
Phase XI:	May-19	204,160
Phase XII:	Jun-22	204,160
	Total:	2,026,549
Amount requested for renewal (phase XIII) (US \$):		394,965
Amount recommended for approval for phase XIII (US \$):		394,965
Agency support costs (US \$):		27,648
Total cost of institutional strengthening phase XIII to the Multilateral Fund (US \$):		422,613
Date of approval of country programme:		1993
Date of approval of HCFC phase-out management plan:		2011
Baseline consumption of controlled substances (ODP tonnes/CO ₂ -eq tonnes):		
(a) Annex B, Group III (methyl chloroform) (average 1998-2000)		0.0
(b) Annex C, Group I (HCFCs) (average 2009-2010)		16.9
(c) Annex E, (methyl bromide) (average 1995-1998)		50.5
(d) Annex F (HFCs) (average 2020-2022 plus 65% of HCFC baseline)		1,030,662
Latest reported ODS consumption (2023) (ODP tonnes) as per Article 7:		
(a) Annex B, Group III (methyl chloroform)		0.00
(b) Annex C, Group I (HCFCs)		0.55
(c) Annex E, (methyl bromide)		0.00
	Total:	0.55
(d) Annex F (HFCs) (CO ₂ -eq tonnes) as per Article 7		1,368,669
Year of reported country programme implementation data:		2023
Amount approved for projects (as at December 2023) (US \$):		19,423,541
Amount disbursed (as at December 2022) (US \$):		18,258,493
ODS to be phased out (as at December 2023) (ODP tonnes):		726.80
ODS phased out (as at December 2022) (ODP tonnes):		698.20

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

Summary of activities	Funds approved (US \$)
(a) Investment projects:	13,305,858
(b) Institutional strengthening:	2,026,549
(c) Project preparation, technical assistance, training and other non-investment projects:	4,091,133
Total:	19,423,541
(d) HFC activities funded from additional voluntary contributions	0

¹ Data as at December 2022 are based on document UNEP/OzL.Pro/ExCom/93/16.

Progress report

2. Phase XII of the institutional strengthening (IS) project for Cuba has been successfully implemented. The Ozone Technical Office had direct contact with decision makers, which facilitated the implementation of projects funded by the Multilateral Fund and all issues related to the Montreal Protocol. The country-maintained control over its ODS phase-out and has a robust licensing and quota system for all controlled substances. The country proceeded in implementing stage II of the HCFC phase-out management plans (HPMP) in close collaboration with local authorities and stakeholders, carrying out multiple initiatives such as training of refrigeration and air-conditioning technicians on low-GWP alternatives and implementation of good refrigeration practices. The Kigali HFC implementation plan (KIP) was developed, submitted and approved during the phase and the country is actively preparing for the implementation of the Kigali Amendment. It also participated in regional and global meetings relevant to the implementation of the Montreal Protocol and is currently a member of the Executive Committee of the Multilateral Fund.

Plan of action

3. During phase XIII of the institutional strengthening project, the Government of Cuba will maintain the ban on CFCs and halons, as well as the reductions made in HCFC consumption, and will start the control of HFCs through the new quota system. The activities to be developed will count on the active participation of the actors involved in the consumption of the substances controlled by the Montreal Protocol, including national and local authorities, maintaining a solid training programme on good refrigeration practices and continuous public awareness activities. Likewise, the Government of Cuba will continue the implementation of stage II of the HPMP and the first stage of its KIP to ensure its commitments to reduce HFC consumption. The Government of Cuba will continue to actively participate in the meetings of the Montreal Protocol regional and global network, looking to exchange information and experiences that favour the implementation of national policies and strategies for the protection of the ozone layer.

Sustainability and risk assessment

4. The whole system of implementation of the Montreal Protocol in Cuba is based on achieving sustainability of the system through the completion and improvement of the legislation and national implementation programmes and plans, as well as the new regulation for the management and handling of ODS and HFCs, equipment and technologies containing them, which will be approved as a National Resolution of mandatory compliance. These actions minimise the risks in the development of the process. In addition, OTOZ is integrated in the national institutions in charge of implementing the country's environmental and energy policy, which ensures the sustainability and support of its actions.

Indonesia: Renewal of institutional strengthening

Summary of the project and country profile			
Implementing agency:			UNDP
Amounts previously approved for institutional strengthening (US \$):			
Phase I:	Jun-93		355,701
Phase II:	Nov-97		235,475
Phase III:	Dec-00		235,677
Phase IV:	Dec-03		290,833
Phase V:	Nov-05		291,480
Phase VI:	Nov-07		291,588
Phase VII:	Nov-09		290,432
Phase VIII:	Nov-11		289,958
Phase IX:	Dec-13		290,083
Phase X:	Nov-15		371,467

Summary of the project and country profile			
Implementing agency:			UNDP
	Phase XI:	Nov-17	367,335
	Phase XII:	Dec-19	369,097
	Phase XIII:	Jun-22	371,498
		Total:	4,050,625
Amount requested for renewal (phase XIV) (US \$):			718,693
Amount recommended for approval for phase XIV (US \$):			718,693
Agency support costs (US \$):			50,309
Total cost of institutional strengthening phase XIV to the Multilateral Fund (US \$):			769,002
Date of approval of country programme:			1994
Date of approval of HCFC phase-out management plan:			2011
Baseline consumption of controlled substances (ODP tonnes/CO ₂ -eq tonnes):			
(a)	Annex B, Group III (methyl chloroform) (average 1998-2000)		13.3
(b)	Annex C, Group I (HCFCs) (average 2009-2010)		403.9
(c)	Annex E (methyl bromide) (average 1995-1998)		40.7
(d)	Annex F (HFCs) (average 2020-2022 plus 65% of HCFC baseline)		23,370,721
Latest reported ODS consumption (2023) (ODP tonnes) as per Article 7:			
(a)	Annex B, Group III (methyl chloroform)		0.00
(b)	Annex C, Group I (HCFCs)		149.42
(c)	Annex E (methyl bromide)		0.00
		Total:	149.42
(d)	Annex F (HFCs) (CO ₂ -eq tonnes) as per Article 7		1,535,575
Year of reported country programme implementation data:			2023
Amount approved for projects (as at December 2023) (US \$):			85,652,023
Amount disbursed (as at December 2022) (US \$):			76,857,505
ODS to be phased out (as at December 2023) (ODP tonnes):			10,555.9
ODS phased out (as at December 2022) (ODP tonnes):			10,721.9

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

Summary of activities	Funds approved (US \$)
(a) Investment projects:	71,411,179
(b) Institutional strengthening:	4,050,625
(c) Project preparation, technical assistance, training and other non-investment projects:	10,190,219
	Total:
	85,652,023
(d) HFC activities funded from additional voluntary contributions	250,000

Progress report

6. Under phase XIII, Indonesia continued its efforts towards implementation of the Montreal Protocol obligations and ODS phase-out activities. The national ozone unit provided support and actively coordinated the implementation of HCFC phase-out management plans (HPMP) stage II, achieving the HCFC reduction targets under its Agreement, and led the preparation and timely submission of stage III of the HPMP. The Government of Indonesia continued to control the consumption of ODS with an effective control of supply and consumption through the Licensing and Quota Systems and submitted the country programme and Article 7 reports in a timely manner. Indonesia is in compliance with the post-2015 HCFC phase-out targets due to the effective ODS control measures (legislations) put in place in the country. The Kigali Amendment was ratified in December 2022. During this phase, Indonesia designed and put in place the HFC licensing system and its supporting instruments through coordination meetings, focused group discussions and dissemination activities; conducted periodic monitoring of manufacturers/importers and evaluated the ODS import data; coordinated actions on the implementation of HCFC consumption reduction

to meet phase-out targets; and raised the awareness of the general public and the specific sectors to support implementation of Multilateral Fund projects through social media, communication materials, and events for celebrating the World Ozone Day.

Plan of action

7. Phase XIV of the institutional strengthening (IS) project for Indonesia will continue the support for integrating projects in the country and enhancing its achievements by supporting and ensuring the implementation of the Montreal Protocol programme. It will continue to (i) deliver effective management, monitoring and enforcement on ODS phase-out activities including sustainability of ODS phase-out, (ii) continue the implementation and enforcement of the Ozone Depleting Substances legal framework; (iii) provide coordination and oversight to complete the stage II of the HPMP and advance the implementation of stage III; and (iv) continue the awareness outreach activities for active involvement of all stakeholders in sustaining ODS phase-out, HPMP implementation, Kigali HFC implementation plan preparation and implementation.

Sustainability and risk assessment

Category	Risk	Impact and Likelihood	Mitigation
Operational	Potential risk of staff turnover during project lifecycle that may impact effectiveness of project execution tasks and potential delays	Delays in the initiation of the project and in project activities and implementation Impact: Medium Likelihood: Low	Establish a “project staff transition’ plan to secure that new staff is properly trained and responsibilities are handed over to reduce negative impacts to project execution
Political	Formation of new Ministry cabinet due to elections can lead to change in MOEF Senior Managers responsible for MLF portfolio management, leading in delays in the project execution	Delays in the initiation of the project and in project activities and implementation Impact: Medium Likelihood: Medium	IA to conduct regular oversight meetings with MOEF, IS and project staff to secure proper institutional memory that can be transmitted to new Government Senior Staff

Panama: Renewal of institutional strengthening

Summary of the project and country profile			
Implementing agency:			UNDP
Amounts previously approved for institutional strengthening (US \$):			
	Phase I:	Jul-93	194,925
	Phase II:	Jul-00	129,950
	Phase III:	Nov-02	149,500
	Phase IV:	Dec-04	149,500
	Phase V:	Nov-11	128,390
	Phase VI:	Dec-13	159,960
	Phase VII:	Nov-15	204,558
	Phase VIII:	Nov-17	204,754
	Phase IX:	Dec-19	204,755
	Phase X:	Jun-22	204,755
		Total:	1,731,047
Amount requested for renewal (phase XI) (US \$):			396,115

Summary of the project and country profile	
Amount recommended for approval for phase XI (US \$):	396,115
Agency support costs (US \$):	27,728
Total cost of institutional strengthening phase XI to the Multilateral Fund (US \$):	423,843
Date of approval of country programme:	1993
Date of approval of HCFC phase-out management plan:	2011
Baseline consumption of controlled substances (ODP tonnes/CO ₂ -eq tonnes):	
(a) Annex B, Group III (methyl chloroform) (average 1998-2000)	0.0
(b) Annex C, Group I (HCFCs) (average 2009-2010)	24.8
(c) Annex E (methyl bromide) (average 1995-1998)	0.0
(d) Annex F (HFCs) (average 2020-2022 plus 65% of HCFC baseline)	2,543,386
Latest reported ODS consumption (2023) (ODP tonnes) as per Article 7:	
(a) Annex B, Group III (methyl chloroform)	0.0
(b) Annex C, Group I (HCFCs)	8.85
(c) Annex E (methyl bromide)	0.0
Total:	8.85
(d) Annex F (HFCs) (CO ₂ -eq tonnes) as per Article 7	2,733,914
Year of reported country programme implementation data:	2023
Amount approved for projects (as at December 2023) (US \$):	6,800,227
Amount disbursed (as at December 2022) (US \$):	5,377,649
ODS to be phased out (as at December 2023) (ODP tonnes):	318.8
ODS phased out (as at December 2022) (ODP tonnes):	251.4

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

Summary of activities	Funds approved (US \$)
(a) Investment projects:	3,201,014
(b) Institutional strengthening:	1,731,047
(c) Project preparation, technical assistance, training and other non-investment projects:	1,868,165
Total:	6,800,227
(d) HFC activities funded from additional voluntary contributions	0

Progress report

9. Phase X of the institutional strengthening (IS) project for Panama focused on monitoring HCFC import control measures and the 50 per cent and 56 per cent reduction scheduled for 2022 and 2023, respectively; consultation and promulgation of the legal instrument establishing the mechanisms for the regulation and control of HFCs; capacity building for officials of key institutions for the monitoring and control of HFCs by applying the specific tariff items for HFCs and their mixtures in accordance with the VII Amendment to the Harmonized System; coordination with stakeholders to establish the levels of consumption of methyl bromide and the timely submission of reports to the Multilateral Fund and the Ozone Secretariats. Communication channels and the exchange of technical information among all stakeholders, both from the public and private sectors, were kept open for effective decision-making in the implementation of all projects. Essential products were prepared, edited, designed, and laid out to raise awareness of the implementation of the Kigali Amendment, the Montreal Protocol, and gender equality. Actions were carried out to strengthen synergies with the climate change and energy efficiency agendas. Awareness-raising actions were developed within the framework of the celebration of Ozone Day with relevant sectors of the population, including innovative actions that take advantage of art and cultural spaces to raise awareness about the environment and gender.

Plan of action

10. Phase XI will concentrate national ozone unit (NOU) efforts on following up on HCFC import control measures and the upcoming scheduled reductions, monitoring HFC import control measures, and freezing baseline consumption. Also, efforts will be focused on the implementation of the legal framework that establishes provisions for HFC substance trade control and monitoring the importation of controlled technologies that contain or are designed to contain HFC; capacity-building sustainability for officials of the National Customs Authority (ANA), the Ministry of Health (MINSAs), and other key institutions; and developing the process for the establishment of a mechanism for institutional coordination of Montreal Protocol implementation, particularly the Kigali Amendment. An NOU communication and awareness plan will be developed in consultation with key stakeholders, both public and private, and a roadmap developed to promote gender mainstreaming and the gender approach in the implementation of the Montreal Protocol in Panama. General awareness-raising activities and Ozone Day celebrations will continue for relevant sectors of the population, ensuring the distribution of promotional and educational material and the diffusion of relevant information throughout different communication networks.

Sustainability and risk assessment

11. The project is designed to ensure the sustainability of the NOU to meet the challenge of meeting the Montreal Protocol's ODS and HFC phase-out targets. The existing legal and regulatory basis for HCFC and HFC control is sound and functional and has been designed with the input and consensus of all parties, public and private. This legal framework may incorporate new meanings in accordance with the progress made in its application or evolve according to the challenges of the future. The strict and sustained application of this legal framework has also prevented illegal trade in ODS/HFC and indirectly facilitated the process of transitioning to other alternative substances and new technologies. Importers of refrigerant gases led the process of regulating HCFC and HFC quotas. They have been able to undertake or adopt new lines of business that replaced those substances that had been phased out and continue today to lead the search for alternatives that do not include substances harmful to the ozone layer. Along the way, this sector has provided support to other UNO/MINSAs initiatives, providing information and baseline data for studies or field evaluations and supporting awareness-raising and technical training actions. Ozone protection issues had been integrated into the national structure. Internally, the objectives and indicators assumed under the Montreal Protocol are incorporated in the annual operational plans (AOP) of the General Sub-Directorate of Environmental Health, as well as in the Monitoring and Evaluation System of the National Health Plan (SIMEPLANS) 2016–2025 of the Ministry of Health. This element gives the project and, consequently, the Montreal Protocol the relevance and sustainability it requires for the development of the ozone layer protection strategy. The project has promoted synergies between other chemical conventions that the Ministry of Health has within the same sub-directorate, such as the Basel, Rotterdam, Stockholm, and, more recently, Minamata Conventions. The training programs for customs officials and other relevant agents in the application of ODS control measures incorporate this perspective, which benefits the environmental sustainability interventions of these agreements at the national level. Through this project, the NOU also assumes the responsibility of articulating at the inter-institutional level issues related to the Montreal Protocol, such as the actions for climate protection led by the Ministry of Environment and the rational and efficient use of energy led by the National Energy Secretariat.

Trinidad and Tobago: Renewal of institutional strengthening

Summary of the project and country profile			
Implementing agency:			UNDP
Amounts previously approved for institutional strengthening (US \$):			
	Phase I:	Oct-96	68,678.01
	Phase II:	Dec-00	45,616.29
	Phase III:	Nov-02	64,063.50

Summary of the project and country profile			
Implementing agency:			UNDP
	Phase IV:	Dec-04	64,017.52
	Phase V	Nov-06	61,196.53
	Phase VI:	Nov-09	64,500.00
	Phase VII:	Dec-12	64,180.00
	Phase VIII:	Nov-14	64,200.00
	Phase IX:	Jul-17	90,542.79
	Phase X:	May-19	90,424.97
	Phase XI:	Nov-21	90,950.00
		Total:	768,370
Amount requested for renewal (phase XII) (US \$):			180,000
Amount recommended for approval for phase XII (US \$):			180,000
Agency support costs (US \$):			12,600
Total cost of institutional strengthening phase XII to the Multilateral Fund (US \$):			192,600
Date of approval of country programme:			1996
Date of approval of HCFC phase-out management plan:			2011
Baseline consumption of controlled substances (ODP tonnes/CO ₂ -eq tonnes):			
(a)	Annex B, Group III (methyl chloroform) (average 1998-2000)		0.7
(b)	Annex C, Group I (HCFCs) (average 2009-2010)		46.0
(c)	Annex E, (methyl bromide) (average 1995-1998)		1.7
(d)	Annex F (HFCs) (average 2020-2022 plus 65% of HCFC baseline)		5,681,787
Latest reported ODS consumption (2023) (ODP tonnes) as per Article 7:			
(a)	Annex B, Group III (methyl chloroform)		0.00
(b)	Annex C, Group I (HCFCs)		10.11
(c)	Annex E, (methyl bromide)		0.00
		Total:	10.11
(d)	Annex F (HFCs) (CO ₂ -eq tonnes) as per Article 7		4,969,573
Year of reported country programme implementation data:			2023
Amount approved for projects (as at June 2023) (US \$):			6,157,071
Amount disbursed (as at December 2022) (US \$):			4,123,676
ODS to be phased out (as at June 2023) (ODP tonnes):			251.8
ODS phased out (as at December 2022) (ODP tonnes):			131.4

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

Summary of activities	Funds approved (US \$)
(a) Investment projects:	3,774,356
(b) Institutional strengthening:	768,370
(c) Project preparation, technical assistance, training and other non-investment projects:	1,614,345
	Total:
	6,157,071
(d) HFC activities funded from additional voluntary contributions	150,000

Progress Report

13. Phase XI of Trinidad and Tobago's institutional strengthening (IS) project was successfully implemented by the national ozone unit (NOU) at the Ministry of Planning and Development. Trinidad and Tobago has a successful Licensing and Quota System of HCFC management and met its reduction targets as per its Agreement with the Executive Committee. The country also successfully developed its licensing and quota system for HFCs. In close coordination with importers and relevant stakeholders, the country managed to introduce low-GWP alternatives in key sectors such as domestic air-conditioning. Trinidad and Tobago also raised awareness with end-users, technicians, and associations, and technical capacities were built through the import of training equipment that allowed the building of capacities in the country.

Plan of action

14. Phase XII of the IS project will allow Trinidad and Tobago to continue the reinforcement of the licensing and quota system for the import of Montreal Protocol controlled substances. Relevant activities and stakeholder consultations are key for an adequate development of the strategy that will allow the country to continue its effective path for ODS management and phase-out. The upcoming phase will allow the NOU to continue its active participation in global and regional network meetings, relevant trainings and high-level meetings for the promotion of the Montreal Protocol activities in the country. In addition, Trinidad and Tobago will continue efforts to introduce energy efficiency activities for refrigeration and air-conditioning equipment in order to reinforce the reduction of HFC consumption. Awareness-raising and dissemination activities will also be continued and reinforced.

Sustainability and risk assessment

15. Constant coordination with border control agencies and importers reduces the risk for non-sustainability of activities given that the country enforces a strict control of imports for Montreal Protocol controlled substances. The renewal of the IS allows Trinidad and Tobago to continue the implementation of effective training programs on good refrigeration practices and the expansion of its successful Certification Programme for refrigeration and air-conditioning technicians. The Trinidad and Tobago NOU has also been successful in the training of Border Control officials on ODS regulation and HFC phase-down at the Ministry of Trade and Industry and the Trinidad and Tobago Bureau of Standards. Furthermore, the renewal of IS and the funds received will allow the NOU to continue with all activities as planned.

Annexe II

ÉBAUCHE DES POINTS DE VUE EXPRIMÉS PAR LE COMITÉ EXÉCUTIF SUR LE RENOUVELLEMENT DES PROJETS DE RENFORCEMENT DES INSTITUTIONS SOUMIS À LA 94^E RÉUNION

Cuba

1. Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de renforcement des institutions pour Cuba (phase XIII) et il a pris note avec satisfaction des données de 2023 déclarées en vertu de l'article 7 et dans le programme de pays, aux Secrétariats de l'Ozone et du Fonds respectivement, indiquant que le gouvernement de Cuba se conforme à ses cibles de réduction. Le Comité a noté par ailleurs que le gouvernement de Cuba a pris des mesures pour éliminer les SAO et réduire progressivement la consommation de HFC ; notamment la mise en œuvre de mesures de contrôle des importations de HCFC et de HFC à travers le système de permis et de quotas et la formation des agents des douanes et des techniciens en réfrigération. Le Comité a noté aussi avec satisfaction les activités amorcées pour la mise en œuvre de l'Amendement de Kigali. Le Comité reconnaît les efforts du gouvernement de Cuba et il a donc bon espoir qu'au cours des trois prochaines années, le gouvernement de Cuba poursuivra, avec succès, la mise en œuvre du plan de gestion de l'élimination des HCFC, du plan de mise en œuvre de l'Amendement de Kigali sur les HFC et les activités du projet de renforcement des institutions, pour parvenir à la réduction de 67,5 pour cent de la consommation de HCFC exigée au 1^{er} janvier 2025 et instaurer les mesures de contrôle reliées à l'Amendement de Kigali à partir de 2024.

Indonésie

2. Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de renforcement des institutions pour l'Indonésie (phase XIV) et il a pris note avec satisfaction des données de 2023 déclarées en vertu de l'article 7 et dans le programme de pays, aux Secrétariats de l'Ozone et du Fonds respectivement, indiquant que le pays a atteint sa cible de réduction des HCFC pour cette année. Le Comité a reconnu l'engagement de l'Indonésie à maintenir la mise en œuvre effective des activités reliées au renforcement des institutions, incluant la conception et la mise en place du système de permis pour les HFC et de ses instruments, la surveillance et l'évaluation des données sur l'importation de SAO, la coordination des mesures visant la réduction de la consommation de HCFC, et la sensibilisation du public et des secteurs concernés au soutien de la mise en œuvre des projets du Fonds multilatéral. Le Comité félicite aussi l'Indonésie pour la ratification de l'Amendement de Kigali, le 14 décembre 2022, et les mesures pertinentes prises pour préparer sa mise en œuvre.

Panama

3. Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de renforcement des institutions pour le Panama (phase XI) et il a pris note avec satisfaction des données de 2023 déclarées en vertu de l'article 7 et dans le programme de pays, aux Secrétariats de l'Ozone et du Fonds respectivement, indiquant que le pays se conforme au Protocole de Montréal. Le Comité a noté par ailleurs que le gouvernement du Panama a pris des mesures pour éliminer la consommation de SAO ; notamment la mise en œuvre de mesures de contrôle des importations de HCFC et de HFC à travers le système de permis et de quotas et la formation des agents des douanes et des techniciens en réfrigération. Le Comité a noté aussi avec satisfaction les activités amorcées pour la mise en œuvre de l'Amendement de Kigali, telle que l'approbation de la première tranche du plan de mise en œuvre de l'Amendement de Kigali sur les HFC. Le Comité reconnaît les efforts du gouvernement du Panama et il a donc bon espoir qu'au cours des trois prochaines années, le gouvernement du Panama poursuivra, avec succès, la mise en œuvre du plan de gestion de l'élimination des HCFC, du plan de mise en œuvre de l'Amendement de Kigali sur les HFC et les activités du projet de renforcement des institutions, pour parvenir à la réduction de 67,5 pour cent de la

consommation de HCFC exigée au 1^{er} janvier 2025, maintenir le gel de la consommation de HFC et respecter les prochaines cibles des mesures de contrôle en 2025.

Trinité-et-Tobago

4. Le Comité exécutif a examiné le rapport soumis avec la demande de renouvellement du projet de renforcement des institutions pour Trinité-et-Tobago (phase XII) et il a pris note avec satisfaction des données de 2023 déclarées en vertu de l'article 7 et dans le programme de pays, aux Secrétariats de l'Ozone et du Fonds respectivement, indiquant que le pays se conforme au Protocole de Montréal. Le Comité a pris note aussi des efforts du pays pour éliminer la consommation de SAO, à travers le système de permis et de quotas, la formation des agents des douanes et des techniciens en réfrigération et l'introduction de solutions de remplacement. Le Comité a pris note, avec satisfaction, des activités amorcées pour faciliter la mise en œuvre de l'Amendement de Kigali sur les HFC et il a bon espoir qu'au cours des trois prochaines années, le gouvernement de Trinité-et-Tobago poursuivra, avec succès, la mise en œuvre du plan de gestion de l'élimination des HCFC, du plan de mise en œuvre de l'Amendement de Kigali sur les HFC et des activités du projet de renforcement des institutions, pour atteindre les prochaines cibles de contrôle du Protocole de Montréal en 2024 et 2025.

**94th Meeting of the Executive Committee of the Multilateral Fund
for the Implementation of the Montreal Protocol**

(27 – 31 May 2024)

**UNDP
2024 WORK PROGRAMME**

2024 WORK PROGRAMME

I. EXECUTIVE SUMMARY

The present document constitutes UNDP's 2024 Work Programme and is being submitted for consideration of the Executive Committee (ExCom) at its 94th Meeting. The list of submissions for all funding requests (including investment projects) that will be submitted by UNDP to the 94th ExCom meeting in Annex 1 to this document is provided for information. Project documentation such as tranche requests under multi-year agreements (MYA), investment and demonstration project proposals and other individual proposals are not included in this document and are submitted separately as per normal practice. Only the following (non-investment) submissions are part of this document.

II. FUNDING REQUESTS PART OF THE WORK PROGRAMME

Institutional Strengthening Extensions

UNDP is submitting the requests for funding the extension of institutional strengthening projects to the 94th ExCom Meeting as tabulated below. Relevant terminal reports and requests for extension of funding are being submitted separately.

Country	Type	Title	Duration (months)	Amount	Agency Fee	Total
Cuba	INS	Several Ozone unit support	36	394,965	27,648	422,613
Indonesia	INS	Several Ozone unit support	36	718,693	50,309	769,002
Panama	INS	Several Ozone unit support	36	396,115	27,728	423,843
Trinidad and Tobago	INS	Several Ozone unit support	36	180,000	12,600	192,600
Total (4 requests)				1,689,773	118,285	1,808,058

Preparation funding requests for HFCs phase down

UNDP is submitting the following funding requests for the preparation of the Stage I KIP to the 94th ExCom meeting. The request for Belize is being submitted as a Cooperating Agency. The actual request will be submitted by UNEP as a Lead Agency. Annex 2 contains the submissions.

Country	Type	Title	Duration (months)	Amount	Agency Fee	Total
Belize	PRP	Preparation of a Kigali HFC implementation plan	12	39,000	2,730	41,730
China	PRP	Preparation of a Kigali HFC implementation plan	12	250,000	17,500	267,500
Total (2 requests)				289,000	20,230	309,230

Project preparation (PRP) requests for national inventories of banks for used and/or unwanted controlled substances and a plan for the collection, transport and disposal of such substances

Pursuant to the ExCom decision 91/66, UNDP is submitting the following requests for the preparation of national inventories of banks of used or unwanted controlled substances and a plan

for the collection, transport and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction. Annex 3 contains the submissions.

Country	Type	Title	Duration (months)	Amount	Agency Fee	Total
Chile	PRP	Preparatory funding for inventories of bans of used/unwanted controlled substances	12	90,000	6,300	96,300
Panama	PRP	Preparatory funding for inventories of bans of used/unwanted controlled substances	12	90,000	6,300	96,300
Total (2 requests)				180,000	12,600	192,600

Project preparation (PRP) requests for pilot projects to maintain and/or enhance energy efficiency of replacement technologies and equipment in the context of HFC phase-down

Pursuant to the ExCom decision 91/65, UNDP is submitting the following requests for the preparation of pilot projects to maintain and/or enhance energy efficiency of replacement technologies and equipment in the context of HFC phase-down. Annex 4 contains the submissions.

Country	Type	Title	Duration (months)	Amount	Agency Fee	Total
Global	PRP	Project preparation for Demonstrating digital monitoring and management tools to enhance energy efficiency and reduce emission of greenhouse gases in the space cooling and cold chain sectors in Columbia, Lebanon, Panama, Sri Lanka, and Trinidad and Tobago	12	80,000	5,600	85,600
China	PRP	Preparatory funding for HFC Energy Efficiency Investment project	12	25,000	1,750	26,750
Total (2 requests)				105,000	7,350	112,350

Project preparation (PRP) requests for LVCs HPMP Verification Reports

UNDP is submitting the following requests for the preparation of LVCs' HPMP verification reports.

Country	Type	Title	Duration (months)	Amount	Agency Fee	Total
Angola	PRP	Project preparation for HPMP Verification Report	12	30,000	2,700	32,700
Sri Lanka	PRP	Project preparation for HPMP Verification Report	12	30,000	2,700	32,700
Total (2 requests)				60,000	5,400	65,400

III.SUMMARY OF FUNDING REQUESTS (WORK PROGRAMME)

The table below summarizes the funding requests for non-investment activities and proposals being submitted to the 94th ExCom Meeting as part of UNDP's Work Programme for 2024:

Country	Type	Title	Duration (months)	Amount	Agency Fee	Total
Angola	PRP	Preparatory funding for HPMP Verification Report	12	30,000	2,700	32,700
Belize	PRP	Preparatory funding for Stage I KIP	12	39,000	2,730	41,730
Chile	PRP	Preparatory funding for inventories of bans of used/unwanted controlled substances	12	90,000	6,300	96,300
China	PRP	Preparatory funding for Stage I KIP	12	250,000	17,500	267,500
China	PRP	Preparatory funding for HFC Energy Efficiency Investment project	12	25,000	1,750	26,750
Cuba	INS	Several Ozone unit support	36	394,965	27,648	422,613
Global	PRP	Project preparation for Demonstrating digital monitoring and management tools to enhance energy efficiency and reduce emission of green-house gases in the space cooling and cold chain sectors in Columbia, Lebanon, Panama, Sri Lanka, and Trinidad and Tobago	12	80,000	5,600	85,600
Indonesia	INS	Several Ozone unit support	36	718,693	50,309	769,002
Panama	INS	Several Ozone unit support	36	396,115	27,728	423,843
Panama	PRP	Preparatory funding for inventories of bans of used/unwanted controlled substances	12	90,000	6,300	96,300
Sri Lanka	PRP	Preparatory funding for HPMP Verification Report	12	30,000	2,700	32,700
Trinidad and Tobago	INS	Several Ozone unit support	36	180,000	12,600	192,600
Total (12 requests)				2,323,773	163,865	2,487,638

ANNEX 1

List of all UNDP submissions for funding to the 94th ExCom Meeting

No.	Country	Type	Description	Funding Request to the 94th ExCom (US\$)		
				Amount	Agency Fee	Total
1	Angola	PRP	Preparatory funding for HPMP Verification Report	30,000	2,700	32,700
2	Bangladesh	PHA	Stage II HPMP (air conditioning and servicing)	1,071,205	74,984	1,146,189
3	Belize	PHA	HPMP Stage II	59,233	4,146	63,379
4	Belize	PRP	Preparatory funding for Stage I KIP	39,000	2,730	41,730
5	Brazil	PHA	Stage III HPMP (servicing)	5,010,039	350,703	5,360,742
6	Chile	PRP	Preparatory funding for inventories of bans of used/unwanted controlled substances	90,000	6,300	96,300
7	China	PRP	Preparatory funding for Stage I KIP	250,000	17,500	267,500
8	China	PRP	Preparatory funding for HFC Energy Efficiency Investment project	25,000	1,750	26,750
9	Cuba	INS	Several Ozone unit support	394,965	27,648	422,613
10	El Salvador	KIP	KIP	180,000	23,400	203,400
11	El Salvador	TAS	Support to public sector end-users in the promotion of new technologies with low GWP as alternatives to HFCs under KIP (Decision 91/65)	125,000	16,250	141,250
12	Eswatini (the Kingdom of)	PHA	Stage II HPMP	142,617	9,983	152,600
13	Global	PRP	Project preparation for Demonstrating digital monitoring and management tools to enhance energy efficiency and reduce emission of green-house gases in the space cooling and cold chain sectors in Columbia, Lebanon, Panama, Sri Lanka, and Trinidad and Tobago	80,000	5,600	85,600
14	Indonesia	INS	Several Ozone unit support	718,693	50,309	769,002
15	Iran (Islamic Republic of)	PHA	Stage II HPMP	337,860	23,650	361,510
16	Lao People's Democratic Republic (the)	PHA	Stage II HPMP	65,685	4,598	70,283
17	Lao People's Democratic Republic (the)	KIP	HFC phase-down plan	18,612	2,420	21,032
18	Malaysia	PHA	Stage III HPMP	6,587,185	461,103	7,048,288
19	Panama	INS	Several Ozone unit support	396,115	27,728	423,843
20	Panama	PRP	Preparatory funding for inventories of bans of used/unwanted controlled substances	90,000	6,300	96,300
21	Paraguay	PHA	Stage II HPMP (servicing)	281,077	19,675	300,752
22	Paraguay	TAS	Energy efficiency activities under Stage II HPMP (Decision 89/6)	50,000	3,500	53,500
23	Paraguay	KIP	HFC phase-down plan	235,675	30,638	266,313
24	Republic of Moldova (the)	PHA	Stage III HPMP	145,500	10,185	155,685

25	Republic of Moldova (the)	TAS	Introduction of alternatives to HCFCs with low or zero GWP and for maintaining energy efficiency in the refrigeration servicing sector:	70,000	6,300	76,300
26	Sri Lanka	PHA	Stage II HPMP (servicing)	293,200	20,524	313,724
27	Sri Lanka	TAS	Energy efficiency activities under Stage II HPMP	120,000	8,400	128,400
28	Sri Lanka	KIP	HFC phase-down plan	229,800	16,086	245,886
29	Sri Lanka	TAS	Energy Efficiency activities under KIP	245,000	17,150	262,150
30	Sri Lanka	PRP	Preparatory funding for HPMP Verification Report	30,000	2,700	32,700
31	Timor-Leste	PHA	Stage II HPMP (servicing)	25,421	1,779	27,200
32	Trinidad and Tobago	INS	Several Ozone unit support	180,000	12,600	192,600
Total (32 requests)				17,586,882	1,266,640	18,923,071

Notes:

- a. All amounts in are in US dollars.
- b. Special reports due (delays, balances, status reports, etc.) as well as other projects not part of the WP will be submitted separately.

ANNEX 2

Project preparation (PRP) request for Stage I Kigali Implementation Plan

1. China

**MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
KIGALI-HFC IMPLEMENTATION PLAN (KIP) PROJECT PREPARATION (PRP)
KIGALI HFC PHASE DOWN PLAN (OVERARCHING STRATEGY)**

PLEASE ADJUST THE TEXT IN THE ANNEX IN LINE WITH THE TEXT IN THE GUIDE

Part I: Project information

<u>Project title:</u>	<u>Overarching Strategy for HFCs Phase-down, Stage I Project Preparation</u>	
<u>Country:</u>	<u>People's Republic of China</u>	
<u>Lead implementing agency:</u>	<u>UNDP</u>	
<u>Cooperating agency (1):</u>	<u>(select)</u>	<u>Click or tap here to enter text.</u>
<u>Cooperating agency (2):</u>	<u>(select)</u>	<u>Click or tap here to enter text.</u>
<u>Cooperating agency (3):</u>	<u>(select)</u>	<u>Click or tap here to enter text.</u>
<u>Implementation period for stage I of the KIP:</u>	<u>From approval to 2029</u>	
Duration of PRP implementation (i.e., time (in months) from the approval of PRP to submission of the KIP (please specify): 18 months		
<u>Funding requested:</u>		
<u>Agency</u>	<u>Sector</u>	<u>Funding requested (US \$)*</u>
<u>UNDP</u>	<u>Overarching</u>	<u>250,000</u>
<u>(select)</u>	<u>(select)</u>	<u>Click or tap here to enter text.</u>
<u>(select)</u>	<u>(select)</u>	<u>Click or tap here to enter text.</u>
<u>(select)</u>	<u>(select)</u>	<u>Click or tap here to enter text.</u>

*Details should be consistent with information provided in the relevant sections below.

Part II: Prerequisites for submission

Item	Yes	No
Official endorsement letter from Government, indicating the specifying roles of respective agencies (where more than one IA is involved)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

A. Information required for PRP funding request for the overarching strategy of the KIP

1. Montreal Protocol compliance target to be met in <input type="checkbox"/> stage I of the KIP			
Phase-out commitment (%)	10	Year of commitment	2029
<input type="checkbox"/> Servicing only		<input type="checkbox"/> Manufacturing only	<input checked="" type="checkbox"/> Servicing and manufacturing
2. Brief background/description/information on approved relevant projects and multi-year agreements as follows:			
<ul style="list-style-type: none"> • The current progress in implementation of any funded HFC-related project (enabling activities or stand-alone HFC investment projects) • The current progress in ongoing HCFC phase-out management plan (HPMPs) • Consideration of integrating HFC phase-down activities with HPMP activities taking into account previously approved HFC-related projects, if this information is available. 			
<p>Enabling activities for HFCs Phase-down in China, totaling USD 250,000, were approved at the 80th Excom meeting in November 2017 with UNDP and UNEP as implementing agencies. The activities conducted under the project supported China in its ratification of the Kigali Amendment and fulfilment of the initial obligations. All project activities have been completed by June, 2021. The government of China accepted the Kigali Amendment in June 17, 2021 and preparations for meeting initial obligations have been accordingly conducted . China has been implementing its HPMPs stage II in the following sectors: (i) industrial and commercial refrigeration and air conditioning, (ii) room air conditioning, (iii) polyurethane (PU) foam, (iv) extruded polystyrene (XPS) foam, (v) solvent and (vi) service sectors since 2016, which supported China to achieve targets of reducing HCFCs by 35% from baseline levels by 2020.</p> <p>According to the revised HPMP stage II strategy (2021-2026) approved by the 86th ExCom meeting:</p> <ul style="list-style-type: none"> • the industrial and commercial refrigeration and air conditioning, sector and service sector will achieve a reduction of 67.5% of the baseline level by the end of 2025. • Room air conditioning will achieve a 70% reduction of the baseline level by the end of 2025. • (c) A complete phase-out of HCFCs consumption in PU foam, XPS foam and solvent sectors by 2026. <p>In these six (6) Sector Plans, conversion of production lines and technical assistance activities such as revision of standards, awareness-raising and training have been carried out, and 104,000 tons of HCFCs are expected to be eliminated by the year 2026.</p> <p>Since there are no previous experiences of implementing HFC phase-down projects and EE projects within FEEO, and also considering that needs to develop the national strategies to achieve the Stage I of the HFC phase down targets, in line with the Kigali Amendment to the Montreal Protocol, China has not yet considered options for integrating HFC phase-down activities with HPMP activities at this moment.</p>			
3. Overview of current HFC consumption in metric tonnes by substance (last three years)			

Substance/blend	Sector	2019	2020	2021
(select)	Manufacturing-AC	N/A	N/A	138,848.40
(select)	Manufacturing-Foam	N/A	N/A	12,138.59
(select)	Manufacturing-REF	N/A	N/A	90,536.00
(select)	Solvent	N/A	N/A	2,478.38
(select)	(select)			
(select)	(select)			
(select)	(select)			
(select)	(select)			
(select)	(select)			

4. Based on the consumption data given above, please provide a description of the sector/sub-sector that use HFCs in the country, including a short analysis and explanation of the consumption trends (i.e., increasing or decreasing)

Click or tap here to enter text.

As the largest producer and consumer of HFCs, China must fulfill its responsibility to reduce HFC consumption, and at the same time, it also needs international support. China should achieve a consumption freeze in 2024 and a 10% reduction in 2029, the task is daunting, and China must take actions to achieve the compliance targets of the Kigali Amendment and contribute to reducing climate warming.

Besides as the world's largest producer, consumer, China is also the largest exporter of HFCs. According to the national data reported to the Ozone Secretariat, the global production of HFCs in 2022 is about 1.7 billion tons of CO₂-eq, of which China's production accounts for more than 90%. At the same time, nearly 60% of the HFCs produced in China are exported to other countries as chemicals. China faces arduous task in phasing down HFCs.

According to preliminary information on HFC consumption in China, the refrigeration and air-conditioning sectors are the most important application fields of HFCs in China. There are also HFC consumption in foam, fire-fighting, aerosol, electronics and other sectors. In refrigeration and air-conditioning sectors, room air-conditioning sector is the estimated largest consumer, and automobile and industrial and commercial refrigeration account for a large proportion.

In order to achieve the compliance objectives stipulated in the Kigali Amendment, China, like all A5 countries, needs urgently to conduct research on HFCs management and reduction strategies as soon as possible with the support of the Multilateral Fund of the Protocol and the assistance of the international implementing agencies, so as to send a clear signal of compliance to the sectors and the public, which will also contribute to the global fulfillment of the Kigali Amendment compliance goals.

China has an important cooling and heating industry, not only with large internal demand for use in thermal comfort for cooling and heating, with growing demands for reversible heat pumps based on vapor-compression refrigeration cycle, but also for processes required in several industries.

Independent consultancies project that the cooling and heating sector in China may grow with a CAGR of 9% until the year 2029 to cope with the demand, also considering the important exporting capacities of China.

These factors are corroborated by the consumption data reported by China through the A7 and CP Reports, therefore sector priority shall also be carefully reviewed when phasing down HFCs, taking into account multiple factors. As indicated by preliminary information, some of the sectors and sub-sectors is experiencing rapid growth, which may pose great challenges for fulfilling the first stage HFCs phase-down obligations at the national level.

5. Description of information that needs to be gathered during project preparation. Explain how this data will be gathered

Information needed	Description	Agency
Data on HFC consumption in manufacturing/servicing sector	To collect the historical data of production, import, export and use of HFCs, compare with relevant data and surveys of sectors, put forward the sectorial HFC distribution in China, and analyze the reasons for the historical growth and development potential, and analyze China's import and export distribution.	UNDP
HFC sectoral consumption information	To organize sector survey, collect sector information, analyze and summarize the use of HFCs and alternatives in the sectors, sectors scale, sector characteristics, enterprise distribution, etc.	UNDP
New information on ODS regulations	To do research on existing policies, regulations and management systems on controlled substance, and analyze how existing policies and management systems can be improve to ensure the fulfillment of compliance objectives.	UNDP
Others, specify.	To collect information about HFCs alternative technologies at	UNDP

	home and abroad, analyze and evaluate existing alternatives and alternative technologies, identify their advantages and disadvantages and scope of application, and determine the alternative technology roadmap based on the latest research results of alternative technology selection in sectors	
6. Activities to be undertaken for project preparation and funding (decision 87/xx(b))		
Activity	Indicative funding (US \$)	Agency
Workshops/meetings Including inception and validation workshops, stakeholders consultations and technical visits.	40,000	UNDP
Project development including data collection and analysis: carry on field surveys for data refinement, analysis of technology scenarios and options, technical support for strategy and project interventions development, development of action plans, project concept writing and translation.	195,000	UNDP
Management, communications and miscellaneous: including oversight travel costs for FECO staff, translators to assist international experts, outreach and communication costs, printing and other miscellaneous costs	15,000	UNDP
Click or tap here to enter text.		(select)
Click or tap here to enter text.		(select)
TOTAL		

7. How will activities related to preparing the KIP be linked to the current stages of the HPMP being implemented in the country? (OPTIONAL)
N/A
8. How will the Multilateral Fund gender policy be considered during project preparation?
<p>In line with the decision 84/92, the operational policy on gender mainstreaming would be applied wherever feasible in the preparation of the project including in the following activities (a) collected gender aggregated data and encouraging participation in the consultative meetings. (b) promoting awareness to develop staff competency and awareness on gender mainstreaming as part of the consultation exercise. (c) share experiences and lessons learned on gender mainstreaming.</p>

B. Information required for PRP funding request for investment projects/sector plans as part of or in advance of the KIP

1. Agency:		(select)			
2. Sector:		(select)			
3. HFC consumption in item #2 reported under country programme data?		<input type="checkbox"/> Yes, please specify reported amount and year: <input type="checkbox"/> No			
4. Does the enterprise commit to phase out the HFC consumption associated with the proposed investment project, if approved by the Executive Committee?		<input type="checkbox"/> Yes, please provide support letter <input type="checkbox"/> No			
5. If the project preparation is requested in advance of the KIP, did the Government provide a written commitment that the consumption associated with these investment projects, once approved, will be deducted from the country's starting point, once established?		<input type="checkbox"/> Yes <input type="checkbox"/> No			
6. Please explain briefly how the investment project would relate to the overarching strategy for the country, and when the final KIP will be submitted (decision 87/50(e))					
7. Information on sector consumption (specify previous year HFC consumption)					
Substance		Consumption (metric tonnes)			
(select)					
(select)					
(select)					
8. Information on enterprise(s) for which funding is being sought					
Enterprise	Year established	HFC consumption (metric tonnes) (last three years)			HFC phase-out to be achieved (metric tonnes and CO ₂ -eq. tonnes)
		2019	2020	2021	
9. Activities to be undertaken for preparation of the investment project and funding requested					
Activity		Indicative funding (US \$)		Bilateral/implementing agency	
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TOTAL					

ANNEX 3

Project preparation (PRP) requests for national inventories of banks for used and/or unwanted controlled substances and a plan for the collection, transport and disposal of such substances

1. Chile
2. Panama

GOVERNMENT OF CHILE

**FUNDING REQUEST FOR THE PREPARATION OF NATIONAL
INVENTORIES OF BANKS OF USED OR UNWANTED CONTROLLED
SUBSTANCES**

Lead Implementing Agency:

UNDP

National Executing Agency:

Ozone Unit

Climate Change Division

Ministry of Environment

March 2024

Part I: Project information

Project title:	Preparation of national inventories of banks of used or unwanted controlled substances
Country:	Chile
Lead implementing agency:	UNDP
Meeting where request is being submitted	94th
Implementation period	July 2024 – June 2026
Duration of implementation (i.e., time (in months)) from the approval of PRP to submission of the national inventory and action plan (please specify): 24	
Funding requested:	
Agency	Funding requested (US \$)
UNDP	90,000

Part II: Prerequisites for submission

Item	Yes	No
Official endorsement letter from Government, indicating roles of respective agencies (where more than one IA is involved), and that the national inventory/action plan will be completed within 24 months from the date of project approval	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Project included in the bilateral/IA business plan?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

A. Information required for PRP funding request for the national inventories of banks of used or unwanted controlled substances and a plan for the collection, transport and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction.

<p>1. Brief overview of the the concept, methodology and approach to be taken for the preparation of the national inventory and / or action plan and how it is linked to other activities in the country (i.e., national plans like the KIP), in particular those activities in the refrigeration servicing sector such as recovery, recycling, and reclamation programmes.</p>
<p>The Government of the Republic of Chile is requesting funding for the preparation of the national inventories of banks of used or unwanted controlled substances. The project complies with the criteria established by Decision 91/66.</p> <p>ODS banks are defined as the ‘total amount of substances contained in existing equipment, chemical stockpiles, foams and other products not yet released to the atmosphere’ (IPCC/TEAP, 2005). Thus, ODS can either be quantified in an aggregated manner such as bulk/cylinder (stockpiles) or estimated via ODS-containing equipment.</p> <p>A sound understanding of ODS banks at the country level is the basis for any action and policy decisions in the field of ODS bank management. In particular, the inventory is important to:</p> <ul style="list-style-type: none"> • Assess the general need for action in the field of ODS bank management. • Assess the potential environmental benefits to the ozone layer and the climate. • Decide whether to export ODS or to find a local destruction solution. • Design optimal capacities for destruction technology in case of local destruction options. • Assess long-term availability of ODS to guarantee economic viability of a destruction plant. • Design appropriate policy measures. • Design appropriate collection systems.

Key elements of responsible ODS/HFC management:

- Promote on-site recycling.
- Use of reusable cylinders.
- Adopt a take-back obligation with a deposit-and-refund scheme.
- Ensure accessible collection points for refrigerants or waste appliances.
- Ensure reclamation and destruction facilities.
- Building a quality infrastructure based on informed decision-making.

The case of Chile has the following unique features:

- Chile is a developing country with mid ODS/HFC consumption.
- The opportunity to leverage market-based finance mechanisms will be explored for the conversion of environmental services of avoided ODS emissions into carbon assets. Methodology and standards and the critical issues (technical, regulatory and financial risks) will be discussed.
- This proposal will review and evaluate the development and implementation of the ODS and HFC destruction strategy in place.
- The main challenge in Chile is related to setting up the logistic framework and cost-effective infrastructure for transport, storage and destruction of ODS/HFC.

2. Description of activities that will be implemented during the preparation of the national inventories/action plans of banks for used and/or unwanted controlled substances and an indication of the estimated costs for the activities described broken down per agency

Activity	Description	Agency
Others, specify. Data collection and analysis	Elaboration of an inventory to cover the equipment in-service and predictive analysis to estimate the rate it reaches EOL(End-of-life) inclusive of national capability to maintain it and update the initial EOL management plan.	UNDP
Stakeholder consultations	Conducting interviews, organizing workshops and stakeholders' consultations for the integration of national regulations and procedures and the harmonization with national waste management regulation to accommodate EOL ODS/HFCs.	UNDP
Others, specify. Analysis and evaluation of the disposal system of refrigerant waste in place.	Assessment of options for the final disposal of refrigerant waste in the country.	UNDP
Preparation of inventory report/national plan	Delivery of inventory report and national plan for the collection, transport and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction.	UNDP
Communication and outreach plan preparation and development of awareness-raising activities	Awareness raising of relevant stakeholders on ODS/HFC banks and EOL management and disposal.	UNDP

3. Funding for the activities described in 2 above

Activity	Indicative funding (US \$)	Agency
Data collection and analysis	20,000	UNDP
Stakeholder consultations	20,000	UNDP
Analysis and evaluation of the disposal system of refrigerant waste in place.	15,000	UNDP
Preparation of inventory report/national plan	25,000	UNDP

Communication and outreach plan preparation and development of awareness-raising activities	10,000	UNDP
TOTAL	90,000	
4. How will the Multilateral Fund gender policy be considered during project preparation?		
<p>The objective of the gender policy of the Multilateral Fund is to promote gender mainstreaming (gender equality and women's empowerment - GEWE) in the preparation and implementation of projects funded by the Multilateral Fund, consistent with the gender policies of the implementing agencies.</p> <p>The Chilean Government promotes a program for the inclusion of women in line with the MLF gender policy contained in ExCom document 84/73 and special effort will be made to involve females in data collection and analysis of inventory of ODS/HFC bank as well as on EOL management of RAC equipment.</p> <p>The project preparation will aim to advocate the importance of the leadership of women technicians in awareness-raising activities.</p> <p>Also, this project preparation will ensure that both women and men can provide input, access and participate in all activities (e.g., through outreach / invitations of female technicians to participate in stakeholder consultations, expert recruitment etc.).</p>		

GOVERNMENT OF PANAMA

**FUNDING REQUEST FOR THE PREPARATION OF NATIONAL
INVENTORIES OF BANKS OF USED OR UNWANTED CONTROLLED
SUBSTANCES**

Lead Implementing Agency:

UNDP

National Executing Agency:

**National Ozone Unit
Ministry of Health**

March 2024

Part I: Project information

Project title:	Preparation of national inventories of banks of used or unwanted controlled substances
Country:	Panama
Lead implementing agency:	UNDP
Meeting where request is being submitted	94th
Implementation period	July 2024 – June 2026
Duration of implementation (i.e., time (in months)) from the approval of PRP to submission of the national inventory and action plan (please specify): 24	
Funding requested:	
Agency	Funding requested (US \$)
UNDP	90,000

Part II: Prerequisites for submission

Item	Yes	No
Official endorsement letter from Government, indicating roles of respective agencies (where more than one IA is involved), and that the national inventory/action plan will be completed within 24 months from the date of project approval	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Project included in the bilateral/IA business plan?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

B. Information required for PRP funding request for the national inventories of banks of used or unwanted controlled substances and a plan for the collection, transport and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction.

<p>5. Brief overview of the the concept, methodology and approach to be taken for the preparation of the national inventory and / or action plan and how it is linked to other activities in the country (i.e., national plans like the KIP), in particular those activities in the refrigeration servicing sector such as recovery, recycling, and reclamation programmes.</p>
<p>The Government of the Republic of Panama is requesting funding for the preparation of the national inventories of banks of used or unwanted controlled substances. The project complies with the criteria established by Decision 91/66.</p> <p>ODS banks are defined as the ‘total amount of substances contained in existing equipment, chemical stockpiles, foams and other products not yet released to the atmosphere’ (IPCC/TEAP, 2005). Thus, ODS can either be quantified in an aggregated manner such as bulk/cylinder (stockpiles) or estimated via ODS-containing equipment.</p> <p>A sound understanding of ODS banks at the country level is the basis for any action and policy decisions in the field of ODS bank management. In particular, the inventory is important to:</p> <ul style="list-style-type: none"> • Assess the general need for action in the field of ODS bank management. • Assess the potential environmental benefits to the ozone layer and the climate. • Decide whether to export ODS or to find a local destruction solution. • Design optimal capacities for destruction technology in case of local destruction options. • Assess long-term availability of ODS to guarantee economic viability of a destruction plant. • Design appropriate policy measures. • Design appropriate collection systems.

Key elements of responsible ODS/HFC management:

- Promote on-site recycling.
- Use of reusable cylinders.
- Adopt a take-back obligation with a deposit-and-refund scheme.
- Ensure accessible collection points for refrigerants or waste appliances.
- Ensure reclamation and destruction facilities.
- Building a quality infrastructure based on informed decision-making.

The case of Panama has the following unique features:

- Panama is a developing country with an ODS/HFC consumption centred around the RAC sector.
- The opportunity to leverage market-based finance mechanisms will be explored for the conversion of environmental services of avoided ODS emissions into carbon assets. Methodology and standards and the critical issues (technical, regulatory and financial risks) will be discussed.
- This proposal will review and evaluate the development and implementation of the ODS and HFC destruction strategy in place.
- The main challenge in Panama is related to setting up the logistic framework and cost-effective infrastructure for transport, storage and destruction of ODS/HFC.

6. Description of activities that will be implemented during the preparation of the national inventories/action plans of banks for used and/or unwanted controlled substances and an indication of the estimated costs for the activities described broken down per agency

Activity	Description	Agency
Others, specify. Data collection and analysis	Elaboration of an inventory to cover the equipment in-service and predictive analysis to estimate the rate it reaches EOL(End-of-life) inclusive of national capability to maintain it and update the initial EOL management plan.	UNDP
Stakeholder consultations	Conducting interviews, organizing workshops and stakeholders' consultations for the integration of national regulations and procedures and the harmonization with national waste management regulation to accommodate EOL ODS/HFCs.	UNDP
Others, specify. Analysis and evaluation of the disposal system of refrigerant waste in place.	Assessment of options for the final disposal of refrigerant waste in the country.	UNDP
Preparation of inventory report/national plan	Delivery of inventory report and national plan for the collection, transport and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction.	UNDP
Communication and outreach plan preparation and development of awareness-raising activities	Awareness raising of relevant stakeholders on ODS/HFC banks and EOL management and disposal.	UNDP

7. Funding for the activities described in 2 above

Activity	Indicative funding (US \$)	Agency
Data collection and analysis	20,000	UNDP
Stakeholder consultations	20,000	UNDP
Analysis and evaluation of the disposal system of refrigerant waste in place.	15,000	UNDP
Preparation of inventory report/national plan	25,000	UNDP

Communication and outreach plan preparation and development of awareness-raising activities	10,000	UNDP
TOTAL	90,000	
8. How will the Multilateral Fund gender policy be considered during project preparation?		
<p>The objective of the gender policy of the Multilateral Fund is to promote gender mainstreaming (gender equality and women's empowerment - GEWE) in the preparation and implementation of projects funded by the Multilateral Fund, consistent with the gender policies of the implementing agencies.</p> <p>The Panama Government promotes a program for the inclusion of women in line with the MLF gender policy contained in ExCom document 84/73 and special effort will be made to involve females in data collection and analysis of inventory of ODS/HFC bank as well as on EOL management of RAC equipment.</p> <p>The project preparation will aim to advocate the importance of the leadership of women technicians in awareness-raising activities.</p> <p>Also, this project preparation will ensure that both women and men can provide input, access and participate in all activities (e.g., through outreach / invitations of female technicians to participate in stakeholder consultations, expert recruitment etc.).</p>		



ANNEX 4

Project preparation (PRP) requests for pilot projects to maintain and/or enhance energy efficiency of replacement technologies and equipment in the context of HFC phase-down

1. Global
2. China

Title of project: Demonstrating digital monitoring and management tools to reduce emission of HFCs and enhance energy efficiency in the space cooling and cold chain sectors in Colombia, Lebanon, Panama, Sri Lanka, and Trinidad and Tobago

Objective: Supporting program countries to pilot digital tools for monitoring, optimizing, and managing air conditioning and cold chain systems to reduce emission of the HFCs, reduce energy consumption and associated indirect emission of greenhouse gas, and improve overall maintenance of cooling system proactively.

Funding Window: Energy Efficiency window

Estimated Funding for this project: US\$ 1,000,000

Requested PRP funding: US\$ 80,000

Sector relevance and technology development trends

1. Space cooling and cold chain are essential for sustainable development, providing people comfortable environment and relief from heat waves, preserving food, reducing food waste, ensuring the safe storage of medicines. However, cooling also generated a serious carbon footprint, directly and indirectly, due to the emissions of high global warming potential refrigerants and the consumption of electricity.
2. Air conditioners currently consume 20% of the electricity used in buildings around the world and their use is expanding more rapidly than any other building appliance¹. According to projections by the International Energy Agency, global energy demand for space cooling is expected to triple by 2050². If cooling efficiency is not improved significantly, an increase in greenhouse gas emissions from energy consumption and refrigerants will occur and warm the planet.
3. Designing more sustainable food cold chains is also an important component of the sustainability and resilience of the food system. According to the Food and Agriculture Organization of United Nations (FAO), food waste accounts for approximately 8% of global greenhouse emissions. Almost one third of food produced for human consumption goes to waste and the lack of effective and efficient refrigeration systems is a leading contributor to this waste, directly resulting in the loss of 526 million tons of food production (12% of total) in 2017³.
4. In its 2023 Supplementary Progress Report on Energy Efficiency, the Technical and Economic Assessment Panel (TEAP) highlighted the importance of a system approach for sustainable cooling that looks at the whole cooling system design, operation and maintenance, not just the individual components.
5. TEAP noted that, through design optimization, operation, and maintenance of the RACHP systems within the context of the overall facility which they service, the emission could be reduced and overall efficiency could be improved significantly. This requires a holistic

¹ <https://www.coolingcollaborative.org/the-challenge/>

² IEA report, The Future of Cooling, 2018

³ Cool Coalition (2022). *Sustainable Food Cold Chains: Opportunities, Challenges and the Way Forward*. Peters, T. and Sayin, L. Nairobi: United Nations Environment Programme and Food and Agriculture Organization of the United Nations

analysis of the cooling and heating loads, the equipment and system performance, leakage detection and prevention, optimizing of operation in response to the change of temperature, energy supply and demand, as well as the solutions for energy recycling and storage.

6. In the past decade, digital technology is the primary enabler and driver for high quality and efficient cooling equipment in RACHP sector either at component/unit level (inverter compressor and smart air-conditioner), or system/facility level (such as smart hospital and district cooling). Digital tools provide valuable insights, automation, and control capabilities that can significantly enhance the energy efficiency of cooling systems, reducing emission of refrigerants, identifying energy saving opportunities.
7. Furthermore, smart cooling contributes to sustainable urban planning. City can develop a smart energy management system to balance energy supply and demand, reduce the urban heat island effect by deploying solutions for energy recycling and storage from cooling, minimize the amount of electricity consumed, which in turn reduces the use of fossil fuels and pressure on the power grid in the peak time.

Addressing HFCs phase-down and yielding energy efficiency benefits by combining use of low-GWP refrigerants and digitalization trends in AC-R Sectors

8. Digitalization of refrigeration and air conditioning systems, using Internet of Things (IoT) and Artificial Intelligence (AI), is an innovative approach for the effective implementation of the Kigali Amendment. Digital solutions in RACHP sector offers the following advantages:
 - a) Early warning of (high-GWP) refrigerant leakages: Digital sensors and monitoring systems can collect real-time data on system operation such as temperature and pressures. This data can be analyzed to identify refrigerant leakages below 5-10% and detect potential issues. As such, maintenance can be scheduled timely to prevent further emission. Such monitoring and detection systems are particularly important for large systems that use high GWP HFC blends. It will help for informed decision from high GWP HFCs to more sustainable and advanced cooling system.
 - b) Optimizing system settings for energy saving: Digital tools could monitor the performance of equipment and energy consumption in a real time, so the data could be used for analysis to optimization of the operations using long terms reports and parameters designed. Smart monitoring and control system could save energy up to 30%. In assembly sub-sector, digital tools are critical for achieving higher performance of cooling system while using low-GWP alternative technology to HFCs.
 - c) Improve management practices of servicing sector: Digital software can help develop a centralized cooling service management platform. The platform could be used for inventory of refrigerants and cooling assets and connecting ender users and service providers. The platform also has the potential to advance “cooling as a service - CaaS” model for affordable cooling in low-income and rural communities. This potential could be explored in the servicing sector to improve the effectiveness of refrigerant management and energy saving.
9. Figure 1 illustrates a flowchart detailing the process of digital data collection. In this setup, the operational machinery (or complex plant) is equipped with a selection of appropriate sensors and data acquisition systems to conduct real-time measurements. Subsequently, the

collected data can be stored and analyzed for various purposes, whether on local platforms or remotely through a network.



Figure 1 Flow chart of digital data collection
(source: IIR, 55th Informatory Note on Refrigeration Technologies, 2023)

10. IoT and digitalization offer substantial advantages in managing energy for building air conditioning, especially for energy-intensive systems. The trend is moving towards "smart entities." This entails installing and utilizing building technology systems comprising sensors, controllers, actuators, controllable valves, pumps, cameras, and microphones interconnected through a building management system (BMS). This integration facilitates efficient energy management and enhanced comfort solutions.
11. IoT has been used in retail, and most equipment has been IoT-ready for some time. It performs vital functions to ensure safety compliance by monitoring temperature, maintaining equipment reliability to prevent food waste and enabling traceability for insurance purposes. IoT operates at both the product and equipment level.
12. In practical terms, when applied in the Kigali Amendment framework, monitoring and managing refrigerant consumption and energy efficiency could be achieved in an integrated manner enabled by digital tools. The digitalized low GWP solutions to be demonstrated in the KIP could help the government and stakeholders accessing real time data for motivation, data analysis, policy development, awareness raising to support the transition to sustainable cooling.

PROJECT JUSTIFICATION

13. This project idea aligns with the TEAP assessment on the needs to approach energy efficiency interventions within the Montreal Protocol framework on a system approach. It is also inspired by innovative approaches and technologies that can help end-users to predict equipment faults and avoid refrigerant leakages before it happens by establishing online, Realtime, energy monitoring tools.
14. This project idea also aligns with the ExCOM Decision 91/65 for pilot projects to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down in different levels as:
 - (a) Manufacturing Level: enable manufacturers to design cooling systems able to adopt parts that are "ready-to-use" with digital tools and IoT, aiming enhance energy efficiency while converting out of HFCs.
 - (b) Assembling and Installations Levels: Support designers and installers to access lower costs digital tools and support the widening of the supply chain of parts and accessories required for these installations, while overlapping the HFCs use. This technical assistance can result in the adoption of technologies to maintain and/or enhance energy efficiency while converting from HFCs and demonstrate replicability and scalability of more energy efficient, low GWP refrigerant systems.

- (c) Servicing Sector: track the energy efficiency of the installed base of high GWP HFC-based cooling equipment and act on corrective maintenance before catastrophic faults that could lead to emissions of refrigerants. Hence, also avoiding the leakage at first place. Faults and data analysis can also help the stakeholders to make informed decision about the retrofit option or the early replacement of equipment to fulfill the obligation of HFC phasing down.
15. Micro, Small and Medium Enterprises (MSMEs) could be one of the most critical beneficiaries of the project in all levels above considering the lack of technical capacities and challenges in access lower cost or open-source digital tools, hence, fully in line with the provisions of Decision 91/65.
16. Despite refrigeration and air conditioning accounting for a significant share of global energy consumption, the application of digitalization to these areas has so far received less attention than for other household appliances and mobility devices⁴. Therefore, it is important to conduct demonstration projects to showcase and accumulate experiences for replication in more countries. The project will explore the demonstration projects in manufacturing, assembly and servicing sector target at design and installation of the new system using low GWP alternative, and effective refrigerant management and energy saving practices in serving and maintenance of existing HFC-based equipment that was installed more than five years without digital tools.

Linkages to the HFCs phase-down activities in targeted Pilot Countries

17. The selection of demonstration countries is based on several criteria including the willingness of respective governments, relevant experience and capacity of local partner, relevant initiatives in the cooling sector in respective countries, availability of data, and alignment with priority of government policies related to digitalization and/or cooling/cold chain strategy. Based on above criteria, recommendations were made by UNDP for the demonstration countries of digital tools include Sri Lanka, Trinidad and Tobago, Panama, Lebanon, and Columbia.

Sri Lanka

18. UNDP, on behalf of the Government of Sri Lanka, is submitting the Stage I of its KIP for the consideration of the 94th Ex.COM. The cold chain in Sri Lanka is expected to grow at high rates of 10 to 15%. For example, the Government and the Dairy Association have ambitions plans to refrigerate all 12,000 milk farmers in country to improve shelf life, reduce waste and increase food security in dairy sector. Current technologies are based on HFC-134a or R-404A.
19. There is also a need to facilitate the introduction of low-GWP refrigerants based AC and Condensing Units and replication strategies are highlighted in stage-I KIP of Sri Lanka. For this purpose, not only green procurement guidelines will be needed, but real energy efficiency testing and continuous monitoring is required so to convince stakeholders about technology choice. This project idea can directly benefit Sri Lanka's KIP by deploying digital monitoring methods to support the transition.

⁴ IIR, 55th Informatory Note on Refrigeration Technologies, USE OF INTERNET OF THINGS AND ARTIFICIAL INTELLIGENCE IN REFRIGERATION AND AIR CONDITIONING, 2023

Lebanon

20. UNDP is supporting the Government of Lebanon to prepare its KIP Stage I, which is expected to be submitted to the 95th Ex.COM. It is already anticipated the need for Lebanon to promote the use of lower GWP alternatives, particularly in the cold chain (large to medium sized) given the economic profile when it comes to the local production and exports of foods and goods that depend on cooling. Hence, the country is also considering the development of EE interventions in the Assembly and Installation sector of larger cooling equipment, such as condensing units (for cold rooms), process chillers and centralized racks.
21. This project idea can support local designers and installers to access to lower costs digital tools, incorporate new design features that align online performance monitoring to system safety, and assist in the identification of an effective supply chain of parts and accessories required for these installations while overlapping the HFCs use. This technical assistance can result in the adoption of technologies to maintain and/or enhance energy efficiency while converting from HFCs and demonstrate replicability and scalability of more energy efficient, HFC-free, systems.

Trinidad and Tobago

22. Trinidad and Tobago, a twin-island State, located in the Caribbean, is a RAC technology taker. Surveys performed during the Stage KIP preparation noted that a wide availability of HFC based equipment and systems are currently installed and operating in the country. This is backed through aggressive commercial policies from suppliers, along with skepticism and/or resistance from the installers / end-users to adopt HFC-free / low-GWP technologies.
23. The country strongly promotes the adoption of policies to support the implementation of the Kigali Amendment including potential bans on import of certain types of HFC based RAC equipment and the development of energy efficiency standards and other relevant standards. Measures to replace domestic air conditioning equipment are already being promoted through a GEF-funded project.
24. With support from UNDP, the Government of Trinidad and Tobago submitted its Stage 1 KIP at the 93rd meeting of the ExCom. Digital Solutions will be incorporated into project implementation, to motivate stakeholders on technology transition and energy efficiency improvement.

Panama

25. UNDP, on behalf of the Government of Panama, submitted and got approval of the Stage I of its KIP at the 93rd meeting of the ExCOM. During the preparation of the KIP and the implementation of its different HPMP stages, it has been cleared that Panama is an early adopter of technologies, which replicate in the region due to its intense commerce sector, supported by the Panama Canal and the Colon Free Trade Zone.
26. The implementation of this project will complement the initiatives to be conducted under the first stage of the KIP on the promotion of new technologies and the introduction of non-ODS, low-GWP, energy efficient RAC systems. Understanding of digital tools, IoT and connectivity are fundamental for the adoption of the latest technologies and a powerful tool

for the implementation of the Kigali Amendment, as an informed stakeholder, either end-user, designer, installer or technician, will accept more easily the introduction of new technologies.

Colombia

27. UNDP is supporting the Government of Colombia to prepare its KIP Stage I, which is expected to be submitted to the 95th Ex.COM. During the preparation of the KIP, it has been noted the important consumption of HFC in the RAC sector and the interest of stakeholder in the adoption of non-ODS, low-GWP, energy efficient RAC systems.
28. It is expected that the stage I of the KIP will work with the food cold chain and agro-industrial sectors, giving technical assistance to foster the introduction of non-ODS, low-GWP, energy efficient technologies. Digital solutions will be a key tool to complement and facilitate the transitions needed to comply with the Kigali Amendment.
29. Also, the stage I of the KIP in Colombia will work on the promotion of good practices for HFCs management and promotion of the safe and sustainable use of low-zero GWP alternatives, digital solutions are an important tool to fully promote the practices and alternatives that will be fostered.

Activities that can potentially be performed in the full-sized project

30. Engage with Stakeholders and disseminate data and improve awareness on the Project:
 - (a) Organize workshops, create knowledge materials, create awareness and improve their capacities on the benefits of AC-R digitalization.
 - (b) Create engagement/coordination mechanisms to engage with relevant stakeholders and also lead to coordination and exchange of experiences and enable to Policy setting among government agencies and private sector stakeholders.
 - (c) Establish partnerships with international organizations to leverage resources and identify project replication opportunities.
 - (d) Raise awareness about the project's benefits and share success stories.
31. Asses highly energy efficiency, low-GWP refrigerant based, Technologies and conduct implementation of pilot initiatives to:
 - (a) Identify and evaluate existing digital monitoring and management tools and technologies relevant to energy efficiency and refrigerant emission reduction.
 - (b) Explore potential adaptations or innovations specific to the local context.
 - (c) Select space cooling and cold chain representative installations for pilot testing of the chosen digital tools and technologies.
 - (d) Implement energy-efficient equipment, IoT sensors, and monitoring systems.
 - (e) Collect data on energy consumption and emissions before and after implementation.
 - (f) Continuously monitor and collect data from the pilot site to assess the impact on energy efficiency and emissions reduction.
 - (g) Analyze the data to make necessary adjustments and improvements.
32. Installation and Servicing Sector Capacity Building:

- (a) Provide training to local technicians and operators on using the digital tools and managing energy-efficient systems.
- (b) Foster knowledge transfer and skills development among local technical community.

Potential Outcomes and Deliverables of the full-sized project

33. Low-GWP, highly efficient, truly monitored technologies demonstrated

- (a) Taking into consideration national efforts to deploy low-GWP alternatives in selected countries, expand national projects scope and deploy Digital and IoT technologies to be tested in space cooling and cold chain sectors, focusing on enhancing energy efficiency and reducing greenhouse gas emissions from energy consumption.
- (b) Monitoring and data analytics are carried out to improve system performance and minimize refrigerant loss.
- (c) Technology assessed is duly reported, experiences about monitoring and management tools, IoT sensor networks and data collection systems are made available and possible to be replicated in KIPs of other countries.
- (d) Pilot implementation reports templated, methodologies and standards are developed with real data on energy savings and emission reductions based on national conditions.

32. New approaches to capacity building and training materials for manufacturing, assembling and installation companies, as well as to servicing sector companies, are developed:

- (a) Capacity-building documentation is prepared allowing national trainings to be revamped to incorporate energy efficiency features linked to the adoption of digital tools under the KIPs.
- (b) Training manuals and materials for local technicians and operators are developed.

33. Policy Recommendations:

- (a) Policy briefs advocating for energy-efficient practices and incentives for the digitalization in the space cooling and cold chain sectors.

34. Replication initiatives/possibilities are assessed and reported on, to ensure the sustainability and replication of the project, considering the following points:

- (a) Creation of a comprehensive documentation of the project, including lessons learned and best practices. This will serve as a valuable resource for replication in other regions.
- (b) Comprehensive analysis and experience sharing on building local capacity, so that trained professionals can replicate the project in different locations.
- (c) Assessment of the use of open-source tools making the digital tools and technologies open-source or freely available to encourage wider adoption and replication.

Why UNDP?

- 34. UNDP has extensive experience in working with governments across all geographies and levels, providing neutral expertise and independent support on diverse aspects of their digital transformation, from strategy to technology procurement, as well as convening across public and private sectors and capacity building. UNDP developed its Digital Strategy with a vision to support the digitalization in 100 countries by 2030.

35. UNDP has been successfully using digital tools to address the challenges in the distribution of vaccines during the covid-19 pandemic. UNDP Indonesia has helped develop and scale up the cloud-based SMILE digital system which manages tracking of vaccine inventory for the national immunization programme. Similarly, the CoWIN system in India does all that SMILE does, as well as the ability to identify, register, monitor and certify vaccine recipients. Several UNDP COs have supported the used of DHIS-2 for logistics and stock management for health. All these solutions are open-source and open-license, can be freely adopted in countries. UNDP has the experience and technical know-how to support countries in customizing and scaling up similar digital tools.
36. UNDP chemical and waste hub/Montreal Protocol Unit has extensive experience in the cooling sector as one of the implementing agencies of the Multilateral Fund since 1991 and has active programs and pipelines in more than 50 countries to support the transition of cooling sector to low global warming, energy-efficient technologies. The hub developed sustainable cooling offer which aims to promote integrated programs for the refrigerant transition and energy efficiency, enabled by innovative finance, green technologies, and digital tools to accelerate the transition and amplify the impact. UNDP could build upon the on-going programs such as HCFC Phase-out Management Plan (HPMP), Kigali Implementation Plan (KIP) and other relevant initiatives such as Cool-Up, demonstrate the power of digital solutions in the cooling sector, and roll out to all program countries.

Estimated Budget

37. The cost of digital monitoring software and tools for cooling systems can range from relatively affordable options for small-scale applications to more expensive solutions for larger and more complex cooling systems. It is important to demonstrate the potential cost savings and benefits that digital monitoring tools can provide. It is worth noting that the cost of these tools has been decreasing over time as technology advances and becomes more accessible at scale. It is expected that 20-30% of energy saving could be achieved by the digital tools, and even more depending on the context of pilot site. The detailed budget of the project will be analyzed at the preparation stage with a tentative estimation of project fund at 1 million US dollars. UNDP may be able to provide co-financing if this project concept could be approved by the MLF.

Estimated budget at preparation stage:

Items	Budget Unit	REMARK	Subtotal
International Consultant on air conditioning and cold chain technology	US\$ 800/day	25 working days	US\$ 20,000
International consultant of digital experts	US\$ 800/day	25 working days	US\$ 20,000
National consultants	US\$ 200/day	60 working days	US\$ 12,000
Travel cost	US\$ 28,000		US\$ 28,000
Total			US\$ 80,000

**MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
KIGALI-HFC IMPLEMENTATION PLAN (KIP) PROJECT PREPARATION (PRP)
ENERGY EFFICIENCY PROJECT UNDER DECISION 91/65**

Part I: Project information

Project title:	Improve energy efficiency and accelerate removal of HFCs through single-phase immersion cooling solution for intelligent data center	
Country:	People's Republic of China	
Lead implementing agency:	UNDP	
Cooperating agency (1):	(select)	Click or tap here to enter text.
Cooperating agency (2):	(select)	Click or tap here to enter text.
Cooperating agency (3):	(select)	Click or tap here to enter text.
Implementation period for stage I of the KIP:	TBD	
Duration of PRP implementation (i.e., time (in months) from the approval of PRP to submission of the KIP (please specify):		
Funding requested:		
Agency	Sector	Funding requested (US \$)*
UNDP	(select)	25,000

*Details should be consistent with information provided in the relevant sections below.

Part II: Prerequisites for submission

Item	Yes	No
Official endorsement letter from Government, indicating the specifying roles of respective agencies (where more than one IA is involved)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

C. Information required for PRP funding request for the overarching strategy of the KIP

9. Montreal Protocol compliance target to be met in <input type="checkbox"/> stage I of the KIP			
Phase-out commitment (%)	tbd	Year of commitment	tbd
<input type="checkbox"/> Servicing only		<input type="checkbox"/> Manufacturing only	<input type="checkbox"/> Servicing and manufacturing
10. Brief background/description/information on approved relevant projects and multi-year agreements as follows:			
<ul style="list-style-type: none"> The current progress in ongoing HCFC phase-out management plan (HPMPs) Consideration of integrating HFC phase-down activities with HPMP activities taking into account previously approved HFC-related projects, if this information is available. 			
<p>China has ratified the Kigali Amendment to the Montreal Protocol on 15 September 2021. As per the provisions of the Montreal Protocol, licensing system has been put in place since 25 October, 2021. Data reporting on HFCs and blends containing HFCs were delivered for the years 2020, 2021 and 2022. China is yet to prepare its Kigali Implementation Plan (KIP-I) with the assistance of the Multilateral Fund (MLF) for the implementation of the Montreal Protocol</p> <p>China has met the 2013, 2015 and 2020 compliance targets as per the accelerated phase out schedule of the Montreal Protocol and is currently implementing the Stage II of its HPMP. Through the implementation of HPMP Stage-1, and HPMP Stage-2, as well, China has complied with the policy, regulatory framework and investment and technical assistance activities to assist and sustain the phase out HCFCs.</p> <p>Since there is no previous experience of implementing HFC phase-down linked to EE projects within FECO, and also considering that needs to develop the national experiences to allow strategy and policy setting framework for HFC phase down, in line with the Kigali Amendment to the Montreal Protocol, China has not yet considered integrating HFC phase-down activities with HPMP activities.</p>			

11. Overview of current HFC consumption in metric tonnes by substance (last three years)				
Substance/blend	Sector	2020	2021	2022
(select)	Manufacturing-AC	75800.2 (R32)	84400 (R32)	74100(R32)
(select)	Manufacturing-REF	3700(R32)	5000(R32)	8000(R32)
(select)	RAC servicing	949.13(R32)	8546.71(R32)	3370.13(R32)
(select)	Other, specify.	100(R32) Aerosol	0	0
(select)	Other, specify.	17000(R134a) MAC	16542.4(R134a) MAC	17573.8(R134a) MAC
(select)	Manufacturing-REF	21500(R134a)	25500(R134a)	24000(R134a)
(select)	RAC servicing	15978.13(R134a)	13942.54(R134a)	7979.33(R134a)
(select)	Other, specify.	2980(R134a)domestic refrigeration and heat pump	3130(R134a)domestic refrigeration and heat pump	3930(R134a)domestic refrigeration and heat pump
(select)	Manufacturing-AC	300(R134a)	460(R134a)	0
	MAC servicing	17361(R134a)	21000(R134a)	15940.8(R134a)
	Aerosol	3000(R134a)	4000(R134a)	60(R134a)
	Blowing agent	2000(R134a)	1000(R134a)	23.84(R134a)
	Manufacturing-AC	43000(R410A)	37300(R410A)	37400(R410A)
	Manufacturing-REF	28000(R410A)	37000(R410A)	39500(R410A)
	RAC servicing	19040.96(R410A)	24771.4(R410A)	35673.76(R410A)
12. Based on the consumption data given above, please provide a description of the sector/sub-sector that use HFCs in the country, including a short analysis and explanation of the consumption trends (i.e., increasing or decreasing)				
<p>In recent years, the rise of Intelligent Data Centers has paralleled the advancements in information technologies like cloud computing, big data, and artificial intelligence. According to the Ministry of Industry and Information Technology, China had 74,000 data centers with 2.44 million standard data racks in 2019. By 2022 the number of racks has surged to 6.5 million, reaching 7.6 million in 2023. The Chinese data-center market has been expanding at an annual growth rate of about 30% since 2012. The huge market demand is driving the expansion of computing power in data centers and cooling technology. The evolution of data center cooling technology in China has occurred in three stages: before 2012, air-cooled direct-expansion precision air conditioners predominated; from 2012 to 2018, centralized water-cooled chilled water air-conditioning systems were prevalent; since 2019, refrigeration technologies such as evaporative cooling and liquid cooling have emerged.</p> <p>It is estimated that more than 80% of data centers in China rely on air-conditioning systems, primarily using high GWP refrigerants like R134a and R410a, with a conservative estimate of 5,500MT in installed capacity. Additionally, the energy efficiency of air conditioning systems are low due to the thermo-physical limitations of air. Cooling can consume as much as 30-50% of the overall energy consumption of the data center.</p> <p>The rapid advancement of chip technology and the proliferation of GPUs driven by AI training have put significant strain on air-based cooling systems in data centers. This has prompted some facilities to bolster their air conditioning capacity or adopt supplementary cold-plate liquid cooling methods. Consequently, data center cooling systems consume substantial electricity annually, exacerbating the exponential rise in HFCs consumption.</p> <p>Also, in light of the highly demanding use of cooling systems, it is estimated that their useful lifecycle is shorter than usual air conditioning systems, which demand more constant servicing interventions and replacement of units more often than other commercial uses, hence, demand of new installed based of HFCs-based equipment will continue to be on the rise in this sub-sector.</p> <p>In light of the implementation of the Kigali Amendment aimed at phasing down HFCs in China and the national advocacy for carbon neutrality and reduction targets, it is crucial to explore alternative solutions that not only replace HFCs but also enhance the energy efficiency of data centers. This proposed Energy Efficiency project preparation request will support the Government of China to develop a full stand-alone EE project aiming to</p>				

asses and validate the potential EE benefits aligned with potential HFCs reduction in the sub-sector by applying immersion liquid cooling solution for data center, which could later be upscaled in conjunction with renewable energy sources and a waste heat collection system for improved EE gains.

By integrating these elements, the project aims demonstrate the feasibility of promoting a potential early retirement of vapour-compression cooling systems, which are based on high GWP HFCs (reducing future needs of these HFC for installation and servicing), and achieve carbon neutrality in the data center. The results of the project will be carefully analyzed to advocate for the renovation/replacement with the phase-down of use HFC-based equipment in data centers in China. Furthermore, the findings will contribute to updating the energy efficiency standards for data centers in China, ensuring alignment with modern technologies and sustainability objectives, and ultimately, shared information can benefit the Montreal Protocol community on replication actions or projects under KIPs being developed or under implementation.

13. Description of information that needs to be gathered during project preparation. Explain how this data will be gathered

Information needed	Description	Agency
HFC sectoral consumption information	Collection of HFC-related data and equipment profile in the data centers sector, estimates of growth and relative impact in the overall consumption of targeted substances	UNDP
New information on ODS regulations	Surveys on adjacent standards and regulations related to cooling performance for data centers, interlinkages with relevant energy efficiency Policies for this sector	UNDP
Others, specify.	Assess baseline information on immersion liquid cooling solution for data center, in conjunction with renewable energy sources and a waste heat collection system	UNDP

14. Activities to be undertaken for project preparation and funding (decision 87/xx(b))

Activity	Indicative funding (US \$)	Agency
Data collection	7,000	UNDP
Project preparation and technology assessment	10,000	UNDP
Consultant (Advisor Services)	3,000	UNDP
Stakeholders consultation	5,000	UNDP
Click or tap here to enter text.		(select)
TOTAL	25,000	

15. How will activities related to preparing the KIP be linked to the current stages of the HPMP being implemented in the country? (OPTIONAL)

n/a

16. How will the Multilateral Fund gender policy be considered during project preparation?

In line with the decision 84/92, the operational policy on gender mainstreaming would be applied wherever feasible in the preparation of the EE project including in the following activities (a) collected gender aggregated data and Encouraging participation in the consultative meetings. (b) Promoting awareness to develop staff competency and awareness on gender mainstreaming as part of the consultation exercise. (c) Share experiences and lessons learned on gender mainstreaming.

D. Information required for PRP funding request for investment projects/sector plans as part of or in advance of the KIP

10. Agency:	UNDP
11. Sector:	Air-conditioning
12. HFC consumption in item #2 reported under country programme data?	<input checked="" type="checkbox"/> Yes, please specify reported amount and year: <input type="text"/> <input type="checkbox"/> No
13. Does the enterprise commit to phase out the HFC consumption associated with the proposed	Not applicable

investment project, if approved by the Executive Committee?	
14. If the project preparation is requested in advance of the KIP, did the Government provide a written commitment that the consumption associated with these investment projects, once approved, will be deducted from the country's starting point, once established?	<input type="checkbox"/> Yes, <input checked="" type="checkbox"/> Not applicable since the PRP is not for INV project
15. Please explain briefly how the investment project would relate to the overarching strategy for the country, and when the final KIP will be submitted (decision 87/50(e))	Not applicable

ANNEX I

Technical Characteristics for Immersion liquid cooling technologies for data centers

Immersion liquid cooling has emerged as a cutting-edge heat dissipation technology garnering significant attention in recent years. This innovative cooling solution offers a host of advantages, making it efficient, eco-friendly, and energy-saving. By directly contacting the heat-generating equipment, the coolant minimizes convection heat resistance and maximizes heat transfer efficiency.

With high thermal conductivity and specific heat capacity, coupled with minimal operating temperature variability, the coolant ensures optimal cooling performance. Additionally, immersion liquid cooling eliminates the need for fans, reducing both energy consumption and noise levels while maintaining superior cooling efficiency. Furthermore, the coolant's outstanding insulation properties, high flash point, and non-flammable, non-toxic nature make it a safe and reliable choice that resists corrosion. As a result, this liquid-cooling technology is ideally suited for large data centers, supercomputing facilities, and industrial and scientific research institutions with stringent requirements for heat-flow density and energy efficiency.

Its compact design significantly reduces space requirements, making it particularly well-suited for urban areas with limited space and environments sensitive to noise pollution, such as offices and residential areas. Moreover, the heat generated by liquid cooling can be efficiently collected and transferred to other heat-demanding industries, optimizing overall energy utilization. Leveraging renewable energy sources further enhances its environmental credentials, allowing data centers to achieve carbon neutrality or even carbon negativity.

Fig. 1 illustrates the schematic of a single-phase immersion cooling system featuring a hybrid power supply system and waste heat recovery system. The single-phase immersion cooling system comprises a liquid cooling tank, cooling distribution unit, and cooling equipment. Multiple servers are submerged in the liquid cooling tank to directly exchange heat with the flowing coolant. During operation, the coolant, now at a higher temperature, is conveyed to the cooling distribution unit, where it transfers heat to cooling water from the cooling equipment. Regarding power supply, the utilization of a hybrid power supply system is crucial for reducing energy consumption and carbon emissions. This system integrates grid electricity with renewable energy sources such as wind, water, and solar energy. Additionally, recycling waste heat from single-phase immersion cooling data centers to provide heating and domestic water can maximize energy efficiency.

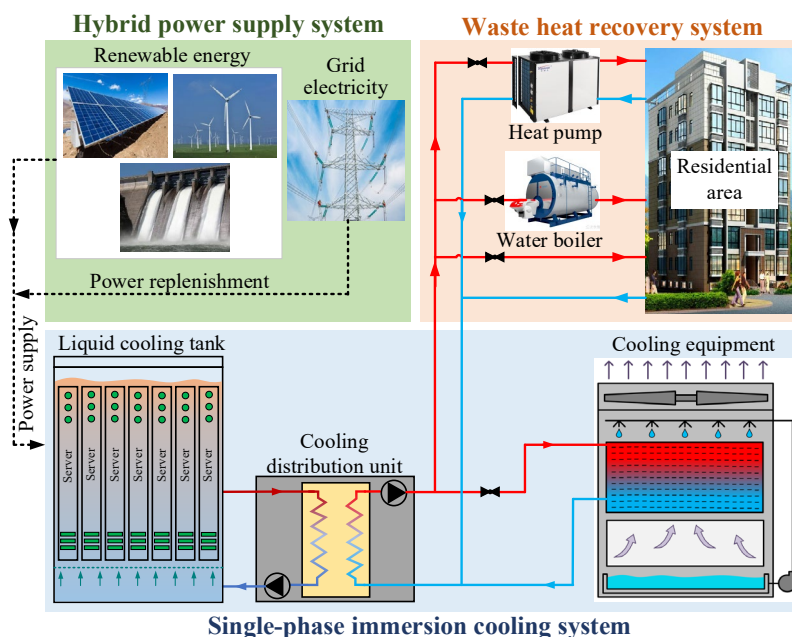


Fig. 1 Schematic of single-phase immersion cooling system

Source: Environment-friendly coolant: the coolant is an innovated product by Chinese company, it is branded as Ice Core 797.

Table 1 Thermo-physical parameter of coolant- Ice Core 797

Temperature (°C)	Density (kg/m ³)	Heat capacity (J/(kg·°C))	Dynamic viscosity (Pa·s)	Thermal conductivity (W/(m·°C))
20	794	1965	0.0117	0.34
40	786	2051	0.0061	0.36
60	775	2154	0.0036	0.38
80	762	2253	0.0024	0.42

REVISED COUNTRY PROGRAMME REPORT FORMAT (2019 DATA AND BEYOND)

COUNTRY: China

YEAR: January to December of the year

2021

SECTION B. ANNEX F - DATA ON CONTROLLED SUBSTANCES (METRIC TONNES)

NOTE: Data entry is required in UNSHADED cells only

Substance	Use by Sector							Solvent	Other ³	TOTAL	Import	Export	Production	Import quotas	If imports are banned, indicate date ban commenced (DD/MM/YYYY)	Remarks ⁴
	Aerosol	Foam	Fire Fighting	Refrigeration			Servicing***									
				Other*	AC**	Total ⁵										
R-462A																
Controlled Substances																
HFC-32	0.00	0.00	0.00	5400.00	84400.00	0.00	8546.71	0.00	60.00	98406.71	202.15	48675.36	239030.99	0.00		
HFC-41	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	24.36	34.36	25.72	37.10	45.74	0.00		
HFC-125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47216.11	172433.81	0.00		
HFC-134	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
HFC-134a	4000.00	1000.00	0.00	28630.00	17002.40	0.00	34942.54	50.00	0.00	85624.94	390.24	100368.22	200706.60	0.00		
HFC-143	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
HFC-143a	0.00	0.00	0.00	0.00	0.00	0.00	7.50	0.00	0.00	7.50	0.00	27115.96	53208.68	0.00		
HFC-152	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
HFC-152a	0.00	1996.66	0.00	0.00	0.00	0.00	0.00	2400.00	0.00	4396.66	0.00	24944.80	30078.07	0.00		
HFC-227ea	356.23	16.54	25534.35	0.00	0.00	0.00	0.00	0.00	0.00	25907.12	18.94	4421.09	30371.73	0.00		
HFC-236cb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
HFC-236ea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73.26	73.26	73.07	99.71	99.90	0.00		
HFC-236fa	0.00	0.00	-25.81	0.00	0.00	0.00	0.00	0.00	0.00	-25.81	0.00	575.42	552.36	0.00		
HFC-245ca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
HFC-245fa	0.00	8706.85	0.00	300.00	0.00	0.00	20.00	0.00	0.00	9026.85	416.86	4441.27	13051.56	0.00		
HFC-365mfc	0.00	418.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	418.54	199.68	0.24	0.00	0.00		
HFC-43-10mcc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.38	0.00	28.38	28.39	0.01	0.00	0.00		
HFC-23 (use)	0.00	0.00	0.00	10.00	0.00	0.00	1.00	0.00	637.98	648.98	145.88	647.57	1151.66	0.00		
Sub-Total	4356.23	12138.59	25508.54	34350.00	101402.40	0.00	43517.75	2478.38	795.60	224547.49	1500.93	258542.86	740731.10	0.00		
Blends (Mixture of Controlled Substances)¹																
R-404A (HFC-125=44%, HFC-134a=4%, HFC-143a=52%)	0.00	0.00	0.00	4200.00	0.00	0.00	1201.10	0.00	0.00	5401.10	20.75	24755.37		0.00		
R-407A (HFC-32=20%,HFC-125=40%,HFC-134a=40%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	161.77		0.00		
R-407C (HFC-32=23%,HFC-125=25%, HFC-134a=52%)	0.00	0.00	0.00	380.00	35.40	0.00	564.40	0.00	0.00	979.80	1.74	8995.04		0.00		
R-407F	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	378.46		0.00		
R-407G	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	336.00		0.00		
R-407H	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	5.00	0.00	128.66		0.00		
R-410A (HFC-32=50%, HFC-125=50%)	0.00	0.00	0.00	40300.00	37410.60	0.00	24827.50	0.00	0.00	102538.10	489.01	75011.40		0.00		
R-410B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	951.46		0.00		
R-417A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	393.49		0.00		
R-417B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.57		0.00		
R-421A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	457.65		0.00		
R-422A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.28		0.00		
R-422B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11777.08		0.00		
R-422D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	951.47		0.00		
R-426A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.62		0.00		
R-427A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.54		0.00		
R-437A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.03		0.00		
R-438A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3365.13		0.00		
R-448A	0.00	0.00	0.00	50.00	0.00	0.00	4.00	0.00	0.00	54.00	0.00	514.87		0.00		
R-449A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.32		0.00		
R-452A (HFC-32 = 11%, HFC-125 = 59%, HFO-1234yf = 30%)	0.00	0.00	0.00	50.00	0.00	0.00	4.00	0.00	0.00	54.00	0.90	3.06		0.00		
R-462A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.70		0.00		
R-466A (HFC-32 = 49%, HFC-125 = 11.5%, R1311 = 39.5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.06		0.00		
R-507A (HFC-125=50%, HFC-143a=50%)	0.00	0.00	0.00	11200.00	0.00	0.00	1716.84	0.00	0.00	12916.84	0.00	7903.05		0.00		
R-508A (HFC-23 = 39%, PFC-116 = 61%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00		0.00		
R-508B (HFC-23=46%, PFC-116=54%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.37		0.00		

R-513A	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.91	0.00	0.00
R23/R125/CO2/HFO-1132 (10%/10%/60%/20%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00
R23/R125/R236fa/CF4/Argon (19%/24%/26%/21%/10%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
R23/R125/R236fa/CF4/Argon (20%/15%/25%/25%/15%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
R23/R125/R236fa/CF4/Argon (20%/15%/30%/25%/10%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00
R23/R125/R245fa/CF4/Argon (15%/10%/10%/10%/55%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
R23/R125/R245fa/CF4/Argon (15%/15%/45%/20%/5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
R23/R125/R245fa/CF4/Argon (20%/14%/40%/20%/6%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45	0.00	0.00	0.00
R23/R125/R245fa/CF4/Argon (1%/2%/4%/90%/3%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.92	0.00	0.00	0.00
R23/R125/R245fa/R236fa/CF4/Argon (5%/15%/20%/20%/10%/30%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00
R23/R236fa/CF4 (30%/48%/22%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
R23/Other uncontrolled substances (98%/2%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
R32/R125/R134a/HFO (24%/25%/26%/25%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00
R32/R125/R134a/HFO/Trans-HFO (26%/26%/21%/20%/7%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
R32/R125/HFO (11%/59%/30%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.81	0.00	0.00	0.00
R32/HFO (21.5%/78.5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00
R125/R134a/R143a/CF4/Argon (19.4%/1.8%/23%/44.1%/11.7%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
R125/R134a/R143a/C5H12 (42.2%/3.8%/50%/4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00
R134a/Other uncontrolled substances (90%/10%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.49	0.00	0.00	0.00
R134a/Other uncontrolled substances (93%/7%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00
R134a/HFO (44%/56%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.94	0.00	0.00	0.00
R134a/HFO (69%/31%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00
R365mfc/R227ea (83%/17%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
R365mfc/R227ea (93%/7%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	236.16	0.00	0.00	0.00
R32/R125/R134a (26%/26%/48%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.56	0.00	0.00
R32/R125/R134a (35%/5%/60%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.16	0.00	0.00
R32/R125/R134a (8.7%/46%/45.3%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	177.00	0.00	0.00
R32/R125/R134a/R227ea/R236fa/R600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	607.65	0.00	0.00
R32/R125/R134a/R600a (2%/45.1%/50%/2.9%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.26	0.00	0.00
R32/R125/R134a/R600a (29%/29%/38%/4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	142.95	0.00	0.00
R32/R125/R134a/R600a (6%/38%/54%/2%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.56	0.00	0.00
R125/R134a (45%/55%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.04	0.00	0.00
R125/R134a/R600 (48%/48%/4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.09	0.00	0.00
R125/R134a/R600a (63%/33%/4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.99	0.00	0.00
R125/R152a/R600a (73%/25%/2%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.99	0.00	0.00
R125/R152a/R134a/R290 (60.1%/9%/27.5%/3.4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85.09	0.00	0.00
R125/R218/R290 (86%/9%/5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00
R125/R290/C2H6 (75%/20%/5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90	0.00	0.00
R125/R32/R600 (47%/50%/3%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	94.70	0.00	0.00
R125a/R134a (50%/50%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	363.50	0.00	0.00
R134a/1-Bromopropane (70%/30%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00
R152a/DME (60%/40%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	152.00	0.00	0.00
R152a/DME (70%/30%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.00	0.00	0.00
R152a/DME (75%/25%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	780.50	0.00	0.00
R152a/DME (90%/10%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.00	0.00	0.00
R152a/R600a/Fluorescers (72.6%/26.4%/1%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.09	0.00	0.00
R365mfc/R245fa (60%/40%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
Others ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Others ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-Total	0.00	0.00	0.00	56186.00	37446.00	0.00	28322.84	0.00	0.00	121954.84	790.96	138943.36	0.00	0.00
Others														
HFC-245fa in imported pre-blended polyol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-365mfc in imported pre-blended polyol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	4356.23	12138.59	25508.54	90536.00	138848.40	0.00	71840.59	2478.38	795.60	346502.33	2291.89	397486.22	740731.10	0.00

1 When reporting blends/mixtures, reporting of controlled substances should not be duplicated. For the CP report, countries should report use of individual controlled substances and quantities of blends/mixtures used, separately, while ensuring that the amounts of controlled substances are not reported more than once.

2 If a non-standard blend not listed in the above table is used, please indicate the percentage of each constituent controlled substance of the blend being reported in the remarks column.

3 Uses in other sectors that do not fall specifically within the listed sectors in the table.

4 Provide explanation if total sector use and consumption (import-export+production) is different (e.g. stockpiling).

5 If break-down of consumption in manufacturing is not available, information in total can be provided.

REVISED COUNTRY PROGRAMME REPORT FORMAT (2019 DATA AND BEYOND)

COUNTRY: China

YEAR: January to December of the year

2022

SECTION B. ANNEX F - DATA ON CONTROLLED SUBSTANCES (METRIC TONNES)

NOTE: Data entry is required in UNSHADED cells only

Substance	Use by Sector							Solvent	Other ³	TOTAL	Import	Export	Production	Manufacturing of Blends*	Import quotas	If imports are banned, indicate date ban commenced (DD/MM/YYYY)
	Aerosol	Foam	Fire Fighting	Refrigeration			Servicing									
				Other	AC	Total ⁵										
Annex F																
Controlled Substances																
HFC-32	0.00	0.00	0.00	9500.00	74100.00	0.00	3370.13	0.00	60.00	87030.13	47.03	57637.34	259094.31		0.00	
HFC-41	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	59.73	60.73	27.60	33.37	66.50		0.00	
HFC-125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27602.91	188859.73		0.00	
HFC-134	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	
HFC-134a	3051.88	23.84	0.00	27930.00	17573.80	0.00	23920.13	0.00	0.00	72499.65	263.45	145456.40	227222.81		0.00	
HFC-143	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	
HFC-143a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.60	5912.78	55390.06		0.00	
HFC-152	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	
HFC-152a	0.00	2000.00	0.00	0.00	0.00	0.00	4130.59	2500.00	0.00	8630.59	0.00	23265.95	32586.13		0.00	
HFC-227ea	367.79	20.16	28584.65	0.00	0.00	0.00	0.00	0.00	0.00	28972.60	0.36	5079.70	34054.48		0.00	
HFC-236eb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	
HFC-236ea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	111.97	111.97	111.15	189.18	190.00		0.00	
HFC-236fa	0.00	0.00	409.79	0.00	0.00	0.00	0.00	0.00	0.00	409.79	1.16	781.64	1191.21		0.00	
HFC-245ca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	
HFC-245fa	0.00	8412.42	0.00	420.00	0.00	0.00	35.00	0.00	0.00	8867.42	0.00	8245.81	17113.21		0.00	
HFC-365mfc	0.00	420.24	0.00	0.00	0.00	0.00	0.00	60.00	0.00	480.24	211.20	0.00	0.00		0.00	
HFC-43-10mee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.18	0.00	18.18	18.18	0.00	0.00		0.00	
HFC-23 (use)	0.00	0.00	0.00	5.00	0.00	0.00	1.00	0.00	1464.09	1470.09	164.31	699.51	2006.67		0.00	
Sub-Total	3419.67	10876.66	28994.44	37856.00	91673.80	0.00	31456.85	2578.18	1695.79	208551.39	863.04	274904.59	817775.11		0.00	
Blends (Mixed of Controlled Substances)¹																
R-404A (HFC-125=44%, HFC-134a=4%, HFC-143a=52%)	0.00	0.00	0.00	7320.00	0.00	0.00	2142.00	0.00	0.00	9462.00	7.44	51921.89		0.00	0.00	
R-407A (HFC-32=20%,HFC-125=40%,HFC-134a=40%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	227.18		0.00	0.00	
R-407C (HFC-32=23%,HFC-125=25%, HFC-134a=52%)	0.00	0.00	0.00	340.00	26.00	0.00	404.11	0.00	0.00	770.11	0.00	8874.65		0.00	0.00	
R-407F (HFC-32 = 30%, HFC-125 = 30%, HFC-134a =40%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	322.22		0.00	0.00	
R-407H (HFC-32 = 32.5%, HFC-125 = 15%, HFC-134a = 52.5%)	0.00	0.00	0.00	0.00	0.00	0.00	13.00	0.00	0.00	13.00	0.00	17.18		0.00	0.00	
R-410A (HFC-32=50%, HFC-125=50%)	0.00	0.00	0.00	43400.00	37530.50	0.00	35780.26	0.00	0.00	116710.76	31.46	106286.77		0.00	0.00	
R-410B(HFC-32 = 45%, HFC-125 = 55%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	655.91		0.00	0.00	
R-413A (HFC-134a=88%,R218=9%,R600a=3%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.28		0.00	0.00	
R-417A(HFC-125 = 46.6%, HFC-134a = 50%,R600=3.4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	598.90		0.00	0.00	
R-417B(HFC-125 = 79%, HFC-134a = 18.3%,R600=2.7%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	233.79		0.00	0.00	
R-421A(HFC-125 =58%, HFC-134a = 42%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	601.78		0.00	0.00	
R-422A(HFC-125 = 85.1%, HFC-134a =11.5%,R600a=3.4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.36		0.00	0.00	
R-422B(HFC-125 = 55%, HFC-134a =42%,R600a=3%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	474.16		0.00	0.00	
R-422D(HFC-125 = 65.1%, HFC-134a =31.5%,R600a=3.4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	588.08		0.00	0.00	
R-426A(HFC-125 = 5.1%, HFC-134a =93%,R600=1.3%,R601a=0.6%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17	50.91		0.00	0.00	
R-427A(HFC-32=15%,HFC-125 = 25%, HFC-134a =50%,HFC-143a=10%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.89		0.00	0.00	
R-437A(HFC-125 = 19.5%, HFC-134a =78.5%,R600=1.4%,R601=0.6%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.52		0.00	0.00	
R-438A(HFC-32=8.5%,HFC-125 = 45%, HFC-134a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	658.54		0.00	0.00	
R-448A(HFC-32=26%,HFC- 125=26%,HFC-134a=21%,HFO-	0.00	0.00	0.00	10.00	0.00	0.00	5.00	0.00	0.00	15.00	0.04	560.70		0.00	0.00	
R-449A(HFC-32=24.3%,HFC- 125=24.7%,HFC-134a=25.7%,HFO-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	101.38		0.00	0.00	
R-452A(HFC-32=11%,HFC- 125=59%,HFO- 1234yf=30%)	0.00	0.00	0.00	40.00	0.00	0.00	8.00	0.00	0.00	48.00	1.36	27.31		0.00	0.00	
R-454B(HFC-32=68.9%,HFO- 1234yf=31.1%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.94	1.72		0.00	0.00	
R-454C(HFC-32=21.5%,HFO- 1234yf=78.5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	1.26		0.00	0.00	
R-455A (HFC-32=21.5%,HFO- 1234yf=75.5%,R-744=3%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00		0.00	0.00	
R-458A(HFC-32=20.5%,HFC- 125=4%,HFC-134a=61.4%,HFC-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	97.92		0.00	0.00	
R-468C (HFC-32=42%,HFO- 1234yf=52%,R-1132a=6%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00		0.00	0.00	
R-469A (HFC-32=32.5%,HFC- 125=32.5%,R-744=35%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00		0.00	0.00	
R-473A (HFC-23=10%,HFC- 125=10%,R-744=60%,R-1132a=20%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.00		0.00	0.00	

Annex III

R-507A (HFC-125 = 50%, HFC-143a = 50%)	0.00	0.00	0.00	19500.00	0.00	0.00	3581.24	0.00	0.00	23081.24	0.00	12071.43		0.00	0.00
R-508B(HFC-23 = 46%, PFC-116 = 54%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.53		0.00	0.00
R-513A(HFC-134a=44%,HFO-123yf= 56%)	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	26.57		0.00	0.00
R125/R134a/other uncontrolled substances(50.5%/47%/2.5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.86		0.00	0.00
R125/R134a/R600a(63%/33%/4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.00		0.00	0.00
R125/R152a/R134a/R290(60.1%/9%/27.5%/3.4%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	91.42		0.00	0.00
R134a/R152a(50%/50%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00		0.00	0.00
R152a/DME(1%/99%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.00		0.00	0.00
R152a/DME(60%/40%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	117.20		0.00	0.00
R152a/DME(70%/30%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.50		0.00	0.00
R152a/DME(75%/25%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	710.30		0.00	0.00
R32/ R125/ R134a/ R601a/R600) (8.5%/45%/44.2%/0.6%/1.7%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.30		0.00	0.00
R32/R125/R134a(31.5%/30%/38.5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00		0.00	0.00
R32/R125/R134a/other uncontrolled	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11		0.00	0.00
R32/R125/R134a/other uncontrolled substances(26%/21%/20%/33%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.98		0.00	0.00
R32/R125/R134a/other uncontrolled substances(26%/26%/21%/27%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11		0.00	0.00
R32/R125/R134a/R227ea/R236fa/other uncontrolled	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.90		0.00	0.00
R32/R125/R134a/R600a(6%/48%/45%/1%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	240.00		0.00	0.00
R23/R125/R245fa/R236fa/other uncontrolled	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00		0.00	0.00
R23/R245fa/other(26%/43%/31%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
R32/Other uncontrolled substances(21.5%/78.5%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00		0.00	0.00
R365mfc/Other uncontrolled substances(85%/15%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00		0.00	0.00
R365mfc/R227ea(93%/7%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	288.00	0.00		0.00	0.00
Others: ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
Others: ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
Sub-Total	0.00	0.00	0.00	70613.00	37556.50	0.00	41933.61	0.00	0.00	150103.11	339.98	186019.53		0.00	0.00
Others															
HFC-245fa in imported pre-blended polvol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
HFC-365mfc in imported pre-blended polvol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Sub-Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
TOTAL	3419.67	10876.66	28994.44	108469.00	129230.30	0.00	73390.46	2578.18	1695.79	358654.50	1203.02	460924.12	817775.11	0.00	0.00

1 When reporting blends/mixtures, reporting of controlled substances should not be duplicated. For the CP report, countries should report use of individual controlled substances and quantities of blends/mixtures used, separately, while ensuring that the amounts of controlled substances are not than once.

2 If a non-standard blend not listed in the above table is used, please indicate the percentage of each constituent controlled substance of the blend being reported in the remarks column.

3 Uses in other sectors that do not fall specifically within the listed sectors in the table.

4 Provide explanation if total sector use and consumption (import-export+production) is different (e.g. stockpiling).

5 If break-down of consumption in manufacturing is not available, information in total can be provided.