



**Programa de las  
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COMITÉ EJECUTIVO DEL FONDO MULTILATERAL  
PARA LA APLICACIÓN DEL  
PROTOCOLO DE MONTREAL  
Octogésima segunda Reunión  
Montreal, 3-7 de diciembre de 2018

**DOCUMENTO PRELIMINAR SOBRE TODOS LOS ASPECTOS RELACIONADOS  
CON EL SECTOR DE SERVICIO Y MANTENIMIENTO DE REFRIGERACIÓN  
QUE APOYAN LA REDUCCIÓN DE LOS HFC (DECISIÓN 80/76 c))**

**INTRODUCCIÓN**

1. En la 28ª reunión de las Partes en el Protocolo de Montreal relativo a las Sustancias que Agotan la Capa de Ozono (celebrada en octubre de 2016) se acordó enmendar dicho Protocolo de Montreal y se adoptó la decisión XXVIII/2<sup>1</sup>. Al Comité Ejecutivo se le pidió, entre otras cosas:

- a) Que, al elaborar las nuevas directrices sobre metodologías y el cálculo de los costos en lo que respecta al sector de mantenimiento, haga admisibles las siguientes categorías de costos y las incluya en el cálculo de los costos: actividades de concienciación del público; elaboración y aplicación de políticas; programas de certificación y formación de técnicos en relación con el manejo seguro, las buenas prácticas y la seguridad de las alternativas, incluidos los equipos para la formación; capacitación de funcionarios de aduanas; prevención del comercio ilícito de hidrofluorocarbonos; instrumentos para el mantenimiento; equipo de pruebas de refrigerantes para el sector de la refrigeración y el aire acondicionado; reciclado y recuperación de hidrofluorocarbonos (párrafo 15 c);
- b) Que aumente en relación con el sector de mantenimiento la financiación disponible de conformidad con la decisión 74/50 del Comité Ejecutivo por encima de las cantidades enumeradas en esa decisión, para las Partes con un consumo de referencia total de hidroclorofluorocarbonos de hasta 360 toneladas métricas cuando sea necesario para la introducción de alternativas a los hidroclorofluorocarbonos con bajo PCA y de alternativas a los hidrofluorocarbonos con PCA nulo, y mantener la eficiencia energética también en el sector de mantenimiento/usuarios finales (párrafo 16); y

<sup>1</sup> Decisión atinente a la enmienda sobre la eliminación de los HFC.

- c) Que dé prioridad a la asistencia técnica y el fomento de la capacidad para abordar cuestiones de seguridad relacionadas con las alternativas de bajo o nulo PCA (párrafo 23).

2. En su 80ª reunión (noviembre de 2017), y en el contexto de las deliberaciones sobre la elaboración de las directrices sobre los costos para la reducción de los HFC, bajo la cuestión 10 c) del orden del día, el Comité Ejecutivo decidió, entre otras cosas, incluir las categorías de gastos para el sector de servicio y mantenimiento en el proyecto de plantilla de las directrices sobre los costos para la reducción de los HFC (decisión 80/76 a) iv)); y pidió a la Secretaría que, en cooperación con los organismos bilaterales y de ejecución, preparara un documento preliminar a presentar ante la 82ª reunión en el que se trataran todos los aspectos relacionados con el sector de servicio y mantenimiento de equipos de refrigeración que apoyen la reducción de los HFC, tras haber tenido en cuenta:

- a) Los documentos sobre políticas, estudios de casos y exámenes de supervisión y evaluación anteriores, la labor que hubieran realizado los organismos bilaterales y de ejecución en el desarrollo y la ejecución de programas de capacitación y asistencia técnica, en particular la relación de asociación que el Programa de asistencia para el cumplimiento (PAC) había establecido con institutos de capacitación y certificación reconocidos a nivel mundial;
- b) Un análisis de las capacidades existentes en los países que operan al amparo del artículo 5 con la financiación aprobada hasta ahora para el sector de servicio y mantenimiento de refrigeración y la manera en que esas capacidades se podrían utilizar para la reducción de los HFC, en relación con lo siguiente:
  - i) Los resultados de las actividades de recuperación, reciclaje y regeneración (denominadas RRR) financiadas y el suministro de herramientas de servicio y mantenimiento, y sus posibilidades de reducir las emisiones de refrigerantes;
  - ii) El alcance de la participación de los sectores público o privado (por ejemplo, proveedores de equipos, componentes y refrigerantes) para introducir y adaptar alternativas en el sector de servicio y mantenimiento;
  - iii) Normas, protocolos y equipos de salud y seguridad (incluidos equipos de protección) disponibles para las alternativas;
  - iv) Programas de capacitación y certificación;
  - v) Si se abordaba la eficiencia energética en el sector de servicio y mantenimiento/usuarios finales y de qué manera; y
- c) La información mínima requerida para el desarrollo de programas y módulos de capacitación y certificación basados en competencias para los técnicos de servicio y mantenimiento y los funcionarios de aduanas para la transición a las alternativas (decisión 80/76 c)).

3. En su 81ª reunión, y en el contexto de las deliberaciones de desarrollo sobre la elaboración de directrices relativas a los costos para la reducción de los HFC, bajo la cuestión 10 a), el Comité Ejecutivo decidió examinar en la 82ª reunión el tema de la asignación de prioridad a la asistencia técnica y el fomento de la capacidad para abordar cuestiones de seguridad relacionadas con las alternativas de bajo o nulo PCA para todos los sectores, y teniendo en cuenta el documento que la Secretaría está preparando en

respuesta a la decisión 80/76 sobre aspectos relacionados con el sector de servicio y mantenimiento de refrigeración que apoyaran la reducción de los HFC (decisión 81/67c)).

4. La Secretaría ha preparado este documento preliminar como respuesta a las decisiones 80/76 c) y 81/67 c).

### **Fuentes informativas consultadas**

5. Al elaborar el presente documento, la Secretaría tuvo en cuenta todas las decisiones del Comité Ejecutivo y de las Partes en el Protocolo de Montreal relacionadas con el sector de servicio y mantenimiento de equipos de refrigeración, la experiencia acumulada en el Fondo Multilateral a raíz del examen de las actividades autónomas<sup>2</sup> y de los planes de eliminación<sup>3</sup> con que se aborda al sector de servicio y mantenimiento; los estudios de caso y las evaluaciones acometidas y terminadas por el Oficial Superior de Supervisión y Evaluación; y los informes de terminación de proyectos.

6. La Secretaría tuvo también en cuenta:

- a) Las conversaciones mantenidas con las partes interesadas del sector de servicio y mantenimiento de equipos de refrigeración de los países que operan al amparo del artículo y de los que no lo hacen, conversaciones que se celebraron en el transcurso de las misiones efectuadas a una diversidad de países y en las reuniones celebradas en la Secretaría entre febrero y abril de 2018;
- b) Las conversaciones mantenidas con los peritos de los organismos bilaterales y de ejecución sobre todos los aspectos del sector de servicio y mantenimiento de equipos de refrigeración, en el transcurso de dos reuniones de coordinación entre organismos (IACM) celebradas en 2018<sup>4</sup> y durante una reunión de dos días que se dedicó sola y exclusivamente al sector de servicio y mantenimiento de equipos de refrigeración, celebrada en Montreal los días 29 y 30 de mayo de 2018;
- c) Las presentaciones y las deliberaciones mantenidas durante el Taller Internacional de Partes Interesadas de OzonAction, Racionalización del apoyo y de los servicios para el sector de servicio y mantenimiento de equipos de refrigeración, celebrada en París del 16 al 17 de julio de 2018;<sup>5</sup> y
- d) Los materiales pertinentes publicados por el PAC del PNUMA, el Grupo de evaluación técnica y económica y otras organizaciones internacionales<sup>6</sup>.

7. Antes de finalizar el presente documento, la Secretaría lo envió a los organismos bilaterales y de ejecución para que presentaran sus observaciones al respecto. Así mismo, la Secretaría envió el informe a un perito independiente a fin de recibir sus observaciones sobre las cuestiones técnicas recogidas en el

<sup>2</sup> Incluidos los programas de capacitación de técnicos en refrigeración y de funcionarios de aduanas; programas de recuperación y reciclaje; y retroadaptación de equipos de refrigeración que se hubieran aprobado desde las fechas de celebración de la 4ª reunión del Comité Ejecutivo (junio de 1991).

<sup>3</sup> Incluidos los planes de gestión de refrigerantes, los planes de gestión de eliminación definitiva, los planes nacionales de eliminación para países que no son de bajo consumo, y más recientemente, los planes de gestión de eliminación de HCFC.

<sup>4</sup> La primera reunión de coordinación entre organismos se celebró del 6 al 8 de marzo de 2018; y la segunda del 4 al 6 de septiembre de 2018.

<sup>5</sup> Los documentos sobre la reunión pueden encontrarse en [www.ozonactionreunions.org](http://www.ozonactionreunions.org).

<sup>6</sup> Incluidos la Agencia Internacional de la Energía y el Instituto Internacional del Frío (IIF).

documento. La Secretaría examinó las aportaciones recibidas e introdujo las modificaciones pertinentes a la luz de ello.

8. La Secretaría tiene en un alto aprecio las percepciones, la información y las observaciones que facilitan los organismos bilaterales y de ejecución.

### **Estructura del documento**

9. Dado el considerable volumen de información sobre el sector de servicio y mantenimiento de equipos de refrigeración que se analizó, habida cuenta de las orientaciones recogidas en la decisión 80/76 c), y con objeto de facilitar que los miembros que forman el Comité Ejecutivo pudieran examinarlo, dicho documento se ha estructurado en cinco secciones, incluyendo una recomendación. Con objeto de auxiliar al Comité Ejecutivo en sus deliberaciones, cada sección alberga la información pertinente que se centra más en los aspectos de política-normativa de los temas y no en los aspectos más técnicos. No obstante, se dispone de una información técnica pormenorizada que puede obtenerse solicitándola. Lo que se indica seguidamente es una breve descripción de las cinco secciones del documento.

- I. Reseña del sector de servicio y mantenimiento de equipos de refrigeración:  
Describe la evolución de la asistencia técnica y financiera suministrada al sector de servicio y mantenimiento de equipos de refrigeración desde la creación del Fondo Multilateral; recoge un análisis de las actuales características de los sectores de equipos de refrigeración y de climatización; e identifica los retos potenciales a los que se enfrenta la reducción de los HFC en el sector.
- II. Análisis de la capacidad actual creada con la financiación aprobada para el sector de servicio y mantenimiento de equipos de refrigeración:  
Describe la capacidad que se ha establecido y fortalecido en los países que operan al amparo del artículo 5 en relación con: los marcos reglamentarios y de política-normativa, incluidos los estándares; la capacitación y certificación de técnicos en refrigeración; y asistencia técnica, incluyendo la provisión de herramientas de servicio y mantenimiento para técnicos, el establecimiento de los programas RRR, la retroadaptación de sistemas de refrigeración, y el mantenimiento del consumo energético eficiente. El análisis de cada una de estas esferas incluye la participación de los sectores público y privado y cómo la capacidad creada puede emplearse para la reducción de los HFC.
- III. Análisis de la información mínima necesaria para desarrollar programas de titulación en capacitación y competencia, así como módulos enfocados a los técnicos de servicio y a los funcionarios de aduanas con objeto de lograr la transición a los refrigerantes alternativos:  
Debate sobre cómo podrían aplicarse los módulos comunes de capacitación a las circunstancias reinantes en los países que operan al amparo del artículo 5, y analiza cómo podrían los productos universales creados por el PNUMA, en asociación con otros organismos internacionales, respaldar las actividades en el sector de servicio y mantenimiento de equipos de refrigeración financiadas por el Fondo Multilateral.
- IV. Consideraciones para financiar la reducción de los HFC en el sector de servicio y mantenimiento de equipos de refrigeración:  
Debate sobre la ejecución conjunta de las decisiones XIX/6 y XXVIII/2 respecto del sector de servicio y mantenimiento de equipos de refrigeración, teniendo en cuenta el solape entre los programas de reducción de los HCFC y de los HFC; resume cómo se ha

financiado el sector de servicio y mantenimiento de equipos de refrigeración; y presenta las repercusiones potenciales para poder determinar la asistencia necesaria para la reducción de los HFC.

V. Recomendaciones

10. El documento recoge también los anexos siguientes:

- I: Decisiones pertinentes relacionadas con el sector de servicio y mantenimiento de equipos de refrigeración adoptadas por el Comité Ejecutivo y las Partes en el Protocolo de Montreal.
- II: Lista de las evaluaciones relacionadas con el sector de servicio y mantenimiento de equipos de refrigeración acometidas por el Fondo Multilateral.
- III: Productos de aplicación universal desarrollados por el PNUMA y otros organismos internacionales para asistir al sector de servicio y mantenimiento de equipos de refrigeración en los países que operan al amparo del artículo 5.

**I. RESEÑA DEL SECTOR DE SERVICIO Y MANTENIMIENTO DE EQUIPOS DE REFRIGERACIÓN**

11. Ya desde la creación del Fondo Multilateral, el Comité Ejecutivo ha venido considerando, como una de sus prioridades, la eliminación de las sustancias controladas<sup>7</sup> que se emplean en el sector de servicio y mantenimiento de equipos de refrigeración<sup>8</sup>. El Fondo Multilateral, ya en las fechas de su 4ª reunión (junio de 1991), había comenzado a financiar las actividades necesarias para atajar el consumo de las sustancias controladas que se utilizan en el sector de servicio y mantenimiento de equipos de refrigeración. Ante la constante emisión de refrigerantes a la atmósfera, el sector de servicio y mantenimiento de equipos de refrigeración será más y más pertinente en todos los países que operan al amparo del artículo 5 hasta que se logren alcanzar los objetivos del cumplimiento de reducción en virtud de la Enmienda de Kigali.

**Evolución de las actividades relacionadas con el sector de servicio y mantenimiento de equipos de refrigeración**

12. Las primeras actividades en el sector de servicio y mantenimiento de equipos de refrigeración se centraron en la eliminación del CFC-12 empleado para las tareas de servicio y mantenimiento de refrigeradores de viviendas, equipos comerciales autónomos de refrigeración y unidades de climatización para vehículos y, en menor medida, la eliminación de CFC-11 y CFC-115 empleados en enfriadores y otras aplicaciones.

Actividades autónomas

13. Las primeras actividades en el sector de servicio y mantenimiento de equipos de refrigeración se efectuaron primero en proyectos autónomos, que consistían en capacitar a los técnicos de equipos de refrigeración en buenas prácticas de servicio y mantenimiento de los mismos, facilitándoles herramientas

<sup>7</sup> Con anterioridad a la Enmienda de Kigali, todas las sustancias controladas recogidas en el Protocolo de Montreal constituían sustancias que agotaban la capa de Ozono.

<sup>8</sup> En lo que al presente documento concierne, el término “sector de servicio y mantenimiento de equipos de refrigeración” se referirá tanto a los equipos de refrigeración como también a los de climatización (o aire acondicionado).

y equipos básicos, y creando los programas de recuperación y reciclaje de refrigerantes. Se facilitó frecuentemente asistencia para fortalecer los sistemas de concesión de cuotas y licencias de importación y exportación de sustancias controladas en virtud del artículo 4B del Protocolo de Montreal<sup>9</sup>; desarrollar regulaciones específicas para respaldar el programa de eliminación; y capacitar a los funcionarios de aduanas y a los de ejecución de la ley en la legislación y los reglamentos con objeto de eliminar el consumo de las sustancias controladas, incluyendo los equipos para identificar los refrigerantes.

#### Planes de eliminación de los CFC

14. A medida que el programa de eliminación fue avanzando, las actividades autónomas relacionadas con los marcos regulatorios reglamentarios y la asistencia técnica se fundieron en un plan de financiación integral aplicable a los países de bajo consumo, a saber: un plan de gestión de refrigerantes. El objetivo general de este plan de gestión fue el de desarrollar y planificar una estrategia que permitiera gestionar el uso y la eliminación de los CFC vírgenes empleados en tareas de servicio y mantenimiento de equipos de refrigeración y de climatización,<sup>10</sup> tras tener en cuenta las circunstancias reinantes en los países en cuestión. La primera serie de planes de gestión de refrigerantes se aprobó en la 23ª reunión (noviembre de 1997).<sup>11</sup>

15. En su 33ª reunión (marzo de 2001), el Comité Ejecutivo reconoció que se necesitaba un planteamiento específico para cada país, que permitiera la flexibilidad necesaria para determinar el enfoque que posibilitara al país en cuestión poder cumplir, durante el periodo de cumplimiento, con las obligaciones contraídas en virtud del Protocolo de Montreal, y adoptó el marco relativo a los objetivos, prioridades, problemas y modalidades destinados a la planificación estratégica del Fondo durante el periodo de cumplimiento. En el transcurso de este periodo, un país que opere al amparo del artículo 5 tiene que crear y asentar objetivos nacionales, políticas-normativas y medidas a tomar para poder lograr su plan estratégico de cumplimiento, el cual puede constar de proyectos individuales, planes sectoriales o ambas cosas. La financiación tiene que buscar el compromiso de alcanzar reducciones acumulativas permanentes en el consumo y en la producción, como algo pertinente. Al adoptar este marco de trabajo, el Comité tomó nota de que las actualizaciones de los planes de gestión de refrigerantes<sup>12</sup> dotarían a los países que operan al amparo del artículo 5 con un mecanismo con el que respaldar las estrategias nacionales de eliminación y decidió fomentar que los países que operan al amparo del artículo 5 aprovecharan esta oportunidad (decisión 33/54). A fechas de 2007, cuando los países tenían que cumplir con el 85 por ciento de las reducciones del consumo de los CFC, 104 países que operan al amparo del artículo 5 habían aprobado un plan de gestión de refrigerantes y/o una actualización del ya existente, lo cual se elaboró tras adoptarse el planteamiento específico para cada país en la 33ª reunión. De igual manera, tras el planteamiento específico para cada país, y a fin de alcanzar la total eliminación de los CFC, se desarrollaron planes de gestión de eliminación definitiva para los países de bajo consumo, y

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<sup>9</sup> El artículo 4B requiere que cada Parte establezca y ejecute un sistema de concesión de cuotas y licencias para la importación y exportación de sustancias controladas vírgenes, usadas, recicladas y recuperadas que figuran en los anexos A, B, C y E del Protocolo de Montreal. Desde las fechas de adopción de dicho Protocolo, las Partes y el Comité Ejecutivo han adoptado una serie de decisiones destinadas a financiar actividades que permitan a los países que operan al amparo del artículo 5 cumplir con sus obligaciones contraídas en virtud del artículo 4B.

<sup>10</sup> La estrategia podría incluir, entre otras, medidas tales como incentivos y desincentivos jurídicos y económicos dirigidos a los proveedores, técnicos de servicio y mantenimiento, propietarios de equipos; capacitación de técnicos; actividades de concienciación del público; controles aduaneros destinados a los nuevos vehículos y equipos con CFC; prohibiciones en la introducción de sistemas de climatización con CFC para vehículos en el mercado postventa; la retirada de los equipos y vehículos vigentes dotados con CFC; y un incremento gradual en el suministro de CFC reciclado.

<sup>11</sup> Se aprobaron planes de gestión de refrigerantes para las Bahamas, Georgia, Guyana, Santa Lucía y Trinidad y Tobago.

<sup>12</sup> Los países de bajo consumo que hayan ejecutado los planes de gestión de refrigerantes recibirán el 50 por ciento de la financiación para elaborar su plan original y actualizarse periódicamente (decisión 35/57).

planes de eliminación en función del desempeño en el plano nacional (planes nacionales de eliminación) para los países que no eran de bajo consumo.

### Planes de eliminación de los HCFC

16. A raíz de acelerar la eliminación de los HCFC conforme a la decisión XIX/6 de las Partes, en su 53ª reunión (noviembre de 2007), el Comité Ejecutivo consideró un documento sobre las opciones para evaluar y definir como admisibles los costos adicionales<sup>13</sup> relativos a las actividades de eliminación del consumo y producción de los HCFC. El documento formó la base para elaborar las directrices destinadas a la preparación de los planes de gestión de eliminación de los HCFC. Se propuso un planteamiento gradual de forma que los países pudieran desarrollar un plan general para alcanzar la eliminación total, al tiempo que permitiera que las propuestas pudieran alcanzar las dos primeras medidas de control de los HCFC en 2013 y 2015 y, simultáneamente, permitiendo también las propuestas aplicables a una etapa o etapas posteriores, si se necesitara más de una, para gestionar su eliminación de dichos HCFC. El Comité Ejecutivo reconoció la importancia de la financiación según el desempeño. Todo esto derivó en un compromiso de financiación acordado en principio para cada país hasta un objetivo de consumo máximo de financiación admisible para el país en cuestión, con intervalos de reducción lineal.

17. Partiendo de estas directrices, en su 61ª reunión (abril de 2010), el Comité Ejecutivo aprobó los dos primeros planes de gestión de eliminación de los HCFC para los países que operan al amparo del artículo 5<sup>14</sup>. Desde aquellas fechas, se ha aprobado la etapa I (y en muchos casos la etapa II) de los planes de gestión de eliminación de los HCFC para todos los países que operan al amparo del artículo 5, excepto en el caso de la República Árabe Siria<sup>15</sup>.

18. La información que se deriva de los planes de gestión de eliminación de los HCFC aprobados es que el empleo de los HCFC, en 95 de los 145 países que operan al amparo del artículo 5, se destina sola y únicamente a servicio y mantenimiento de equipos de refrigeración y de climatización. En lo tocante a los otros 50 países, en los que los HCFC se consumen también en el sector fabril, la eliminación de los HCFC empleados en el sector de servicio y mantenimiento de equipos de refrigeración pasa a ser crítica para poder cumplir con sus obligaciones de cumplimiento a medida que tales HCFC comienzan a ser eliminados en los sectores de fabricación.

19. En las deliberaciones sobre la reducción del impacto climático por la eliminación de los HCFC en el sector de servicio y mantenimiento de equipos de refrigeración,<sup>16</sup> se reconoció que la capacitación facilitada a los técnicos habría de ampliarse más allá de las buenas prácticas en refrigeración y centrarse en la debida contención de las sustancias controladas mediante medidas de mantenimiento preventivo, mejora de la calidad de las instalaciones, y mantenimiento/mejora del consumo energético eficiente de los equipos sirviéndose de los entornos de control apropiados, la debida limpieza de los termointercambiadores, y la facilitación de los flujos de aire pertinentes. Ante la combustibilidad de varios de los refrigerantes de bajo PCA y del riesgo potencial asociado a su uso, los programas de capacitación tendrían que incluir planteamientos rigurosos para la gestión segura de tales refrigerantes y el entendimiento de las correspondientes políticas-normativas y reglamentos reguladores conexos. Se sugirió además que habrá que mejorar la capacidad de los institutos de capacitación, de manera que puedan seguir llevando a cabo la capacitación necesaria para poder cumplir permanentemente con el

<sup>13</sup> UNEP/OzL.Pro/ExCom/53/60.

<sup>14</sup> Se aprobaron los planes de gestión de eliminación de los HCFC para la Antigua República de Yugoslavia, República de Macedonia y las Maldivas.

<sup>15</sup> La presentación de la solicitud de financiación para la etapa I del plan de gestión de eliminación de los HCFC destinado a la República Árabe Siria se ha incluido en el plan administrativo de 2019.

<sup>16</sup> Lo que se recoge en el documento UNEP/OzL.Pro/ExCom/70/53 sobre reducción al mínimo de la repercusión climática por la eliminación de los HCFC en el sector de servicio y mantenimiento de equipos de refrigeración.

Protocolo de Montreal, y que habrá que dotar con una capacitación especializada adicional a los instructores y sectores específicos (por ejemplo, uso de equipos con CO<sub>2</sub> en supermercados, mejoras de la eficiencia en el consumo energético a la hora de reemplazar los enfriadores, o las ventanas y las unidades con condensador separado de los edificios mediante sistemas centrales, e instalaciones con opción de consumo energético eficiente en los nuevos edificios, entre otras cosas). Varios de los planes de gestión de eliminación de los HCFC en curso de ejecución se ajustaron partiendo de estas deliberaciones, tras lo que se incorporaron algunas de las sugerencias planteadas.

### **El sector de servicio y mantenimiento de equipos de refrigeración tras la Enmienda de Kigali**

20. En el plano mundial, los sectores de equipos de refrigeración y de climatización han aumentado considerablemente desde las fechas de creación del Fondo Multilateral<sup>17</sup>. El número de equipos de refrigeración y de climatización instalados,<sup>18</sup> y el uso conexo de una amplia gama de refrigerantes ha derivado en un incremento significativo en el transcurso de los últimos 20 años y seguirá creciendo como consecuencia de lo siguiente: el crecimiento ininterrumpido de la población mundial, a lo que se suma la tendencia general a vivir en las ciudades<sup>19</sup>; el creciente poder adquisitivo de la población; la creciente disponibilidad de equipos a precios asequibles; y la expansión de las cadenas de frío en las que adquirir los alimentos, entre otras cosas.

21. En 2024, fechas en las que entrará en vigor la primera obligación de cumplir con el consumo estipulado en virtud de la Enmienda de Kigali para los países del grupo 1 que operen al amparo del artículo 5, la mayor parte del consumo de HCFC y HFC en los países que operan al amparo del artículo 5 tendrá lugar en el sector de servicio y mantenimiento de equipos de refrigeración.

#### Consumo de refrigerantes con HFC

22. En las fechas de adopción de la Enmienda de Kigali, el conocimiento del que se disponía sobre el volumen y usos de sustancias incluidas en el anexo F producidas y consumidas en cada país que opere al amparo del artículo 5 era limitado. Los informes elaborados por el Grupo de tareas de evaluación técnica y económica (GETE) fueron acumulando información sobre los HFC, de conformidad con las decisiones XXV/5 y XXVI/9 de las Partes, a lo que se sumó el contenido de un artículo científico publicado en *Atmospheric Science*<sup>20</sup>.

23. Los estudios de alternativas a las SAO efectuados en 119 de los países que operan al amparo del artículo 5<sup>21</sup>, como respuesta al párrafo 4 de la decisión XXVI/9<sup>22</sup>, publicaron información adicional sobre

<sup>17</sup> Por ejemplo, la Agencia Internacional de la Energía (AIE) estima que de los 2,8 billones de personas que viven en las partes más calidas del planeta, tan sólo un 8 por ciento dispone de una unidad de climatización. Entre 1990 y 2016 el consumo energético de China para el enfriamiento de espacios pasó de 6,6 TWh a 450 TWh, habiéndose multiplicado la demanda en otros países por un factor de 15 desde 1990 (*The future of cooling – opportunities for energy efficient air-conditioning, 2018*–El futuro del enfriamiento – oportunidades para el consumo eficiente de energía para climatización, 2018).

<sup>18</sup> Los investigadores que trabajan en el Lawrence Berkeley National Laboratory estiman que las existencias de aparatos acondicionadores de habitaciones aumentarán pasando de 700 millones adicionales para 2030, a 1,6 billones en 2059.

<sup>19</sup> Se prevé que la población mundial de 7,0 billones en 2012 aumente a 9,3 billones para 2050, habiendo más de un billón adicional de habitantes para 2025.

<sup>20</sup> Los informes del Grupo de tareas de evaluación técnica y económica incluyen los datos del consumo y producción de HFC y las proyecciones para cada uno de los periodos quinquenales comprendidos entre 2010 y 2030. El informe de Velders et al. (2015) recoge información sobre los volúmenes atmosféricos futuros y los forzamientos del clima derivados de las hipótesis de emisiones mundiales y regionales de HFC.

<sup>21</sup> La financiación para los 127 estudios se aprobó en la 74ª reunión (mayo de 2015) y en la 75ª reunión (noviembre de 2015).



el consumo de los HFC, estudios que se presentaron a la 80ª reunión (noviembre de 2017)<sup>23</sup>. Los estudios facilitaron datos desglosados del volumen de consumo los HFC y de otros refrigerantes alternativos a los HCFC, junto con su distribución sectorial. Los datos desglosados permitieron identificar los principales HFC consumidos en su distribución sectorial de países de bajo consumo y países que no son de bajo consumo, no habiendo sido posible ese análisis sirviéndose tan sólo de los datos acumulados que se recogieron en los informes del Grupo de tareas de evaluación técnica y económica<sup>24</sup>.

24. Partiendo de los informes elaborados por el Grupo de tareas de evaluación técnica y económica (GETE), se estima que el consumo de HFC en todos los países que operan al amparo del artículo 5 aumente pasando de 284 326 tm en 2015 a 1 021 220 tm en 2030, basándose en una hipótesis de base de referencia del status quo (la cual no tiene en cuenta la Enmienda de Kigali),<sup>25</sup> como se recoge en el Cuadro 1. Más del 95 por ciento del consumo total de HFC se concentra en el sector de equipos de refrigeración y de climatización. El consumo acumulado de los HFC en el sector de servicio y mantenimiento de equipos de refrigeración está previsto aumente pasando de 176 493 tm en 2020 a 468 550 tm en 2030, lo que representa el 46 por ciento del consumo total de todos los países que operan al amparo del artículo 5. Se prevé que la mayor parte de ese consumo se produzca en mezclas de HFC.

**Cuadro 1. Distribución del consumo de HFC en los países que operan al amparo del artículo 5 basándose en una hipótesis de base de referencia del status quo**

Sectores	Consumo de HFC				
	2010	2015	2020	2025	2030
<b>Toneladas métricas</b>					
Fabricación de equipos de refrigeración y de climatización	91 523	185 838	281 619	392 390	510 596
Servicio y mantenimiento de equipos de refrigeración y de climatización	33 476	87 033	176 493	305 922	468 550
Otros sectores	2 010	11 458	19 506	33 092	42 074
Total (tm)	127 009	284 329	477 618	731 404	1 021 220
<b>Porcentaje (%)</b>					
Fabricación de equipos de refrigeración y de climatización	72,1	65,4	59,0	53,6	50,0
Servicio y mantenimiento de equipos de refrigeración y de climatización	26,4	30,6	37,0	41,8	45,9
Otros sectores	1,6	4,0	4,1	4,5	4,1

<sup>22</sup> Pedir al Comité Ejecutivo que considere facilitar financiación adicional para llevar a cabo inventarios o estudios sobre las alternativas a las SAO en los países que operen al amparo del artículo 5 según lo soliciten.

<sup>23</sup> Los resultados de los estudios efectuados en 119 países, en los que se incluyen 42 que no son de bajo consumo y 77 que sí son de bajo consumo, pueden encontrarse en el documento UNEP/OzL.Pro/ExCom/80/54.

<sup>24</sup> Si bien los estudios se efectuaron en el 82 por ciento de los países que operan al amparo del artículo 5 (119 de un total de 145), el consumo básico de referencia acumulativo de HCFC de esos países representa tan solo el 25 por ciento del consumo básico de referencia acumulativo de todos los países que operan al amparo del artículo 5. El consumo básico de referencia acumulativo de HCFC de los 42 países que no son de bajo consumo representa solo el 24 por ciento del consumo básico acumulativo de todos los países que no son de bajo consumo, mientras que el consumo básico de referencia acumulativo de HCFC de los 77 países de bajo consumo representa el 91 por ciento de dicho consumo básico de todos los países de bajo consumo. Cabe destacar que los mayores países consumidores no presentaron los estudios, incluyendo a Brasil, China e India.

<sup>25</sup> A título de referencia, el consumo básico de referencia de HCFC en los países que operan al amparo del artículo 5 alcanzó 538 749 tm, formado principalmente de tres HCFC, a saber: HCFC-22, que representa el único uso de HCFC común a todos los países que operan al amparo del artículo 5 (395,413 tm); HCFC-141b (107 971 tm); y HCFC-142b (31 580 tm).

25. La información recolectada de los 119 estudios de alternativas a las SAO<sup>26</sup> aportan una reseña de las principales mezclas de HFC y HCFC que se consumen y de su distribución sectorial, como se recoge en el Cuadro 2.

**Cuadro 2. Principales mezclas de HFC y HCFC consumidas en 119 países que operan al amparo del artículo 5**

HFC	Nº de países	% del total	Régimen de crecimiento %*	Usos
HFC-134a	119	34	9	Equipos de refrigeración comercial, de viviendas y de vehículos; usos a pequeña escala en aplicaciones de refrigeración, espumas y aerosoles
R-410A	119	43	40	Aplicaciones de climatización
R-404A	118	7	11	Aplicaciones para refrigeración a bajas temperaturas
R-507A	70	1	21	Equipos de refrigeración comercial
R-407C	110	6	33	Aplicaciones de climatización
HFC-152a**	19	4	23	Sector de aerosoles industriales y de espuma de poliestireno extruido
HFC-245fa***	10	2	9	Espumas de poliuretano
Otros	64	3	35	Uso a pequeña escala en todas las aplicaciones

(\*) Cálculo como régimen compuesto de crecimiento anual comprendido entre 2012 y 2015.

(\*\*) Más del 90 por ciento de este consumo notificado corresponde a un solo país.

(\*\*\*) Un país notificó un alto consumo de HFC-245fa para el sector de espumas (es decir, aproximadamente un 15 por ciento de su consumo total de HFC).

26. Del consumo total de mezclas de HFC y HCFC notificado para 2015 por parte de 77 países de bajo consumo y de otros 42 que no lo son<sup>27</sup>, más del 90 por ciento del consumo de países que no son de bajo consumo y más del 95 por ciento de otros que sí lo son se utilizó en el sector de refrigeración, incluyendo en ello la fabricación y el servicio y mantenimiento, como se indica en el Cuadro 3.

**Cuadro 3. Consumo total de HFC notificado por 119 países en 2015 (tm)**

Sector	Bajo consumo	Sin bajo consumo	Total	% bajo consumo	% sin bajo consumo
Refrigeración	14 466	151 548	166 014	8,7	91,3
Otros sectores *	751	15 376	16 127	4,7	95,3
Total (tm)	15 217	166 924	182 141	8,4	91,6

(\*) Incluyendo los sectores de aerosoles, espumas y lucha contra incendios.

27. Los principales HFC consumidos en el sector de refrigeración en 2015 fueron: HFC-134a (36 por ciento), R-410A (47 por ciento), R-404A (8 por ciento) y R-407C (6 por ciento), medidos en tm. El consumo de HFC empleado para servicio y mantenimiento de equipos de refrigeración y de climatización alcanzó el 78 per cent del consumo total (es decir, el 97 por ciento del consumo total en países de bajo consumo y 76 por ciento en países que no son de bajo consumo).

<sup>26</sup> Los estudios de alternativas a las SAO fueron un primer intento de recolectar datos del consumo de substancias que aún no estaban controladas por el Protocolo de Montreal; lo que es más, la metodología para recolectar los datos no estaba normalizada. Por ende, la reseña que se deriva de los estudios habrá de considerarse como “mejores estimaciones”.

<sup>27</sup> Los consumos básicos de referencia de CFC y de HCFC para que los 77 países de bajo consumo que presentaron informes sobre las SAO puedan alcanzar el cumplimiento representan un 92 y un 91 por ciento, respectivamente, de todos los países de bajo consumo, mientras que los consumos básicos de referencia de CFC y de HCFC para los 42 países que no son de bajo consumo, y que presentaron informes, representaron el 35 y el 24 por ciento, respectivamente, de todos los países que no son de bajo volumen.

### Avances tecnológicos en los sistemas de refrigeración y de climatización

28. El pronunciado incremento del número de equipos de refrigeración y de climatización desde las fechas en las que se fundó el Fondo Multilateral ha venido acompañado de considerables avances tecnológicos que se han visto impulsados por la necesidad de optimizar los sistemas y de mejorar la eficiencia de su consumo energético. El número de componentes electrónicos, controles y mandos de regulación de la velocidad instalados en los equipos de refrigeración y de climatización sigue creciendo; los fabricantes de equipos se encuentran actualmente desarrollando juegos de control y diagnósticos sirviéndose de sofisticados microprocesadores mediante los que gestionan el funcionamiento del compresor y del sistema<sup>28</sup> de flujo de aire. Lo que es más, se prevé que el número y la diversidad de los equipos de refrigeración y de climatización sea cada vez mayor, junto con las restricciones al consumo de los HCFC y HFC, que derivarán en un incremento del número de mezclas refrigerantes para fines de retroadaptación y de servicio y mantenimiento.

29. El Cuadro 4 ilustra la evolución de la complejidad del sector de servicio y mantenimiento de equipos de refrigeración al presentar un análisis comparativo de las necesidades en el sector en diferentes momentos de la implantación del Protocolo de Montreal.

**Cuadro 4. El sector de servicio y mantenimiento de equipos de refrigeración en diferentes fases de implantación del Protocolo de Montreal**

Descripción	Eliminación de CFC	Eliminación de HCFC	Eliminación de HCFC/ Eliminación de HFC
<b>Substancias abordadas</b>	Principalmente CFC-12 y, en menor medida, CFC-11 y CFC-115, R-502 (baja temperatura)	Principalmente HCFC-22 (volúmenes limitados de HCFC-141b utilizados en el lavado a presión y HCFC-124 y HCFC-142b presentes en mezclas)	HCFC-22, HFC-134a, R-410A, R-404A, R-407C, R-507, y otros HFC y mezclas (los HFC se emplean como una alternativa al HCFC-22)
<b>Consumo básico de referencia en países que operan al amparo del artículo 5 en lo tocante a equipos de refrigeración y de climatización</b>	No se dispone de las cifras del consumo básico de referencia, en tm, para refrigeración y climatización. La cifra notificada de 164 923 toneladas PAO incluye todos los CFC empleados en todos los sectores. (consumo básico de referencia para alcanzar el cumplimiento – es decir, consumo medio de 1995-1997)	318 474 tm de HCFC-22 empleadas en el sector de equipos de refrigeración y de climatización (media para 2009-2010). 165 924 tm en fabricación. 152 550 tm en tareas de servicio y mantenimiento	272,871 tm de HFC-134a, R-410A, R-407C, R-404A y R-507A previsto para emplearse en el sector de equipos de refrigeración y de climatización en 2015 (tanto en fabricación como en servicio y mantenimiento) <sup>29</sup> . Además, sigue habiendo un consumo remanente de HCFC-22 pendiente de ser eliminado.

<sup>28</sup> <http://www.asme.org/engineering-topics/articles/technology-and-society/global-cooling-the-history-of-de-climatización>

<sup>29</sup> Informe del Grupo de tareas de evaluación técnica y económica de conformidad con las decisiones XXV/5 y XXVI/9.

Descripción	Eliminación de CFC	Eliminación de HCFC	Eliminación de HCFC/ Eliminación de HFC
<b>Alternativas introducidas o consideradas en las conversiones de fabricación</b>	HFC-134a, HCFC-22 para algunos usos, R-404A y otras mezclas, R-600a en parte del mercado de refrigeración de viviendas	Mezclas de HFC de alto PCA. Refrigerantes de bajo PCA siempre que sea posible, con cuestiones conexas relacionadas con la combustibilidad o la toxicidad o elevada presión de funcionamiento o disponibilidad comercial limitada. No obstante, el mercado aún ofrece grandes volúmenes de equipos con HFC.	Alternativas potenciales: con hidrocarburos, HFO, mezclas HFC/HFO, CO <sub>2</sub> y amoníaco, con cuestiones conexas relativas a la combustibilidad o la toxicidad o mayor presión operativa o disponibilidad comercial limitada.
<b>Variedad de mezclas</b>	Limitada (R-502) para aplicaciones a baja temperatura	Limitada (R-406A, R-409A) (desplazamiento limitado de la temperatura)	Gran volumen (R-404A, R-407C, R-410A, R-507A, (mayor desplazamiento de la temperatura)). Uso disperso de muchos otros tipos de mezclas con HFC o HFC/HFO (por ejemplo, R-448A, R-449A, R-450A, R-513A y otras).
<b>Aplicaciones (carga de refrigerante)</b>	Refrigeración para viviendas y comercial a pequeña escala; fabricación de equipos de climatización para vehículos en unos pocos países y servicio y mantenimiento en todos los países; pequeñas cargas de refrigerante	Solo equipos con HCFC-22, la mayoría en equipos de climatización y algunos de refrigeración comercial; mayores cargas de refrigerante	Todo tipo de equipos de refrigeración comercial, industrial y para viviendas, climatización de vehículos, transporte refrigerado; cargas de refrigerantes de todo tipo de volúmenes.
<b>Actividades admisibles</b>	Incluyendo, entre otras cosas, asistencia para redactar legislación y reglamentos reguladores, incluyendo sistemas de concesión de licencias y cuotas de importación y exportación; capacitación para aduaneros y autoridades de ejecución de la ley; capacitación en buenas prácticas de servicio y mantenimiento de equipos de refrigeración; establecimiento de programas RRR; incentivos para usuarios finales con miras a la conversión; y en algunos casos, certificación de técnicos, estándares, fortalecimiento de asociaciones, y programas de reducción de fugas		Muchas categorías de costos adicionales admisibles para financiación para la eliminación de HCFC/reducción de HFC son iguales. La asistencia se centra en asegurar una mayor repercusión y sostenibilidad a largo plazo de las actividades propuestas.
<b>Repercusión de las actividades ejecutadas</b>	Eliminación de CFC: Cambios mínimos durante las tareas de servicio y mantenimiento cuando se trabaja con alternativas introducidas. Repercusión de actividades iniciales difíciles de medir a la hora del servicio y mantenimiento. Sector de servicio y mantenimiento adaptado a alternativas. Departamentos aduaneros y centros de capacitación fortalecidos	Evaluación en curso. Cambios previstos durante las tareas de servicio y mantenimiento a trabajar sin peligro con algunas alternativas de PCA bajo que se están introduciendo. Algunas actividades, por lo general del sector de servicio y mantenimiento, en planes de gestión de eliminación de los HCFC, podría ayudar a introducir alternativas de bajo PCA.	Las actividades en el sector de servicio y mantenimiento tienen que ejercer una repercusión más amplia y mantenerse en el tiempo para apoyar la adopción segura de tecnologías de bajo PCA, incluyendo lo tocante a la instalación, funcionamiento, mantenimiento y puesta fuera de servicio de sistemas.

### Impedimentos a una penetración más amplia de las tecnologías alternativas de bajo PCA

30. La Enmienda de Kigali activó además la necesidad de adoptar tecnologías con refrigerantes de bajo PCA a mayor escala, lo que plantea cuestiones atinentes a la seguridad y a los costos. Por ejemplo, el uso de cargas de refrigerantes combustibles de más de 150 gramos requiere cambiar las normas, amén de precauciones adicionales de seguridad durante la instalación, funcionamiento y puesta fuera de servicio de los sistemas de refrigeración que hagan uso de esas tecnologías. Otras causas que limitan la introducción de estas tecnologías incluyen:

- a) La falta de estándares para la introducción, instalación y el debido servicio y mantenimiento de los nuevos equipos con refrigerantes combustibles o tóxicos;
- b) La falta de estándares para transportar debidamente los refrigerantes y códigos de construcción;
- c) La falta de equipos esenciales y de herramientas básicas en los talleres de servicio y mantenimiento; y
- d) El lento ritmo de la comercialización y la disponibilidad de algunos refrigerantes o del equipo en los que éstos trabajan.

31. A día de hoy no es posible dilucidar si habrá el número suficiente de técnicos con las pericias mínimas necesarias para servir y mantener el creciente número de equipos de tecnología más avanzada, utilizando una diversidad de refrigerantes con diferentes características de funcionamiento relacionadas con la presión, combustibilidad y toxicidad. Un reto al que se enfrentan los institutos de capacitación, el sector y las asociaciones de refrigeración para mejorar las pericias de los técnicos con objeto de servir y mantener debidamente los equipos tecnológicamente avanzados que se están introduciendo en los mercados es que, con frecuencia, los técnicos tienen carácter estacional; en temporada baja (generalmente el invierno) esos técnicos buscan otras oportunidades de empleo y tienden a emplear su limitado tiempo libre durante la temporada alta en labores de instalación y de servicio y mantenimiento de equipos, pero no en ampliar su capacitación. Además, el número de nuevos técnicos que entran a la fuerza de trabajo es a la baja, puesto que, al parecer, el sector de equipos de refrigeración y climatización es menos atractivo que otras actividades, tales como los de la electrónica o los de la tecnología de la información.

32. Los países que operan al amparo del artículo 5 se encuentran atajando varias de estas barreras e impedimentos mediante actividades que se están convirtiendo de manera creciente en componentes estándar de los planes de gestión de eliminación de los HCFC, tales como la creación de capacidad de las instituciones locales de capacitación; la capacitación de técnicos centrada en refrigerantes combustibles o tóxicos, y/o refrigerantes a alta presión; revisión de códigos de buenas prácticas; elaboración de reglamentos reguladores y la adopción de normas conexas a la instalación, servicio y mantenimiento de diversos sistemas de refrigeración con hidrocarburos; uso de incentivos; proyectos de demostración de tecnología para refrigerantes de bajo PCA; y programas de incremento de la concienciación.

## **II. ANALISIS DE LA CAPACIDAD ACTUAL CREADA CON LA FINANCIACIÓN APROBADA PARA EL SECTOR DE SERVICIO Y MANTENIMIENTO DE EQUIPOS DE REFRIGERACIÓN**

33. El Fondo Multilateral se estableció como mecanismo financiero del Protocolo de Montreal para asistir a los países que operan al amparo del artículo 5 a estar en situación de cumplimiento con dicho Protocolo y con sus enmiendas. Dado que las sustancias controladas las emplean todos los países que operan al amparo del artículo 5 para tareas de servicio y mantenimiento y para mantener los equipos de

refrigeración, este sector ha venido recibiendo asistencia técnica, y financiera desde la 4ª reunión del Comité Ejecutivo.

34. Desde aquellas fechas, el Comité Ejecutivo ha continuado tomando decisiones para fortalecer dicha asistencia y abordar las necesidades que surjan y las cuestiones atinentes al sector a fin de facilitar a los países que operan al amparo del artículo 5 el cumplimiento de sus obligaciones con el Protocolo de Montreal. Lo que es más, en virtud del programa de trabajo de Supervisión y Evaluación del Fondo Multilateral, el Comité Ejecutivo ha acometido estudios teóricos, estudios de caso de países, evaluaciones del sector de servicio y mantenimiento de equipos de refrigeración, y evaluaciones de proyectos autónomos (por ejemplo, sistemas y reglamentos para la concesión de licencias y cuotas de importación y exportación; programas de capacitación para funcionarios de aduanas; programas de capacitación para técnicos de refrigeración; programas de recuperación y reciclaje; y planes de gestión de refrigerantes) con objeto de evaluar ulteriormente la capacidad de aplicación de sus decisiones en las circunstancias reinantes en los países que operan al amparo del artículo 5, y para evaluar la efectividad de las actividades de financiación para reducir las emisiones de sustancias controladas a la atmósfera. Las lecciones aprendidas de estas evaluaciones y las recomendaciones efectuadas como resultado, se han ido incorporando continuamente a las actividades del sector de servicio y mantenimiento de equipos de refrigeración que estuvieran ejecutándose<sup>30</sup>.

35. A título de referencia, el anexo I del presente documento recoge las decisiones pertinentes relacionadas con el sector de servicio y mantenimiento de equipos de refrigeración adoptadas por el Comité Ejecutivo y las Partes, y el anexo II recoge una lista de las evaluaciones correspondientes al sector de servicio y mantenimiento de equipos de refrigeración acometidas por el Fondo Multilateral.

### **Fortalecimiento de la capacidad nacional**

36. La experiencia acumulada durante el proceso de ejecución de proyectos relacionados con el sector de servicio y mantenimiento de equipos de refrigeración ha fortalecido la capacidad nacional dedicada a dichos proyectos. Sumándose a las Dependencias Nacionales del Ozono, para las que se facilita una financiación directa bajo el “fortalecimiento institucional”, se han establecido y/o fortalecido la capacidad nacional conexas a las escuelas y a las autoridades aduaneras y de ejecución de la ley; institutos de enseñanza y escuelas de formación profesional dedicados a técnicos en refrigeración; y asociaciones de técnicos en refrigeración. Se ha facilitado directamente también la creación de capacidad sirviéndose del Programa de asistencia al cumplimiento, del PNUMA, a través del Centro de intercambio de información, así como en los planos regional y mundial, principalmente mediante reuniones de redes regionales celebradas desde la 9ª reunión (marzo de 1993). Las reuniones regionales de red se celebran anualmente.

37. En el transcurso de la implantación de los planes de gestión de eliminación de los HCFC, específicamente, varios de los países que operan al amparo del artículo 5 consideraron pertinente asegurar la sostenibilidad de largo plazo de las actividades propuestas que se relacionaban con: el sector de

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<sup>30</sup> Por ejemplo, en su 49ª reunión (julio de 2006), el Comité Ejecutivo examinó el documento UNEP/OzL.Pro/ExCom/49/7 en el que se recogía un compendio de recomendaciones pertinentes a la evaluación de planes de gestión de refrigerantes y de planes nacionales de eliminación, elaborado todo ello conforme a la decisión 48/10. Ello derivó en mayores orientaciones a la hora de planificar e implantar tales planes, incluyéndose, entre otras cosas, la cooperación con otras agencias gubernamentales; la actualización de medidas legislativas; la actualización de programas de capacitación para técnicos, a fin de incluir la más reciente información sobre la aplicación de buenas prácticas con objeto de reducir el uso de sustancias controladas y fomentar el uso de refrigerantes alternativos, prestando la debida atención a los aspectos de la seguridad en aquellos países en los que se usaron refrigerantes inflamables; la titulación obligatoria de técnicos; y todo ello teniendo en cuenta la decisión 41/100 sobre los programas de recuperación y reciclaje.

servicio y mantenimiento de equipos de refrigeración aumentando y/o fortaleciendo, entre otras cosas, las instituciones y la capacidad local para facilitar programas generales de capacitación a un mayor número de técnicos en refrigeración o de funcionarios de aduanas; modificando el temario de los institutos de capacitación, las escuelas de formación profesional y/o las autoridades aduaneras; revisando y actualizando el código de buenas prácticas para las tareas de servicio y mantenimiento e introduciendo sistemas conducentes a la titulación que certifiquen la competencia de los técnicos para trabajar con buenas prácticas de instalación y de servicio y mantenimiento; ampliando la capacitación para incluir la manipulación de tecnologías alternativas que no incluyan HCFC, en especial aquellas con refrigerantes inflamables; y fomentar/facilitar la adopción de normas relacionadas con el sector de servicio y mantenimiento de equipos de refrigeración .

### **Apoyo al marco reglamentario y de políticas-normativas**

38. El marco reglamentario y de políticas-normativas creado en virtud del Fondo Multilateral ha sido de especial importancia a la hora de respaldar las actividades de eliminación en el sector de servicio y mantenimiento de equipos de refrigeración, y serán aún de mayor relevancia en la reducción de los HFC. Es así pues que en esta sección del documento se describe detenidamente dicho marco de regulación reglamentario.

#### Marco reglamentario establecido durante la eliminación de los CFC

39. Los países que operan al amparo del artículo 5 han reducido el suministro de sustancias controladas en virtud del Protocolo restringiendo para ello las importaciones y/o exportaciones, sirviéndose principalmente de sus sistemas de concesión de cuotas y licencias. Además, varios de los países han establecido controles a la importación y exportación, o están en proceso de establecerlos, donde corresponda, de equipos de refrigeración dotados con sustancias controladas, para limitar el aumento de su número y reducir el volumen instalado de los mismos.

40. Tales restricciones han sido cada vez más eficaces, como se desprende de los informes de verificación presentados junto con las solicitudes de financiación de tramos de los planes de eliminación examinados por la Secretaría, todo lo que dejó patente mejoras considerables en la coordinación entre la Dependencia Nacional del Ozono, las entidades emisoras de las licencias, las autoridades aduaneras y los importadores. La supervisión de las importaciones de sustancias controladas en virtud del Protocolo ha mejorado también considerablemente, y los países se encuentran utilizando en medida creciente en sus aduanas una base de datos informatizada.

41. Como respaldo al marco reglamentario dedicado a las sustancias controladas en virtud del Protocolo y a su ejecución y entrada en vigor, se ha suministrado amplia asistencia para la capacitación de funcionarios de aduanas y de funcionarios de ejecución de la ley. Por ejemplo, en su 48ª reunión (abril de 2006), el Comité Ejecutivo pidió a los organismos bilaterales y de ejecución que elaboraran y ejecutaran planes de eliminación que aseguraran, en la medida de lo posible, la implantación de las recomendaciones siguientes, a saber:

- a) La introducción de reglamentos reguladores relativos a las exportaciones, programas de concesión de licencias y la prohibición de vender sustancias controladas a empresas que no tengan las debidas licencias; restricciones a la importación de equipos de refrigeración y de climatización con refrigerantes controlados; nombramiento de funcionarios de aduanas para que participen en los Comités del Ozono, estando autorizados para firmar memorandos de entendimiento entre las Autoridades de Aduanas y la Dependencia Nacional del Ozono, así como la creación en las aduanas de puntos focales atinentes al medio ambiente desde los que se tenga acceso a los estratos superiores de la jerarquía aduanera; haciendo que los institutos de titulación y normalización participen en la

identificación de sustancias controladas de haber una falta de laboratorios debidamente equipados en las oficinas aduaneras; elaborando códigos aduaneros más pormenorizados añadiendo dígitos al Sistema Armonizado de Designación y Codificación de Mercancías (SA) que desarrolló y mantiene la Organización Mundial de Aduanas; informando a los países importadores sobre remesas autorizadas y verificando que los clientes se encuentran en la lista de importadores autorizados, lista que habrán de facilitar los países importadores reglamentariamente;

- b) La invitación a los funcionarios superiores de las aduanas, otros ministerios gubernamentales y agentes comerciales o corredores encargados de gestionar el visto bueno y despacho por parte de las autoridades aduaneras, a celebrar seminarios para asegurar la correcta aplicación del sistema de concesión de licencias y de identificación de la importación de sustancias controladas; asegurar que las fases de capacitación de instructores y la capacitación de funcionarios de aduanas acontecen consecutivamente y que se mantiene un base de datos de instructores y alumnos activos; acelerar el despacho de los identificadores de refrigerantes a los servicios de aduanas; y
- c) La organización de seminarios que traten de la cooperación regional entre aduaneros, y que respalden la armonización de la legislación y de los procedimientos de aduanas sirviéndose para ello del Programa de asistencia al cumplimiento del PNUMA; el fomento de la creación de redes regionales oficiosas de funcionarios de aduanas; la enmienda de manuales de capacitación para funcionarios de aduanas incorporando información en los controles de aduanas y la detección del comercio ilegal; y el desarrollo de herramientas y medios de detección y selección (por ejemplo, la Referencia Rápida de Aduanas, murales, listas de comprobación y bases de datos), asegurándose la amplia distribución a los países que operan al amparo del artículo 5.

#### Fortalecimiento del marco reglamentario durante la eliminación de los HCFC

42. Los países que operan al amparo del artículo 5, y los organismos bilaterales y de ejecución, han venido observando todas las recomendaciones indicadas *supra*, con arreglo a sus circunstancias particulares. A este respecto, el marco regulatorio reglamentario que ha sido establecido se ha empleado plenamente para la eliminación acelerada de los HCFC como acordaron las Partes.

43. La financiación que incluyera las medidas de control de los HCFC en las leyes, los reglamentos reguladores y sistemas de concesión de licencias se facilitaron como parte de la financiación para la elaboración de los planes de gestión de eliminación de los HCFC, puesto que la confirmación de la ejecución de tales medidas de control fue un requisito previo para aprobar la financiación destinada a la ejecución del plan de gestión de eliminación de los HCFC (decisión 54/39 e)). A fin de fortalecer ulteriormente el sistema de concesión de cuotas y licencias, el Comité Ejecutivo decidió que, en lo tocante a todas las solicitudes de financiación de planes de gestión de eliminación de los HCFC presentadas a partir de la 68ª reunión (diciembre de 2012), se tendría que recibir confirmación del Gobierno de que se había promulgado y estaba en vigor un sistema nacional con mecanismo aplicable para las importaciones de HCFC y, donde correspondiera, la producción y exportación de tales HCFC, y que dicho sistema era capaz de asegurar que el país pudiera cumplir con el calendario de eliminación de los susodichos HCFC (decisión 63/17).

44. En el transcurso de la implantación de sus planes de gestión de eliminación de los HCFC, varios de los países que operan al amparo del artículo 5 consideraron pertinente introducir medidas de control reguladoras de carácter complementario, incluyendo, entre otras, la notificación obligatoria de informes por parte de los importadores y exportadores de HCFC; la prohibición de cilindros “no rellenables” (o



sea, desechables); emolumentos por las importaciones de HCFC; extensión del sistema de concesión de licencias a todos los refrigerantes que se importe al país; medidas de control de las emisiones de HCFC; y las opciones relacionadas a la teneduría de libros de registro<sup>31</sup>.

#### Marco reglamentario tras la Enmienda de Kigali

45. En el contexto de la reducción de HFC, los países que operan al amparo del artículo 5 tendrían que examinar, actualizar y/o desarrollar ulteriormente legislación, incluyendo los sistemas de concesión de cuotas y licencias, con objeto de incluir los HFC que a día de hoy no se han incluido en el Sistema Armonizado actualmente vigente, dificultando así la labor de las autoridades aduaneras a la hora de reconocer la naturaleza ilegal de la pertinente importación o exportación de los HCFC y HFC<sup>32</sup>. El examen del marco regulatorio reglamentario es especialmente urgente en el caso de aquellos países que ratifiquen la Enmienda de Kigali antes del 1 de enero de 2019, puesto que tendrían que establecer un sistema de concesión de licencias para los HFC en 2018 a fin de poder cumplir con los requisitos de notificación estipulados en virtud del artículo 7 del Protocolo de Montreal. El incremento en el volumen y la variedad de sustancias controladas, incluyendo una gran parte de mezclas refrigerantes, así como las medidas para poder cumplir con la producción y el consumo de HFC, en términos de toneladas de CO<sub>2</sub> equivalente, exigirá también actualizaciones y ajustes en los actuales contenidos de los materiales de capacitación de funcionarios de aduanas y en la solicitud de licencias y cuotas para las importaciones y exportaciones de HFC.

46. Dada la implantación paralelamente a la eliminación de los HCFC y a la reducción de los HFC, el marco reglamentario podría fortalecerse en mayor grado al incluir los HFC en el marco de las regulaciones actuales de los HCFC, en especial los relacionados con el control y supervisión del comercio (por ejemplo, sistemas de concesión de cuotas y licencias de importación; prohibiciones de cilindros de HFC no rellenables; prohibiciones de las importaciones de ciertos tipos de equipos con HFC; teneduría de libros de registro de ciertos tipos de sistemas con HFC, y controles de las emisiones de HFC)<sup>33</sup>.

47. Varios de los países que no operan al amparo del artículo 5 utilizan medidas regulatorias para asegurar que las buenas prácticas de refrigeración se adopten en un mayor grado. Por ejemplo, la titulación o certificación y la capacitación son condiciones previas que los técnicos de servicio y mantenimiento de sistemas de refrigeración tienen que cumplir; los productores y distribuidores de refrigerantes están obligados a recibir y utilizar refrigerantes para reciclar o desechar; y los técnicos titulados están obligados a recuperar refrigerantes.

48. A medida que un gran número de las alternativas a los HCFC y a los HFC van quedando clasificadas con un cierto grado de inflamabilidad, habrá que adoptar regulaciones, códigos de prácticas, y

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<sup>31</sup> La publicación del PNUMA que trata de las opciones legislativas y políticas-normativas sobre los HCFC recoge un análisis general de las opciones legislativas y reguladoras que han venido utilizando las Dependencias Nacionales del Ozono para concebir, diseñar e implantar sus planes de eliminación en el sector de servicio y mantenimiento de equipos de refrigeración.

<sup>32</sup> La 26ª reunión de las Partes (noviembre de 2014) pidió a la Secretaría del Ozono coordinarse con la Organización Mundial de Aduanas para ver la posibilidad de designar códigos del Sistema Armonizado para la mayor parte de los compuestos fluorados que se comercian más frecuentemente para sustituir a los HCFC y los CFC y que están clasificados en el marco del código 2903.39 del Sistema Armonizado, y alentó a las partes a tomar las medidas necesarias para recomendar dichas clasificaciones aduaneras internacionales y considerar el establecimiento de códigos aduaneros nacionales para los sustitutos que fueren pertinentes (decisión XXVI/8). Los códigos SA se actualizan cada quinquenio, por lo que la próxima actualización de la que emanen los nuevos códigos no ocurrirá antes del año 2022.

<sup>33</sup> La publicación del PNUMA que trata de las opciones legislativas y políticas-normativas sobre los HFC, recoge un análisis general de las opciones legislativas y reguladoras que podrían considerarse a la hora de implantar los planes de reducción de los HFC.

estándares<sup>34</sup> a fin de asegurar el funcionamiento seguro del equipo con tales refrigerantes alternativos y su manipulación sin peligro por parte de todas las partes interesadas que se vean involucradas (por ejemplo, autoridades aduaneras, importadores, talleres de servicio y mantenimiento y técnicos). La adopción de estas regulaciones y estándares podría hacer que se retrasase la introducción de tecnologías alternativas de bajo PCA. Por ejemplo, entre los impedimentos identificados por el PNUMA para la adopción de estándares se encuentran la complejidad y duración del proceso; la falta de experiencia y de infraestructura institucional adecuada; la falta de conexiones con las entidades internacionales/regionales de normalización; la resistencia de las pequeñas empresas a modificar las prácticas y ante los costos conexos a la adquisición de estándares. Las Dependencias Nacionales del Ozono pueden respaldar a las entidades nacionales de racionalización para facilitar el proceso de desarrollo, adopción y actualización de los estándares para fortalecer los vínculos con las asociaciones locales de refrigeración y de climatización y con las partes interesadas.<sup>35</sup>

49. En su 72ª reunión (mayo de 2014), el Comité Ejecutivo alentó a los países que operan al amparo del artículo 5 a que, al implantar sus planes de gestión de eliminación de los HCFC, consideren como necesario y factible, entre otras cosas, el desarrollo de reglamentos reguladores y códigos de prácticas, y la adopción de estándares relativos a la introducción segura de refrigerantes inflamables y tóxicos que trabajen a muy altas presiones, dado el riesgo potencial de que se produzcan accidentes y ante el menoscabo de la salud asociados a su uso; y considerar las actividades del sector de servicio y mantenimiento de equipos de refrigeración centrándose en la capacitación de los técnicos, buenas prácticas, la manipulación segura de refrigerantes, contención, recuperación y reciclaje, reutilización de los refrigerantes recuperados (decisión 72/41). La capacitación en la instalación, funcionamiento, mantenimiento y eliminación de equipos que utilicen sustancias inflamables se ha considerado una prioridad en la etapa I de los planes de gestión de eliminación de los HCFC en aquellos países en los que estos refrigerantes se encontraban ya en el mercado o estaba prevista su introducción.

50. Si bien se han incluido ciertas actividades para adoptar normas o estándares nacionales para facilitar la introducción de alternativas de bajo PCA en diversos planes de gestión de eliminación de los HCFC durante el curso de su ejecución, se necesitaría un mayor trabajo en esta esfera en la mayoría de los países que operan al amparo del artículo 5. A este respecto, y en su 79ª reunión (julio de 2017), el Comité Ejecutivo acordó la financiación de actividades de apoyo que respaldasen la reducción de los HFC (decisión 79/46), actividades que constaban de aquellas que facilitarían y apoyarían la ratificación de la Enmienda de Kigali lo antes posible, pero sin limitarse a ellas; actividades dirigidas a iniciar el respaldo de arreglos institucionales; el examen de los sistemas de concesión de licencias; la notificación de los datos relativos a los HFC; y actividades de demostración sin inversión; y estrategias nacionales. El Comité acordó también que se aportaría la financiación para la preparación de los planes nacionales de reducción de los HFC a fin de poder cumplir con las obligaciones iniciales de la reducción, como muy pronto cinco años antes de activarse dichas obligaciones, y una vez hubiera ratificado el país la Enmienda de Kigali. En las fechas de culminarse la elaboración del presente documento, 35 de los países que operan al amparo del artículo 5 habían ratificado la Enmienda de Kigali, todos ellos clasificados en el grupo 1. En el caso de esos países, las solicitudes de financiación podrían recibirse a partir de principios de 2019.

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<sup>34</sup> En lo tocante a sustancias, equipos, contenedores de refrigerantes, así como almacenamiento, transporte, diseño de sistemas y componentes, carga máxima de refrigerante, instalación, servicio y mantenimiento y eliminación de equipo, entre otras cosas.

<sup>35</sup> La publicación del PNUMA sobre normas internacionales de refrigeración y de climatización, recoge una introducción al papel que juegan las normas en el contexto de la eliminación de los HCFC en los países en desarrollo (2014).

## Capacitación y titulación de técnicos

51. La capacitación se facilitó inicialmente a los técnicos como capacitación puntual en buenas prácticas de servicio y mantenimiento de equipos de refrigeración, lo que incluía una sesión de capacitación del instructor seguida de la capacitación del técnico. Aunque el temario de los programas de capacitación era limitado y no se llegaba a cuantificar la reducción en el consumo de los CFC que se alcanzaba, de las evaluaciones efectuadas por el Fondo Multilateral se concluyó que la introducción de buenas prácticas en el servicio y mantenimiento en equipos de refrigeración constituía un factor importante en la reducción de las emisiones de CFC a la atmósfera<sup>36</sup>, y a la hora de permitir que los países cumplieran con las obligaciones contraídas en virtud del Protocolo de Montreal. Además, los programas de capacitación incrementaron la concienciación al respecto de la conservación, mantenimiento preventivo y tecnologías sustitutivas, y contribuyeron a la actualización de los temarios que se impartían en los cursos de los centros de capacitación.

52. A medida que los programas de capacitación para técnicos en refrigeración evolucionaron desde actividades puntuales hasta convertirse en componentes integrales de planes de eliminación sectorial y nacional, las Dependencias Nacionales del Ozono incrementaron la participación de los centros nacionales de capacitación/formación profesional en su ejecución, y aseguraron que los temas tratados en la capacitación (por ejemplo, buenas prácticas en refrigeración, uso debido de refrigerantes inflamables) se incluyeran en los temarios de los centros.

53. Los programas para la capacitación y titulación de los técnicos implantados hasta la fecha han permitido a varios países fortalecer sus instituciones locales, y les ha posibilitado facilitar la capacitación de técnicos a diferentes niveles de pericia. Las pasadas evaluaciones de los programas de capacitación recomiendan también apoyar el establecimiento de sistemas de titulación o certificación de técnicos. Muchos países se han inclinado hacia el establecimiento de programas de certificación voluntaria respaldados por reglamentos de regulación. Hacer que tales programas sean obligatorios es algo más difícil, puesto que ello sobrepasaría el ámbito de la Dependencia Nacional del Ozono (es decir, una cuestión relacionada con los Ministerios de Educación y/o Trabajo) que requeriría un trabajo institucional adicional. Hay países en los que se considera la emisión de licencias medioambientales como un planteamiento alternativo, que caería en el ámbito de los Ministerios del Medio Ambiente.

54. Una de las evaluaciones de los programas<sup>37</sup> de capacitación recomendó fortalecer las asociaciones y hacer que se involucraran más profundamente en la ejecución del proyecto. Esta recomendación se ha incorporado en los planes de gestión de eliminación de los HCFC de varios de los países que operan al amparo del artículo 5 obteniéndose resultados positivos, hasta el punto de que algunos gobiernos han designado y respaldado a las asociaciones de equipos de refrigeración para implantar el sistema de titulación de técnicos, lo que, potencialmente, generaría ingresos que podrían contribuir a su capacidad para sostenerse. Estos resultados han sido confirmados por la actual evaluación del sector de servicio y mantenimiento de refrigeración y de climatización, en la que se ha hecho hincapié en la importancia de las asociaciones de refrigeración como partes interesadas clave en el diseño e implantación de los proyectos, y en las que se ha recomendado fortalecerlas o se ha sugerido intensamente que de no existir se creen<sup>38</sup>.

<sup>36</sup> Informe final de la evaluación de la ejecución de los planes de gestión de refrigerantes (UNEP/OzL.Pro/ExCom/41/7).

<sup>37</sup> UNEP/OzL.Pro/ExCom/31/20

<sup>38</sup> UNEP/OzL.Pro/ExCom/81/7 (informe preliminar) y UNEP/OzL.Pro/ExCom/82/11 (informe de síntesis).

### Utilización de la capacidad de capacitación creada para reducir los HFC

55. Al acelerarse la eliminación de los HCFC y la adopción de la Enmienda de Kigali, el número y diversidad de sistemas de refrigeración y de climatización que funcionan con refrigerantes de bajo PCA ha ido creciendo gradualmente. En este contexto, varios países ya han comenzado a fortalecer los entes e instituciones locales que participan en la titulación y capacitación de técnicos durante la implantación o ejecución de sus planes de gestión de eliminación de los HCFC. Ello ayudará a crear las condiciones necesarias para asegurar que los técnicos que atiendan a los equipos dotados con estos refrigerantes alternativos dispongan de los conocimientos, pericias y herramientas para hacerlo de forma segura y razonable sin menoscabar el medio ambiente.

56. Las lecciones aprendidas de los proyectos ejecutados indicaron que la capacitación pasaría a ser autosuficiente para asegurar una cobertura más amplia tras terminar el proyecto y a contribuir mejor a cambiar permanentemente la conducta en el sector de refrigeración.

57. Con objeto de asegurar que a largo plazo se mantienen las prácticas de servicio y mantenimiento de los equipos de refrigeración tras la asistencia facilitada por el Fondo Multilateral, habrá que prestar, entre otras cosas, una mayor consideración a actualizar continuamente los temarios de capacitación de las instituciones y escuelas de formación profesional con objeto de incluir en ellos cambios, actualizaciones tecnológicas de los sistemas de refrigeración y la introducción de refrigerantes alternativos; ampliar la capacitación incluyendo a otras partes interesadas de los usuarios finales y de la cadena de suministro de equipos y refrigerantes; ampliar la certificación a empresas que participen en la instalación, servicio y mantenimiento, y puesta fuera de servicio de equipos de refrigeración; vincular la titulación de técnicos a las normativas regulatorias o a los estándares adoptados por el país; determinar el número de niveles de titulación de técnicos según las necesidades específicas del país; considerar si la titulación de los técnicos habrá de ser obligatoria y asegurar que haya una masa crítica de técnicos titulados; así como fortalecer y hacer que las asociaciones de refrigeración participen en el fomento o implantación de la titulación de dichos técnicos.

58. Una de las cuestiones que requieren una mayor consideración es la de la población de técnicos sin formación formal que no pertenecen a talleres de servicio y mantenimiento ni a asociaciones de equipos de refrigeración, que no constan registrados como técnicos, y que, con frecuencia, no trabajan permanentemente en el sector de servicio y mantenimiento de equipos de refrigeración. Por ejemplo, hay algunos países en los que este sector se ha visto sustentado, entre otras cosas, por las actividades de capacitación y de incremento del grado de concienciación ejecutadas por medios no convencionales (por ejemplo, cursillos cortos y videos descargados de un sitio Web; “aplicaciones” específicas para teléfonos móviles, y por otros medios), y/o sirviéndose de la asistencia de asociaciones de refrigeración. Dada la creciente complejidad de los sistemas de refrigeración y de climatización, habrá que mejorar el nivel mínimo de las pericias y conocimientos de estos técnicos.

### **Asistencia técnica incluidos equipos y herramientas de servicio y mantenimiento**

59. Las tres formas clave de asistencia técnica en el sector de servicio y mantenimiento de equipos de refrigeración respaldadas por el Fondo Multilateral son: la provisión de herramientas básicas de servicio y mantenimiento a los técnicos en refrigeración; el establecimiento de programas de recuperación y reciclaje (R&R) o de programas RRR de refrigerantes; la retroadaptación y reemplazamiento de equipos.

### Herramientas básicas de servicio y mantenimiento para técnicos

60. Las herramientas para tareas de servicio y mantenimiento<sup>39</sup> en equipos de refrigeración ya han sido distribuidas en la mayoría de los países que operan al amparo del artículo 5, lo que hace posible que un mayor número de técnicos trabajen desplegando buenas prácticas de servicio y mantenimiento. Los juegos de herramientas distribuidos varían de un país a otro, en función de las prioridades locales, el tipo más común y corriente de equipos a los que se sirve y mantiene, el presupuesto del que se dispone y el número de técnicos a cubrir. El uso de equipos y la aplicación de buenas prácticas de trabajo para las operaciones de lavado a presión de los circuitos de refrigerante han sido también tenidas en cuenta por algunos países. Durante la implantación de los planes de gestión de eliminación de los HCFC se han distribuido herramientas adicionales para realizar labores de servicio y mantenimiento de equipos de refrigeración con refrigerantes inflamables, de funcionamiento a alta presión y/o elevada toxicidad<sup>40</sup>.

### Programas para la recuperación, reciclaje y regeneración de refrigerantes

61. El Comité Ejecutivo ha venido aprobando proyectos de recuperación y reciclaje de refrigerantes desde 1991. El nivel de infraestructura creada mediante los proyectos tipo RRR implantados varía considerablemente de un país a otro. En algunos países se facilitó una diversidad de equipos para RRR, lo que implicó una gran diversidad de refrigerantes, al tiempo que en otros, sólo se facilitaron herramientas de servicio y mantenimiento, dado que los volúmenes de refrigerantes no justificaban una operación de recuperación.

62. Como ya quedó documentado en evaluaciones<sup>41</sup> anteriores, las cuestiones que impidieron la eficaz implantación de los primeros proyectos de recuperación y reciclaje de CFC incluyeron: la falta de reglamentos reguladores que prohibieran la emisión intencionada de las sustancias controladas; la falta de un modelo económico combinado con los bajos precios de los CFC reinantes durante la mayor parte del periodo de eliminación de dichos CFC; la falta de concienciación entre los técnicos y los usuarios finales; los elevados costos de los equipos de recuperación y reciclaje y la falta de suministros (por ejemplo) en los mercados locales; asuntos logísticos (por ejemplo, peso de los equipos, distancia y cargas a recuperar demasiado pequeñas); y falta de los debidos sistemas de supervisión y notificación de informes.

63. Sirviéndose de la experiencia acumulada en previos proyectos de recuperación y reciclaje, varios países han sopesado, en el contexto de sus planes de eliminación subsiguientes y de sus actuales planes de gestión de eliminación de los HCFC, factores adicionales que mejoren la efectividad de los programas RRR. Por ejemplo, algunos países sustituyeron los equipos de reciclaje por otros de recuperación relativamente más económicos y capaces de garantizar la producción de refrigerante<sup>42</sup> certificado. En el caso de otros países se establecieron centros de recuperación en el marco de grandes empresas activas en

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<sup>39</sup> Una lista indicativa, sin ser exhaustiva, de herramientas típicas incluye, entre otras cosas, cortatubos de cobre, pesas, herramientas escariadoras, herramientas soplete de llama para quemar, almohadillas abrasivas no metálicas, aleación de fósforo para soldadura fuerte, aleación de plata para soldadura fuerte y fundente, herramientas para la calibración y doblado de tuberías, llaves, llave dinamométrica, calibre de vacío, herramienta expansora de tubos y cabezales expansores, bombas de vacío, grupo de soldadura autógena por oxiacetileno, detector electrónico de fugas, prueba calibrada de fugas, encendedor de soplete, maza de caucho, trinquete para refrigeración, botellas de atomizador (para detectar fugas), calibre de manómetros, y mangueras. El equipo de protección personal incluye elementos estándar tales como gafas protectoras, guantes protectores y extintores.

<sup>40</sup> Una lista indicativa, sin ser exhaustiva, de herramientas incluye, entre otras cosas, detectores de gas, calibres electrónicos de manómetros y mangueras, amoniaco y CO<sub>2</sub>. Según el refrigerante, el equipo de protección puede incluir protección especial para respirar (por ejemplo, respiradores autónomos de cartucho o equipos de respiración) y vestimenta protectora.

<sup>41</sup> Párrafos 31 a 33 del documento UNEP/OzL.Pro/ExCom/31/18.

<sup>42</sup> AHRI Norma 700.

los negocios de ventas de refrigerantes en vez de en centros de capacitación o entidades gubernamentales, conforme a un modelo de empresa y con financiación conjunta de las empresas beneficiarias. Los equipos de recuperación se armaron también para trabajar con diferentes tipos de refrigerantes puros o presentes en mezclas. Se lograron tasas de recuperación de HCFC-22 más elevadas debido al mayor volumen de las cargas de los equipos con HCFC en comparación con los de CFC que se abordaron en el pasado.

64. Se observó también que una parte considerable del refrigerante recuperado procedía de la puesta fuera de servicio y desmantelamiento de equipos que habían llegado al final de su vida útil. En esos casos, las empresas reciclaron todos los componentes del equipo, lo que generó más ingresos, con lo que poder seguir manteniendo las operaciones de recuperación de refrigerante. En algunos pocos países el proyecto de recuperación y reciclaje (o regeneración) vino asociado a programas de consumo energético eficiente que estaban dirigidos a intercambiar refrigeradores de viviendas con CFC, viejos e ineficientes, por otros de consumo energético eficiente, con volúmenes considerables de CFC recuperados (para ser utilizados o destruidos, según el caso) que, de no ser este el caso, se habrían emitido a la atmósfera durante la eliminación del equipo.

65. A pesar del considerable avance alcanzado hasta la fecha, la última evaluación del sector de servicio y mantenimiento de equipos de refrigeración efectuada identificó que la capacidad de sostener los sistemas RRR sigue siendo un reto por factores tales como costos logísticos, costos laborales, falta de equipo auxiliar y falta de incentivos económicos que motiven las labores de recuperación dado el bajo costo del refrigerante virgen.

#### Retroadaptación y reemplazamiento de equipos

66. En la 28ª reunión (julio de 1999)<sup>43</sup> se adoptaron directrices para la conversión de usuarios finales del sector de refrigeración comercial, permitiéndose en la 32ª reunión (diciembre de 2000) programas de incentivos para fomentar la retroadaptación de equipos de refrigeración. La evaluación de los planes de gestión de eliminación definitiva llevada a cabo en 2009 arrojó que esos programas de incentivos funcionaron bien cuando los precios de CFC-12 aumentaban rápidamente, en confrontación con un telón de fondo de precios estables de alternativas que podían obtenerse también comercialmente. La diferencia de precio, el nivel del incentivo, y las actividades relacionadas con la Dependencia Nacional del Ozono jugaron también un papel significativo.

67. De aplicarse a los HCFC los principios expuestos en la decisión 28/44, las circunstancias pertinentes que tienen que prevalecer antes de otorgarse prioridad a las actividades de conversión de usuario final son, a saber: a) controles a las importaciones y exportaciones de los HCFC y de equipos con HCFC promulgados y firmemente en vigor, y restricción del despliegue de nuevos componentes de HCFC; b) el mayor consumo remanente del país corresponde a las tareas del servicio y mantenimiento de equipos de refrigeración y de climatización; c) ninguna otra actividad posible permitiría al país cumplir con sus obligación de control de los HCFC, o bien el precio comparativo de los HCFC al consumidor, relativo a los refrigerantes sustitutivos, ha sido elevado y se prevé siga subiendo; y d) hay códigos de prácticas y normas de uso de refrigerantes inflamables firmemente en vigor y los técnicos que efectúan el servicio y mantenimiento del equipo han recibido la titulación/certificación y la capacitación pertinentes.

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<sup>43</sup> Las directrices establecieron las circunstancias que deben reinar antes de concederse prioridad a la conversión de los usuarios finales, a saber: a) controles a la producción e importación de los CFC y de los equipos con CFC promulgados y firmemente en vigor, y restricción del despliegue de nuevos componentes CFC; b) el mayor consumo remanente del país corresponde a las tareas del servicio y mantenimiento de equipos de refrigeración y de climatización; c) se han determinado y puesto a disposición del Comité Ejecutivo los datos generales sobre el perfil de todo consumo remanente, y d) ninguna otra actividad posible permitiría al país cumplir con sus obligación de control de los CFC, o bien el precio comparativo de los CFC al consumidor, relativo a los refrigerantes sustitutivos, ha sido elevado durante al menos 9 meses y se prevé siga subiendo (decisión 28/44).

68. A día de hoy, los únicos refrigerantes<sup>44</sup> alternativos adecuados que pueden obtenerse para tareas de retroadaptación son de un elevado PCA, lo que no sería una mejora en las emisiones de los refrigerantes, ni tampoco en la eficiencia del consumo energético. Los equipos con refrigerantes de HCFC-22 tienen, en la mayoría de los casos, una eficiencia inherente comparativamente superior a la de otros refrigerantes potenciales para la retroadaptación. Por consiguiente, el Comité Ejecutivo ha alentado a los países que operan al amparo del artículo 5 a que cuando ejecuten sus planes de gestión de eliminación de los HCFC, tengan en cuenta, entre otras cosas, centrar sus actividades del sector de servicio y mantenimiento de equipos de refrigeración en capacitar técnicos, poner énfasis en buenas prácticas, manipular los refrigerantes sin peligro, confinar, recuperar y reciclar, así como reutilizar los refrigerantes en vez de realizar retroadaptaciones (decisión 72/41 c) iii)).

69. En el transcurso de la implantación de los planes de gestión de eliminación de los HCFC, se ha notificado que en varios de los países que operan al amparo del artículo 5, el R-290 se está empleando para retroadaptar, poner a funcionar y/o cargar los equipos con HCFC-22. Parece ser que las condiciones del mercado favorecen esta práctica, dado que está teniendo lugar fuera del marco de los planes de gestión de eliminación de los HCFC. Se plantearon graves preocupaciones respecto del uso seguro de refrigerantes inflamables en sistemas diseñados para otros refrigerantes que no lo son, junto con los riesgos conexos para técnicos y usuarios finales.<sup>45</sup> Como respuesta a esta práctica, el Comité Ejecutivo tomó nota de que si el país realizaba tareas de retroadaptación en equipos de refrigeración y de climatización diseñados para refrigerantes con HCFC con objeto de utilizar refrigerantes inflamables o tóxicos, amén del servicio y mantenimiento asociado y de la asistencia facilitada por el Fondo, dicho país lo haría dándose por entendido que asumía todas las responsabilidades y riesgos conexos y que dichas retroadaptaciones deben realizarse tan solo de conformidad con las normas y protocolos pertinentes (decisiones 72/17 y 73/34).

#### Subsector de montaje, instalación y carga

70. En su 31ª reunión (julio de 2000), el Comité Ejecutivo definió el subsector de montaje, instalación y carga y convino las directrices para calcular los costos adicionales (decisión 31/45). En la 62ª reunión se acordaron orientaciones adicionales (decisión 62/14).<sup>46</sup> Desde aquellas fechas, las actividades en este subsector se han venido aprobando en el contexto de proyectos generales o de planes de eliminación en los que se desconocían las condiciones pormenorizadas específicas de las empresas de montaje de los equipos.

71. Este subsector puede ayudar, potencialmente, a facilitar la adopción de alternativas de bajo PCA a medida que se montan e instalan nuevos sistemas de refrigeración y de climatización. El subsector abarca varios tipos de empresas, incluidas las de fabricación de refrigeración o de climatización comercial que cargan el refrigerante *in situ* (estas empresas disponen, por lo general, de instalaciones de fabricación,

<sup>44</sup> Los únicos refrigerantes alternativos al HCFC-22 que pueden obtenerse para retroadaptación presentan elevados PCA (tal como el HFC-407C/F, y el HFC-404A). El HFC-32 no se considera un candidato para retroadaptación como consecuencia de que necesita mayores presiones de trabajo. El único refrigerante alternativo de bajo PCA que se acerca al HCFC-22 es el HC-290; sin embargo, su aplicación se ve limitada por su inflamabilidad. El HC-1270 (propileno) parece tener mayor capacidad volumétrica; si bien sigue habiendo preocupaciones sobre su inflamabilidad y las modificaciones al termointercambiador.

<sup>45</sup> Esto incluye: las cualificaciones de los técnicos que acometen las retroadaptaciones, la necesidad de instalar sensores para detectar fugas, la necesidad de colocar visualmente etiquetas en las que figure el refrigerante, y el calibre del equipo que se está retroadaptando.

<sup>46</sup> El Comité Ejecutivo pidió a los organismos que, cuando presenten proyectos relacionados con el sector de instalación, montaje y carga, demuestren que cada una de las empresas que participan en el proyecto en cuestión han invertido en equipos, desarrollo de productos, o capacitación de personal específico a la tecnología de HCFC de forma que las sumas así invertidas superan considerablemente el nivel de las inversiones efectuadas en el sector de servicio y mantenimiento; y que las actividades previstas para dichas empresas representan costos adicionales.

líneas de producción y almacenes, además de sistemas de montaje diseñados *ex profeso* para el cliente); contratistas que instalan sistemas de refrigeración o de climatización diseñados *ex profeso* para los usuarios finales; o bien que tales usuario finales instalan ellos mismos sus sistemas con la propia capacidad técnica de la que disponen internamente. Este subsector suministra sistemas a una amplia gama de sectores, incluyendo a vendedores al por menor, tal como supermercados, minimercados y carnicerías; empresas agroindustriales, incluyendo flores, almacenes de congelación de alimentos, mataderos, derivados de productos lácteos; el sector farmacéutico; servicio y mantenimientos de cocina para el ejército, escuelas, hospitales; cadenas de restauración; plantas de tratamiento de alimentos; el sector pesquero; hoteles y edificios de oficinas, entre muchos otros más.

72. Lo que es más, no se dispone de la actual distribución para el consumo de sustancias controladas entre servicio y mantenimiento y montaje, instalación, y carga inicial<sup>47</sup>. En las conversaciones sobre la experiencia acumulada en los organismos bilaterales y de ejecución por la implantación de planes de gestión de eliminación de los HCFC, se concluyó que se requiere un mayor entendimiento de este subsector puesto que podría facilitar la reducción de los HFC, favorecer la introducción de tecnologías de bajo PCA, y fomentar prácticas de instalación de consumo energético eficiente.

#### Uso de la actual capacidad de asistencia técnica para reducir los HFC

73. Las herramientas de servicio y mantenimiento para técnicos continuarán considerándose un componente importante del sector de servicio y mantenimiento de equipos de refrigeración. En vez de definir la composición de un juego universal de herramientas para todos los países, cada país que opere al amparo del artículo 5 habrá de determinar qué juego o juegos de herramientas de servicio y mantenimiento atajaría mejor las necesidades de sus técnicos en diferentes etapas de la implantación de los proyectos.

74. El fortalecimiento de los actuales programas RRR, o la creación de otros nuevos, se fundamentará en modelos generales de empresa idóneos para las condiciones del país y de las partes interesadas que participen, habida cuenta, entre otras cosas, del precio del refrigerante virgen y del volumen del refrigerante a recuperar<sup>48</sup>. La idoneidad y eficiencia a largo plazo de estos programas se sustentará con reglamentos reguladores sobre el confinamiento obligatorio del refrigerante<sup>49</sup>, y las actividades de incremento del grado de concienciación enfocadas a los técnicos y usuarios finales, con la participación de asociaciones de refrigeración. En aquellos casos en los que ya están establecidas políticas-normativas para reemplazar los equipos de refrigeración de bajo eficiencia en el consumo energético, la propuesta incluirá estrategias para recuperar el refrigerante de los equipos desmontados o puestos fuera de servicio.

75. En virtud de la Enmienda de Kigali, a mayor volumen y variedad de sistemas de refrigeración con HCFC y HFC funcionando, mayor serán las oportunidades de recuperación y regeneración de refrigerantes. Entre otras cosas, habría que tener en cuenta: la capacidad del equipo y de los componentes

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<sup>47</sup> A título de ejemplo, un país de consumo medio estimó que el subsector había instalado recientemente hasta el 25 por ciento del banco de refrigerante.

<sup>48</sup> Por ejemplo, en el caso de un país, el precio mínimo del refrigerante virgen para poder acometer la regeneración era de 7,00 \$EUA/kg. A la hora de estimar los volúmenes a regenerar, es importante considerar que se regeneran y reciclan considerables cantidades que no se registran, sirviéndose de filtros *in-situ* y que vuelven a utilizarse sin pasar por un centro de regeneración.

<sup>49</sup> Incluyendo, entre otras cosas, la prohibición/control de las emisiones a la atmósfera de refrigerantes durante las labores de servicio y mantenimiento, los instrumentos económicos que pueden servir a la viabilidad económica de la operación (por ejemplo, gravamen a los costos del refrigerante); prohibición en el uso de cilindros desechables; pruebas obligatorias de fugas para todos los equipos con un cierto volumen de carga de refrigerantes; y registros cronológicos y registros para los usuarios finales; o medidas elaboradas partiendo de los reglamentos reguladores vigentes (por ejemplo, productos químicos o sustancias peligrosas, programas sobre responsabilidad de los productores).



auxiliares (por ejemplo, cilindros, identificadores de refrigerantes) para recuperar o reciclar tanto los HCFC como los HFC, incluyendo en ello las mezclas; la debida gestión de volúmenes potencialmente crecientes de gas no reciclable que se hayan recuperado (como consecuencia de grandes volúmenes de mezclas zeotrópicas en el mercado, las cuales, tras sufrir fugas, podrían haber perdido la composición original de los refrigerantes); un análisis de los beneficios y retos de la recuperación, reciclaje y regeneración de refrigerantes inflamables (incluyendo la seguridad reglamentaria de una recuperación sin riesgos y de las capacidades de transporte); así como una evaluación de la viabilidad económica de las instalaciones de regeneración, especialmente en el caso de mezclas zeotrópicas y de sus componentes.

76. Las empresas del sector de montaje, instalación y carga inicial, así como las de fabricación, podrían ayudar a asegurar las buenas prácticas de servicio y mantenimiento, y a sustentar la eficiencia en el consumo energético, en especial si se trata de grandes sistemas, sirviéndose de contratos de servicio y mantenimiento periódicos y previamente organizados para los primeros años de funcionamiento y/o garantías prorrogadas, lo que también sería de ayuda en aquellos casos en los que la oferta de técnicos capaces de aportar servicio y mantenimiento de tecnologías recientemente introducidas es limitada.

### **Consideraciones sobre la eficiencia de consumo energético en el sector de servicio y mantenimiento de equipos de refrigeración**

77. Aunque la financiación destinada a mejorar la eficiencia en el consumo energético de los equipos de refrigeración no ha sido aprobada, el consumo energético de tales equipos sí se ha considerado, al tiempo que se desarrollaban los criterios para financiar proyectos<sup>50</sup> de eliminación de HCFC. Lo que es más, el Comité Ejecutivo ha perseguido oportunidades para fomentar las mejoras en la eficiencia del consumo energético. En lo tocante a la eliminación de los CFC, el consumo energético eficiente se analizó en el contexto de proyectos de enfriadoras. En las reuniones 26ª y 28ª se aprobaron dos proyectos, sirviéndose de los mecanismos de concesión de préstamos (decisiones 26/34 y 28/32) y en la 46ª reunión, se aprobó un monto de financiación por un valor de 15,2 millones de \$EUA para proyectos de demostración adicionales en el subsector de enfriadores (decisión 46/33). El informe de evaluación sobre enfriadores presentado a la 80ª reunión<sup>51</sup> concluye que la eficiencia en el consumo energético y los ahorros en el mismo constituyen impulsores importantes para reemplazar enfriadores; así mismo, dicho informe recoge que habría que considerar las capacidades de recuperación y de reciclaje del país al respecto del reemplazamiento de enfriadores. Si bien el informe no facilitó recomendaciones para las intervenciones conexas al servicio y mantenimiento destinadas a fomentar las operaciones de consumo energético eficiente, el mantenimiento y servicio adecuados de los enfriadores es fundamental para que estos equipos funcionen eficientemente.

78. En lo referente a los HCFC, el Comité Ejecutivo decidió aprobar la demostración de alternativas de bajo PCA a los HCFC; uno de los criterios para seleccionar tales proyectos estaba relacionada con el fomento de las mejoras en el consumo energético (decisión 72/40 b) i) f)). Por ende, 14 proyectos de demostración conexas al sector de equipos de refrigeración y de climatización se aprobaron en las reuniones 74ª (mayo de 2015), 75ª (noviembre de 2015) y 76ª (mayo de 2016). El desempeño de la eficiencia en el consumo energético habrá de notificarse como parte de los resultados pertinentes de los proyectos.<sup>52</sup>

79. Además, se incluyeron condiciones, específicas vinculadas al consumo eficiente de energía, a la hora de aprobar algunos de los planes de gestión de eliminación de los HCFC. Por ejemplo, el plan de

<sup>50</sup> Párrafo 11 b) de la decisión XIX/6.

<sup>51</sup> UNEP/OzL.Pro/ExCom/80/9

<sup>52</sup> La información pormenorizada sobre los proyectos de demostración se encuentra en el documento UNEP/OzL.Pro/ExCom/78/6.

gestión de eliminación de los HCFC para Jordania<sup>53</sup> incluyó el requisito de que el plan del sector de equipos de climatización incorporara planteamientos técnicos y de políticas-normativas destinados a mejorar la eficiencia en el consumo energético de los equipos de climatización de viviendas con objeto de compensar la repercusión en el clima asociada a la introducción de la tecnología de los R-410A; y un compromiso del Gobierno para alcanzar una eficiencia en el consumo energético en los equipos de climatización de viviendas dotados con R-410A que, como mínimo, fuera igual o inferior a la de los climatizadores con HCFC-22 a los que sustituyen (decisión 65/40). El plan de gestión de eliminación de los HCFC para Tailandia<sup>54</sup> incluye asistencia técnica como respaldo al fomento de la adopción de productos de consumo energético más eficiente que los que formaron parte de la conversión, así como para asistir en las iniciativas para el consumo energético eficiente en edificios.

#### Prácticas de instalación, mantenimiento y servicio y mantenimiento

80. Las prácticas de instalación y de servicio y mantenimiento juegan un papel crítico en asegurar el funcionamiento con consumo energético eficiente de los equipos a lo largo de toda su vida útil. Los reglamentos y políticas-normativas nacionales relacionadas con las prácticas de servicio y mantenimiento y el consumo energético eficiente, especialmente las normas sobre un desempeño energético mínimo, permiten respaldar el consumo energético eficiente mientras se utilizan estos equipos.

81. Con arreglo al Instituto Internacional del Frío (IIF), un mayor grado de funcionamiento óptimo, de supervisión y de mantenimiento de los equipos de enfriamiento presenta el potencial de ahorrar 30 Giga toneladas de emisiones de CO<sub>2</sub> para 2050. El informe del Grupo de evaluación técnica y económica (GETE) que elaboró su Grupo de tareas sobre cuestiones conexas a la eficiencia en el consumo energético mientras se reducen los HFC, indica que el debido mantenimiento y prácticas de servicio y mantenimiento pueden reducir en hasta un 50 por ciento la degradación del desempeño y mantener el régimen del mismo a lo largo de su vida útil. La Agencia Internacional de la Energía ha recopilado los fallos más comunes conexas a la degradación de la eficiencia en el consumo energético relativos a las bombas de calor aire-aire ocasionados por instalaciones y mantenimiento deficientes (es decir, fallos asociados al ventilador (ocurrencia del 26 por ciento), controles y electrónica (25 por ciento) y sensores de la temperatura (16 por ciento)).

82. El uso de refrigerantes incompatibles y, concretamente, el relleno parcial con refrigerantes inadecuados, podría reducir la eficiencia en el consumo energético del equipo actualmente vigente. Lo que es más, la introducción de refrigerantes con desplazamientos de temperatura (es decir, refrigerantes zeotrópicos) podría también reducir dicha eficiencia. El servicio y mantenimiento efectivo de grandes sistemas de climatización, sirviéndose de buenas prácticas de servicio y mantenimiento, puede ayudar a que estos sistemas trabajen más eficientemente, reduciendo los riesgos de seguridad, mejorando el confort térmico de los ocupantes, reduciendo los costos operativos como consecuencia de un funcionamiento de consumo energético más eficiente y reduciendo los desembolsos de capital para reemplazar los equipos.<sup>55</sup>

83. Varias de las buenas prácticas de servicio y mantenimiento que se están implantando en los planes de gestión de eliminación de los HCFC mantendrán la eficiencia del consumo energético de los equipos (Cuadro 5)<sup>56</sup>. Estas medidas continuarán siendo una parte integral de los planes de reducción de los HFC.

<sup>53</sup> UNEP/OzL.Pro/ExCom/65/39/Rev.1.

<sup>54</sup> UNEP/OzL.Pro/ExCom/68/41.

<sup>55</sup> Informe del Grupo de evaluación técnica y económica: Volumen 5, Decisión XXIX/10. Grupo de tareas sobre cuestiones conexas al consumo energético eficiente en la fase de reducción de los HFC (informe final actualizado)

<sup>56</sup> UNEP/OzL.Pro/ExCom/77/70. Cabe destacar que hay varios estudios técnicos en los que se demuestra el vínculo entre las buenas prácticas de servicio y mantenimiento, y el funcionamiento de consumo energético eficiente de los equipos.

**Cuadro 5: Medidas para mantener y supervisar la eficiencia en el consumo energético**

Particulares	Intervenciones
<b>Instalación y mantenimiento de equipos</b>	
Capacitación y creación de capacidad	<ul style="list-style-type: none"> <li>• Equipos de detección de fugas para equipos de mayor capacidad</li> <li>• Buenas prácticas en la instalación de equipos de climatización (por ejemplo, juntas bien estancas y asegurarse de que el equipo funciona con una carga completa de refrigerante)</li> <li>• Buen mantenimiento y prácticas de servicio y mantenimiento (por ejemplo, limpieza reglamentaria de los termointercambiadores)</li> <li>• Verificaciones periódicas del funcionamiento y del mantenimiento</li> <li>• Servicio y mantenimiento del equipo por técnicos cualificados y capacitados</li> </ul>
<b>Medidas en los planos sectoriales y nacionales</b>	
Fortalecimiento de normas de funcionamiento	<ul style="list-style-type: none"> <li>• Introducción de normas y de programas de etiquetaje con miras a un desempeño mínimo en el consumo energético eficiente</li> <li>• Normas integradas sobre el consumo energético eficiente para las aplicaciones de usuario final, incluyendo prácticas de instalación y de mantenimiento</li> <li>• Introducción de normas de seguridad y de uso eficiente de los equipos, incluyendo buenas prácticas de mantenimiento<sup>57</sup></li> </ul>
Normas y políticas-normativas reguladoras integradas	<ul style="list-style-type: none"> <li>• Desarrollo de políticas-normativas que fomenten normas para el consumo energético eficiente y refrigerantes que no menoscaben el clima</li> <li>• Programas de adquisición a granel (gubernamentales o de otro tipo) de equipos de consumo energético eficiente que utilicen refrigerantes de PCA bajo o cero</li> <li>• Prohibición de importación de equipos que funcionen bajo normas de un consumo energético eficiente inferior a lo especificado (por ejemplo, utilizar equipos con HCFC de consumo energético de eficiencia baja, o equipos de segunda mano)</li> <li>• Políticas-normativas de financiación integrada para las viviendas, de forma que se adopten equipos de consumo energético eficiente para los edificios actuales y nuevos</li> <li>• Políticas favorables a tecnologías de consumo energético eficiente y que no menoscaben el clima para diferentes segmentos sectoriales (por ejemplo, cadenas de frío, aplicaciones de turismo)</li> <li>• Políticas-normativas para desarrollar programas de incentivos para las empresas de servicios públicos a fin de fomentar el uso de equipos de consumo energético eficiente</li> <li>• Políticas-normativas para adoptar tecnologías de sustitución, siempre que sea posible</li> </ul>

### III. ANALISIS DE LA INFORMACIÓN MÍNIMA NECESARIA PARA DESARROLLAR PROGRAMAS DE TITULACIÓN EN CAPACITACIÓN Y COMPETENCIA, ASÍ COMO MÓDULOS ENFOCADOS A LOS TÉCNICOS DE SERVICIO Y MANTENIMIENTO Y A LOS FUNCIONARIOS DE ADUANAS CON OBJETO DE LOGRAR LA TRANSICIÓN A REFRIGERANTES ALTERNATIVOS

84. Como ya se indicó anteriormente, los países que operan al amparo del artículo 5 se encuentran actualmente en diferentes etapas de implantación de sus planes de eliminación de los HCFC, en diferentes niveles de desarrollo de las capacidades ya establecidas necesarias para abordar la eliminación de sustancias controladas relacionadas con el sector de servicio y mantenimiento de equipos de refrigeración.

85. Aunque todos los países podrían utilizar elementos comunes para diseñar programas de capacitación de técnicos y de funcionarios de aduanas, los organismos bilaterales y los de ejecución han resaltado que es importante mantener una flexibilidad a fin de poder determinar las prioridades de cada país fundamentándose en su situación vigente, los sectores estratégicos, las actuales instituciones y los

<sup>57</sup> Si bien esto no está directamente vinculado a la eficiencia en el consumo energético, ésta se verá fomentada mediante la adopción segura de refrigerantes de bajo/cero PCA.

reglamentos reguladores. De igual manera, los marcos jurídicos y los requisitos para la concesión de cuotas y licencias de importación y exportación varían de un país a otro. Hay países en los que existen entes específicos a los que corresponde elaborar las certificaciones y normas técnicas, y los técnicos obtienen un certificado de competencia expedido por la entidad laboral o de formación profesional pertinente del Gobierno, mientras que en otros países esos certificados pueden también expedirlos las asociaciones de refrigeración o bien éstas son las responsables de expedirlos en exclusividad.

86. Así pues, mientras que algunos países pueden beneficiarse de módulos técnicos comunes que pueden emplearse como referencias para capacitar a sus técnicos y a sus funcionarios aduaneros, se prefiere elaborar programas de capacitación y formación de los técnicos y de los funcionarios de aduanas, así como programas de entrega de certificaciones, que se ciñan a las circunstancias específicas de cada país partiendo de un planteamiento único o armonizado.

### **Productos elaborados para asistir al sector de servicio y mantenimiento de equipos de refrigeración en los países que operan al amparo del artículo 5**

87. La experiencia acumulada por los organismos bilaterales y de ejecución del sector de servicio y mantenimiento de equipos de refrigeración se ha venido incorporando ininterrumpidamente a los manuales que se utilizan como referencia para capacitar a los funcionarios de aduanas y a los técnicos en refrigeración, y también al código de buenas prácticas de servicio y mantenimiento para técnicos. Esta experiencia se ha empleado también para seleccionar juegos de herramientas básicas de servicio y mantenimiento para técnicos, juegos de identificación de sustancias controladas utilizados principalmente por las autoridades de aduanas en los puertos de entrada, y para las unidades de reciclaje y de recuperación rentables.

88. Además, y en virtud del PAC del PNUMA, el Comité Ejecutivo ha aprobado la financiación necesaria para desarrollar herramientas, productos y servicios que pueden emplear todos los países que operan al amparo del artículo 5 a la hora de implantar actividades en el sector de servicio y mantenimiento de equipos de refrigeración. En el Cuadro 6 se enumera un resumen de estos productos y una información algo más pormenorizada se incluye también en el anexo III.

### **Cuadro 6. Herramientas, productos y servicios para el sector de servicio y mantenimiento de equipos de refrigeración desarrollados por el PCA del PNUMA**

<b>Producto</b>	<b>Breve descripción</b>
<b>Fichas técnicas/Resúmenes informativos</b>	
Juego sobre Kigali (20 fichas técnicas, poster, manual)	Fichas técnicas de OzonAction, manuales, resúmenes informativos sobre tecnología/políticas-normativas, destinado a incrementar el nivel de concienciación de las diversas partes interesadas que pueden distribuir y utilizar los países que operan al amparo del artículo 5 para respaldar proyectos de eliminación y las actividades de recolección de datos.
Fichas técnicas sobre seguridad	
Clasificación de refrigerantes (expedida cada seis meses)	
Eficiencia en el consumo energético en el sector de servicio y mantenimiento de equipos de refrigeración y de climatización	
Resúmenes informativos sobre tecnología de las cadenas de frío	
<b>Aplicaciones para móviles</b>	
WhatGas?	Estas aplicaciones de OzonAction para teléfonos móviles pueden obtenerse en los países que operan al amparo del artículo 5 como ayuda para identificar especificaciones/pormenores sobre sustancias controladas, calcular valores PAO/PAC, y respaldar la capacitación de técnicos en refrigeración.
Calculadora PCA PAO	
Videos sobre equipos de refrigeración y de climatización	
Guía rápida (Manual guía en red sobre el buen servicio y mantenimiento de refrigerantes inflamables)	
Serie de videos sobre identificadores de refrigerantes	
Calculadora del volumen de la carga para climatización	
<b>Herramientas en línea</b>	
Relatos sobre refrigeración (ASHRAE)	Los países que operan al amparo del artículo 5

<b>Producto</b>	<b>Breve descripción</b>
Gestión sobre refrigeración (ASHRAE)	pueden fomentar el uso de los cursos electrónicos a distancia de OzonAction-ASHRAE sobre refrigerante para respaldar las actividades de capacitación enfocadas a las Dependencias Nacionales del Ozono, partes interesadas, técnicos en equipos de refrigeración y de climatización en el marco de los programas de capacitación de los planes de gestión de eliminación de los HCFC y/o sirviéndose de las diversas partes interesadas, por ejemplo, institutos de capacitación, asociaciones locales de refrigeración.
<b>Herramientas de capacitación para equipos de refrigeración y de climatización</b>	
Videos de buenas prácticas (Nuevo: videos sobre teorías y buenas prácticas que se publicará en 2019)	Los países que operan al amparo del artículo 5 pueden hacer uso de los videos de OzonAction sobre buenas prácticas para respaldar la capacitación / creación de capacidad de técnicos, bien en el marco de los programas de capacitación de los planes de gestión de eliminación de los HCFC y/o sirviéndose de las diversas partes interesadas, por ejemplo, institutos de capacitación, asociaciones locales de refrigeración.
Juego universal para capacitación	Los países que operan al amparo del artículo 5 pueden hacer uso del juego universal de capacitación de OzonAction (que es un conjunto general de carácter modular) para respaldar las actividades de capacitación destinadas a técnicos en refrigeración, en los institutos/centros locales de capacitación, ya sea en el marco de los planes de gestión de eliminación de los HCFC o de otro tipo de programas.
<i>Refrigerant driving license</i> (RDL) (un programa universal de titulación sobre la gestión racional de refrigerantes que viene respaldada por las asociaciones internacionales del sector)	En los países que operan al amparo del artículo 5 se puede cursar el <i>Refrigerant Driving License</i> para asegurarse un mínimo nivel de competencias y pericias acumuladas por el sector de servicio y mantenimiento a lo largo y lo ancho de la red de la cadena de suministro de refrigerantes.
Curso universitario sobre gestión de refrigerantes (curso optativo para los estudios de licenciatura de ingeniería mecánica, según sean los requisitos académicos)	En los países que operan al amparo del artículo 5 se puede cursar el curso universitario de OzonAction sobre gestión de refrigerantes que imparten las universidades de ingeniería y las escuelas técnicas de ámbito nacional.

#### IV. CONSIDERACIONES PARA FINANCIAR LA REDUCCIÓN DE LOS HFC

89. Ante el drástico incremento del número de equipos de refrigeración y de climatización como consecuencia del continuo aumento de la población mundial y también de la expansión de la cadena de frío dedicada a los alimentos, el sector de servicio y mantenimiento de equipos de refrigeración será cada vez más importante en todos los países que operan al amparo del artículo 5, hasta llegar a reducir los objetivos estipulados en virtud de la Enmienda de Kigali.

**La implantación conjunta de las decisiones XIX/6 y XXVIII/2 en lo que al sector de servicio y mantenimiento de equipos de refrigeración concierne: programa para la eliminación de los HCFC y la reducción de los HFC solapadamente**

90. Las actividades de los primeros años de reducción de los HFC se solaparán con las de eliminación del consumo remanente de los HCFC, los cuales, en el caso de la mayoría de los países que operan al amparo del artículo 5, se estarían utilizando principalmente en el sector de servicio y mantenimiento de equipos de refrigeración. Además, fundamentándose en el estudio de refrigerantes alternativos a las SAO presentado por 119 de los países que operan al amparo del artículo 5, se prevé que más del 70 por ciento del consumo de los HFC en países que no son de bajo consumo y más del 95 por ciento de los que sí son de bajo consumo tendrá lugar en el sector de servicio y mantenimiento de equipos de refrigeración.<sup>58</sup>

91. Por ende, el programa en el que se solapa la eliminación de los HCFC y la reducción de los HFC podría presentar una oportunidad a los países que operan al amparo del artículo 5 para planificar estrategias general, rentables y a largo plazo, destinadas a sus sectores de servicio y mantenimiento de equipos de refrigeración, habida cuenta de la debida gestión de todos los refrigerantes que se utilizan (incluyendo tanto las sustancias alternativas controladas como las no controladas), y la necesidad de fortalecer las instituciones pertinentes y las partes interesadas, y de asegurar la sustitución mantenida y apropiada de los refrigerantes que agotan la capa de ozono y/o los de elevado PCA con otros refrigerantes de bajo PCA. Ello conllevaría una estrategia de gestión de refrigerantes singular, integral y fundamental para el sector de servicio y mantenimiento, que fortalecería y mejoraría la infraestructura y las instituciones vigentes, formalizando de hecho al sector de servicio y mantenimiento de equipos de refrigeración.

92. De forma específica:

- a) Desarrollando, desde las primeras fases, una estrategia fundamental para introducir, adoptar y/u optimizar las tecnologías alternativas de bajo PCA en el sector de refrigeración de los mercados locales más importantes de los países que operan al amparo del artículo 5, evitando en la medida de lo posible, la sustitución de tecnologías con HCFC por otras con HFC de un elevado PCA, reduciendo así las labores de servicio y mantenimiento debidas a los HFC de elevado PCA;
- b) Fortaleciendo la introducción de estándares, códigos y normas pertinentes que faciliten la adopción, funcionamiento y servicio y mantenimiento seguros de las tecnologías/refrigerantes de bajo PCA;
- c) Respaldando el desarrollo de marcos generales reguladores para la gestión de los refrigerantes, incluyendo, entre otras cosas: certificación de técnicos, concesión de licencias a las empresas/talleres, etiquetaje, mantenimiento de registros, creación y envío de informes, medios de poder comprar y vender refrigerantes sin dificultades, herramientas de supervisión y de ejecución de la ley, y programas de creación de capacidad destinados a las autoridades y las partes interesadas; amén de evaluar las necesidades y respaldar los mecanismos de imposición;
- d) Examinando el temario de los programas de capacitación destinados a los funcionarios de aduanas y a los de ejecución de la ley, abordando las obligaciones contraídas en virtud del Protocolo de Montreal, incluyendo su Enmienda de Kigali; desarrollando un temario común troncal y programas de capacitación que podrían ser utilizados por todos los

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<sup>58</sup> Cabe destacar que los mayores países consumidores, incluyendo Brasil, China y la India no presentaron estudios sobre alternativas a las SAO.

organismos bilaterales y de ejecución, actualizándolos cada dos años para reflejar los cambios acaecidos en la tecnología;

- e) Fortaleciendo la capacidad de las entidades de titulación y el sistema de formación profesional de ámbitos nacionales al analizar el temario de los programas de capacitación para técnicos en refrigeración a fin de abordar las materias relacionadas con la emisión de refrigerantes a la atmósfera, reduciendo el consumo energético gracias a equipos bien mantenidos y bien servidos, y atajando las cuestiones de seguridad atinentes a la inflamabilidad y/o toxicidad de que vayan siendo introducidos al sistema;
- f) Desarrollando (o fortaleciendo si ya está en vigor) una estrategia de confinamiento de refrigerante sólida y autosuficiente que asegure que los equipos actualmente instalados puedan continuar hasta el final de su vida útil, y teniendo en cuenta, entre otras cosas: la capacidad del equipo y los componentes auxiliares (por ejemplo, cilindros, identificadores de refrigerantes) para recuperar, reciclar o regenerar tanto los HCFC como los HFC, incluidas las mezclas; la potencial reutilización de las mezclas zeotrópicas, dado que tras producirse fugas esas mezclas podrían perder su composición original como refrigerante; gestión apropiada de volúmenes potencialmente crecientes de gas recuperado que no puede volver a utilizarse (como consecuencia de la gran cantidad de mezclas zeotrópicas en el mercado); un análisis de los beneficios e impedimentos de recuperar, reciclar y regenerar refrigerantes inflamables; y una evaluación de la viabilidad económica de los medios/instalaciones de regeneración, especialmente en lo tocante a las mezclas zeotrópicas y a sus componentes;
- g) Fortaleciendo el apoyo técnico al subsector de montaje, instalación y carga inicial dado que podría influir en la introducción de tecnologías de refrigeración en los países que operan al amparo del artículo 5;
- h) Introduciendo herramientas de supervisión y notificación de informes que puedan medir las repercusiones de las actividades y programas en el sector de servicio y mantenimiento;
- i) Evaluando la sostenibilidad a largo plazo de las actividades implantadas en el sector de servicio y mantenimiento de equipos de refrigeración mediante modelos de empresa y/o recursos adicionales;
- j) Fortaleciendo las asociaciones de refrigeración y de climatización, asegurando su participación en la ejecución de actividades y en el fomento de prácticas racionales en los mercados locales;
- k) Desarrollando directorios/bases de datos para el sector de servicio y mantenimiento que incluyan técnicos titulados y autorizados, centros de capacitación, y distribuidores de equipos y de refrigerante; y
- l) Utilizando los productos universales desarrollados por el PAC del PNUMA y otras organizaciones internacionales enumeradas en el anexo III para respaldar al sector de servicio y mantenimiento de equipos de refrigeración.

### **Consideraciones atinentes a la financiación de la reducción de los HFC**

93. Hasta la aprobación de las directrices para la preparación de los planes de gestión de los refrigerantes y del primer grupo de propuestas relativas a dichos planes efectuadas en la 23ª reunión, las

actividades en el sector de servicio y mantenimiento de equipos de refrigeración se aprobaban cual proyectos autónomos y se financiaban caso a caso habida cuenta de las circunstancias reinantes en el plano de país, tales como el volumen de población y la distribución geográfica de las actividades económicas; el nivel de consumo de sustancias controladas en los sistemas de refrigeración y de climatización instalados y en funcionamiento; las características de los talleres de servicio y mantenimiento; y las pericias técnicas de los técnicos de servicio y mantenimiento.

94. Los planes de gestión de los refrigerantes constituían un plan plurianual de eliminación por los que los países de bajo consumo se comprometían a lograr una reducción del 50 por ciento en su consumo básico de referencia de CFC con miras a poder alcanzar el cumplimiento en 2005, y sirviéndose de los fondos aprobados para ellos. En su 35ª reunión (diciembre de 2001), el Comité Ejecutivo decidió dotar con una financiación adicional a los países de bajo consumo con objeto de poder desarrollar sus actualizaciones de los planes de gestión de refrigerantes, lo que se calculó como equivalente al 50 por ciento de la financiación aportada para sus planes de gestión de refrigerantes (decisión 35/57), para aquellos países de bajo consumo que se comprometieron alcanzar una reducción del 85 por ciento de su consumo básico de referencia de CFC para alcanzar el cumplimiento en 2007. En fechas posteriores, en la 45ª reunión (abril 2005), se aportó una asistencia ulterior a los países de bajo consumo para el periodo posterior a 2007 a fin de lograr la total eliminación de los CFC sirviéndose de propuestas para los planes de gestión de eliminación definitiva. La financiación aplicable a los planes de gestión de eliminación definitiva quedó sujeta al nivel del consumo básico de referencia de CFC definido en un cuadro que fue acordado<sup>59</sup>. En el caso de la reducción del consumo de CFC en el sector de servicio y mantenimiento de equipos de refrigeración, los países que no son de bajo consumo recibieron asistencia como parte de sus planes nacionales de eliminación, fundamentándose en una relación de costo a eficacia de 5,00 \$EUA/kg.

95. En lo tocante a la eliminación de los HCFC, se incluyeron actividades en los planes de gestión de eliminación de los HCFC en el sector de servicio y mantenimiento de equipos de refrigeración, tanto para los países de bajo consumo como para los que no lo eran. La financiación de esas actividades se fundamentó en la experiencia acumulada durante la ejecución de los planes de gestión de refrigerantes, planes de gestión de eliminación definitiva y planes de eliminación en el plano nacional. En lo que respecta a los países que no son de bajo consumo, se aprobó una financiación de 4,50 \$EUA/kg para la etapa I de los planes de gestión de eliminación de los HCFC y de 4,80 \$EUA/kg para la etapa II de tales planes de gestión, al tiempo que la financiación de los países de bajo consumo se fundamentó en el nivel de consumo de HCFC en el sector de servicio y mantenimiento, como se recoge en el Cuadro 7.

**Cuadro 7. Nivel de los fondos aprobados para los países de bajo consumo en el marco de los planes de gestión de eliminación de los HCFC (etapa II) (decisión 74/50 c) xii)**

Consumo en el sector de servicio y mantenimiento (tm)	Financiación máxima admisible (\$EUA)		
	Hasta 2020	Hasta 2025	Eliminación total
>0 <15	205 625(*)	396 500	587 500
15 <40	262 500(**)	506 250	750 000
40 <80	280 000	540 000	800 000
80 <120	315 000	607 500	900 000
120 <160	332 500	641 250	950 000

<sup>59</sup> 205 000 \$EUA para países con un consumo básico de referencia de CFC inferior a 15 toneladas PAO, 295 000 \$EUA para países con consumo básico de referencia comprendido entre 15 y 30 toneladas PAO; 345 000 \$EUA para países con un consumo básico de referencia comprendido entre 30 y 60 toneladas PAO; 520 000 \$EUA para países con un consumo básico de referencia comprendido entre 60 y 120 toneladas PAO; y 565 000 \$EUA para países con un consumo básico de referencia por encima de las 120 toneladas PADO.



Consumo en el sector de servicio y mantenimiento (tm)	Financiación máxima admisible (\$EUA)		
	Hasta 2020	Hasta 2025	Eliminación total
160 <200	350 000	675 000	1 000 000
200 <320	560 000	1 080 000	1 600 000
320 <360	630 000	1 215 000	1 800 000

(\*) 164 500 \$EUA para la etapa I (decisión 60/44) e incremento para la etapa II en la decisión 74/50.

(\*\*) 210 000 \$EUA para la etapa I (decisión 60/44) e incremento para la etapa II en la decisión 74/50.

### Consideraciones para determinar la asistencia a la reducción de los HFC

96. Como ya se ha indicado en el presente documento, todas las categorías de costos del sector de servicio y mantenimiento admisibles para financiación que haya acordado el Comité Ejecutivo y que se vayan a incluir en el cálculo de costos de la reducción de los HFC, ya se han financiado en un pasado como parte de la asistencia al sector de servicio y mantenimiento de equipos de refrigeración. Estas categorías constituyen actividades de concienciación del público; desarrollo e implantación de políticas-normativas; programas de certificación y capacitación de técnicos sobre manipulación segura, buenas prácticas y seguridad en comparación con las alternativas, incluyendo el equipo de capacitación; capacitación de los funcionarios de aduanas; prevención del comercio ilegal de los HFC; herramientas de servicio y mantenimiento; equipo de pruebas de refrigerantes para el sector de equipos de refrigeración y de climatización; y reciclaje y recuperación de los HFC.

97. Las consideraciones preliminares para determinar el nivel y la modalidad de financiación necesarios para la reducción de los HFC en el sector de servicio y mantenimiento de equipos de refrigeración, incluyen:

- a) De conformidad con lo expuesto en el párrafo 16 de la decisión XXVIII/2, si incrementar, en lo tocante al sector de servicio y mantenimiento, la financiación estipulada en virtud de la decisión 74/50 para los países de bajo consumo (Cuadro 7) cuando se necesite para introducir alternativas a los HCFC con refrigerantes de PCA bajo o cero y mantener la eficiencia en el consumo energético en el sector de servicio y mantenimiento/usuario final;
- b) De conformidad con el párrafo 23 de la decisión XXVIII/2, si considerar lo antes posible la aprobación de la asistencia técnica y la creación de capacidad para facilitar la adopción segura de alternativas de PCA bajo o cero;
- c) Los retos adicionales que se han resumido en el presente documento, así como las sinergias que se deriven de la implantación de las actividades que benefician tanto a la eliminación de los HCFC como a la reducción de los HFC, habida cuenta de los niveles de financiación necesarios para asegurar el cumplimiento de las fases de reducción, en vez de con un tonelaje específico a eliminar. Este enfoque permitiría a los países que operan al amparo del artículo 5 la flexibilidad necesaria para asignar la financiación a las prioridades estratégicas en función de su consumo (por ejemplo, respaldo a las tecnologías específicas en sectores específicos, abordar a los montadores, establecer prioridades entre refrigerantes específicos a reducir); y
- d) Si considerar la eficiencia en el consumo energético y la eliminación de refrigerantes que no se desean en el marco de las directrices de costos relativas a los HFC.

**V. RECOMENDACIONES**

98. El Comité Ejecutivo puede estimar oportuno:

- a) Tomar nota del documento preliminar UNEP/OzL.Pro/ExCom/82/64 al respecto de todos los aspectos relacionados con el sector de servicio y mantenimiento de equipos de refrigeración que respalden la reducción de los HFC; y
- b) Tener en consideración el documento a la hora de determinar el nivel y la modalidad de la asistencia necesaria para reducir los HFC en el sector de servicio y mantenimiento de equipos de refrigeración.



## Annex I

**RELEVANT DECISIONS RELATED TO THE REFRIGERATION SERVICING SECTOR ADOPTED BY THE EXECUTIVE COMMITTEE AND THE PARTIES TO THE MONTREAL PROTOCOL**

Decision Number	Sector/ Sub-sector/Title	Decision Text
12 <sup>th</sup> ExCom meeting (Annex v)	Recovery, reclamation and recycling	The Eighteenth Meeting of the Executive Committee decided to consider the provision of recovery/recycling equipment to commercial refrigeration companies in projects related to servicing and recovery/recycling in the refrigeration sector in the future.
12 <sup>th</sup> ExCom meeting (para 159-160)	Mobile air-conditioning (MAC)	The Twelfth Meeting of the Executive Committee adopted the following recommendations on mobile air conditioners (MAC) project proposals: (a) that Article 5 countries be encouraged to pursue a more aggressive recycling and reclamation programme in the MAC sector, and to convert their CFC-12 MAC production plants to HFC-134a technology for new vehicles. Implementing agencies should be requested to intensify their efforts in the implementation of investment projects and technical assistance activities already approved by the Executive Committee and to prepare new investment projects in those areas. (b) that Article 5 countries be encouraged to develop and adopt regulatory measures for better containment and recycling and conversion of MAC manufacturing to HFC-134a technology. Implementing agencies should provide the necessary assistance in transferring the available knowledge and experience for this particular area within their technical assistance activities. (c) that approval of projects in MAC retrofitting be delayed until the retrofitting technology is proven cost-effective and is adequately mature to be transferred to Article 5 countries. The Executive Committee may wish to request the Secretariat to follow closely the progress in the development of retrofitting technology in the developed countries and to report to the Executive Committee on the state-of-the-art situation. (d) that the Executive Committee should encourage Article 5 countries to adopt necessary measures to regulate import of vehicles with CFC-12 based MACs. The Executive Committee further recommended that in countries where specific data were not available, appropriate pilot studies should be supported by the Fund when presented to facilitate making a cost-effective choice. Such studies should only be undertaken if they were cost-effective.
12 <sup>th</sup> ExCom meeting (para 159-160)	Chillers	The Twelfth Meeting of the Executive Committee adopted the following recommendations on chiller project proposals: (a) that consideration be given to the Total Equivalent Warming Impact (TEWI) in selecting alternative technology in the chiller sector, which would include both direct effects (refrigerant global warming potential) and indirect effects (system energy efficiency), and to human health and safety aspects. (b) that the Executive Committee approves refrigerant containment and better operation and maintenance practices, including recovery/recycling/reclamation as a strategic option in ODS phase-out in the chiller sector in Article 5 countries. Article 5 countries should be encouraged to pursue a more aggressive refrigerant containment programme, including recovery/recycling/reclamation. The Implementing Agencies should be requested to intensify their efforts in formulation of new investment projects in this area. (c) that the Executive Committee approves conversion of CFC-based chiller manufacturing facilities as a strategic option of ODS phase-out in the chiller sector. The Implementing Agencies should be requested to increase their activities in identifying and preparing project proposals in this area. (d) that the Executive Committee approves the replacement of CFC chillers as a first priority of strategic options in ODS phase-out in the chiller sector. Implementing agencies should be requested to focus their activities on the replacement options in addressing ODS phase-out in the chiller sector. Energy savings should be taken into consideration when calculating the incremental costs of replacement. (e) that the Executive Committee defer consideration of projects to retrofit chillers, except in special cases and when definite substitutes are used. (f) that the Executive Committee encourages the governments in Article 5 countries to give full consideration to appropriate regulatory and legislative action facilitating the implementation of CFC phase-out projects in the chiller sector. These should include an immediate cessation in the installation of new CFC chillers.
ExCom 17/12	Recovery and recycling of refrigerants	The Seventeenth Meeting of the Executive Committee decided that there should be an investigation of the practicality and implications of taking operating savings resulting from recovery and recycling into account and adjusting at a subsequent meeting of the Executive Committee institutional-strengthening grants or any other Fund-supported activity related to ozone layer protection for the country concerned on the basis of reported quantities of recovered ozone-depleting substances. This would not apply to small demonstration projects, and requested the Secretariat to prepare a paper on the subject for submission to the Committee at its Eighteenth Meeting.

Decision Number	Sector/ Sub-sector/Title	Decision Text
ExCom 20/4	Refrigerant management plans (RMPs)	The Twentieth Meeting of the Executive Committee decided: (a) to request Implementing Agencies, when preparing institutional-strengthening projects for low-volume ODS consuming countries, to give due consideration to the need for formulating a refrigerant management plan, including a recovery and recycling project in the refrigeration sector; (b) that, while the Implementing Agencies could proceed immediately with the disbursement of the first one-year tranche of the funds approved for institutional strengthening in low-volume ODS consuming countries, subsequent disbursements would be contingent on the submission of a report to the Executive Committee on the status of development of a refrigerant management plan, including a recovery and recycling project, for the country concerned.
ExCom 21/40	Training guidelines	The Twenty-first Meeting of the Executive Committee decided: (a) to take note of the discussion paper for the establishment of training guidelines for identification of needs and coordination of activities (UNEP/OzL.Pro/ExCom/21/35), as introduced by the representative of UNEP; (b) to note that, at the Twenty-first Meeting of the Executive Committee, there was insufficient time to have a full discussion of the paper; (c) to invite members of the Committee who wished to do so to submit written comments on the paper to the Secretariat and UNEP; (d) to request UNEP, in consultation with the Secretariat and the other Implementing Agencies, to proceed with the development of the training guidelines in line with the framework proposed in the discussion paper, taking into account the comments received in writing from members of the Committee.
ExCom 21/5	RMPs	The Twenty-first Meeting of the Executive Committee decided: (a) to take note of the 1997 business plans of the Implementing Agencies; (b) to request the Implementing Agencies to revise their 1997 business plans in the light of Executive Committee decision 21/3, subparagraph (b), and in conformity with its decisions 21/11, 21/12, 21/13 and 21/14, on the 1997 work programmes of the Implementing Agencies, and to submit them to the Executive Committee at its Twenty-second Meeting; (c) to request the Implementing Agencies, when implementing their 1997 business plans, to integrate the preparation of projects for national recovery and recycling in low-volume-consuming countries into refrigerant management plans; (d) to request the Secretariat to work with the Implementing Agencies to develop more standardized criteria for evaluating their performance so that it would be possible to examine the relative performance of the agencies prior to consideration of their 1998 business plans; (e) to request the Secretariat to work with the Implementing Agencies to produce a summary status report for each Article 5 country that would, using the latest available data, include information on the consumption of each country, the number of tonnes to be reduced through implementation of projects already approved by the Fund, the status of implementation of such projects, the amount of ODS that was expected to be reduced through planned approvals in 1997, and an indication of the relative difficulty that each country might face in meeting the 1999 freeze and, as far as practicable, subsequent control measures; (f) to request the Secretariat to submit a report to the Executive Committee on the exercises referred to in subparagraphs (d) and (e) above. The Monitoring, Evaluation and Finance Sub-Committee established by decision 21/35 would consider this report and make recommendations to the Executive Committee.
ExCom 22/22	Recycling projects in CFC-producing countries	The Twenty-second Meeting of the Executive Committee decided: (a) to note the potential usefulness of demonstration projects for refrigeration recovery and recycling in other ODS-producing countries; (b) to note that, while in many cases there may be financial benefits in recycling projects, there could be cases in which the operational costs of refrigerant recovery and reclamation projects could exceed their benefits; (c) to note that measures needed to support recovery and recycling projects needed to be appropriate to local circumstances and could involve, for example, incentives affecting the operational level or regulatory measures.
ExCom 22/23	RMPs	The Twenty-second Meeting of the Executive Committee decided: (a) that future refrigerant recovery and recycling projects should be prepared within the context of the refrigerant management plan/strategy of the country concerned; but that small demonstration projects designed to inform a larger country could be considered; (Note: as amended by Decision 23/16). (b) to urge the Implementing Agencies to work with the countries concerned to ensure that the prerequisites for success were put in place before refrigerant recovery and recycling projects were implemented; (c) to request the Implementing Agencies to make available to the consultants responsible for implementation of the proposed Multilateral Fund monitoring and evaluation exercise information on, inter alia, the extent to which refrigerant recovery and recycling projects had succeeded in reducing consumption of ODS and on the lessons learned from their implementation, bearing in mind that the majority of consumption was the result of poor servicing practices; (d) to request UNDP to make available to the Executive Committee, when completed, some of the evaluations that were being carried out by the United Nations Office for Project Services (UNOPS) on ongoing refrigerant recovery and recycling projects. Other Implementing Agencies that had completed recycling projects should also be requested to submit information on the results of those projects; (e) to take note of the view that it was necessary to take account of the costs involved in undertaking the necessary support measures for refrigerant recovery and recycling projects, such as training and efforts to reduce CFC emissions resulting from leakages; (f) to urge the Implementing Agencies to take time at the forthcoming fifteenth meeting of the Open-Ended Working

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		Group of the Parties to the Montreal Protocol to reach out to, and develop appropriate assistance requests for, all Parties that had not yet received Fund assistance and might be in danger of not meeting the freeze; (g) to request the Secretariat, the Implementing Agencies, Parties involved in bilateral co-operation activities and other interested members of the Executive Committee to meet before the next meeting of the Committee to elaborate draft guidelines for refrigerant management plan projects for the consideration of the Sub-Committee on Project Review and the Executive Committee at its Twenty-third Meeting.
ExCom 22/24	Development of RMPs	The Twenty-second Meeting of the Executive Committee decided: (a) to request UNEP, in consultation with the Secretariat, the Implementing Agencies and members of the Executive Committee, to review the proposed guidelines for refrigeration management plans and bring forward a revised proposal to the September 1997 meeting of the Sub-Committee on Project Review, with comments from members of the Executive Committee to be provided by the end of June 1997; (b) to authorize low-volume-consuming countries that have approved country programmes and now need to take near-term action in this area to meet the freeze, to submit refrigeration management plans based on the draft guidelines recommended by the Sub-Committee on Project Review (with the input coming from the consultations noted in subparagraph (a) above) along with any associated projects, to the next meeting of the Executive Committee and, in this respect, to approve US \$140,000 for UNDP and US \$60,000 for UNIDO for this purpose; (c) to urge the Implementing Agencies not to view this discussion as an opportunity to develop recycling programmes, but rather as an opportunity to help countries think through the measures they need to take to facilitate compliance with the Protocol. In this regard, recycling projects should not be proposed unless there are incentives or regulatory measures that will be in place prior to proposed implementation of any proposed recycling projects to ensure that such projects will be sustainable; (d) to request UNEP to adjust country programmes presently under preparation to accommodate the requirements of the draft guidelines for refrigeration management plans as recommended by the Sub-Committee on Project Review and to urgently finish that work; (e) in cases where no country programmes for very-low-/low-volume-consuming Parties have yet to be started, to request UNEP to reach out to those countries to develop refrigeration management plan/country programme combination documents based on the draft guidelines, authorizing US \$200,000 for this initial UNEP work and requesting UNEP to report on the status of related activities at the Twenty-third Meeting of the Executive Committee.
ExCom 23/15	RMPs	The Executive Committee decided that the Guidelines for the Preparation of Refrigerant Management Plans be approved, subject to the insertion of the following new section before Section 3 - Principles and Steps in Formulating RMPs: "SECTION 2 OVERALL OBJECTIVE. The overall objective of a Refrigerant Management Plan is to develop and plan a strategy that will manage the use and phase-out of virgin CFC refrigerants for servicing refrigeration and air-conditioning equipment."
ExCom 23/48	Training guidelines	The Twenty-third Meeting of the Executive Committee decided: (a) to note the Training Guidelines for Identification of Needs and Coordination of Activities contained in UNEP/OzL.Pro/ExCom/23/Inf.4; (b) to authorize UNEP/IE to proceed with their implementation.
ExCom 25/32 (para 64(c)(d))	Training	The Executive Committee, having noted the comments and recommendations of the Sub-Committee on Project Review (UNEP/OzL.Pro/ExCom/25/17, paragraphs 46 to 50), decided: (c) To request that the possibility of carrying out more cost-effective regional training be considered in future projects. (d) to request the Secretariat to undertake further study on the question of the gains arising from recovered and recycled ozone-depleting refrigerants, which would lead to a renewed discussion within the Sub-Committee on the issue of offsetting benefits in large recycling efforts.
ExCom 26/33	Customs training	The Twenty-sixth Meeting of the Executive Committee also decided: (b) to stress the need for each country to obtain and ensure reliable data on imports of ODS, particularly through a system of import licensing and control, and in that context customs training was of special importance; (c) to request the Fund Secretariat to notify the Implementation Committee of the Montreal Protocol of this problem at its next meeting in Cairo and suggest that the Implementation Committee might send letters to the Governments of Malawi and of the United Republic of Tanzania requesting them to provide updated data on ODS consumption.
ExCom 26/34	Installation, assembly and charging subsector	The Sixty-second Meeting of the Executive Committee decided:(a) To request bilateral and implementing agencies, when submitting projects related to the installation, assembly and charging sub-sector, to demonstrate that each of those enterprises participating in the project had invested in equipment, development of products, or training of personnel specific to HCFC technology significantly exceeding the level of such investments prevalent in the service sector; and (b) That the activities foreseen for those enterprises represented incremental costs.
ExCom 27/19	Customs training and legislation	The Twenty-seventh Meeting of the Executive Committee decided: (a) that no funds should be expended on customs-training projects until either the relevant legislation was already in place or substantial progress had been made towards promulgating such legislation; (b) to request Implementing Agencies to transfer to countries that were in the process of preparing legislation information on ODS issues of relevance to customs authorities so that,

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		as stakeholders, they would be able to provide informed inputs into the legislation preparation process; (c) to examine, mindful of its decision 25/32, customs-training projects on a case-by-case basis in order to determine whether or not chemical-identification equipment should be included in them.
ExCom 27/35	Customs training and legislation	The Executive Committee also decided: (a) no funds should be expended on customs-training projects until either the relevant legislation was already in place or substantial progress had been made towards promulgating such legislation; (b) UNEP is requested to transfer to countries in the process of preparing legislation, information on ODS issues of relevance to customs authorities so that, as stakeholders, they would be able to provide informal inputs into the legislation-preparation process.
ExCom 28/10	Recovery, recycling and reclamation	The Twenty-eighth Meeting of the Executive Committee decided to request those Implementing Agencies to report to its Twenty-ninth Meeting on the steps taken at the national level to expedite the provision of the necessary regulatory and legislative measures required for successful recovery and recycling projects.
ExCom 28/44	End-user conversion in commercial refrigeration	The Twenty-eighth Meeting of the Executive Committee decided to adopt the following guidelines for end-user conversion in the commercial refrigeration sector: For an initial period of 18 months, the relevant circumstances which must prevail before priority will be accorded to end-user conversion activities are: · that the country has production and import controls on CFCs and CFC-based equipment in place and effectively enforced, and restricts the deployment of new CFC components; training of refrigeration technicians should be recognized as part of end-user conversion activity in the refrigeration sector; retrofitting of commercial refrigeration equipment would be considered for funding based on the experience gained from implementation of the relevant parts of a refrigerant management plan; for the initial period, pending review, priority should be given to projects for the conversion of cold stores in the agricultural, fisheries or other food-chain industries which are important for the economies of the countries concerned; for the initial period, the costs associated with replacement of the refrigerant, replacement of the oil and minor capital items where necessary, and labour at the local labour rate, will be eligible as incremental costs. More extensive conversions including reconditioning or replacement of compressors and major overhaul of refrigeration systems will not be considered under the initial guidelines. Incremental operating costs and savings should be calculated as for other commercial refrigeration projects for a two-year period; enterprise consumption will be the average annual quantity of CFC refrigerant which can be established as having been added to the refrigeration system as per existing Executive Committee guidelines; no cost-effectiveness threshold needs to be established for this initial period but all existing baseline conditions and eligibility criteria will be applied. The funding for the initial period of 18 months will be limited to US \$10 million; these guidelines should be reviewed after being in operation for 18 months. that, at the time of seeking compensation in the form of grants for end-user conversions, the country can establish that its major remaining consumption is for the servicing of refrigeration and air-conditioning equipment; to establish the above, that comprehensive data on the profile of all remaining consumption has been determined and made available to the Executive Committee; that either no other possible activities would allow the country to meet its CFC control obligations, or the comparative consumer price of CFCs, relative to substitute refrigerants, has been high for at least 9 months and is predicted to continue to increase. The guidelines for the initial period of 18 months are: retrofitting of commercial refrigeration equipment should continue to be assessed on a case-by-case basis.
ExCom 31/15	Desk study on recovery and recycling projects	The Thirty-first Meeting of the Executive Committee decided: (a) the Implementing Agencies should seek information from governments and/or national ozone units on the status of all the recovery and recycling projects they have implemented so as to ascertain whether they are in operation. The reports should be based on a standardized format for data collection, both at the individual equipment user level and as summarized information at the project level. This format should be developed by the Senior Monitoring and Evaluation Officer in consultation with the Implementing Agencies and interested national ozone units, and should be presented to the Executive Committee at its 32nd meeting; (b) an evaluation of recovery and recycling projects should be undertaken, particularly for those projects implemented as a component of a refrigerant management plan, as soon as they had been monitored for a reasonable period and data had been collected by the national ozone units and the Implementing Agencies and forwarded to the Multilateral Fund Secretariat. Depending on the information received from the national ozone units and the Implementing Agencies, as well as that contained in the project completion reports, the evaluation could be undertaken under the 2001 or 2002 work programme for monitoring and evaluation. The terms of reference for the evaluation would be presented to the Executive Committee for consideration. The draft terms of reference would take account of comments made by members of the Sub-Committee on Monitoring, Evaluation and Finance at its 11th meeting; (c) the national ozone units together with the Implementing Agencies should also be requested to obtain costing data for recovery and recycling which should include the operating cost of equipment, to arrive at the

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		cost of recovery and recycling, as well as the price trends in refrigerants. The data would permit the conditions for economically viable recycling and recovery operations to be determined, and they should be made available to the Implementing Agency, with a copy to the Multilateral Fund Secretariat.
ExCom 31/17	Training projects	The Thirty-first Meeting of the Executive Committee decided: (a) to take note of the findings and recommendations in the report on the evaluation of training projects prepared by the Senior Monitoring and Evaluation Officer (UNEP/OzL.Pro/ExCom/31/20); (b) to request the members of the Executive Committee to submit their comments on the report within 60 days of the adoption of its decision; (c) to request the Senior Monitoring and Evaluation Officer to circulate the reports on the countries evaluated for their comments; (d) to further request the Senior Monitoring and Evaluation Officer to prepare a recommendation on the matter for the 32nd meeting of the Executive Committee, taking into account the comments made by the members of the Executive Committee, the observations made during the 11th meeting of the Sub-Committee, and the views of the countries covered by the evaluations, as well as any further observations submitted by the Implementing Agencies.
ExCom 31/45	Assembly, installation and servicing of refrigeration equipment	The Executive Committee decided: (a) to adopt, for a period of 18 months, the guidelines for the subsector for assembly, installation and charging of refrigeration equipment contained in Annex IX.23; (b) to pay attention to projects submitted under guidelines 3 and 4, in particular to determine whether there is any eligible incremental cost; (c) to consider projects on a case-by-case basis in order to gain experience.
ExCom 31/48	RMPs	The Executive Committee decided: <b>A. Already approved refrigerant management plans (RMPs) for low-volume-consuming countries (LVCs)</b> (a) To request national ozone officers, with the assistance of the implementing agency concerned, to review and assess the content, implementation to date and expected outcomes of their RMPs against their objective to phase out all consumption in the refrigeration sector according to the Montreal Protocol timetable. In undertaking this review, national ozone officers should: (i) Calculate current and forecast future consumption in relation to the freeze, 50% cut in 2005, 85% cut in 2007 and phase-out in 2010 and calculate the size of consumption cuts in the refrigeration sector required to meet these targets; (ii) Include forecast cuts in consumption attributable to the activities already approved under the RMP, including training activities and recovery/recycling; (iii) Ensure that the current and expected future consumption of all subsectors, including the informal sector, small and medium-sized enterprises and mobile air conditioners, are included in the review; (iv) For each activity identified, consider the cost and means of funding, including national financing; (v) Ensure that the RMP and government strategy for delivering phase-out includes adequate provision for monitoring and reporting on progress; (b) That LVCs (or groups of LVCs) with already approved RMPs may submit to the Executive Committee requests for funding additional activities necessary to reduce consumption and thereby ensure compliance with the Protocol. Such additional activities should be essential parts of their comprehensive strategy for phase-out in the refrigeration sector. Additional funding shall not exceed 50% of the funds approved for the original RMP or, where relevant, RMP components. With the possible exception of the post-2007 period noted in subparagraph (d) below, no further funding beyond this level, including funding related to retrofits, would be considered for activities in this sector; (c) That requests for additional funding consistent with subparagraph (b) above should be accompanied by: (i) A justification for the additional activities to be funded in the context of the country's national phase-out strategy; (ii) A clear explanation of how this funding, together with the initial RMP funding and steps to be taken by the government, will ensure compliance with the Protocol's reduction steps and phase-out; (iii) A commitment to achieve, without further requests for funding for the RMP, at least the 50% reduction step in 2005 and the 85% reduction step in 2007. This shall include a commitment by the country to restrict imports if necessary to achieve compliance with the reduction steps and to support RMP activities; (iv) A commitment to annual reporting of progress in implementing the RMP and meeting the reduction steps; (d) That it will review in 2005 whether further assistance is needed for the post-2007 period, and what assistance the Fund might consider at that time to enable full compliance with the Protocol's phase-out requirements; <b>B. Preparation and approval of new RMPs for LVCs</b> (e) That the project preparation phase for RMPs should, as intended by the existing guidelines, include a full survey of CFC consumption in all subsectors, the development of a comprehensive government phase-out strategy and a commitment by the government to enact regulations and legislation required for the effective implementation of activities to phase out the use of CFC refrigerants. To enable these preparatory activities, including the development of legislation and regulations, to be completed in full, the funding provided for the project preparation phase should be double the level traditionally provided; (f) That the provisions relating to existing RMPs in section A, subparagraphs (a), (c) and (d) above shall also apply to new RMPs submitted pursuant to this decision; (g) That in lieu of the ability given to already approved RMPs to request additional funds, the total level of funding for the implementation of new RMPs could be increased by up to 50% compared to the level of RMP funding typically approved to date, with flexibility for the country in selecting and



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		implementing the RMP components which it deems most relevant in order to meet its phase-out commitments. With the exception of the post-2007 phase noted in section A, subparagraph (d) above, no further funding beyond this level, including funding for retrofits, would be considered for activities in this sector; (h) That the following text should be added to the RMP guidelines (decision 23/15) after the last bullet in section 3.1: "The elements and activities proposed for an RMP, whether they are to be funded by the Multilateral Fund or the country itself, should reflect the country's particular circumstances and address all relevant sectors including the informal sector. They should be sufficient to ensure fulfilment of the countries' control obligations at least up to and including the 85% reduction in 2007, and should include mechanisms for reporting progress." <b>C. RMPs for higher-volume-consuming countries</b> (i) That, taking into account the need for large consuming countries to initiate planning for dealing with this large and complex sector, as well as the related decision of the Meeting of the Parties, it will consider requests for funding the development of long-term strategies for the refrigeration sector for high-volume-consuming countries. High-volume-consuming countries that have not yet undertaken country programme updates should undertake this strategic RMP development in the context of such updates, consistent with any Executive Committee guidance on country programme updates; (j) That future Executive Committee decisions on funding the implementation of the elements of such RMP strategies should take into account the relative priority in national government planning of CFC reductions in the refrigeration sector and the availability of other reduction opportunities in meeting the country's control obligations; (k) That, in that context, the Executive Committee may consider whether certain activities often considered to be part of an RMP (such as training of customs officers) could be initiated before an RMP was developed.
ExCom 32/10 (para.21 (b))	RMPs	The Thirty-second Meeting of the Executive Committee decided to request UNDP to comply with Decision 31/48 for countries which apply for the 50 per cent increase to their current RMP funding level. Funding requests should be accompanied by a justification for the proposed additional activities based on a full assessment as described in Decision 31/48, para. (a), and a clear explanation of how this funding will ensure compliance with the Montreal Protocol phase-out schedule to January 2007.
ExCom 32/16	Recovery, reclamation and recycling	The Thirty-second Meeting of the Executive Committee decided to request the Senior Monitoring and Evaluation Officer to review the objectives of the evaluation exercise with a view to improving the exercise and lightening the burden on respondents. That did not imply that the same procedures would apply to all recovery and recycling projects in the future.
ExCom 32/19	Customs training evaluation	It is recommended: 1. that all future non-investment activities related to the refrigeration servicing sector in low-volume countries (such as training of technicians in good services practices and customs training) should continue to be part of the Refrigerant Management Plan in order to place them in the context of a comprehensive plan for sector phase-out. For non low-volume countries, projects such as training of technicians and training of customs officers would be prepared in the framework of a national long-term strategy for the refrigeration sector and considered in accordance with Decision 31/48, part C. When preparing new RMPs, as well as during implementation of approved RMPs, training activities related to the refrigeration servicing sector and customs officers should build on the results of any earlier training activities. Consideration should be also given to strengthen the relevant industry associations and to involve them more closely in project preparation and implementation. 2. that during the compliance period, the capacity of NOUs for development of national policies and regulations regarding monitoring and controlling consumption and trade of ODS and ODS-based equipment should continue to be enhanced. 3. that countries are encouraged to develop a certification system to recognize those trainees who have successfully participated in training programmes through appropriate regulations or other policies. Such regulations are most effective when they are developed with active industry participation and create common certification requirements across the country, either through national legislation or regulations consistent across states/provinces. 4. that national and regional activities should be planned and implemented in a complementary way. Regional workshops/seminars should focus on issues of common interest and should address priority requests in the region. National training programmes should respond to the specific requirements of countries concerned. 5. that a list of relevant past and planned training events, bilateral and multilateral, should be made available by UNEP as part of its information exchange activities to all Parties. It would enable the Parties to consult such information on a timely basis and eliminate the possible duplication of similar events world-wide. 6. that project proposals should include baseline data and indicators by which the results of the project could be assessed. Adequate monitoring systems should be developed to facilitate subsequent reporting on the results of training activities, and each project should foresee a budget line and adequate time for monitoring and reporting. 7. that the PCR format for non-investment projects used for reporting on training projects should be revised. The PCR should correspond to the related indicators defined for the approved project and should include information on the results and follow-up of training projects. 8. that the model of charging participants' fees for training of technicians, as included in the relevant German (GTZ) bilateral projects, in order to make training programmes sustainable should be closely monitored. If successful,

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		countries should be encouraged to adopt it for future projects. 9. that national training handbooks, similar to the ones prepared for 10 African countries by GTZ, should be produced as part of the training materials for other countries as well, taking into account previous training materials developed. 10. that innovative solutions should be developed to reach out with training to the informal sector.
ExCom 32/27	Licensing systems	The Thirty-second Meeting of the Executive Committee decided that it was prepared to approve project proposals for the development of implementation of licensing schemes. In that process, the Secretariat would be requested, in each case, to seek information from countries on the status of their ratification of the Montreal Amendment, as well as whether they had a licensing system in place, and to report such information to the Executive Committee
ExCom 32/28	RMPs	The Thirty-second Meeting of the Executive Committee decided that project proposals for incentive programmes to encourage retrofitting of refrigeration equipment could be submitted within an RMP, on the understanding that, where the project was to make use of the 50 per cent additional funding for an existing RMP available under Decision 31/48: (a) the Implementing Agency concerned should consult with the country and all other agencies implementing components of the RMP; (b) the country concerned was fully informed about all the investment and non-investment activities which might be available; (c) the timing of the proposed activity was appropriate for the country's circumstances.
ExCom 32/9	Training projects	The Thirty-second Meeting of the Executive Committee, having considered the report on evaluation of training projects decided to adopt the recommendations contained in Annex IX.5.
ExCom 33/13	Funding of updates of RMPs	The Thirty-third Meeting of the Executive Committee decided: (a) proposals to update refrigerant management plans should be in conformity with decision 31/48 and should be accompanied by: (i) a progress report from Implementing Agencies on the status of work being undertaken in the projects approved as part of the refrigerant management plan; and (ii) a written justification from countries for additional activities, explaining how the additional activities were related to the refrigerant management plan and the country's phase-out commitments. (b) the level of funding of such requests could be up to 50 per cent of the level of funding approved prior to the Thirty-first Meeting for the preparation of the original refrigerant management plan; (c) approval of the additional funding would be contingent on submission of the progress reports and the written justification referred to above.
ExCom 33/49	RMPs/ Terminal Phase-out plans (TPMPs)	Having considered the recommendation of the Sub-Committee on Project Review (UNEP/OzL.Pro/ExCom/33/17, paras. 87 and 88), the Executive Committee decided: (a) To invite members to provide comments in writing to the Secretariat on the draft prerequisites and guidelines, as contained in document UNEP/OzL.Pro/ExCom/33/25, for compilation and presentation to the Executive Committee at a future meeting; (b) To use the current draft prerequisites and guidelines, as contained in Annex VII to the present report, in a flexible manner, on a case-by-case basis, for consideration of terminal phase-out proposals related to pending requests to be submitted to future meetings of the Executive Committee.
ExCom 33/51	Customs training	The Thirty-third Meeting of the Executive Committee decided: (a) national customs training for each country should continue to be funded. However, UNEP should look for opportunities to implement regional and sub regional customs training as a cost-effective substitute for national customs training, wherever appropriate, and should look for opportunities to make use of existing regional customs training facilities; (b) in order to reach the large number of customs officers, in the countries concerned in a cost-effective manner, national customs training should be through the "train the trainers" approach and be followed by training of customs officers by trainers; (c) for demonstration purposes, additional sub regional or regional training programmes might be considered for funding where regional trading blocs or trading agreements containing relevant regulatory mechanisms were in place, and after the results of already approved regional and sub regional training programmes had been presented to the Executive Committee for review; (d) regional and sub regional customs training activities and the regional ozone officers networks should be used to conduct outreach to representatives of regional trading blocs and customs associations with a view to encouraging the formation of informal networks for information dissemination and data management.
ExCom 35/57 (para.112(b))	RMPs	The Thirty-fifth Meeting of the Executive Committee also decided that countries shall be provided with country programme update funding that is 75 per cent of the level originally provided to them to do country programmes. Low-volume consuming countries that have done RMPs will be given 50 per cent of the funding provided to develop their original RMP to do RMP updates, but will not be given funding to do country programme updates. New country programmes should, consistent with existing Executive Committee guidelines, continue to include RMPs.
ExCom 35/58	RMPs	In view of the above considerations, the Executive Committee decided at its Thirty-fifth Meeting: (a) to encourage Article 5 countries to take advantage of the opportunity of updating the country programmes to prepare the national strategy for complying with the Montreal Protocol obligations; (b) to provide funding for national efforts in updating the country programme. Taking into consideration Decision 31/48 of the Executive Committee on funding of refrigerant management plans, funding of country programme update should be linked with the funding of RMPs. Specifically: (i) in countries where the remaining controlled substance consumed is confined to CFC refrigeration servicing and the RMP has been funded, updating the country

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		programme/RMP should be accomplished by the countries concerned when requesting the additional funding of 50 per cent of their original RMP funding level. Funding should be provided to enable countries to undertake this exercise; (ii) in countries where the preparation of the RMP or a strategy for the refrigeration sector has been funded and is under way, supplementary funding for country programme update should cover CFC consumption in other sectors and controlled substances other than CFCs; (iii) in countries where the RMP has yet to be prepared, funding of country programme update should be combined with the preparation of the RMP. (c) to request that country programme updating be completed within 12 months, on average, from the time that funding is approved by the Executive Committee; (d) to encourage Article 5 countries to take advantage of the opportunity of updating the country programme to develop performance-based sector-wide or substance-wide phase-out agreements; (e) to adopt the Format for Country Programme Update included in Annex VIII.2 to the present report, which could be augmented by countries according to their strategic planning needs; (f) to invite Implementing Agencies, in finalizing their 2002 business plans, to incorporate to the extent possible, requests for assistance for those Article 5 countries seeking to prepare country programme updates at this time.
ExCom 36/14 (b)(c )	Recovery, recycling and reclamation	The Thirty-sixth Meeting of the Executive Committee decided: (b) to remove institutional strengthening, halon banking, customs training, recovery and recycling, and demonstration projects from the list of projects with implementation delays, but to continue to monitor them, as appropriate; (c) to note that the Secretariat and the Implementing Agencies would take actions according to the assessment of status, i.e., progress, some progress, or no progress, as mandated in Decision 34/13.
ExCom 36/5 (para 38 (f)(ii))	Refrigeration servicing	The Thirty-sixth Meeting of the Executive Committee decided: (f) noting that the overall coordination of projects was the responsibility of the country concerned, that: (ii) implementing and bilateral agencies should coordinate among themselves when preparing activities for phase-out of ODS in the servicing sector, with a view to bringing to the Executive Committee one complete national proposal for the servicing sector, in line with the principles and requirements of Decision 31/48 on Refrigerant Management Plans (RMP);
ExCom 37/19	RMPs	The Thirty-seventh Meeting of the Executive Committee decided that, for RMPs in large-volume-consuming countries, interim steps should not be used in performance agreements unless the use of CFCs for manufacturing had been completely phased out, and that the agreement should result in complete phase-out as if it were part of a national CFC phase-out plan or a sector plan.
ExCom 37/70, (para. 121 (a))	Terminal Phase-out plans (TPMPs)	The Thirty-seventh Meeting of the Executive Committee decided to request the Secretariat, in collaboration with the Implementing Agencies and interested Executive Committee members to prepare a document on the issue of whether RMP activities included in business plans could be submitted as new terminal phase-out management plans if countries requested agencies to do so, taking account of the content of Decision 31/48, for consideration at the 38 <sup>th</sup> Meeting.
ExCom 37/9	Refrigeration servicing	The Twenty-first Meeting of the Executive Committee decided: (a) to take note of the 1997 business plans of the Implementing Agencies; (b) to request the Implementing Agencies to revise their 1997 business plans in the light of Executive Committee decision 21/3, subparagraph (b), and in conformity with its decisions 21/11, 21/12, 21/13 and 21/14, on the 1997 work programmes of the Implementing Agencies, and to submit them to the Executive Committee at its Twenty-second Meeting; (c) to request the Implementing Agencies, when implementing their 1997 business plans, to integrate the preparation of projects for national recovery and recycling in low-volume-consuming countries into refrigerant management plans; (d) to request the Secretariat to work with the Implementing Agencies to develop more standardized criteria for evaluating their performance so that it would be possible to examine the relative performance of the agencies prior to consideration of their 1998 business plans; (e) to request the Secretariat to work with the Implementing Agencies to produce a summary status report for each Article 5 country that would, using the latest available data, include information on the consumption of each country, the number of tonnes to be reduced through implementation of projects already approved by the Fund, the status of implementation of such projects, the amount of ODS that was expected to be reduced through planned approvals in 1997, and an indication of the relative difficulty that each country might face in meeting the 1999 freeze and, as far as practicable, subsequent control measures; (f) to request the Secretariat to submit a report to the Executive Committee on the exercises referred to in subparagraphs (d) and (e) above. The Monitoring, Evaluation and Finance Sub-Committee established by decision 21/35 would consider this report and make recommendations to the Executive Committee.
ExCom 38/38	Recovery, recycling and	Having considered the comments and recommendations of the Sub-Committee on Project Review (UNEP/OzL.Pro/ExCom/38/14, paragraphs 67 and 68), the Executive Committee decided: (a) That in future, in proposing for approval any projects that included a CFC recovery and recycling programme, the implementing agencies would: (i) Examine the possibility of collaboration for leveraging additional financing, for example from the Global Environment Facility (GEF), to fund the acquisition of machinery which could be used for recovery and recycling of both HFCs and CFCs; and (ii) Consistent with

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		previous decisions, not commence the recovery and recycling component of the RMPs until the legislation controlling CFC imports was in place and measures had been taken to ensure that the local market prices of CFCs and non-ODS refrigerants were similar; (b) For projects to phase out CFCs by conversion to HCFC technologies, Governments had officially endorsed the choice of technology and it had been clearly explained to them that no further resources could be requested from the Multilateral Fund for funding any future replacement for the transitional HCFC technology that had been selected.
ExCom 38/64	RMPs / TPMPs	The Executive Committee decided that specific requests for funding of terminal CFC phase-out plans for LVC countries might be considered on a case by case basis, provided that: (a) The country concerned has a licensing system in operation and has enacted or improved legislation to phase-out ODS consumption; (b) The Government concerned is committed to achieve, without further request for funding from the Multilateral Fund, the complete phase out of CFCs in accordance with its obligation under the Montreal Protocol; (c) The Government is committed to annual reporting of progress in implementing the activities proposed and meeting the reduction steps; and (d) Implementing and/or bilateral agency(ies) responsible for implementing the terminal phase-out plan be requested to advise the Government concerned on the financial implications to the country for submitting a terminal phase out plan, and make every effort to assist the Government concerned to achieve phase-out targets specified in the plan.
ExCom 39/16	RMPs	The Thirty-ninth Meeting of the Executive Committee decided: (a) to request agencies to coordinate their project preparation requests associated with RMPs or RMP updates so that the total funding sought remained within the limits established by the guidelines in Decision 31/48; (b) to require, with the first project preparation request, nomination of all the agencies that would be involved in the RMP and the lead agency that would be responsible for overall RMP implementation, including its phase-out objectives, and for reporting on overall progress and on achievement. However, in order to be consistent with the country-driven approach, a country would be entitled to change the agency responsible or request additional support from another agency (within the limits of the approved financing), with the Secretariat then being notified of such changes.
ExCom 40/7	Reorient the approach to RMPs to facilitate compliance	The Fortieth Meeting of the Executive Committee decided to set up an open ended working group to discuss, in the margins of the 41st Meeting of the Executive Committee, ways to reorient the approach to RMPs to better facilitate compliance, with members chosen from both the Sub Committee on Project Review and the Sub-Committee on Monitoring, Evaluation and Finance as well as representatives of the Implementing Agencies.
ExCom 41/100	RMPs	Following a discussion, in recognition of the fact that in certain cases Article 5 countries needed flexibility in implementing refrigerant management plans in order to reflect changing circumstances, the Executive Committee decided: (a) To recommend that bilateral and implementing agencies, in collaboration with Article 5 countries preparing and implementing refrigerant management plans, be given flexibility, within historically agreed funding levels, to implement refrigerant management plan components that are adapted to meet the specific needs of relevant Article 5 countries, and that planned changes to project activities be clearly documented and available for future monitoring and evaluation in accordance with Fund rules; and (b) That in developing appropriate interventions, Article 5 countries and bilateral and implementing agencies should give consideration to: (i) Concentrating support on the development of legislation and coordination mechanisms with industry, where these are not yet in place, and on further training programmes for refrigeration technicians and customs officers, using existing national capacities and providing expert support and resources such as equipment and tools required; this should also include efforts to raise awareness of the value of skilled technicians for end users and for stakeholders; (ii) Also concentrating recovery and reuse of CFC on large-size commercial and industrial installations and mobile air conditioner (MAC) sectors, if significant numbers of CFC-12 based systems still exist and the availability of CFC is strongly reduced by the adoption of effective import control measures; (iii) Further exploring possibilities for facilitating cost-effective retrofitting and/or use of drop-in substitutes, possibly through incentive programmes; (iv) Becoming more selective in providing new recovery and in particular recycling equipment by: a. establishing during project preparation a sounder estimate of the likely demand for recovery and recycling equipment; b. delivering equipment to the country only against firm orders and with significant cost participation by the workshops for equipment provided, using locally-assembled machines to the extent possible; c. procuring, delivering and distributing equipment in several stages, after reviewing the utilization of equipment delivered and verifying further demand; and d. ensuring that adequate follow-up service and information are available to keep the recovery and recycling equipment in service; and (v) Monitoring the use of equipment and knowledge acquired by the beneficiaries, on an ongoing basis, through regular consultations and collection of periodic reports from the workshops, to be carried out by national consultants in cooperation with associations of technicians. Progress reports based on such monitoring should be prepared annually by the consultant and/or the National Ozone Units, in cooperation with the implementing agency, as provided for in Decision 31/48, and sufficient additional resources should be made available to allow for such follow-up and reporting work

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ExCom 41/5, (para. 36(a))	Final report on the evaluation of the implementation of RMPs	The Forty-first Meeting of the Executive Committee decided to note the information provided in document UNEP/OzL.Pro/ExCom/41/7.
ExCom 44/63	Guidelines relating to collection, recovery, recycling and destruction of ODSs	The Forty-fourth Meeting of the Executive Committee recalling decision IV/18 by which the Meeting of the Parties identified, as agreed incremental costs for illustration, the cost of collection, recovery, recycling, and, if cost effective, destruction of ozone-depleting substances, recalling also that decision IV/11 facilitated access to and transfer of approved destruction technologies in accordance with Article 10 of the Protocol, together with provision for financial support under Article 10 of the Protocol for the Parties operating under paragraph 1 of Article 5, noting that decision IV/24 urged the Parties to take all practicable measures to prevent releases of controlled substances into the atmosphere, including, inter alia, the recovery of controlled substances for the purposes of recycling, reclamation or destruction and the destruction of unneeded ozone-depleting substances where economically feasible and environmentally appropriate, noting that decision X/7 requested the Parties to consider promoting appropriate measures to ensure the environmentally safe and effective recovery, storage, management and destruction of halons in preparing halon management strategies, mindful that the Technology and Economic Assessment Panel Task Force on Collection, Recovery and Storage, in its 2002 report, pursuant to decision XII/8, had concluded that the collection, recovery and storage of ozone-depleting substances was technically feasible and economically viable, recognizing that several million ODP tonnes of ozone-depleting substances were estimated to have been installed in equipment and as foams in 2002, according to the report of the Task Force, and were likely to be released into the atmosphere if preventive measures were not taken, decided: (a) to request the Secretariat to collect existing guidelines relating to collection, recovery, recycling and destruction of ozone-depleting substances in the light of paragraph 6 of decision IV/18 of the Meeting of the Parties on the indicative list of categories of incremental costs and to report its findings to the 46th Meeting of the Executive Committee; and (b) to consider whether to elaborate further guidelines for the funding of projects for the collection, recovery, recycling and destruction of ozone-depleting substances while ensuring economically feasible and environmentally appropriate management of ozone-depleting substances at the 46th Meeting on the basis of the report of the Secretariat.
ExCom 45/10	Evaluation of customs officers training and licensing systems projects	The Forty-fifth Meeting of the Executive Committee decided: (a) to take note of the report on the evaluation of customs officers training and licensing system projects contained in document UNEP/OzL.Pro/ExCom/45/11, including the recommendations in Section V of the document; (b) to request the Senior Monitoring and Evaluation Officer to revise the language of the recommendations to make them less prescriptive and more general and to include a section on conclusions; (c) to request the Secretariat: (i) to draft a covering note, for submission to the Parties, reflecting the comments on the report made by members of the Executive Committee at the 45 <sup>th</sup> Meeting, to which the revised report would be annexed; (ii) to post a revised version of the report on its intranet to enable the members to review the text and send in their comments; and (iii) to submit the revised report and the covering note, after approval by the Chair of the Executive Committee, to the 25th Meeting of the Open-ended Working Group.
ExCom 45/54	RMPs / TPMPs	Following a discussion on the need to provide assistance to low-volume-consuming countries for the post-2007 period, the Executive Committee decided: (a) To urge bilateral and/or implementing agencies on behalf of low volume consuming countries without an approved terminal phase out management plan (TPMP) to submit TPMP proposals, on the understanding that: (i) TPMP project proposals should be in conformity with all relevant decisions taken by the Executive Committee; (ii) TPMP project proposals should contain, as a minimum, a commitment by the government concerned to the phased reduction and complete phase-out of the consumption of CFCs in the country according to a specific phase out schedule, which was at a minimum consistent with the Montreal Protocol's control measures; (iii) No additional resources would be requested from the Multilateral Fund or bilateral and/or implementing agencies for activities related to the phase out of CFCs and other ODS where applicable; (iv) The government concerned would have flexibility in utilizing the resources available to address specific needs that might arise during project implementation to facilitate the smoothest possible phase-out of ODS; (v) Annual reporting on the implementation of the activities undertaken in the previous year, as well as a thorough and comprehensive work plan for the implementation of the following year's activities, would be mandatory; and (vi) The roles and responsibilities of the major national stakeholders, as well as the lead implementing agency and the cooperating agencies when applicable, must be defined; (b) That additional funding of up to US \$30,000 could be requested for the preparation of a TPMP proposal on the understanding that up to US \$10,000 of this funding could be earmarked for the bilateral and/or implementing agencies to report on the implementation and impact of the approved recovery and recycling programme, where applicable, and that this report should be integrated within the resulting TPMP proposal; (c) That future TPMP proposals for the post-2007 period might

Decision Number	Sector/ Sub-sector/Title	Decision Text												
		<p>include requests for funding up to the levels indicated in the table below, on the understanding that individual project proposals would still need to demonstrate that the funding level was necessary to achieve complete phase-out of CFCs. Up to 20 per cent of approved funds should be used by the bilateral or implementing agency and/or country concerned to ensure comprehensive annual monitoring and reporting of the TPMP, including the recovery and recycling programme:</p> <table border="1" data-bbox="848 388 1558 594"> <thead> <tr> <th data-bbox="848 388 1203 418">CFC baseline(ODP tonnes)</th> <th data-bbox="1203 388 1558 418">Funding level (US \$)</th> </tr> </thead> <tbody> <tr> <td data-bbox="848 418 1203 449">&lt;15</td> <td data-bbox="1203 418 1558 449">205,000</td> </tr> <tr> <td data-bbox="848 449 1203 480">15 to 30</td> <td data-bbox="1203 449 1558 480">295,000</td> </tr> <tr> <td data-bbox="848 480 1203 511">30 to 60</td> <td data-bbox="1203 480 1558 511">345,000</td> </tr> <tr> <td data-bbox="848 511 1203 542">60 to 120</td> <td data-bbox="1203 511 1558 542">520,000</td> </tr> <tr> <td data-bbox="848 542 1203 594">&gt; 120</td> <td data-bbox="1203 542 1558 594">565,000</td> </tr> </tbody> </table> <p>(d) To require, on an annual basis, verification of a randomly selected sample of approved TPMPs for low-volume-consuming countries under implementation (i.e., 10 per cent of approved TPMPs). The costs associated with verification would be added to the relevant work programme of the lead implementing agency; and (e) To approve, on a case-by-case basis, up to US \$30,000 for the preparation of a transitional strategy for CFC-MDIs in low-volume-consuming countries where the need for a strategy had been fully demonstrated and documented.</p>	CFC baseline(ODP tonnes)	Funding level (US \$)	<15	205,000	15 to 30	295,000	30 to 60	345,000	60 to 120	520,000	> 120	565,000
CFC baseline(ODP tonnes)	Funding level (US \$)													
<15	205,000													
15 to 30	295,000													
30 to 60	345,000													
60 to 120	520,000													
> 120	565,000													
ExCom 46/17	RMPs / TPMPs	Following a discussion, the Executive Committee <u>decided</u> to request bilateral and implementing agencies preparing reports under decision 45/54 to prepare the reports in a format similar to the reports currently prepared under decision 31/48 for refrigerant management plan (RMP) updates and to provide a similar comprehensive overview of the implementation of the RMP.												
ExCom 46/18, (para. 90 (b))	RMPs	The Forty-sixth Meeting of the Executive Committee decided to request Bilateral and Implementing Agencies preparing reports under decision 45/54 to prepare the reports in a format similar to the reports currently prepared under decision 31/48 for refrigerant management plan (RMP) updates and to provide a similar comprehensive overview of the implementation of the RMP.												
ExCom 46/36	Phase-out agreement: flexibility conditions	The Forty-sixth Meeting of the Executive Committee decided: (a) to note with appreciation the report on the review of guidelines relating to collection, recovery, recycling and destruction of ozone depleting substances in documents UNEP/OzL.Pro/ExCom/46/42 and Corr.1; (b) to request the Secretariat to prepare a paper covering terms of reference, budget and modalities for a study regarding collection, recovery, recycling, reclamation, transportation and destruction of unwanted ODS, taking into account the proposal of Austria and Japan set out in Annex VII.4 to the present report and the comments made at the 46th Meeting of the Executive Committee; and (c) to request the Secretariat to present the paper to the 47th Meeting of the Executive Committee.												
ExCom 47/52 (a)(i)(ii)(iii)	Collection and disposition of non- reusable and unwanted ODS	The Forty-seventh Meeting of the Executive Committee decided: (a) to request the Secretariat: (i) to organize a meeting of experts in Montreal, Canada, from 22 to 24 February 2006 to assess the extent of current and future requirements for the collection and disposition (emissions, export, reclamation and destruction) of non-reusable and unwanted ODS in Article 5 countries; (ii) to recruit consultants to collect and elaborate as many data as possible on unwanted, recoverable, reclaimable, non-reusable and virgin ODS in Article 5 countries for dissemination to participants in the meeting of experts; (iii) to develop, in cooperation with the consultants, a standard format for reporting data on unwanted, recoverable, reclaimable, non-reusable and virgin stockpiled ODS;												
ExCom 48/10	Evaluation	Following the discussion, the Executive Committee decided: (a) To note with appreciation the final report on the intermediate evaluation of refrigerant management plans and national phase-out plans in non-low-volume-consuming countries focusing on the refrigeration servicing sector contained in document UNEP/OzL.Pro/ExCom/48/12; and (b) To request the Senior Monitoring and Evaluation Officer to develop a comprehensive and categorized compendium of recommendations relevant to that evaluation, distinguishing between new recommendations and those that had already been approved by the Executive Committee, and to present that compendium to the 49th Meeting of the Executive Committee.												
ExCom 48/11	Customs training	The Forty-eighth Meeting of the Executive Committee decided: (a) to take note of the recommendations contained in the report of the Executive Committee on the evaluation of customs officers training and licensing system projects to the Twenty fifth Meeting of the Open ended Working Group (follow up to												

Decision Number	Sector/ Sub-sector/Title	Decision Text
		decision XVII/16, paragraph 8, of the Seventeenth Meeting of the Parties to the Montreal Protocol), as contained in document UNEP/OzL.Pro/ExCom/48/13; (b) to submit the recommendations listed under paragraph 8(b) in document UNEP/OzL.Pro/ExCom/48/13, as amended to include the phrase “where feasible” before the words “in cooperation with other relevant government ministries/agencies:” to the Ozone Secretariat in the context of the ongoing studies and discussions on how best to deal with illegal trade in ODS; (c) to request implementing agencies and bilateral agencies to prepare and implement national phase-out plans and terminal phase-out management plans in a manner that would ensure, where feasible, implementation of the recommendations listed under paragraph 8(b), and to implement the recommendations listed under paragraph 8(c) in document UNEP/OzL.Pro/ExCom/48/13; and (d) to request UNEP to implement the recommendations under paragraph 8(d) in document UNEP/OzL.Pro/ExCom/48/13.
ExCom 49/36	Recovery, recycling and reclamation	The Forty-ninth Meeting of the Executive Committee decided: (a) to take note with appreciation of document UNEP/OzL.Pro/ExCom/49/42, which included the proposed terms of reference for a study regarding collection, recovery, recycling, reclamation, transportation and destruction of unwanted ozone-depleting substances; (b) to inform the Parties, through a letter from the Chair of the Executive Committee to the Ozone Secretariat, that: (i) the Executive Committee was discussing the above-mentioned terms of reference and was of the view that there were substantial commonalities between those terms of reference and those being considered by the Parties in relation to decision XVII/17 of the Seventeenth Meeting of the Parties; (ii) the issues raised by both sets of the above-mentioned terms of reference could be considered by the Executive Committee of the Multilateral Fund, given that it had already held substantial discussions and initiated some work with respect to studying the issue of collection, recovery, recycling, reclamation, transportation and destruction of unwanted ozone-depleting substances; (iii) a request could be addressed to the Executive Committee to develop consolidated terms of reference and if agreed by the Executive Committee to initiate a study based on the consolidated terms of reference, and to report to the Nineteenth Meeting of the Parties on the progress made in that respect; and (c) to consider the issue at the 50th Meeting of the Executive Committee, in light of any guidance provided by the Eighteenth Meeting of the Parties.
ExCom 49/6	RMPs / National Phase-out Plans (NPPs)	Following discussion of those modifications, the Executive Committee decided: (a) To recommend that National Ozone Units (NOUs) in planning and implementing refrigerant management plans and national or terminal phase-out plans consider, where feasible and in cooperation with other relevant government ministries/agencies: (i) Updating and complementing ODS-related legislation where additional legal measures were needed and further specification of enforcement mechanisms had been identified, including, for example: Banning the import and export of CFC-based second-hand refrigeration equipment; Mandatory certification of technicians performing professional activities in refrigeration servicing; Specification of a system of sanctions in cases of violation of legal regulations; Improvement of the mechanisms for import and export quota allocations under the licensing system and the monitoring of their actual use; Enhancement of cooperation between the NOU and the customs authorities; (ii) Upgrading the curriculum for technical training in refrigeration, where needed, and providing all training institutions with the latest relevant information with regard to the general application of good practices to significantly reduce usage of ODS and to promote the use of alternatives; (b) To request implementing and bilateral agencies, when implementing ongoing national phase-out plans and when planning new national phase-out plans, to take into consideration decision 41/100 for the recovery and recycling part of national phase-out plans, in particular the following paragraphs: (i) “Concentrating recovery and reuse of CFCs in large-size commercial and industrial installations and mobile air conditioning sectors, if significant numbers of CFC-12-based systems still existed and the availability of CFC was strongly reduced by the adoption of effective import control measures; (ii) Further exploring possibilities for facilitating cost-effective retrofitting and/or use of drop-in substitutes, possibly through incentive programmes; (iii) Becoming more selective in providing new recovery, and in particular recycling, equipment by: a. Establishing during project preparation a sounder estimate of the likely demand for recovery and recycling equipment; b. Delivering equipment to the country only against firm orders and with significant cost participation by the workshops for equipment provided, using locally-assembled machines to the extent possible; c. Procuring, delivering and distributing equipment in several stages, after reviewing the utilization of equipment delivered and verifying further demand; d. Ensuring that adequate follow-up service and information was available to keep the recovery and recycling equipment in service; (iv) Monitoring the use of equipment and knowledge acquired by the beneficiaries, on an ongoing basis, through regular consultations and collection of periodic reports from the workshops, to be carried out by national consultants in cooperation with associations of technicians. Progress reports based on such monitoring should be prepared annually by the consultant and/or the National Ozone Units, in cooperation with the implementing agency, as provided in decision 31/48, and sufficient additional resources should be made available to allow for such follow-up and reporting work” (from decision 41/100); (c) To request bilateral and multilateral implementing agencies, in cooperation with the

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		<p>relevant national institutions: (i) To base the training of technicians on a strategy combining theoretical training with practical exercises during seminars with limited numbers of participants, and assisting in upgrading the curriculum of technical training institutes for refrigeration servicing in countries where it had not yet been done; (ii) To pay full attention to safety aspects and the necessary modification or replacement of electrical components in countries where training in the use of hydrocarbons and particularly retrofitting was carried out; and (iii) To select carefully the type of refrigerant identifiers to be purchased, taking into account preferences for small portable units, suitable for identifying different types of refrigerants, and including a test phase, where feasible, before buying larger numbers. Moreover, the administrative details of their distribution, usage and storage should be planned in advance in order to avoid delays and to increase the effectiveness of their use; (d) To request the Fund Secretariat, in cooperation with bilateral and multilateral implementing agencies, to develop recommendations for indicative lists of appropriate equipment for the main target groups and share information about competitive suppliers, including from Article 5 countries; and (e) To request the Fund Secretariat, in cooperation with bilateral and multilateral implementing agencies, to develop an appropriate reporting format for the tracking of cumulative progress achieved in the annual work programmes, summarizing in standardized overview tables the information requested in decision 47/50, with a view to simplifying and rationalizing the overall reporting requirements and to report back to the 51st Meeting of the Executive Committee. Such assessment should contain a “comparison of what had been planned in the previous annual tranche and what had been achieved. The disbursement information should be provided cumulatively and data concerning actual or planned commitments could also be provided, as appropriate. The information should also specify how the relevant flexibility clause in the agreement was implemented and/or how to allocate unused funds from previous tranches” (from decision 47/50, subparagraph (b)(i)).</p>
ExCom 50/42	Unwanted ODS	<p>The Fiftieth Meeting of the Executive Committee decided: (a) to request the Multilateral Fund Secretariat to develop specific terms of reference for a study on the treatment of unwanted ozone-depleting substances, identifying a contractor and commissioning the study described below by the end of March 2007, if possible. The study would be completed by 1 February 2008. (b) to define the two distinct objectives of the study as follows: (i) to compile information on management approaches in five non-Article 5(1) countries for the equipment, to provide guidance and to describe the applicability of these management approaches to Article 5(1) countries; and (ii) to compile information on management approaches and markets in five non-Article 5(1) countries for the recovery, collection, recycling and reclamation of ozone-depleting substances that result in those ODS being locally unusable, and the possible options for the disposition (e.g., reuse in other markets, transformation, destruction) of this locally unusable ODS and describe the applicability of these options for Article 5(1) countries. (c) to request that the detailed activities under the objective in paragraph (b)(i) consist of: (i) selecting five non-Article 5(1) countries that represent a wide spectrum of existing management approaches for the collection, transport and disposal of CFC-containing refrigeration and air-conditioning equipment; (ii) compiling information from the five non-Article 5(1) countries and describing: a. the institutions, technologies and processes involved in all steps of collection, transport and disposal of the equipment; b. the costs of the various steps in collecting, transporting and processing the equipment; c. the legal and regulatory requirements and the voluntary administrative procedures for dealing with the CFCs in the equipment; and d. the volume of equipment collected historically and currently; (iii) using the information compiled from the five non-Article 5(1) countries to describe the economic and financial arrangements among the various individuals and entities in the system for disposing of CFC containing refrigeration and air-conditioning equipment; and (iv) collecting information on experiences regarding management approaches for the collection, transportation and disposal of CFC-containing refrigeration and air-conditioning equipment in eight Article 5(1) countries, to be collected by contacting national and local government officials who will recommend additional contacts in industry and institutions in order to describe challenges that may be posed in translating the non-Article 5(1) countries’ experiences to the situation in Article 5(1) countries given domestic, social and economic factors. The selection of the countries should represent a wide spectrum of countries that have already identified challenges and should have regional representation; (d) to request that the detailed activities under the objective in paragraph (b)(ii) consist of: (i) using the data from the Meeting of Experts to Assess the Extent of Current and Future Requirements for the collection and disposition of non-reusable and unwanted ODS in Article 5 countries held in March 2006, data already published in reports from the Technology and Economic Assessment Panel and its subsidiary bodies, and other relevant existing data to describe possible economic incentives and their cost-effectiveness, whether inherent or external to the institutions under the Montreal Protocol, that would encourage disposition (e.g., reuse in other markets, transformation, destruction) of ODS that is locally unusable; (ii) describing the capacity and location of all global existing facilities with destruction technologies approved by the Parties to the Montreal Protocol, comparing this capacity to the estimated volume of ODS predicted to be recovered and locally unusable in the March 2006 Experts’ Meeting report, the viability and potential costs of using these existing destruction technologies, and the regulatory requirements for transporting the locally unusable ODS; and (iii) describing opportunities</p>



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		other than existing destruction technologies for the disposition of locally unusable ODS, and the viability and potential costs of using these other approaches; (e) to request the Secretariat to report to the 51st Meeting of the Executive Committee on the status of the process for contracting a consultant for carrying out the study; (f) to consider at the 52 <sup>nd</sup> Meeting of the Executive Committee the content of a progress report to be submitted to the Nineteenth Meeting of the Parties; and (g) to approve a budget for carrying out the study.
ExCom 52/5	Licensing	The Fifty-second Meeting of the Executive Committee decided: (a) to note the report on the status/prospects of Article 5 countries in achieving compliance with the initial and intermediate control measures of the Montreal Protocol as contained in UNEP/OzL.Pro/ExCom/52/7/Rev.1; (b) to request UNDP and El Salvador to expedite the submission of the terminal phase out management plan proposal to the 53rd Meeting; (c) to urge those countries that have not established licensing systems to endeavour to establish such systems as soon as possible; The Fifty-second Meeting of the Executive Committee decided: (a) to note the report on the status/prospects of Article 5 countries in achieving compliance with the initial and intermediate control measures of the Montreal Protocol as contained in UNEP/OzL.Pro/ExCom/52/7/Rev.1; (b) to request UNDP and El Salvador to expedite the submission of the terminal phase out management plan proposal to the 53rd Meeting; (c) to urge those countries that have not established licensing systems to endeavour to establish such systems as soon as possible;
ExCom 52/6	Retrofit	Following the discussion, the Executive Committee decided: (a) To urge Article 5 countries and respective implementing agencies to intensify their efforts to advance the implementation of approved incentive programmes in order to meet the established targets and phase-out schedules; (b) To draw the attention of Article 5 countries for which terminal phase-out management plans had been approved or would be approved in the near future to incentive programmes as a possibility for achieving CFC phase-out in the refrigeration servicing sector, provided the necessary pre-conditions were in place and lessons learned from previous programmes were taken into account; (c) To request the implementing and bilateral agencies concerned to disseminate the lessons learned from the implementation of incentive programmes among Article 5 countries, including through the regional network meetings; (d) To request all bilateral and implementing agencies that were implementing or considering implementing incentive programmes for retrofits to take into account all the elements contained in paragraph (e) below, as they might apply to their programmes; and (e) To request UNDP in cooperation with the Fund Secretariat: (i) To provide, as part of the guidelines, a template for calculating estimated operating savings and efficiency gains resulting from retrofitting or replacing a given refrigeration system, as well as the economic benefits of extending the life time of retrofitted equipment; (ii) To clarify, during the preparation of incentive programmes, the methodology of calculating planned and actual CFC phase-out, taking into account local circumstances; (iii) To include in the guidelines the preparation of country-specific implementation milestones in order to facilitate monitoring and avoid delays; iv) To foresee in the guidelines the possibility of adapting the scale and sequence of payments to local situations and to increase the maximum limit of US \$10,000 for large-sized end-users in order to motivate them to proceed with the conversion where the total cost might significantly exceed their maximum entitlement; and (v) To incorporate into the guidelines a preference for the use of drop-in alternatives based on natural substances such as hydrocarbons, and to use HCFC ternary blends as drop-in substitutes for CFC-12 only in exceptional circumstances, taking into account safety issues.
ExCom 52/7, para. 57	Customs training	The Fifty-second Meeting of the Executive Committee decided: (a) to request the Senior Monitoring and Evaluation Officer to reorganize the final report on the evaluation of the Compliance Assistance Programme (CAP), (UNEP/OzL.Pro/ExCom/52/9), around the seven issues identified in paragraphs 9(a) to 9(g) of that document; (b) to request UNEP to consider further regionalization of CAP resources; (c) to request UNEP to focus the CAP on: (i) countries in potential or actual non-compliance, taking into account the likely difficulties of a number of countries in meeting the 85 per cent reduction target for CFC in 2007, to be followed by the total phase-out of CFCs, halons and carbon tetrachloride by 31 December 2009; (ii) latecomers to the Montreal Protocol, in order: a. to strengthen their institutional structures and develop local capacities; b. to facilitate the establishment of appropriate ODS-related legislation and regulations; and c. to support their public awareness activities. (iii) further involving more advanced and experienced Article 5 countries to assist and advise less advanced in the same region; (iv) further strengthening local capacities of trained trainers and partner training institutes formed during the “train the trainers” phase to enable future and continued <b>training of customs officers</b> and refrigeration technicians on a sustainable basis. UNEP should also develop a strategy that would integrate the local training capacity created, placing emphasis on national ownership and securing access to appropriate know-how beyond 2010; (v) further promoting collaboration between <b>customs</b> and environmental authorities, in cooperation with professional associations, in order to strengthen the enforcement of legal regulations; (vi) assisting, where applicable, the enforcement of unified regulations in regional <b>customs unions</b> or other areas of political and economic cooperation; and (d) to urge UNEP and the other agencies to ensure close

Decision Number	Sector/ Sub-sector/Title	Decision Text
		coordination of activities in order to avoid overlapping actions; in particular, UNEP should always consult with the lead agency for national phase-out plans, terminal phase-out management plans or other phase-out plans and projects before providing technical or policy advice.
ExCom 54/11 (a)	Evaluation of management, monitoring and verification of NPPs in non-LVC countries	The Fifty-fourth Meeting of the Executive Committee decided: (a) to encourage Article 5 countries implementing phase-out plans to consider: (i) issuing decrees (orders usually emanating at the ministerial level), to the extent possible, so as to introduce the needed policies, bans and restrictions, given the complexity and time required to create or amend legislation; (ii) undertaking a comprehensive needs analysis for the further training of customs officers, and developing a training plan utilizing the train the trainer approach and integrating ODS issues into the regular curriculum in order to create sustainable training capacities; (iii) the possibility of eventually charging participants or their employers fees for technician training so as to increase their sense of ownership and generate funds for additional training activities; (iv) using voucher systems to enable workshops to select the recovery and recycling (R&R) equipment that they wanted and needed, while paying for part of the cost both to increase the likelihood of that equipment being used and to allow a greater amount of equipment to be purchased; (v) when developing business plans for reclamation centres, demonstrating how such centres could be made self-sustainable; (vi) undertaking a needs analysis, where not yet done, or at the least an estimate based on best available information or surveys, and developing comprehensive training plans for the remaining numbers of refrigeration technicians to be trained; (vii) routinely monitoring local market-place conditions as prices for CFCs, and their substitutes tended to be good indicators of the potential risk for illegal trade;
ExCom 54/39	Guidelines for preparation of HPMPs	The Fifty-fourth Meeting of the Executive Committee decided to adopt the following guidelines: (a) countries should adopt a staged approach to the implementation of an HCFC phase-out management plan (HPMP), within the framework of their over arching strategy; (b) as soon as possible and depending on the availability of resources, countries should employ the guidelines herein to develop, in detail, stage one of the HPMPs, which would address how countries would meet the freeze in 2013 and the 10 per cent reduction in 2015, with an estimate of related cost considerations and applying cost guidelines as they were developed; (c) the elaboration of stage one of the HPMP and subsequent stages should be developed as follows: (i) for countries with consumption in the servicing sector only: a. to be consistent with existing guidelines for the preparation of RMPs/RMP updates pursuant to decisions 31/48 and 35/57; and, if applicable, with the preparation of TPMPs pursuant to decision 45/54; b. to contain commitments to achieve the 2013 and 2015 HCFC control measures and include a performance-based system for HPMPs based on the completion of activities in the HPMP to enable the annual release of funding for the HPMP; (ii) for countries with manufacturing sectors using HCFCs, HPMPs should contain a national performance-based phase-out plan (NPP) with one or several substance or sector-based phase-out plans (SPP) consistent with decision 38/65 addressing consumption reduction levels sufficient to achieve the 2013 and 2015 HCFC control measures and provide starting points for aggregate reductions, together with annual reduction targets; (d) for countries that chose to implement investment projects in advance of completion of the HPMP: (i) the approval of each project should result in a phase-out of HCFCs to count against the consumption identified in the HPMP and no such projects could be approved after 2010 unless they were part of the HPMP; (ii) if the individual project approach was used, the submission of the first project should provide an indication of how the demonstration projects related to the HPMP and an indication of when the HPMP would be submitted; (e) consideration should be given to providing funding for assistance to include HCFC control measures in legislation, regulations and licensing systems as part of the funding of HPMP preparation as necessary and confirmation of the implementation of the same should be required as a prerequisite for funding implementation of the HPMP; (f) in cases where there were multiple implementing agencies in one country, a lead agency should be designated to coordinate the overall development of stage one of the HPMP; (g) HPMPs should contain cost information at the time of their submission based on and addressing: (i) the most current HCFC cost guidelines at the time of submission; (ii) alternative cost scenarios based on different potential cut-off dates for new capacity if a specific cut-off date had not yet been decided, for funding eligibility of manufacturing facilities as specified in decision 53/37(k), as well as the current policy for a 25 July 1995 cut-off date; (iii) alternative cost scenarios for the operational and capital costs for second conversions; (iv) the incremental costs of regulating import and supply to the market of HCFC dependent equipment once proven alternatives were commercially available in the country and describing the benefits to the servicing sector of associated reduced demand; (v) cost and benefit information based on the full range of alternatives considered, and associated ODP and other impacts on the environment including on the climate, taking into account global-warming potential, energy use and other relevant factors; (h) countries and agencies were encouraged to explore potential financial incentives and opportunities for additional resources to maximize the environmental benefits from HPMPs pursuant to paragraph 11(b) of decision XIX/6 of the Nineteenth Meeting of the Parties; (i) HPMPs should address: (i) the use of institutional arrangements mentioned in decision 53/37(e) and (f); (ii) the roles and responsibilities of associations of refrigeration technicians and other

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ExCom 58/6	Evaluation of TPMPs	<p>industry associations and how they could contribute to HCFC phase-out; and (j) HPMPs should, as a minimum, fulfil the data and information requirements, as applicable, listed in the indicative outline for the development of HPMPs, as set out in Annex XIX to the present report.</p> <p>The Fifty-eighth Meeting of the Executive Committee decided: (a) to take note of the final report on the evaluation of terminal phase-out management plans (TPMPs) as presented in document UNEP/OzL.Pro/ExCom/58/8; (b) to request: (i) bilateral and implementing agencies assisting Article 5 countries in implementing TPMPs to provide the National Ozone Units regularly with updated financial reports on fund disbursement and commitments associated with the activities in the TPMP projects so that they would be in a position to account to their respective governments; (ii) Article 5 countries to give due consideration to enhancing their data collection and monitoring systems for control of ODS trade in order to improve the quality and reliability of the import/export data from customs authorities, companies and servicing workshops, where applicable; (iii) bilateral and implementing agencies, when implementing the last tranche(s) of the TPMPs, to advise and assist Article 5 countries in reviewing current ODS regulations, including licensing systems, and in incorporating import/export regulations on HCFCs; (iv) bilateral and implementing agencies and Article 5 countries to consider establishing effective and targeted monitoring and reporting mechanisms, which could include establishment of programme management units if countries chose to do so, in order to ensure adequate assessment, monitoring and reporting of the results of TPMPs, in particular regarding recovery and recycling and end-user projects; (v) bilateral and implementing agencies assisting Article 5 countries to provide information on technical feasibility and economic viability when considering the establishment of new ODS reclamation and recycling centres in future requests for TPMP tranches; (vi) Article 5 countries, when developing and/or designing training programmes for technicians, to include specific modalities for assisting the refrigeration service technicians who had not received formal training; and (c) to encourage Article 5 countries to establish and/or strengthen refrigeration technicians' associations in order to promote good practices in the refrigeration sector through recovery, recycling, leak detection and prevention of unnecessary use of ODS.</p>																											
ExCom 60/44	Cost guidelines stage I of HPMPs	<p>The Sixtieth Meeting of the Executive Committee decided, inter alia: Eligible incremental costs of HCFC phase-out projects HCFC phase-out in the refrigeration servicing sector (xi) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes must include in their HPMP, as a minimum: a. A commitment to meeting, without further requests for funding, at least the freeze in 2013 and the 10 per cent reduction step in 2015, and if the country so decides, the 35 per cent reduction step in 2020. This shall include a commitment by the country to restrict imports of HCFC-based equipment if necessary to achieve compliance with the reduction steps and to support relevant phase-out activities; b. Mandatory reporting, by the time funding tranches for the HPMP are requested, on the implementation of activities undertaken in the refrigeration servicing sector and in the manufacturing sector when applicable, in the previous year, as well as a thorough and comprehensive annual work plan for the implementation of the following activities associated with the next tranche; c. A description of the roles and responsibilities of major stakeholders, as well as the lead implementing agency and the cooperating agencies, where applicable; (xii) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes will be provided funding consistent with the level of consumption in the refrigeration servicing sector as shown in the table below, on the understanding that project proposals will still need to demonstrate that the funding level is necessary to achieve the 2013 and 2015 phase-out targets, and if the country so decides, the 2020 phase-out targets:</p> <table border="1" data-bbox="762 1052 1780 1365"> <thead> <tr> <th>Consumption (metric tonnes)*</th> <th>Funding up to 2015 (US\$)</th> <th>Funding up to 2020 (US\$)</th> </tr> </thead> <tbody> <tr> <td>&gt;0 &lt; 15</td> <td>51,700</td> <td>164,500</td> </tr> <tr> <td>15 &lt; 40</td> <td>66,000</td> <td>210,000</td> </tr> <tr> <td>40 &lt; 80</td> <td>88,000</td> <td>280,000</td> </tr> <tr> <td>80 &lt; 120</td> <td>99,000</td> <td>315,000</td> </tr> <tr> <td>120 &lt; 160</td> <td>104,500</td> <td>332,500</td> </tr> <tr> <td>160 &lt; 200</td> <td>110,000</td> <td>350,000</td> </tr> <tr> <td>200 &lt; 320</td> <td>176,000</td> <td>560,000</td> </tr> <tr> <td>320 &lt; 360</td> <td>198,000</td> <td>630,000</td> </tr> </tbody> </table> <p>(*) Level of baseline HCFC consumption in the refrigeration servicing sector.</p>	Consumption (metric tonnes)*	Funding up to 2015 (US\$)	Funding up to 2020 (US\$)	>0 < 15	51,700	164,500	15 < 40	66,000	210,000	40 < 80	88,000	280,000	80 < 120	99,000	315,000	120 < 160	104,500	332,500	160 < 200	110,000	350,000	200 < 320	176,000	560,000	320 < 360	198,000	630,000
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		(xiii) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes and that receive funding consistent with the above table, will have flexibility in utilizing the resources available to address specific needs that might arise during project implementation to facilitate the smoothest possible phase-out of HCFCs; (xiv) Article 5 countries that have total HCFC consumption of up to 360 metric tonnes, used in both the manufacturing and refrigeration servicing sectors, could submit HCFC phase-out investment projects in accordance with prevailing policies and decisions of the Multilateral Fund, in addition to funding for addressing HCFC consumption in the servicing sector; (xv) Article 5 countries that have total HCFC consumption above 360 metric tonnes should first address consumption in the manufacturing sector to meet the reduction steps in 2013 and 2015. However, if such countries clearly demonstrate that they require assistance in the refrigeration servicing sector to comply with these targets, funding for these activities, such as training, will be calculated at US\$4.50/metric kg, which will be deducted from their starting point for aggregate reductions in HCFC consumption. HCFC phase-out in the aerosol, fire extinguisher and solvent sectors (xvi) The eligibility of incremental capital and operating costs for HCFC phase out projects in the aerosol, fire extinguisher and solvent sectors will be considered on a case-by-case basis.
ExCom 72/17	Retrofit to flammable refrigerants	The Seventy-second Meeting of the Executive Committee decided to include in the approval of HCFC phase out management plans, tranches, projects or activities that proposed the retrofit of HCFC based refrigeration and air conditioning equipment to flammable or toxic refrigerants that the Executive Committee notes that, if the country engages in retrofitting HCFC-based refrigeration and air-conditioning equipment to flammable or toxic refrigerants and associated servicing, it does so on the understanding that they assume all associated responsibilities and risks.
ExCom 72/41	Minimizing adverse climate impact of HCFC phase-out in the refrigeration servicing sector	The Seventy-second Meeting of the Executive Committee decided: (a) To take note of documents UNEP/OzL.Pro/ExCom/70/53/Rev.1 and UNEP/OzL.Pro/ExCom/72/42 on minimizing adverse climate impact of HCFC phase-out in the refrigeration servicing sector; (b) To invite relevant bilateral and implementing agencies to consider the information contained in documents UNEP/OzL.Pro/ExCom/70/53/Rev.1 and UNEP/OzL.Pro/ExCom/72/42 when assisting Article 5 countries in the preparation and implementation of activities in the refrigeration servicing sector contained in their HCFC phase-out management plans (HPMPs); and (c) To encourage Article 5 countries, when implementing their HPMPs, to consider, as needed and feasible: (i) The development of regulations and codes of practice, and the adoption of standards for the safe introduction of flammable and toxic refrigerants given the potential risk of accidents and negative effects on health associated with their use; (ii) Measures to limit the import of HCFC-based equipment and to facilitate the introduction of energy efficient and climate-friendly alternatives; and (iii) Focusing activities in the refrigeration servicing sector on training of technicians, good practices, the safe handling of refrigerants, containment, recovery and recycling and reuse of recovered refrigerants rather than retrofitting.
ExCom 73/34	Retrofit to flammable refrigerants	The Seventy-third Meeting of the Executive Committee decided that, if a country were to decide, after taking into account decision 72/17, to proceed with retrofits that used flammable substances in equipment originally designed for non flammable substances, it should be done only in accordance with the relevant standards and protocols.
ExCom 74/50	Cost guidelines stage II of HPMPs	At its Seventy-fourth meeting, the Executive Committee decided, in determining criteria for funding HCFC phase-out in the consumption sector for stage II of the HCFC phase out management plans (HPMPs) in Article 5 countries, <i>inter alia</i> : HCFC phase-out in the refrigeration servicing sector, including servicing for all the relevant refrigeration and air conditioning subsectors (xi) Article 5 countries with total HCFC consumption of up to 360 metric tonnes, and former low-volume consuming (LVC) Article 5 countries with HCFC consumption in the refrigeration servicing sector only above 360 metric tonnes, must include in their HPMPs, as a minimum: a. A commitment to meeting, without further requests for funding at least the 35 per cent reduction step in 2020, and, if the country so decided, the 67.5 per cent reduction step in 2025 or the complete phase-out of HCFCs in line or ahead of the Montreal Protocol schedule. This should include a commitment by the country to restrict imports of HCFC-based equipment if necessary to achieve compliance with the reduction steps and to support relevant phase-out activities; b. Mandatory reporting, by the time funding tranches for the HPMP were requested, on the implementation of activities undertaken in the refrigeration servicing sector and in the manufacturing sector when applicable, in the previous year, as well as a thorough and comprehensive annual work plan for the implementation of the activities associated with the next tranche; c. A description of the roles and responsibilities of major stakeholders, as well as the lead implementing agency and the cooperating agencies, where applicable; (xii) Article 5 countries with total HCFC consumption of up to 360 metric tonnes would be provided with funding consistent with the level of consumption in the refrigeration servicing sector, as shown in the table below, on the understanding that project proposals would still need to demonstrate that the funding level was necessary to achieve the 2020 and 2025 phase-out targets, or if the country so decided, later reduction targets:

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ExCom 80/76	HFC phase-down cost guidelines	<p data-bbox="537 902 2003 1222">The Eightieth Meeting of the Executive Committee decided, <i>inter alia</i> (c) To request the Secretariat to prepare a preliminary document for the 82nd meeting, in cooperation with bilateral and implementing agencies, on all aspects related to the refrigeration servicing sector that support the HFC phase-down, taking into account: (i) Previous policy documents, case studies, monitoring and evaluation reviews, and the work undertaken by bilateral and implementing agencies in developing and implementing training and technical assistance programmes, in particular the partnership that the Compliance Assistance Programme had established with world recognized training and certification institutes; (ii) Analysis of the existing capacities in Article 5 countries with the funding approved thus far for the refrigeration servicing sector and how those could be utilized for HFC phase-down, in relation to: a. The results of funded recovery, recycling and reclamation activities and the provision of servicing tools, and their potential to reduce refrigerant emissions; b. The extent of the involvement of the private and/or public sector (e.g. equipment, components and refrigerant suppliers) in introducing and adopting alternatives in the servicing sector; c. Health and safety standards, protocols and equipment (including protective equipment) available for alternatives; d. Training and certification programmes; e. If and how energy efficiency was addressed in the servicing/end-user sector; and (iii) The minimum information needed for the development of training and competency-based certification programmes and modules for service technicians and customs officers for the transition to alternatives.</p>																																								
MOP IV/24	Recovery, recycling and reclamation	<p data-bbox="537 1232 2003 1416">The Fourth Meeting of the Parties decided: 1. to annul Decision I/12 H of the First Meeting of the Parties ("Imports and exports of bulk used controlled substances should be treated and recorded in the same manner as virgin controlled substances and included in the calculation of the Party's consumption limits"). 2. not to take into account, for calculating consumption, the import and export of recycled and used controlled substances (except when calculating the base year consumption under paragraph 1 of Article 5 of the Protocol), provided that data on such imports and exports are subject to reporting under Article 7. 3. the Parties also agreed on the following clarifications of the terms "recovery", "recycling" and "reclamation": (a) Recovery: The collection and storage of controlled substances from machinery, equipment, containment vessels, etc., during servicing or prior to disposal; (b) Recycling: The re-use of a recovered controlled substance following a basic cleaning process such as filtering and drying. For refrigerants, recycling normally involves</p>																																								

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		recharge back into equipment which it often occurs "on-site"; (c) Reclamation: The re-processing and upgrading of a recovered controlled substance through such mechanisms as filtering, drying, distillation and chemical treatment in order to restore the substance to a specified standard of performance. It often involves processing "off-site" at a central facility. 4. urged all the Parties to take all practicable measures to prevent releases of controlled substances into the atmosphere, including, inter alia: (a) to recover controlled substances in Annex A, Annex B and Annex C of the Protocol, for purposes of recycling, reclamation or destruction, that are contained in the following equipment during servicing and maintenance as well as prior to equipment dismantling or disposal: (i) stationery commercial and industrial refrigeration and air conditioning equipment; (ii) mobile refrigeration and mobile air-conditioning equipment; (iii) fire protection systems; (iv) cleaning machinery containing solvents; (b) to minimize refrigerant leakage from commercial and industrial air-conditioning and refrigeration systems during manufacture, installation, operation and servicing; (c) to destroy unneeded ozone-depleting substances where economically feasible and environmentally appropriate to do so.
MOP IX/8	Licensing	The Ninth Meeting of the Parties decided: 1. that the licensing system to be established by each Party should: (a) assist collection of sufficient information to facilitate Parties' compliance with relevant reporting requirements under Article 7 of the Protocol and decisions of the Parties; and (b) assist Parties in the prevention of illegal traffic of controlled substances, including, as appropriate, through notification and/or regular reporting by exporting countries to importing countries and/or by allowing cross-checking of information between exporting and importing countries; 2. to facilitate the efficient notification and/or reporting and/or cross-checking of information, each Party should inform the Secretariat by 31 January 1998 of the name and contact details of the officer to whom such information and requests should be directed. The Secretariat shall periodically prepare, update and circulate to all Parties a full list of these contact details; 3. that the Secretariat and Implementing Agencies should take steps to assist Parties in the design and implementation of appropriate national licensing systems; 4. that Parties operating under Article 5 may require assistance in the development, establishment and operation of such a licensing system and, noting that the Multilateral Fund has provided some funding for such activities, that the Multilateral Fund should provide appropriate additional funding for this purpose.
MOP VI/19 (b)	Recovery, recycling and reclamation	The Sixth Meeting of the Parties decided with respect to trade in previously used ozone-depleting substances, (d) to request all Parties with reclamation facilities to submit to the Secretariat prior to the Seventh Meeting of the Parties and on an annual basis thereafter a list of the reclamation facilities and their capacities available in their countries;
MOP VII/25	Customs training	The Seventh Meeting of the Parties requested the Executive Committee to provide specific support to low-volume-ODS-consuming countries (LVCs) by: (a) allocating sufficient funds for projects in low-volume-ODS-consuming countries to further strengthen and expand awareness and training programmes, especially in the area of refrigerant management; (b) supporting specialized assistance such as a workshop to establish regulatory and legislative measures required to facilitate the phase-out of ozone-depleting substances; (c) allowing financing of eligible retrofitting projects, in sectors vital to LVC economies on a case-by-case basis where this can be shown to be the best approach; (d) requesting the United Nations Environment Programme, due to its extensive experience with low-volume-ODS-consuming countries (LVCs), to take the lead in preparing an overall approach in addressing these needs; (e) providing funds to low-volume-ODS-consuming countries, on a regional basis, to organize <b>training workshops for their customs</b> and other officers on the harmonized system and other systems to control and monitor consumption of ozone-depleting substances; Approval of projects in low-volume-ODS-consuming countries and very low-volume-ODS-consuming countries should be based upon a more appropriate project-appraisal approach reflecting the particular circumstances encountered by the countries referred to above.
MOP VII/5	Recycled CFCs	The Seventh Meeting of the Parties decided, on the status of recycled CFCs and halons under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, that the international transfers of controlled substances of the Montreal Protocol which are recovered but not purified to usable purity specifications prescribed by appropriate international and/or national organizations, including International Standards Organization (ISO), should only occur if the recipient country has recycling facilities that can process the received controlled substances to these specifications or has destruction facilities incorporating technologies approved for that purpose.
MOP XII/8 (3(a))	Task force on destruction technologies	The Twelfth Meeting of the Parties decided: 3. to request the Technology and Economic Assessment Panel: (a) to evaluate the technical and economic feasibility for the long-term management of contaminated and surplus ozone-depleting substances in Article 5 and non-Article 5 countries, including options such as long-term storage, transport, collection, reclamation and disposal of such ozone-depleting substances;
MOP XIX/12	Licensing	The Nineteenth Meeting of the Parties decided: 1. to remind all Parties of their obligation under Article 4B of the Protocol to establish an import and export licensing system for all controlled ozone-depleting substances; 2. to urge all Parties to fully and effectively implement and actively enforce their

Decision Number	Sector/ Sub-sector/Title	Decision Text
		<p>systems for licensing the import and export of controlled ozone depleting substances as well as recommendations contained in existing decisions of the Parties, notably decisions IX/8, XIV/7, XVII/12, XVII/16 and XVIII/18; 3. that Parties wishing to improve implementation and enforcement of their licensing systems in order to combat illegal trade more effectively may wish to consider implementing domestically on a voluntary basis the following measures: (a) sharing information with other Parties, such as by participating in an informal prior informed consent procedure or similar system; (b) establishing quantitative restrictions, for example import and/or export quotas; (c) establishing permits for each shipment and obliging importers and exporters to report domestically on the use of such permits; (d) monitoring transit movements (trans-shipments) of ozone-depleting substances, including those passing through duty-free zones, for instance by identifying each shipment with a unique consignment reference number; (e) banning or controlling the use of non-refillable containers; (f) establishing appropriate minimum requirements for labelling and documentation to assist in the monitoring of trade of ozone-depleting substances; (g) cross-checking trade information, including through private-public partnerships; (h) including any other relevant recommendations from the ozone-depleting substances tracking study; 4. to request the Ozone Secretariat to continue to collaborate with the World Customs Organization in relation to possible actions by Parties on any new amendments to the Harmonized Commodity Description and Coding System with respect to ozone depleting substances and to report to the Meeting of the Parties on actions taken at the World Customs Organization.</p>
MOP XVII/16	Customs training	<p>The Seventeenth Meeting of the Parties decided: 1. to approve the terms of reference for a study on the feasibility of developing an international system of monitoring the transboundary movement of controlled ozone-depleting substances between Parties, as presented in Annex VI.3 to the present report, and to request the Ozone Secretariat to undertake such a study, to initiate the necessary tenders and to present the results to the Eighteenth Meeting of the Parties to the Montreal Protocol in 2006; 2. to invite the Ozone Secretariat to consult with other conventions or organizations who might benefit from the outcome of that study to contribute towards its work; 3. to urge all Parties, including regional economic integration organizations, to implement fully their obligations under Article 4B of the Montreal Protocol, in particular, the licensing systems for the control of imports, exports, re-exports (re-exports mean exports of previously imported substances) and, if technically and administratively feasible, transit of all controlled ozone-depleting substances, including mixtures containing them, regardless of whether the Party concerned is or is not recognized as the producer and/or importer, exporter or re-exporter of the particular substance or group of substances; 4. to request the Ozone Secretariat to revise the reporting format resulting from decision VII/9 to cover exports (including re-exports) of all controlled ozone-depleting substances, including mixtures containing them, and to urge the Parties to implement the revised reporting format expeditiously. The Ozone Secretariat is also requested to report back aggregated information related to the controlled substance in question received from the exporting/re-exporting Party to the importing Party concerned; 5. to invite Parties to submit information to the Ozone Secretariat by 30 June 2006 on any existing systems for exchanging information on import and export licenses between importing and exporting Parties; 6. to consider additional control measures with regard to the use of controlled ozone depleting substances in particular sectors or in particular applications, as this approach may effectively diminish illegal trade activities; 7. to encourage further work on the Green Customs initiative of the United Nations Environment Programme in combating illegal trade in controlled ozone depleting substances as well as further networking and twinning activities in the framework of regional networks aimed at the exchange of information and experience on both licit and illicit trade in controlled ozone depleting substances between the Parties, including enforcement agencies; 8. to request the Executive Committee to consider at its forty-eighth meeting the recommendations contained in the report of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the Evaluation of Customs Officers Training and Licensing System Projects to the twenty-fifth meeting of the Open-ended Working Group”, in particular where they relate to customs training and other elements of capacity building that are needed in combating illegal trade in controlled ozone-depleting substances; 9. to approve a maximum amount of \$200,000 from the Trust Fund of the Vienna Convention as a one-time measure to facilitate the feasibility study on developing a system for monitoring the transboundary movement of controlled ozone-depleting substances between the Parties.</p>
MOP XVII/17	Implications of the environmentally sound destruction of concentrated and diluted sources of ODSs	<p>The Seventeenth Meeting of the Parties decided: 1. to request the Technology and Economic Assessment Panel to prepare terms of reference for the conduct of case-studies in Parties operating under paragraph 1 of Article 5 of the Protocol, with regional representation, on the technology and costs associated with a process for the replacement of chlorofluorocarbon-containing refrigeration and air conditioning equipment, including the environmentally sound recovery, transport and final disposal of such equipment and of the associated chlorofluorocarbons; 2. that these studies should explore economic and other incentives which will encourage users to phase out equipment and ozone-depleting substances and to reduce emissions, as well as the viability and costs of setting up destruction facilities in countries operating under paragraph 1 of Article 5 of the Protocol, and that the said studies should include a regional analysis relating to the management, transport and destruction of chlorofluorocarbons; 3. also to request the Technology</p>

Decision Number	Sector/ Sub-sector/Title	Decision Text
		and Economic Assessment Panel to review possible synergies with other conventions such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants; 4. to request the Technology and Economic Assessment Panel to adopt the recovery and destruction efficiency parameter proposed in the Panel's report to the Open-ended Working Group at its twenty-fifth meeting as the parameter to be applied in developing the proposed study referred to above; 5. that said terms of reference shall be submitted to the Parties at the twenty-sixth meeting of the Open-ended Working Group, and that provision will be made for resources for this purpose in the 2006–2008 replenishment of the Multilateral Fund.
MOP XVII/18	Collection and disposition of non-reusable and unwanted ODS	The Seventeenth Meeting of the Parties decided to request the Technology and Economic Assessment Panel and its technical options committees to submit to the Multilateral Fund secretariat available data to enable the Multilateral Fund secretariat to assess the extent of current and future requirements for the collection and disposition (emissions, export, reclamation and destruction) of non-reusable and unwanted ozone-depleting substances in Article 5 Parties in pursuance of decision 47/52.
MOP XVIII (annex V)	Recovery, reclamation and recycling	The Eighteenth Meeting of the Executive Committee decided to consider the provision of recovery/recycling equipment to commercial refrigeration companies in projects related to servicing and recovery/recycling in the refrigeration sector in the future.
MOP XVIII/18	Customs training	The Eighteenth Meeting of the Parties decided: 1. to urge all Parties to implement fully Article 4B of the Protocol as well as to take into account recommendations contained in existing decisions of the Parties, notably decisions IX/8, XIV/7, XVII/12 and XVII/16; 2. to encourage all Parties to consider taking effective action to improve monitoring of transboundary movement of controlled ozone-depleting substances including, as appropriate, a better utilization of existing systems under other multilateral agreements for tracking trade in chemicals and to exchange relevant information specifically in the context of trade in ozone-depleting substances between Parties operating under paragraph 1 of Article 5 of the Protocol and Parties not so operating; 3. to encourage all Parties which have experience in using the United Nations commodity trade statistics database, commonly known as "UNComtrade", and the publicly available software Global Risk Identification and Detection, commonly known as "eGRID", which are used to monitor trade in ozone-depleting substances, to provide information on the suitability and costs of those tools to the Ozone Secretariat, which will report such information at the twenty-seventh meeting of the Open ended Working Group and subsequently at the Nineteenth Meeting of the Parties in 2007; 4. to encourage the United Nations Environment Programme's Compliance Assistance Programme to continue its efforts to train ozone officers and customs officers on best practices and to raise awareness and to disseminate examples of best practices for national licensing systems and regional cooperation to combat illegal trade; 5. to invite all Parties to submit written comments by 31 March 2007 to the Ozone Secretariat on the report, focusing in particular on their priorities with respect to the medium- and longer term options listed in the study and/or all other possible options with a view to identifying those cost-effective actions which could be given priority by the Parties both collectively through further action to be considered under the Protocol and at the regional and national levels; 6. to request the Ozone Secretariat to provide a compilation of those comments for consideration at the twenty-seventh meeting of the Open-ended Working Group and subsequently at the Nineteenth Meeting of the Parties in 2007.
MOP XX/7	Environmentally sound management of banks of ozone-depleting substances	The Twentieth Meeting of the Parties decided: 1. to invite Parties, international funding agencies, including the Multilateral Fund and the Global Environment Facility, and other interested agents to enable practical solutions for the purpose of gaining better knowledge on mitigating ozone-depleting substance emissions and destroying ozone-depleting substance banks, and on costs related to the collection, transportation, storage and destruction of ozone depleting substances, notably in Parties operating under paragraph 1 of Article 5 of the Montreal Protocol; 2. to request the Executive Committee of the Multilateral Fund to consider as a matter of urgency commencing pilot projects that may cover the collection, transport, storage and destruction of ozone-depleting substances. As an initial priority, the Executive Committee might consider projects with a focus on assembled stocks of ozone-depleting substances with high net global warming potential, in a representative sample of regionally diverse Parties operating under paragraph 1 of Article 5. It is understood that this initial priority would not preclude the initiation of other types of pilot projects, including on halons and carbon tetrachloride, should these have an important demonstration value. In addition to protecting the ozone layer, these projects will seek to generate practical data and experience on management and financing modalities, achieve climate benefits, and would explore opportunities to leverage co-financing; 3. to encourage Parties to develop or consider further improvements in the implementation of national and/or regional legislative strategies and other measures that prevent the venting, leakage or emission of ozone depleting substances by ensuring: (a) proper recovery of ozone-depleting substances from equipment containing



Decision Number	Sector/ Sub-sector/Title	Decision Text
		<p>ozone depleting substances, during servicing, use and at end of life, where possible in applications such as refrigeration, air conditioning, heat pumps, fire protection, solvents and process agents; (b) the use of best practices and performance standards to prevent ozone-depleting substance emissions at the end of the product life cycle, whether by recovery, recycling, reclamation, reuse as feedstock or destruction; 4. to encourage all Parties to develop or consider improvements in national or regional strategies for the management of banks, including provisions to combat illegal trade by applying measures listed in decision XIX/12; 5. to invite Parties to submit their strategies and subsequent updates to the Ozone Secretariat as soon as possible for the purpose of sharing information and experiences, including with interested stakeholders of other multilateral environmental agreements, such as the United Nations Framework Convention on Climate Change and its Kyoto Protocol and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. The strategies will be placed on the Ozone Secretariat website, which will be updated regularly; 6. to note that any project implemented pursuant to the present decision when applicable should be done in conformity with national, regional, and/or international requirements, such as those mandated by the Basel Convention and Rotterdam Convention; 7. to request the Technology and Economic Assessment Panel to conduct a comprehensive cost-benefit analysis of destroying banks of ozone-depleting substances taking into consideration the relative economic costs and environmental benefits, to the ozone layer and the climate, of destruction versus recycling, reclaiming and reusing such substances. In particular, the report should cover the following elements: (a) consolidation of all available data on ozone-depleting substance banks and summary of this information identifying the sectors where recovery of ozone-depleting substances is technically and economically feasible; (b) respective levels of likely mitigation amounts, based on the categorization of reachable banks at low, medium, and high effort according to substances, sectors, regions, and where possible, sub regions; (c) assessment of associated benefits and costs of respective classes of banks in terms of ozone depleting potential and global warming potential; (d) exploration of the potential “perverse incentives” or other adverse environmental effects that may be associated with certain mitigation strategies, in particular related to recovery and recycling for reuse; (e) consideration of the positive and negative impacts of recovery and destruction of ozone-depleting substances, including direct and indirect climate effects; (f) consideration of the technical, economic and environmental implications of incentive mechanisms to promote the destruction of surplus ozone-depleting substances; 8. to request the Technology and Economic Assessment Panel to provide an interim report in time for dissemination one month before the twenty-ninth meeting of the Open ended Working Group and to provide the final report one month before the Twenty First Meeting of the Parties to the Montreal Protocol; 9. to request the Ozone Secretariat, with the assistance of the Multilateral Fund Secretariat, to consult with experts from the United Nations Framework Convention on Climate Change, the Global Environment Facility, the Executive Board of the Clean Development Mechanism, the World Bank and other relevant funding experts to develop a report on possible funding opportunities for the management and destruction of ozone-depleting substance banks, to present the report to the Parties for review and comments one month prior to the twenty ninth meeting of the Open-Ended Working Group and, if possible, to convene a single meeting among experts from the funding institutions; 10. that the report referred to in paragraph 9 of the present decision would focus on describing possible institutional arrangements, potential financial structures, likely logistical steps and the necessary legal framework for each of the following, if relevant: (a) recovery; (b) collection; (c) storage; (d) transport; (e) destruction; (f) supporting activities; 11. to request the Ozone Secretariat to convene a workshop among Parties that will include the participation of the Montreal Protocol assessment panels, the secretariat of the Multilateral Fund and the Fund’s implementing agencies, and seek the participation of the secretariats of other relevant multilateral environmental agreements, non governmental organizations and experts from funding institutions for the discussion of technical, financial and policy issues related to the management and destruction of ozone depleting substance banks and their implications for climate change; 12. that the above workshop will be held preceding the twenty-ninth meeting of the Open ended Working Group and that interpretation will be provided in the six official languages of the United Nations; 13. further to consider, at the twenty-ninth meeting of the Open-ended Working Group, possible actions regarding the management and destruction of banks of ozone-depleting substances in the light of the report to be provided by the Technology and Economic Assessment Panel under paragraph 7 above, the working group report to be provided by the Secretariat under paragraph 9 above and the discussions emanating from the workshop under paragraph 11 above; 14. to request the Ozone Secretariat to communicate the present decision to the Secretariat of the United Nations Framework Convention on Climate Change and its Kyoto Protocol in time for possible consideration at the fourteenth meeting of the Conference of the Parties to the Convention and fourth meeting of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol on the understanding that the decision is without prejudice to any discussions that may be held on ozone-depleting substance banks within their forum.</p>

Decision Number	Sector/ Sub-sector/Title	Decision Text
MOP XXV/8	Refrigerant servicing	The Twenty-fifth Meeting of the Parties decided: Recalling the parties' decisions on previous terms of reference for studies on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol, Recalling also the parties' decisions on previous replenishments of the Multilateral Fund, 1. To request the Technology and Economic Assessment Panel to prepare a report for submission to the Twenty-Sixth Meeting of the Parties, and to submit it through the Open-ended Working Group at its thirty fourth meeting, to enable the Twenty-Sixth Meeting of the Parties to take a decision on the appropriate level of the 2015–2017 replenishment of the Multilateral Fund; 2. That, in preparing the report referred to in paragraph 1 of the present decision, the Panel should take into account, among other things: (f) The need to allocate sufficient resources to the activities in the servicing sector in stage II of hydrochlorofluorocarbon phase-out management plans through technical assistance such as recovery, training and other necessary activities;
MOP XXVIII/2 (para.15 (c ))	Guidelines and cost calculation	To request the Executive Committee, in developing new guidelines on methodologies and cost calculations, to make the following categories of costs eligible and to include them in the cost calculation: (c) For the servicing sector: (i) Public-awareness activities; (ii) Policy development and implementation; (iii) Certification programmes and training of technicians on safe handling, good practice and safety in respect of alternatives, including training equipment; (iv) Training of customs officers; (v) Prevention of illegal trade of hydrofluorocarbons; (vi) Servicing tools; (vii) Refrigerant testing equipment for the refrigeration and air-conditioning sector; (viii) Recycling and recovery of hydrofluorocarbons;
MOP XXVIII/2 (para.16)	HFC cost guidelines	To request the Executive Committee to increase in relation to the servicing sector the funding available under Executive Committee Decision 74/50 above the amounts listed in that decision for parties with total hydrochlorofluorocarbon baseline consumption up to 360 metric tonnes when needed for the introduction of alternatives to hydrochlorofluorocarbons with low-GWP and zero-GWP alternatives to hydrofluorocarbons and maintaining energy efficiency also in the servicing/end-user sector;



## Annex II

## MULTILATERAL FUND EVALUATIONS RELATED TO THE REFRIGERATION SERVICING SECTOR

Title	Description	Key Findings
Desk study on the recovery and recycling projects (PCRs) (UNEP/OzL.Pro/ExCom/31/18)	This document presents a desk study on recovery and recycling (R&R) projects, excluding those that are part of a refrigerant management plan (RMP). For this desk study, 50 completed R&R projects and 41 project completion reports (PCRs) were studied. Field assessments of R&R projects were conducted by consultants during the evaluation of training projects.	The implementation of an RMP in low-volume consuming (LVCs) countries is an efficient means to reduce CFC emissions. Training programmes for trainers, technicians and customs officers are necessary to implement good refrigeration management practices and to efficiently monitor and control the import of ODS. However, the motivation to recover and recycle is still very low because there is no financial benefit, and the limited purchasing power of end users favours the large-scale use of second-hand refrigerators from abroad, which implies frequent repairs resulting in an increase in ODS consumption. Regulations prohibiting the imports of such refrigerators, coupled with customs training, will reduce this incidence. (Decision 31/15)
Report on the evaluation of training projects (UNEP/OzL.Pro/ExCom/31/20)	This report is a synthesis of the desk study and the 10 country studies of training projects. The objective was to review: training strategies; the planning of training projects by IAs and the NOUs; the design and delivery of training; and the results, impact and sustainability of training projects.	Training projects developed for countries have been well defined and developed in collaboration with the NOUs, national experts and associations. The timing and funding for training activities is usually adequate to target most of the trainees in the formal sector. The study recommended to integrate a comprehensive plan for sector phase-out in all future non-investment activities in the sector; to organize a train-the-trainers and a "hands on" training programmes for technicians, along with a certification system; to introduce awareness-raising activities following new policies requirements; to strengthen and involve local associations; and to have innovative solutions to train the informal sector. (Decision 31/17)
Extended desk study on RMP evaluation (UNEP/OzL.Pro/ExCom/39/14)	The desk study evaluation, with selected country visits in LVC countries, was planned to assess the progress achieved in implementing RMPs. It focused on R&R and training activities as well as policy measures in a country compliance context.	The experiences from the countries visited suggested that difficulties in implementing RMPs are fairly similar in LVC countries across the region, including: the price difference between CFCs and alternative substances; the validity and reliability of import/export data; and the implementation complications brought by the informal sector. The report concluded, <i>inter alia</i> , that the NOUs play a key role in coordinating and implementing projects, improved by strengthening their institutional basis. Cooperation with the industry and the associations has proven important in achieving compliance. Recycling centres are under-utilised or not utilised at all, but retrofitting programmes can be effective if there is a good import licensing system, a reliable control of the level of CFC consumption, a narrowing price differential between controlled and alternative refrigerants, and the introduction of economic incentives to enterprises.
Final report on the evaluation of the implementation of RMPs (UNEP/OzL.Pro/ExCom/41/7)	The synthesis report of the evaluation of the RMPs reassesses the first phase of the evaluation (desk study and country evaluation reports) and analyzes an additional sample of seven LVC countries. The report presents findings, lessons learned, and recommendations to improve the effectiveness of RMPs and to enhance the capacity of LVC countries to achieve CFC phase-out in the refrigeration servicing sector.	RMPs have played a decisive role in coordinating activities for the reduction of CFC consumption in the servicing sector and in accelerating the phase-out process. Most countries visited had complied with the freeze target by 1999. The most important factors contributing to this progress were enforced legislation, strict import controls reducing the availability of CFCs and adequate training of customs officers and refrigeration technicians. In all countries where such progress can be reported, close cooperation between the NOU and the stakeholders (i.e., importers, distributors and workshops) has been established. Political commitment and the capacity of the NOUs play an important role in successful implementation. (Decision 41/5)

Title	Description	Key Findings
Desk study on the evaluation of customs officer training and licensing system projects (UNEP/OzL.Pro/ExCom/44/12)	The objective of this desk study is to identify the results and impact of the implementation of customs training projects and the adoption of import licensing systems and, subsequently, to identify evaluation issues for further analysis and to prepare the field visits.	ODS import licensing and customs training activities were first funded as stand-alone and regional projects, but their rapid increase saw them included in RMPs. Rigorous application of import licenses and the completion of phase-out projects to reduce demand are the most productive methods of controlling international trade and reducing illegal trade. To overcome the implementation issues these projects face, the evaluation recommended <i>inter alia</i> focusing on awareness-raising of customs officers regarding ODS issues, and building a specialized customs team to deal with environmental problems, strengthening local/provincial environment authorities to actively support the control procedures, and relying on technicians, university staff or governmental laboratories to assist customs in identifying suspicious shipments.
Executive Committee Report on the Evaluation of Customs Officers Training and Licensing System Projects (UNEP/OzL.Pro.WG.1/25/6)	The report was prepared in response to decision XIV/7, paragraph 6 of the 14 <sup>th</sup> Meeting of the Parties to the Montreal Protocol and presented to the 25 <sup>th</sup> Meeting of the Open-ended Working Group (OEWG) in June 2005.	The recommendations of the OEWG were: Improving the involvement of customs, including the higher levels of hierarchy, in the ODS phase-out; amending and upgrading the legislation framework in those Article 5 countries where it is incomplete, and improving enforcement and regional cooperation; accelerating and assisting implementation of customs training, including regional activities, where appropriate; and amending training materials and contents and putting supporting information materials and identifiers to effective use.
Extended desk study on the evaluation of national phase-out plans (NPPs) (UNEP/OzL.Pro/ExCom/45/12)	The objective of the evaluation is to undertake a review of experiences under the new modalities (national phase-out plans (NPPs), sector plans and terminal phase-out management plans (TPMPs)) with a view to determining whether the anticipated benefits have accrued and remain useful and relevant, or need adjustment or updating.	The NPPs and TPMPs are designed to accelerate policy development, facilitate implementation and enhance awareness amongst stakeholders. The commitments stipulated in the agreements signed by governments have made the work of the PMUs/NOUs easier when it comes to accelerating the implementation of regulations, and led to inter-departmental cooperation and shared databases that improve monitoring and enforcement. Predictable funding assures a level playing field and allows industries to commit to a specific phase-out plan, while helping them adjust their production and consumption patterns based on the timing of future activities and framework conditions. The phase-out plans improved the implementation of policy and regulations. (Decision 45/11)
Final report on the intermediate evaluation of RMPs and NPPs in non-LVC countries focusing on the refrigeration sector (UNEP/OzL.Pro/ExCom/48/12)	The evaluation of RMPs in non-LVC countries follows the earlier evaluation of RMPs in LVC countries (UNEP/OzL.Pro/ExCom/41/7). As per decision 46/7, the evaluation of RMPs in non-LVCs and of NPPs was combined and focused on the refrigeration servicing sector and the management aspects of the NPPs.	RMPs have played an important role in establishing legal frameworks and training programmes for technicians and customs officers, which are generally less advanced in countries without a RMP. The NPPs are favoured by the additional management capacities created with the PMUs. The NPPs enabled countries without a RMP to address the servicing sector and related legislation and training requirements in a coordinated way, while increasing equipment, trained technicians and customs officers, and completed legislation and enforcement mechanisms. The results of R&R projects implemented individually or under RMPs have in most cases fallen short of expectations. Certification of technicians and reporting on R&R activities performed by contracted service shops should become mandatory and should be combined with provisions that unused equipment can be taken back and transferred to other users. It is recommended to update legislation for additional legal measures such as: a ban on import and export of CFC-based second-hand refrigeration equipment, specification of a system of sanctions in cases of violation of legal regulations, improvement of the mechanisms of import quota allocations under the licensing system, and enhancement of cooperation between the NOU and Customs. (Decision 48/10)
Desk study on the evaluation of management and monitoring of NPPs (UNEP/OzL.Pro/ExCom/51/13)	This evaluation complements the evaluation of RMPs and NPPs in non-LVCs (UNEP/OzL.Pro/ExCom/48/12), focusing on the refrigeration sector and	The phase-out programmes reviewed are, in general, on target. The evaluation raised the question of the cost-effectiveness of the project management units (PMU) frameworks, which can either be a sub-set of the NOU or an entirely separated entity working remotely. Therefore, it is essential to ensure that the capacity building, especially working with the private and informal sectors, is not confined to the PMU, but communicated on an on-going basis to the NOU. No lack of coordination

Title	Description	Key Findings
	not analyzing in depth the management, monitoring and verification aspects of the NPPs. The evaluation and the field visits reviewed the indicators for assessing implementation delays and difficulties and analyzed the coordination between several IAs implementing a NPP.	or delays was reported between the agencies. The IAs need to assist the PMU and NOU in the development and implementation of the associated legislation and regulations, supported by capacity building, institutional strengthening, stakeholder participation and development of ownership. It is thus necessary to ensure that the NPP is mainstreamed into the national plans and policies of the country, which requires cooperation with other governmental agencies. (Decision 51/12)
Extended desk study on the incentive programmes for retrofits (UNEP/OzL.Pro/ExCom/52/8)	The objective of the extended desk study is to review the experience available to date in the implementation of the incentive programmes approved as individual activities under existing or new RMPs.	It can be concluded that the objectives of the incentive programmes were achieved for completed projects. The cost-effectiveness of incentive programmes proved to be at par and even more attractive than other activities traditionally included in RMPs, TPMPs and NPPs. Incentive programmes in the refrigeration servicing sector should be considered as one of the priorities, along with training of refrigeration technicians and R&R equipment. Defining boundary conditions for the incentive programme without prescribing a strict methodology allowed the Governments the flexibility to adapt the implementation of the programme to local circumstances and assured success while meeting the conditions. The case studies confirmed that it is essential for a country to meet the pre-requisites established by the Executive Committee for approval of incentive programmes, such as strict enforcement of quotas. (Decision 52/6)
Desk study on the evaluation of terminal phase-out management plans (TPMPs) (UNEP/OzL.Pro/ExCom/55/8)	This evaluation analyzes the role of TPMPs in LVC countries for achieving CFC phase-out in the servicing sectors and enabling compliance with the 85 per cent reduction target for 2007. It evaluates <i>inter alia</i> , the coordination between the lead and cooperating agencies, the quality of monitoring and reporting, sustainability of measures and institutional capacities, and lessons learned for the final phase-out of CFCs and the preparation of phase-out plans for HCFCs.	The evaluation noted that the establishment of PMUs in LVC countries has to be considered on a country-by-country basis, as some resulted in direct competition with the NOUs. The review of TPMPs demonstrated the absence of standardized methodology in conducting surveys and collecting ODS consumption data in Article 5 countries and in LVC countries in particular. Achieving early CFC phase-out is possible with: sound design, realistic planning allowing sufficient time to start up activities, commitment and cooperation on the part of the Government and stakeholders, and a full-time staff or a PMU, dedicated to implementing and monitoring the TPMP.
Final report on the evaluation of terminal phase-out management plans (UNEP/OzL.Pro/ExCom/58/8)	This synthesis report summarizes the evaluation reports on the role and the effects of TPMPs, which have been prepared in several LVC countries, and assesses the findings of a sample of country case studies carried out in eight LVC countries.	Early CFC phase-out has generally been achieved through an efficient public-private partnership forum consisting of all stakeholders, a strict implementation of quota system and the development of market conditions rather than through investment activities. The sustainability is ensured by the efficient operation and enforcement of the import licensing system and continued monitoring and public awareness campaigns. Experience with the phase-out of CFCs can and should be used for the development of a strategy of HCFC phase-out. Although none of the countries covered by this sample have established a PMU, they are all in compliance with the TPMP agreement and the CFC phase-out targets. However, they would benefit from strengthening their monitoring to provide regular and reliable data on R&R operations. Most countries benefited from the flexibility clause, which made it possible to shift resources from one activity to another if deemed necessary to achieve targets. (Decision 58/6)

Title	Description	Key Findings
<p>Desk study on the evaluation of the preparatory phase of the phasing out of HCFCs (decisions 68/9 and 69/12) (UNEP/OzL.Pro/ExCom/71/14)</p>	<p>The study aims to evaluate how the guidelines for the preparation of HPMPs have been used for the development of the stage I HPMPs, taking into account the preparation process itself and the resulting HPMPs. It also reviewed the reasons for delays in project preparation, the overarching strategy, main initiatives, policy and regulatory measures, and co-financing issues.</p>	<p>The preparation of stage I of HPMPs has taken significantly longer than the preparation of country programmes, RMPs and TPMPs. Although the most important reasons for delays (i.e., lack of experience with HCFC data collection, lack of guidelines, and the need to complete CFC activities) are not likely to occur again, the evidence suggests that the timely preparation of stage II would benefit from increased technical assistance to low- and medium-volume consuming countries. The technical assistance for the RAC servicing sector requires updated guidelines for technology selection and assessment of associated environmental impact. Policy assistance for stage II for LVC countries should concentrate on far-reaching measures, such as the support of energy efficiency, or the safe use of natural refrigerant alternatives. (Decision 71/25)</p>
<p>Desk study on the evaluation of HCFC phase-out projects in the refrigeration and air-conditioning manufacturing sector (UNEP/OzL.Pro/ExCom/75/9)</p>	<p>The desk study on the evaluation of RAC manufacturing projects has the objective of providing information on the progress made in the phasing-out of HCFCs in this sector and examines projects approved in various RAC sub-sectors in 25 countries, addressing issues related to low-GWP alternatives.</p>	<p>The policy framework for HCFC phase-out is quite homogeneous with regard to the control of import/export and trade of HCFCs and the ban of new production facilities relying on HCFCs. However, the standards for the use of alternative technologies are lacking in some cases and need to be thoroughly addressed. Every country evaluated used energy efficiency as a criterion for selection of the alternative technology, and many used it to establish synergies with other environmental agreements. It proved cost-effective to build on the CFC-related enforcement procedures and monitoring tools to control the use of HCFC. The slow development of national standards for the use of some alternatives has hindered the start of operations and the timely completion of a significant number of conversions towards low-GWP flammable or toxic alternatives. The projects using these alternatives included additional training and safety-related equipment for enterprises and technicians with the corresponding changes in project costs, and took steps towards implementing proper standards and codes. Eighty per cent of projects presented substantial delays mainly due to administrative and project management issues, such as staff rotation at the NOU. The demonstration projects have confirmed the feasibility and acceptability of the new technology and products in the local market of end-users and manufacturers alike. (Decision 75/7)</p>
<p>Final report on the evaluation of HCFC phase-out projects in the refrigeration and air-conditioning manufacturing sector (UNEP/OzL.Pro/ExCom/77/9 &amp; Corrs.1 and 2)</p>	<p>The second phase of the evaluation of RAC manufacturing sector, based on the collection and analysis of information gathered at the enterprise level during field visits in several countries, assessed the progress made in the phasing out of HCFC in the RAC manufacturing sector in projects where the conversion process has been completed or is close to completion.</p>	<p>The evaluation concluded the importance of selecting alternative refrigerants and their operating systems based on a thorough analysis that includes energy efficiency, environmental impact, safety, economic considerations, as well as social consequences. Enterprises should evaluate the availability and/or limitations of equipment and refrigerants before converting. Lack of market demand and the servicing sector's reluctance to deal with flammable refrigerants has resulted in the manufacturing of high-GWP-based equipment in some enterprises, despite the fact that they had completed their conversion and developed prototypes for HFC-32. While large enterprises facing this issue may convert one or several production lines while increasing the production on other lines with high-GWP equipment, smaller enterprises cannot do this, as it would jeopardize their financial viability. It is recommended that countries and IAs report to the Executive Committee on the causes and strategies to address this situation, and enable the enterprises to start manufacturing equipment based on the agreed technology. In some countries, incremental operating costs were paid even if the enterprise was not manufacturing the agreed technology. Thus, sustainability is still an issue with the introduction of particularly R-290 and HFC-32 technologies and equipment. The technology selected to replace HCFC-22 in high ambient temperatures, while maintaining its condensing properties, is a critical issue. Countries should introduce licensing and import permits for all chemicals being used as refrigerants, as well as mandatory standards, proper training of servicing technicians and awareness campaigns regarding flammable, toxic and/or high-pressure refrigerants.</p>

Title	Description	Key Findings
Desk study for the evaluation of the refrigeration servicing sector (UNEP/OzL.Pro/ExCom/80/10 and Corr.1)	The desk study analyses the progress made in the phase-out of HCFCs in the refrigeration servicing sector, focusing on the contribution of specific activities to reduce HCFCs, on the impact arising from the introduction of low-GWP alternatives, and challenges encountered during project implementation. The evaluation draws lessons from these projects to help future similar activities in the sector and attempts to identify potential issues that could be related to the phasing down of HFCs.	Energy efficiency standards should be made mandatory for RAC equipment, with labelling requirements and, where possible, incentives such as tax exemption should be given. (Decision 77/6)  The results of HPMP implementation have been very positive so far. However, the reporting record of some of the countries points to the need for more focused assistance concerning HCFC consumption monitoring and reporting, which may affect future endeavours. Key lessons learned included: the importance of encouraging domestic innovative solutions to HCFC phase-out; the need to support training for handling of flammable or toxic refrigerants and the corresponding regulations and standards; the lack of availability of skilled technicians trained on new alternatives; the need to identify suitable alternatives for high-ambient temperature countries, particularly for the AC industry; the importance of strengthening the bridges between the NOU/PMU and other authorities in the country and empowering them with respect to central governments; the importance of training customs officers on the import/export licensing and quota systems, and ensuring the sustainability of training programmes by including the training modules in the curricula of the customs training institutions; and that refrigerant losses are mainly due to old equipment, which could be reduced and prevented by regular servicing and maintenance. (Decision 80/8)
Preliminary report for the second phase of the evaluation of the refrigeration servicing sector (UNEP/OzL.Pro/ExCom/81/7)	The preliminary synthesis report focused on the contribution of specific activities within servicing sector plans to reduce HCFCs, on the impact on servicing arising from the introduction of low-GWP alternatives, and on challenges encountered during project implementation in the field evaluation visits carried out before the 81 <sup>st</sup> meeting, namely in Chile, Grenada, India, Oman and Samoa.	The HPMP implementation has had outstanding results, which may be attributed to the “cascade effect” of all the initiatives implemented within the HPMPs. It has achieved HCFC consumption reductions beyond countries’ obligations, has leveraged funding resources by building on the infrastructure supported during the CFC phase-out and will, in turn, reinforce the building blocks for the HFC phase-down. Some of the main achievements are: the demonstration projects facilitated the transition to low-GWP technologies by identifying common barriers to the adoption of new technologies; and the local RAC associations and training schools are strategic partners for HPMP design and implementation. Findings also show that there is a need for accessible and early adoption of new standards involving technical and financial support; that technical assistance may be necessary to design business models adapted to local markets for the sustainability of RRR systems; that the adoption of the new alternative technologies is hampered by their high cost, safety and security issues, and the lack of local expertise when dealing with flammable, toxic or high pressured refrigerant; and that there is a general unavailability of equipment and servicing tools in the local market. (Decision 81/5)
Final report on the evaluation of the refrigeration servicing sector (UNEP/OzL.Pro/ExCom/82/11)	The synthesis report aims to provide a thorough analysis of the project implementation in the refrigeration servicing sector in a sample of countries, formulates lessons learned for improving future similar projects, and assesses potential issues that could be related to the phasing down of HFCs in the servicing sector.	The HPMP implementation has achieved HCFC consumption reductions above and beyond the Montreal Protocol obligations. HPMPs have leveraged the Multilateral Fund resources by building on the institutional and physical infrastructure created by the CFC phase-out, which will be emulated for the HFC phase-down. Key findings from the synthesis show that training of RAC technicians is the activity that has had the most impact across all countries. Similarly, the establishment of policy and regulatory frameworks has proven to be a powerful tool for compliance. On the other hand, the establishment of refrigerant R&R networks still needs to provide consistent measurable results and seems to be lacking an attractive and sustainable economic model adapted to each local condition. Projects would benefit from a streamlined administration process and a more independent and stable NOU, benefiting from additional operational assistance. Very low-volume consuming countries reported the need for additional assistance for monitoring and reporting.





### Annex III

## GLOBAL PRODUCTS DEVELOPED BY UNEP IN COOPERATION WITH INTERNATIONAL ORGANIZATIONS TO ASSIST THE REFRIGERATION SERVICING SECTOR IN ARTICLE 5 COUNTRIES

### SUMMARY OF RELEVANT TOOLS

1. UNEP OzonAction has re-focused its clearinghouse activities to develop tools that can be utilized by different stakeholders at the local level. For this purpose, OzonAction partnered with several international organizations and associations to develop products that are technologically up-to-date and easy to use.

2. Table 1 summarizes the list of OzonAction key partnerships against relevant products and tools that can be utilized by A5 countries while implementing their phase-out/phase-down programs and projects.<sup>60</sup>

**Table 1. List of OzonAction key partnerships and relevant products and tools**

Partner*	Product	Availability	Who could benefit
ASHRAE	Refrigerants Literacy: E-learning course with international certificate	(English) Available	Government officials, buildings owners, NOUs, consultants, other individuals who wish to learn about refrigerant progression, classification, applications and basic good management practices.
		(Spanish) Nov18	
		(French) Feb-19	
ASHRAE	Sound Management of Refrigerants: E-learning course with international certificate	(English) Nov-18	Servicing technicians and engineers as well as servicing contractors and building managers.
		(Spanish) Mar-19	
		(French) Mar-19	
	Refrigerant Management for Future Engineers (University Program)	Available	Engineering students: full-semester elective course on refrigerant management, designed as per academic requirements, offered at engineering universities and colleges.
EPEE	HFCs Outlook Model	Second pilot stage ongoing with eight countries. <sup>61</sup> Available to all countries in early 2019	NOUs that create a scenario model about HFCs vs. HCFCs projection (as substances and products based on those substances) against MP compliance targets.
AREA	Universal Training Kit	Mar-19	Training institutes and centres in A5 countries: the modular training kit can be used directly to build the desired format of any training course (subject/target groups/duration) through an online portal.
AHRI	Refrigerant Driving License (RDL)	Pilot stage ongoing with six countries. <sup>62</sup> Rollout to all countries expected in mid-2019	Industry stakeholders and governments: global industry-based qualification program on sound management of refrigerants, with international certificate recognized by the RAC industry. <sup>63</sup>

<sup>60</sup> It does not include information publications and events/functions that are developed in cooperation with partners, such as factsheets, technology briefs, O2C Roadshows, technical symposia/events that are already listed in the document titled "OzonAction list of products and tools."

<sup>61</sup> Bosnia and Herzegovina, Dominican Republic, Gabon, Guatemala, Honduras, Mali, Senegal and Sri Lanka

<sup>62</sup> Grenada, Suriname, Trinidad & Tobago, Rwanda, Maldives and Sri Lanka.

<sup>63</sup> RDL Industry supporting group includes: ABRAVA, ACAIRE, AREA, ASHRAE, EPEE, JRAIA, Refrigerant Australia, The Alliance.

Partner*	Product	Availability	Who could benefit
JRAIA	Risk Assessment Model (Roadmap) for use of flammable refrigerants	Part of PRAHA-II project. Ready by April 2019	Participating countries; all regions of the world with high ambient temperatures: a roadmap for building local risk assessment models, analysing risks and measures to be considered when using flammable refrigerants in the logistics (non-manufacturing) process, i.e. installation, operation and servicing of residential AC applications.
GFCCC, IIR, FAO & IEA	Cold Chain Database Model	Feb-19	Countries: A database model assisting in sorting and classifying cold-chain-related applications for better decision making about technology selection and phase-out/phase-down programs. The model will be offered as a tool that can be used during the preparation of Stage II of HPMPs, HFC plans and any relevant local surveys.
BFS	Good Practice Videos & Mobile App	Available	Technicians: a mobile app and a set of short educational videos about best practices in refrigeration servicing.
WCO	Customs E-Learning	Available	Customs and enforcement officers worldwide: a series of interactive training modules on the Montreal Protocol, legal trade facilitation and the prevention of illegal trade in ODS and alternatives.
UNODC / WCO	Customs Training Manual, Risk profiling guide	Available	Customs officers: a comprehensive guide to the Montreal Protocol and illegal trade issues. It provides guidance on the delivery of customs training workshops. The risk profiling guide (in development) provides guidance on applying intelligence-led enforcement to ODS trade.

\* ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers; EPEE: European Partnership for Energy and Environment; AREA: European association of refrigeration, air conditioning and heat pump (RACHP) contractors; AHRI: Air-Conditioning, Heating and Refrigerating Institute; JRAIA: Japan Refrigeration and Air Conditioning Industry Association; GFCCC: Global Food Cold Chain Council; IIR: International Institute of Refrigeration; FAO: Food and Agriculture Organization; IEA: International Energy Agency; BFS: Bundesfachschule Kälte-Klima-Technik; WCO: World Customs Organization; UNODC: UN Office of Drugs & Crime.

3. The formal framework of cooperation between UNEP and ASHRAE includes joint international and regional technical events; strengthening refrigeration and air-conditioning associations in Article 5 countries; facilitating access of Article 5 countries to ASHRAE's knowledge tools; developing joint e-learning training courses and outreach materials; developing international guidelines (assessment program) for good management of refrigeration and air-conditioning installations; participation in ASHRAE's refrigeration and research committees to ensure that the needs of Article 5 countries are known to ASHRAE for its standards; research and global activities.

4. UNEP has also established partnerships with other international and regional bodies and initiatives, including the Global Refrigerant Management Initiative (GRMI); Bundesfachschule Kälte-Klima-Technik (BFS); the China Household Electric Appliances Association (CHEAA); the China Trust Fund; the Emirates Authority For Standardization and Metrology (ESMA); the European Partnership for Energy and the Environment (EPEE); the Pacific Islands Forum Fisheries Agency (FFA); the Secretariat of the Pacific Community (SPC); the Green Customs Initiative (GCI); the Gulf Cooperation Council (GCC) Secretariat; and the League of Arab States (LAS) Secretariat.

## **Refrigeration servicing sector: UNEP OzonAction tools, products and services**

### **Introduction**

5. For the majority of Article 5 countries, the refrigeration servicing sector continues to be the largest, or only, consumer of ODS and is therefore one of the most important sectors being addressed by the Multilateral Fund. The possibility of addressing HCFC phase-out concurrently with the HFC phase-down could potentially allow for a more holistic, robust and comprehensive approach to assist the sector in reducing consumption, ensuring safe handling and optimal equipment operation, thus reducing energy consumption. Servicing technicians and operators need to be properly trained to safely commission, service, repair and decommission equipment based on alternative technologies (flammable, higher-toxicity, higher-pressure). HPMPs provide countries with an opportunity to make the right technology choices, in favour of non-HCFC and non-HFC, low-GWP refrigerants. Over the last few years, CAP has widened its scope and outreach to forge new partnerships, supporting activities for sustainable technician training and good servicing practices, as well as a harmonized model RAC certification programme for Multilateral Fund-wide use.

6. This document provides an overview and a brief explanation of OzonAction tools, products and services that have already been developed and that are in progress for the refrigeration servicing sector.

### **I. PUBLICATIONS AND GUIDES**

#### **Ozone and Climate Benefits in the RAC Sector**

7. A two-volume guide for technical and servicing technicians, and for purchasers/decision makers. The objective is to provide practical guidance on how best practices and operations can be adopted by servicing technicians to achieve ozone and climate benefits, and how these benefits can be measured and evaluated. It also covers issues such as system improvement, reliability, leakage and energy efficiency in the context of installation, commissioning and maintenance. The guide will be available in early 2019.

#### **Good Servicing Practices for Flammable Refrigerants: A Quick Guide**

8. The aim of this guide is to provide RAC servicing technicians with quick reference to key safety classifications and technical properties of commercially available flammable refrigerants. Additionally, it provides important safety guidance for the installation and servicing of room air-conditioners designed to use flammable refrigerants. The guide (published in 2018) has been distributed at relevant meetings, and is also available as an interactive e-book for smartphones (details on the OzonAction website).

#### **Good Servicing Practices: Phasing out HCFCs in the Refrigeration and Air-Conditioning Servicing Sector**

9. The main objective of this guide for trainers is to provide National Ozone Units and refrigeration and air-conditioning training institutes with a standardized module for delivering training programmes under the HCFC Phase-out Management Plan. It can be used together with web-based slides and interactive animated exercises. The guide (published in 2015) is available on the OzonAction website and has been distributed at relevant meetings.

### **Safe Use of HCFC Alternatives in Refrigeration and Air-conditioning: An overview for developing countries**

10. This publication provides an overview of flammable, higher-toxicity, and high-pressure alternatives to HCFCs and HFCs, their general characteristics and their application in the context of the safety issues. It provides guidance for the National Ozone Units (NOUs), servicing technicians and other interested parties in developing countries on how they can advise and assist national stakeholders in the selection and implementation of alternative refrigerants. The guide (published in 2015) is available on the OzonAction website and has been distributed at relevant meetings.

### **International Standards in Refrigeration and Air-Conditioning: An introduction to their role in the context of the HCFC phase-out in developing countries**

11. This guide provides an introduction to and a simple overview of the issues related to international standards in the refrigeration and air-conditioning sector and how they can be useful in the context of the phase-out of hydrochlorofluorocarbons (HCFCs) in developing countries as required by the Montreal Protocol on Substances that Deplete the Ozone Layer. The guide is available on the OzonAction website and has been distributed at relevant meetings (published in 2014).

## **II. FACTSHEETS AND INFORMATION NOTES**

12. Following the adoption of the Kigali Amendment, UNEP's OzonAction prepared a series of factsheets related to policy and technical issues associated with the Kigali Amendment. In addition, the following factsheets, available on the OzonAction website and distributed at relevant meetings, have been developed:

- (a) *Refrigerant designations*: produced by ASHRAE in cooperation with UNEP OzonAction, this factsheet provides information on refrigerants' designation and safety classification. It is updated every six months to indicate refrigerants newly assigned with "r" numbers (ASHRAE designations);
- (b) *Safety factsheets*: Three factsheets on the safe use of HCFC alternatives in RAC (flammable refrigerants, higher-pressure refrigerants, higher-toxicity refrigerants);
- (c) *Cold Chain Technology Briefs*: A series of concise policy briefs for a range of target audiences, including the RSS. The briefs were developed in cooperation with the International Institute of Refrigeration (IIR) and deal with issues such as refrigeration in food production and processing; cold storage and refrigerated warehouses; transport refrigeration; commercial, professional and domestic refrigeration; and fishing vessel application.

## **III. MOBILE APPLICATIONS, VIDEOS & WEB-BASED TOOLS**

### **GWP-ODP Calculator**

13. This application was designed for the Montreal Protocol National Ozone Units and RSS technicians, and should also be useful for other related stakeholders. The application will automatically perform the conversion between metric tonnes, ODP tonnes and/or CO<sub>2</sub>-equivalent tonnes (or kg), and display the corresponding converted values. The app includes both single-component substances and refrigerant blends; components of mixtures and their relative proportions (metric, ODP, CO<sub>2</sub>-eq) are also

displayed. The application can be downloaded (at no cost) from the Google Play Store and iTunes/App Store. It is also available in a web version that can be used from the OzonAction website.

#### **“WHAT GAS?”**

14. WHAT GAS? is a searchable chemical database of ODS, HFCs and their alternatives. RSS technicians and other stakeholders can quickly obtain additional information on substances of interest. National Ozone Officers, customs and enforcement officers and other stakeholders will find this tool helpful. WHAT GAS? makes it easy to find the following information on any specific refrigerant and other chemicals: chemical name, formula and type; ASHRAE designation; trade names; HS code; CAS and UN numbers; Montreal Protocol annex and control measures; ozone depleting potential (ODP); global warming potential (GWP); blend components; toxicity and flammability class; and main uses. The application can be downloaded (at no cost) from the Google Play Store and iTunes/App Store. It is also available in a web version that can be used from the OzonAction website.

#### **Refrigeration and Air-conditioning Technician Video Series**

15. This application consists of a series of short instructional videos on techniques, safety and best practices for refrigeration and air-conditioning (RAC) technicians. It serves as a complementary training tool for technicians to revise and retain the skills acquired during hands-on training. The application can be downloaded (at no cost) from the Google Play Store and iTunes/App Store.

#### **Good Servicing: Flammable Refrigerants Quick Guide**

16. This application is an electronic, interactive version of the UNEP OzonAction Quick Guide on Good Servicing Practices for Flammable Refrigerants. It offers easy reference to key safety classification and technical properties of flammable refrigerants available on the market. It also provides important safety guidance for the installation and servicing of room air-conditioners designed to use flammable refrigerants. This interactive guide allows the user to scroll and browse the text, jump to specific chapters, or use the comprehensive dynamic index to locate specific keywords, figures and tables. The application also includes a refrigerant charge size calculator and a room size calculator for flammable refrigerants. It can be downloaded (at no cost) from the Google Play Store and iTunes/App Store.

#### **Refrigerant Identifier Video Series**

17. This application provides guidance on the application of a refrigerant identifier. It consists of short instructional videos showing how to use and maintain a refrigerant identifier. It is intended for use by technicians involved in the servicing and maintenance of refrigeration and air-conditioning systems, Montreal Protocol National Ozone Officers, and Customs and Enforcement Officers. The application will be available for download (at no cost) from the Google Play Store and iTunes/App Store (expected in November 2018).

### **IV. ONLINE TRAINING TOOLS**

#### **Refrigerants Literacy e-Learning Course**

18. The Refrigerants Literacy e-Learning Course, developed in cooperation with ASHRAE, is the first of its kind for non-specialists. The course is offered to all NOUs and other stakeholders at no cost. The course is currently being translated into Spanish and French and will be offered in both languages by the end of 2018. Feedback on the course has been very positive due to its simplicity and thorough explanations of refrigerant-related issues in a language appropriate to both specialists and non-specialists. The course

includes interactive activities, knowledge checks, audio and video, and a final test. The course is mainly designed for non-specialists in HVAC&R operation and servicing, i.e. NOUs, policy makers, procurement officers, building owners, facility managers, etc., but is also recommended for HVAC&R engineers, consultants and technical people who wish to get a general, holistic overview. This course consists of four lessons on refrigerant types, refrigerant classification, refrigerant selection, and refrigerant management. It is available online on the ASHRAE training platform. ASHRAE creates an account, completes enrolment, and sends an email with instructions on how to access the course (details on the OzonAction website).

### **Sound management of refrigerants**

19. Developed in cooperation with ASHRAE, this will be the first e-learning course for technicians and engineers on the sound management of refrigerants, including all good servicing practices and issues related to new and flammable refrigerants. The course is planned to be completed by the end of 2018.

## **V. TRAINING PACKAGES AND PROGRAMS**

### **Universal Training Kit**

20. The specialised “Universal Training Kit on Alternative Refrigerants” was developed in cooperation with AREA<sup>64</sup> for the use of training institutes and centres in developing countries, with the aim of offering state-of-the-art information and knowledge on the best practices and techniques in managing and handling future, mainly flammable, refrigerants in a sound and safe manner. The modular course can be adapted to suit different sectors and sub-sectors (small and medium, domestic and light commercial workshops, commercial AC, large service companies and workshops, mobile AC, commercial refrigeration, plant operators and managers) and focuses on trainers and master trainers. The modules are: general module; hydrocarbons; and low-GWP HFC/HFO.

21. The course comprises pre-assessment test (to be taken before the training), post-training assessment, venue requirements for training (equipment, tools, aids, consumables, etc.), instructors’ minimum qualification; guide for the instructor; checklists and procedures to start and hold a training course; supporting syllabus, textbook, manuals, tables, charts; PowerPoint presentations for instructors; and hand-out Materials for the attendees

22. The Universal Kit will be offered, starting from 2019, to all NOUs and training institutes in A5 countries. A dedicated website portal will be developed to maximize outreach.

### **The Refrigerant Driving License**

23. The objective of the Refrigerant Driving License (RDL), an initiative by UNEP OzonAction and the Air Conditioning, Heating, and Refrigeration Institute (AHRI), is to develop a globally recognised and acceptable qualification program that sets minimum requirements for the proper and safe management of refrigerants in air-conditioning, heating, and refrigeration equipment. In close cooperation with industry and association partners, the initiative will set minimum qualification requirements and seek international recognition of such a program from industry and the governments. The RDL will address the requirements for sound management of different types of current and future refrigerants, including best practices for identifying, handling, charging, recovery and recycling, leak testing, storing, record-keeping, etc. The implementation of the RDL will be achieved through the HVAC&R industry business networks, which over time is expected to lead to its widespread recognition by governments and end users in both public and private sectors. AHRI and UNEP are promoting the RDL to HVAC&R associations via the Global

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<sup>64</sup> The European association of refrigeration, air conditioning and heat pump (RACHP) contractors.

Refrigerant Management Initiative (GRMI) and the International Council of Air-Conditioning, Refrigeration, and Heating Manufacturers Associations (ICARHMA) in order to create the right momentum for a globally accepted qualification program. An Advisory Committee has been formed with industry associations that support the RDL to provide technical advice and ensure that it does not conflict with existing certification schemes.<sup>65</sup> The RDL program encompasses three categories of equipment:

- (a) Small Applications;
- (b) Commercial Refrigeration;
- (c) Commercial AC.

24. The RDL Pilot Framework is as follows

- (a) Sets Competency (Qualification) Level;
- (b) Sets Skills/Tasks Documentation;
- (c) Train the Trainers/Assessors Sessions;
- (d) Technician Training Sessions;
- (e) Technician Testing;
- (f) Endorsing the Granting of Certificates.

25. Expected outcomes:

- (a) Minimal global qualification programme for servicing technicians (Refrigerant Driving License) developed, launched and operational;
- (b) Developing a globally acceptable programme that sets out the minimum qualification requirements for the HVAC&R Supply-Chain network whilst at the same time creating the international recognition of such programs by the industry and the governments;
- (c) This unified programme should concomitantly address, but not be limited to, the requirements for sound management of different types of current and future refrigerants;
- (d) The global HVAC&R industry will be the catalyst for the programme by ensuring its introduction and enforcement through its business networks;
- (e) Resources for the RDL will be sought from different sources including, but not limited to, AHRI, participating associations and societies, and the Multilateral Fund. UNEP foresees that RDL shall be self-sustained in the long term in terms of resources and operation

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<sup>65</sup> The Advisory Committee consists of: ABRAVA, ACAIRE, AREA, EPEE, JRAIA, Refrigerants Australia, the Alliance for Responsible Atmospheric Policy, the Russian Union of Refrigeration Enterprises and ASHRAE. ABRAVA: Brazilian trade association that represents refrigeration, air-conditioning, ventilation, heating, and air treatment equipment manufacturers. ACAIRE: Colombian air-conditioning and refrigeration association that represents business, institutes, professional members, technicians, correspondents, and students in the industry. AREA: Air conditioning and Refrigeration European Association. ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers. EPEE: European Partnership for Energy and the Environment. JRAIA: Japan Refrigeration and Air Conditioning Industry Association.



through a business-model concept which will be part of its core operational mechanism.

### The Refrigerant Driving License: Phase II

26. The next stage of the RDL is to complete the documentation of RDL for other categories (Commercial Refrigeration, Commercial AC and Enterprises) and to finalize the organizational and operational arrangements of the RDL I programme for wider application.

Competency Requirements	(A) Small Applications	(B) Commercial AC	(C) Commercial Refrigeration	(D) Enterprises
Basic knowledge (environment, refrigerant classification / types, applications and relevant policies)	X	X	X	
Handling, transportation, storage and management of refrigerant containers	X	X	X	
Servicing skills of leak detection, R&R, evacuation, charging and system tightness	X	X	X	
Logging and record keeping		X	X	X
Tools and equipment for the job	X	X	X	X
Employment skills, training and certification				X

### Refrigerant Management: Special Course for Future Engineers

27. The objective of this course, developed in cooperation with the American University in Beirut, is to support the engineering education process at various engineering institutes and colleges by acquainting future engineers with the knowledge and skills required to manage refrigerants soundly, as well as understand the technical and policy aspects associated with the refrigeration and air-conditioning industry. This special course is the first of its kind concerning refrigerant management that offers comprehensive scientific information and knowledge suitable for the academic level. The course was developed in accordance with academic requirements for engineering universities and colleges and it includes a complete set of lecture notes, presentations and activity sheets for a full-semester course (16 weeks). Through cooperation with ASHRAE and its university network of more than 450 engineering colleges and institutes worldwide, the course has been offered since early 2018; more than 40 universities and colleges have expressed interest in offering it. Twenty-four universities have already started offering the course in 2018 (including those in Brazil, Canada, Egypt, India, Indonesia, Lebanon, Pakistan, Peru, Philippines, Singapore, Serbia, Turkey, UAE & USA). The course outline is as follows:

- (a) Module 1 (4 weeks): Refrigeration & air-conditioning industry, evolution of refrigerants & environmental impacts;
- (b) Module 2 (3.5 weeks): Alternative refrigerants for different sectors & lubricants;
- (c) Module 3 (3 weeks): Containment of refrigerants, service & maintenance of air-conditioning & refrigeration systems;
- (d) Module 4 (2 weeks): Safe use & handling of refrigerants;
- (e) Module 5 (2 weeks): Related standards and codes for systems and substances.

## **VI. SPECIAL SERVICES IN COOPERATION WITH PARTNERS**

### **Training and Certification Programs**

28. The Montreal Protocol funding mechanism has assisted Article 5 governments in developing and introducing different schemes for certifying and qualifying RAC service technicians with the aim to ensure the provision of good service practices and to minimize emissions. The certification schemes differ notably between countries and regions in terms of their structure, comprehensiveness and ability to be adequately enforced. Accordingly, in collaboration with different partners, CAP has introduced different products and tools that can be incorporated into the national programs and HPMPs and complement national programs.

29. The competence of the personnel handling refrigerants is important from both an environmental and safety perspective. It is recommended that only certified technicians be allowed to install, maintain, repair, recover, and dismantle RAC systems and to purchase refrigerants. Certifications can be issued to personnel or enterprises, or to a combination of the two. Certification is the best practical method to verify the competence of personnel handling refrigerants and to ensure the correct installation, maintenance, repair and dismantling of refrigeration, air-conditioning and heat pump systems. OzonAction has developed a guide, “National Certification Schemes for Refrigeration and Air Conditioning Service Technicians,” that provides Ozone Officers and RAC associations with examples of strategies and requirements for their establishment and operation. OzonAction also regularly includes discussions on certification programmes in its Regional Network and Thematic meetings.

### **Risk Assessment Model for high ambient temperature (HAT)**

30. OzonAction is building, in cooperation with partners, a comprehensive Risk Assessment Model for the logistics (installation, operation and servicing) of air-conditioning units that operate with lower-GWP refrigerants in high-ambient-temperature (HAT) countries. The project also assesses the technology transfer barriers, to reduce dependency on high-GWP alternatives and technologies. The project outcome will not only benefit the participating countries, but all regions of the world where high ambient temperatures are prevalent. Progress reports of EGYPRA and PRAHA-II projects, including the detailed analysis and comparison of HAT testing projects, have been shared during network meetings and through specific thematic workshops.

### **HFC Outlook Model**

31. UNEP OzonAction teamed up with the European Partnership for Energy and the Environment (EPEE) in a project to develop the “HFCs Outlook Model.” The HFCs Outlook Model is a scenario model for comparing local consumption and use of HFCs and HCFCs in different consuming sectors historically and at present. It also presents different projection scenarios for each substance and sector, based on global, regional and local forecasts of technology trends obtained through exhaustive consultation process with local stakeholders and key players. Stage I of the project was piloted successfully in Bahrain and Kuwait, and was presented to all Article 5 parties at the Interregional Networks Meeting (January 2018 in Paris). Accordingly, and as requested by several Article 5 parties, OzonAction and EPEE started the second pilot of the HFCs Outlook Model with a focus on the servicing sector, which will engage additional countries, i.e.: Bosnia and Herzegovina, the Dominican Republic, Gabon, Guatemala, Honduras and Senegal.

### **Cold Chain Database Model for A5 Countries**

32. UNEP OzonAction is developing, in cooperation with the GFCCC<sup>66</sup> and international RAC association partners, a Cold Chain Sector database model for the compilation of information and data about technologies and trends, with a view to pilot it in select Article 5 countries as part of the data collection and analysis work under the Kigali Enabling projects.

### **Customs and Enforcement: UNEP OzonAction Tools, Products and Services**

#### **Introduction**

33. As part of CAP's work in assisting countries to comply with their HCFC phase-out commitments and sustaining compliance with prior targets, OzonAction provides support to strengthen national capacity for effective customs & trade controls. This is achieved through the development of a range of materials intended to support customs and enforcement officers in their work to implement national licensing systems for ozone-depleting substances, and future commitments on HFCs under the Montreal Protocol, to detect and prevent illegal trade in these chemicals, and to facilitate legal trade. Many of these materials are produced in cooperation with our partner organizations.

#### **I. PUBLICATIONS AND GUIDES**

##### **Training Manual for Customs Officers: Saving the Ozone Layer - Phasing out Ozone-Depleting Substances in Developing Countries - Third Edition**

34. The *Training Manual for Customs Officers* provides the necessary guidance and information to effectively monitor and facilitate legal trade in ozone-depleting substances and to combat their illegal trade. It presents information on the international policy context and an overview of technical issues, including information on chemicals and products traded and how these may be smuggled. The manual is intended for use in conducting training programmes for Customs Officers, as well as serving as a stand-alone reference document. Now in its third edition, it takes into account the developments in international trade and provides new material to reflect changes in the Montreal Protocol, Harmonized System codes, licensing systems and other relevant information added since its original publication in 2001 and its second edition in 2008. The guide (published in 2013) is available on the OzonAction website and has been distributed at relevant meetings.

##### **Ozone-depleting substances smuggling and concealment case-study handbook**

35. This handbook, which provides information and guidance on commonly used methods of smuggling and concealment of ODS, is intended to promote cooperation between criminal justice agencies within borders, and to strengthen the law enforcement response to illegal trade in chemicals controlled under the Montreal Protocol. The handbook is targeted to enforcement officers and is particularly beneficial to Police, Customs and Border Security Officials. It provides technical information that will reinforce officers' understanding of ODS and assist with the recognition and detection of illegal trade in these chemicals. The Handbook was developed in cooperation with the INTERPOL Environmental Crime Programme. It is available on demand only (due to its enforcement-sensitive content) and has been distributed at relevant meetings (published in 2013).

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<sup>66</sup> Global Food Cold Chain Council.

### **Risk assessment of illegal trade in HCFCs**

36. This report provides a summary of recent cases of illegal trade, and lists existing policy measures to combat HCFC smuggling. By considering market conditions for HCFCs and drawing parallels with the context and methods used by smugglers which led to chlorofluorocarbon (CFC) smuggling, the report provides an analysis of the risks of HCFC smuggling becoming entrenched, and makes recommendations on how this illegal trade can be prevented. The report was developed in cooperation with the Environmental Investigation Agency. The guide (published in 2011) is available on the OzonAction website and has been distributed at relevant meetings.

### **Informal Prior-Informed Consent (iPIC): Supporting compliance through prevention of illegal and unwanted trade in ozone-depleting substances**

37. This short booklet briefly describes the mechanism and the advantages of the iPIC system. It provides some information on iPIC's results and successes and encourages countries that are not yet members to join and to begin to reap the benefits of this initiative. The booklet (published in 2015) is available on the OzonAction website and has been distributed at relevant meetings.

### **Legislative and Policy Options to Control Hydrofluorocarbons**

38. This booklet provides developing countries with a suite of different options that they may wish to consider, including both mandatory and voluntary approaches to developing, enacting and enforcing different legislative and policy measures to facilitate a smooth HFC phase-down process. This guide complements the previous OzonAction publication, *HCFC Policy & Legislative Options: A Guide for Developing Countries* (2010). The booklet was published in 2018 and is available on the OzonAction website.

### **Establishing an HCFC import quota system**

39. This booklet provides the necessary information and practical guidance for developing countries to design and implement a workable and effective quota system that will contribute to ensuring the country's compliance with the Montreal Protocol HCFC phase-out schedule. The booklet is available on the OzonAction website and has been distributed at relevant meetings (published in 2012).

## **II. FACTSHEETS AND INFORMATION NOTES**

40. UNEP's OzonAction continues to prepare factsheets providing relevant information and describing the immediate and future challenges to be addressed by the different Parties. The following factsheets and information notes, available on the OzonAction website, are of specific interest to customs and enforcement officers, as well as NOUs:

### **Customs Poster**

41. The updated Customs Poster provides concise information on ODS and alternatives and a short checklist of issues for customs officers to keep in mind when handling ODS shipments (updated in 2016).

### **Customs Officer's Quick Tool for Screening ODS**

42. A quick reference tool for customs and enforcement officers that provides access to key information regarding ODS, their alternatives, and relevant customs codes.

### **Refrigerant Designations**

43. Produced by ASHRAE in cooperation with UNEP OzonAction, this factsheet provides information on refrigerant designation and safety classification, and is updated every six months to indicate new refrigerants which are assigned “R” numbers (ASHRAE designations).

### **Harmonized System code factsheets:**

- (a) HS nomenclature (HS codes) for HCFCs and certain other ozone-depleting substances (post-Kigali update);
- (b) Commonly traded HCFCs and mixtures containing HCFCs (post-Kigali update);
- (c) Commonly used non-ODS substitute refrigerants (post-Kigali update);
- (d) Common products and equipment containing or reliant on HCFCs;
- (e) HS codes for HFCs: Actions to take ahead of the of the new 2022 HS (in production, with WCO).

### **Free trade zones and trade in ODS**

44. As part of international trade, many ODS shipments pass through Free Trade Zones (FTZ). Lack of proper oversight and controls in such zones can create an environment where illegal trade in ODS can proliferate. This paper provides a brief overview of the subject.

### **The informal prior-informed consent (iPIC) mechanism**

45. The iPIC mechanism is a voluntary and informal system of information exchange on intended trade between the authorities in importing and exporting countries that are responsible for issuing ODS trade licenses. This factsheet gives an overview of how this informal mechanism operates and provides some interesting information on the results of ODS trade control and monitoring, conducted through iPIC.

### **The Kigali Amendment to the Montreal Protocol: HFC phase-down**

46. This short paper provides an overview of the Kigali Amendment and its consequences.

### **The Kigali Amendment factsheet series and poster**

47. Following the adoption of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, UNEP's OzonAction prepared a series of factsheets describing the immediate and future challenges to be addressed by the different Parties between now and the time when the Amendment comes into force. A timeline poster is also available.

### **III. MOBILE APPLICATIONS, VIDEOS & WEB-BASED TOOLS**

48. In addition to the apps described in the refrigeration section above (“WHAT GAS?” app and the refrigerant identifier video app), the following products have been developed:

#### **iPIC**

49. The online iPIC system provides participating countries with real-time, 24-hour, 7-days-a-week personalized access to key licensing-system data in each of the 100 participating countries. The system provides a standardized and secured repository of iPIC data. Features of the online iPIC include the ability to search specific items of information; an interactive query and information sharing forum; the ability to easily and rapidly generate various reports and statistics; and the ability to update iPIC information with a simple click that will copy the information from a previous year. It is equipped with a FAQ section (which answers basic questions) and a Help section (which thoroughly explains how to use the online system); multi-lingual capability; and an interactive colour-coded map displaying country iPIC information sheet status. iPIC-online is accessible on an invitation-only basis (i.e. not open to the public). The platform is currently being upgraded and streamlined.

#### **Combating illegal trade in ODS: training video**

50. This 26-minute training video provides customs and enforcement officers with an overview of illegal trade in ODS, and shows specific cases and examples from around the world. It provides practical guidance and tips on identifying suspicious shipments and smuggled ODS. The video is available on demand only (due to its enforcement-sensitive content) and has been distributed at relevant meetings (published in 2014).

### **IV. ONLINE TRAINING TOOLS**

#### **E-Learning Modules for Customs Officers**

51. OzonAction and the World Customs Organization (WCO) jointly developed an e-learning course in 2009 devoted to the enforcement of the Montreal Protocol. The course has been updated several times since then. The course is based on the *UNEP Training Manual for Customs and Enforcement Officers* (Third Edition) and reflects WCO's expertise in developing and delivering online training to customs officers worldwide. The e-learning modules are hosted and disseminated through the WCO CLIKC platform. Since it is a closed enforcement platform, the modules are accessible on an invitation-only basis to all customs officers and NOUs on request. Updates and maintenance are ongoing.

#### **OzonAction Web pages**

52. OzonAction hosts a specific customs and enforcement page with a range of materials intended to support customs and enforcement officers in their work to implement national licensing systems for ODS, to detect and prevent illegal trade in these chemicals, and to facilitate the legal trade.

### **V. SPECIAL SERVICES IN COOPERATION WITH PARTNERS**

#### **World Customs Organization (WCO)**

53. UNEP and the WCO have had long-standing cooperation on the issues related to trade (and prevention of illegal trade) in ODS controlled under the Montreal Protocol and in their alternatives. This

cooperation was formalized with an MOU signed in 2003 as a cooperation framework between the two agencies, and has led to specific concrete initiatives, such as:

- (a) Developing e-learning modules on the Montreal Protocol and ODS trade with dissemination through WCO CLIKC platform (see above);
- (b) Cooperation on specific WCO operations:
  - (i) The *Sky-Hole Patching* initiative on ozone-depleting substances and hazardous waste (2006 to 2009);
  - (ii) The *Sky-Hole Patching II* project, in 2010: Customs from over 80 countries conducted a six-month global project to monitor trade and fight ODS smuggling, with support from the WCO, UNEP and National Ozone Units (NOUs); and
  - (iii) Ongoing operation on waste and ODS.
- (c) OzonAction representation at relevant meetings and workshops, including WCO Enforcement Committee, Customs Cooperation Council, Working Group on Commercial Fraud, and WCO Regional Intelligence Liaison Office (RILO) meetings;
- (d) Participation of WCO HQ and RILO representatives at OzonAction workshops and training sessions;
- (e) Cooperation on ECA and global ozone protection awards;
- (f) Survey/evaluation: comprehensive global assessment of customs training methodologies and infrastructure (Montreal Protocol), carried out in cooperation with the WCO;
- (g) Communication on issues of HS codes for ODS and alternatives, and other issues for joint factsheets, expert review of OzonAction factsheets and Customs Training Manual, and guidance to countries; and
- (h) OzonAction information materials and tools, uploaded on the secure *WCO Environet* platform.

### **Green Customs**

54. OzonAction is a member of the Green Customs Initiative. This initiative, launched in 2004, is a partnership of international organizations cooperating to enhance the capacity of customs and other relevant border-control officers to monitor and facilitate legal trade and to detect and prevent illegal trade in environmentally sensitive commodities covered by relevant trade-related Multilateral Environmental Agreements (MEAs) and international conventions. OzonAction (in cooperation with the Ozone Secretariat) provided a chapter on the Montreal Protocol and illegal trade in ODS to the Green Customs Guide.