行政院所屬各機關因公出國人員出國報告書
（出國類別：出席國際會議）

出席「蒙特婁議定書第三十四次締約國會議」報告

出國人服務機關、職稱及姓名：
駐加拿大台北經濟文化代表處業務組副組長 許佑福
行政院環境保護署簡任技正 蘇意筠
助理環境技術師 張育瑋

出國地點：加拿大蒙特婁

出國期間：111 年 10 月 29 日至 11 月 7 日

報告日期：112 年 2 月 4 日

摘要

蒙特婁議定書第 34 次締約方會議（以下簡稱 MOP 34）於西元（下同）2022 年 10 月 31 至 11 月 4 日假加拿大蒙特婁國際民航組織（ICAO）舉行，本次會議計有超過 180 多個國家及民間單位，共計 500 多位代表參與。

保護臭氧層維也納公約於 1985 年在各國協議下通過，1988 年正式生效，並於 1987 年通過具有實質管制規定及約束力的蒙特婁議定書，於 1989 年正式生效。這些年於各國合作協商下已再次通過 5 個蒙特婁議定書修正案與 14 個調整案，管制所有破壞臭氧層的化學物質，並分階段進行削減。其中，於 2010 年起讓全球禁止生產氟氯碳化物（CFCs）與海龍且消費量降為零，並大幅削減氟氯烴（HCFCs）。另因氟氯烴（HCFCs）之替代品氫氟碳化物（HFCs），具有較高的全球溫暖化潛勢值（GWP），故於 2016 年通過吉佳利修正案，並於 2019 年正式生效，管制 HFCs 排放，以同步保護臭氧層並減少溫室氣體排放問題，至 MOP 34 會議落幕時，計有 143 個締約方批准修正案。

本次會議議題包含吉佳利修正案各國執行狀況、大氣臭氧層破壞物質（ODSs）監測、避免低效率設備傾銷之執行作法、海龍及其替代品、溴化甲烷流通情形等。本次會議遲至加拿大東部標準時間（EST）2022 年 11 月 5 日凌晨 1 點 3 分結束，共計產生 24 項決議；其中，值得我國持續關注之決議及其後續發展包括：

1. 為強化推動高能效與低 GWP 值替代技術，技術與經濟評估委員會（TEAP）將提供締約方深入研究資料，並鼓勵各締約方強化合作機制。
2. 請各締約方於 2023 年 5 月 1 日前向聯合國環境規劃署（UNEP）臭氧秘書處提交其限制含有管制物質之冷凍冷藏空調或熱泵設備進口相關資訊，以作為後續會議討論訂定相關規範之參考。
3. 強化打擊非法走私，鼓勵各國技術分享。
4. 考量新冠疫情對開發中國家（Article 5 之 Group1）影響其 HFCs 基準量，請締約方於 2023 年 5 月 1 日前向臭氧秘書處完成 2022 年 HFCs 消費量數據資料申報作業，並完成 2018~2021 年每年申報資料作業，以供後續討論修改基準量使用。

另本次會議我團特別針對吉佳利修正案所管制之 HFC 使用於半導體製程之消費量認定、再生冷媒管理以及冷媒銷毀技術等議題，分別與英國、美國、日本與新加坡

等各締約方代表以及 TEAP 專家進行資訊交流，可作為我國後續研訂 HFCs、再生冷媒等管理策略與精進冷媒銷毀技術之重要參考依據。

目　　錄

壹、前言

臭氧層是指在平流層裡面的大量臭氧，可保護地球防止有害的紫外線輻射到達地表。西元（下同）1974 年科學家發現「氟氯碳化物（Chlorofluorocarbons，CFCs）」會破壞臭氧層，於當時這議題並不被重視，但在 1985 年英國南極勘測局發現臭氧層上有一個空洞（臭氧量非常低）後，立即引起全球各國的關注。世界各國於 1987 年簽訂「蒙特婁議定書」，以管制臭氧層破壞物質（Ozone Depleting Substances，ODSs）。

蒙特婁議定書自 1989 年 1 月 1 日起正式生效後，聯合國環境規劃署（United Nations Environment Programme，UNEP）臭氧秘書處隨即每年召開 1 次締約方會議（Meeting of the Parties，MOP），檢討議定書執行的現況、並協商其他 ODS 的管制方案及討論衍生的管制議題。一旦有增加新的管制方案與物質，則締約方會議會產出修正案（Amendments），且該修正案需要一定數目的締約國批准才具有效力；若無新增管制項目，僅是加嚴現有管制方案，則締約方會議會產出調整案（Adjustments），該調整案僅需締約方會議決議即可生效，無需締約國批准程序。截至目前，議定書共計產出 5 個修正案與 14 個調整案。

我國雖非聯合國會員國而無法成為蒙特婁議定書締約方，但為避免國內產業受到貿易阻礙，除透過內國法化方式於修訂空氣污染防制法時，明定針對國際公約管制之易致空氣污染物質訂定管制法規，並依循蒙特婁議定書相關規定陸續發布「蒙特婁議定書列管化學物質管理辦法」、「氟氯烴消費量管理辦法」以及「溴化甲烷管理辦法」，以管制我國 CFCs、海龍、氟氯烴（Hydrochlorofluorocarbons，HCFCs）以及溴化甲烷等破壞臭氧層物質之進出口與製造等行為外，亦自 1990 年起，每年以財團法人工業技術研究院之非政府組織（Non-governmental organization，NGOs）身分，派員出席蒙特婁議定書締約國會議，以掌握蒙特婁議定書締約國會議及周邊相關會議之最新資訊，據以滾動檢討我國相關法令與管制作為。此外，更運用此一場合與相關國家及民間機構進行交流，以進一步向國際間展現我國管理破壞臭氧層物質之作為與成效。

本次 MOP 34 為世界各國受新型冠狀肺炎疫情影響而連續兩年以視訊方式辦理後，首次恢復以實體會議方式辦理，除討論眾多議案外，多數開發中國家更以

新型冠狀肺炎影響其經濟發展為由，提出吉佳利修正案之消費基準量計算方式修正而成為本次會議之焦點。

貳、我國代表團

本次我國代表團由行政院環境保護署空氣品質保護及噪音管制處簡任技正蘇意筠、該署助理環境技術師張育瑋、駐加拿大台北經濟文化代表處業務組許佑福副組長、財團法人工業技術研究院楊斐喬經理及徐麗瀅工程師，共計 5 人與會參加，成員任務分工如表 1。

表 1、成員任務分工表

單位	職稱	姓名	任務分工
行政院環境保護署空氣品質保護及噪音管制處	簡任技正	蘇意筠	團長/對外交流
	助理環境技術師	張育瑋	資訊蒐集/行政事務
駐加拿大台北經濟文化代表處業務組	副組長	許佑福	外交事務
財團法人工業技術研究院	經理	楊斐喬	介紹國際友人/訪談人員洽詢
	工程師	徐麗瀅	行政事務

參、代表團行程及會議議程

MOP 34 於 2022 年 10 月 31 日至 11 月 4 日假加拿大蒙特婁之國際民航組織（International Civil Aviation Organization，ICAO）召開（如圖 1），本次會議計有 126 個締約方、61 個 NGO，合計 512 位各界代表出席與會。MOP 34 分為 2022 年 10 月 31 日至 11 月 2 日共 3 天的預備會議及 11 月 3 日至 4 日共 2 天的高層會議。本次代表團行程及會議議程，如表 2：

表 2、本次代表團行程及 MOP 34 議程

日期	行程
10/29~10/30	搭機前往加拿大蒙特婁
10/31	**預備會議** 1. 完成會場報到

	2. 聯合國環境規劃署代表致詞 3. 會議架構：確認預備會議討論議題項目、會議工作程序與架構 4. 多邊基金預算與財務報告，及審查 2023 年執委會、多邊基金及不限成員工作小組（OEWG）共同主席等資格多邊基金 2024~2026 年預算討論 5. 各部門評估小組 2024~2026 三年期報告之潛在重點領域
11/1	**預備會議** 1. 能源效率：提供高能效和低 GWP 技術的資訊，反傾銷低效製冷和空調設備 2. 加強《蒙特婁議定書》有效實施和執行的體制進程 3. 四氯化碳排放 4. 海龍及其替代品的未來可用性 5. 各項豁免有關的事項：溴化甲烷關鍵用途豁免提名、庫存、檢疫和裝運前用途 6. 為逐步削減 HFCs，以及應對與《蒙特婁議定書》和氣候有關的其他未來挑戰，加強技術和經濟評估小組（TEAP）及其技術選擇委員會
11/2	**預備會議** 1. 審議締約方提名的 TEAP 專家人選 2. 遵約與資料提報事項：蒙特婁議定書不遵守情事程序下設履行委員會的工作和建議 3. 吉佳利修正案的執行：HFCs 替代品審查、批准情況及 COVID-19 對 HFCs 基線的影響 4. 安全標準 5. 表彰 1995 年諾貝爾化學獎獲得者 Paul Jozef Crutzen、Mario José Molina 和 Frank Sherwood Rowland 的成就

	6. 其他事項
11/3	**高層會議** 1. 開幕典禮：MOP 33 主席、UNEP 代表、加拿大政府代表致詞 2. 會議架構：MOP 34 主席選舉、確認高階會議議程、會議工作程序與架構、代表之到任文件（Credentials of representatives） 3. 評估小組 2022 年四年期綜合報告 4. 多邊基金執行委員會主席報告基金執行內容與進展 5. 各國代表致詞與關鍵議題討論
11/4	**高層會議** 1. MOP 34 預備會議決議結果說明 2. MOP 35 會議地點與時間 3. 其他事項 4. MOP 34 會議決議 5. MOP 34 會議決議確認通過
11/5	整理 MOP 34 決議資料以及會議重要報告
11/5~11/7	由加拿大蒙特婁搭機返國

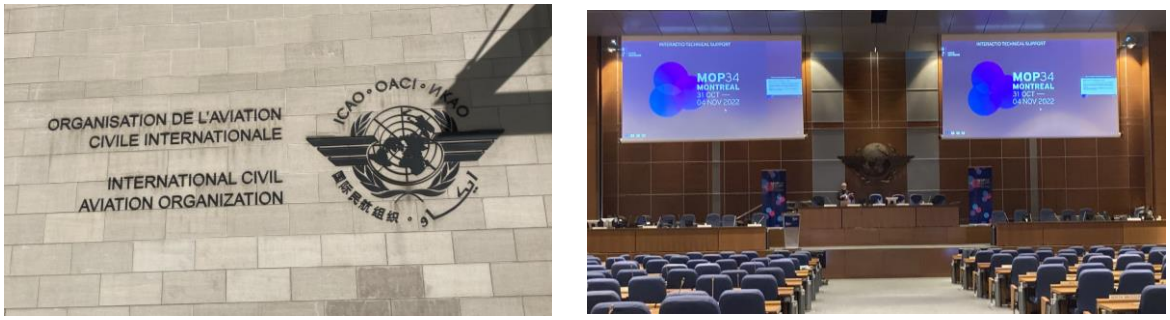

圖 1、會議地點：加拿大蒙特婁國際民航組織（ICAO）

肆、會議過程及重要決議

本次 MOP 34 我團以財團法人工業技術研究院之 NGOs 身分參加，於 2022 年 10 月 30 日順利完成報到並取得入場證如圖 2，並於 10 月 31 日起參與 MOP 34 及周邊會議，以下重點摘要我國應持續關注之決議、議題及其後續發展如下：

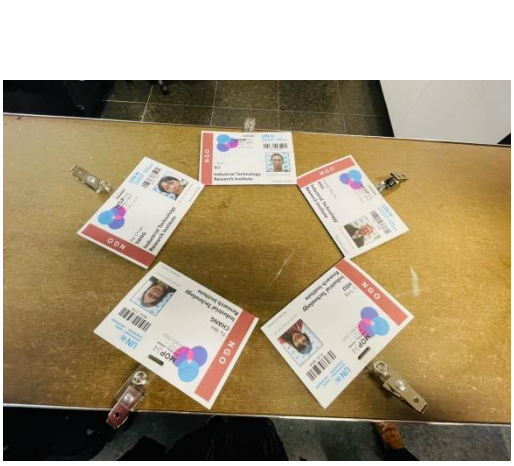

圖 2、我國出席人員順利取得入場證件

一、MOP 34 重點內容

本次會議共計產出 24 個決議文，我國應持續關注之決議及其後續發展內容如下：

（一）強化並促進高能源效率與低或零 GWP 值替代技術（Decision XXXIV/3）

全球暖化促使全球對於冷凍空調設備的需求攀升，惟使用冷凍空調設備需求亦將加劇氣候變遷的現象，而成為惡性循環，也可稱為冷卻悖論（cooling paradox）。UNEP 臭氧秘書處下的能源效率評估小組（EETF）強調冷卻技術對實現永續發展目標（SDG）具重要性，例如冷卻技術可以有效減少食品冷鏈、儲存藥物及疫苗的損失；轉換使用低 GWP 值替代品之冷媒兼具高能源效率設備，除減少 HFCs 排放量外，亦可減少 20%能源消費量。針對此議題本次會議上，美國、加拿大、挪威與英國共同提交了一份會議文件（Conference Room Paper, CRP），主要有 3 個重點：

1. 要求 UNEP 臭氧秘書處下的技術經濟評估小組（Technology

Economic Assessment Panel，TEAP）提供加強能源效率的相關資訊，包含能源有效的作法或技術，以減少能源使用與溫室氣體排放。

2. 要求 TEAP 自 2023 年起，每年的評估報告與四年期的研究報告納入冷凍空調及熱泵設備之能源效率資訊。

3. 要求 UNEP 臭氧秘書處在既有規範下，提出削減 HFCs 與提高能源效率之間的關聯性。

針對前述議題，另有密克羅尼西亞、加拿大、布吉納法索、歐盟、紐西蘭、中國、突尼西亞、塞內加爾等多數國家皆表達支持此共同提案，並願意就此議題繼續討論；其中，密克羅尼西亞提出另一份 CRP，其內容包括：

1. 要求 TEAP 定期提交能源效率之評估報告。

2. 加強開發中國家（A5 國家）ODSs 管理單位的能力，提升 HFCs 與能源效率之協同效益。

然針對上開國家所提議題，阿根廷則持反對意見，其主張能源效率議題已經超越原蒙特婁議定書之規範內容，儘管 HFCs 削減與能源效率具有相關性，兩者可以互相協調但不應在蒙特婁議定書下討論，且此為氣候變遷問題而非臭氧層保護問題，已悖離吉佳利修正案之目的。針對阿根廷之提案，亦有印度、巴西、科威特、巴林、沙烏地阿拉伯等國表示支持；其中，巴林指出能源效率已超過國家管制破壞臭氧層單位的能力，而科威特亦表示應著重 HFCs 源頭管制，而非新增更多的衍生議題。爰此，鑑於各締約方對此議題並無共識，最後主席裁示成立接觸小組（Contact group），於 MOP 34 大會期間繼續就此議題探討。最終決議如下：

1. **請 TEAP 評估小組在 2023 年評估報告中，納入有關改善設備能源效率資訊、節能產品、含低或零 GWP 值冷凍空調與熱泵設備之可用性、可取得性、電器相容性及成本等相關資訊**；執

行最低能源效率標準與標籤之驗證設備與其程序，以及自願性標籤計畫等相關資訊；**分析消費者與企業採用更高能源效率產品與低或零 GWP 值設備的障礙，同時包含前述產品或設備之電器相容性、過渡至前述產品或設備之解決方案**；以及分析導入高能源效率冷凍空調與熱泵設備之潛在效益，包含**削減 HFCs 同時提高設備能源效率之成本與氣候效益**；有關冷凍空調與熱泵設備之 GWP 值和能源效率的範圍與趨勢等相關可用等資訊。另**自 2023 年起，每年的評估報告與四年期的評估報告更新逐步削減 HFCs 冷凍空調與熱泵設備時之能源效率資訊**。

2. 請執行委員會繼續支持希望削減HFCs同時提高設備能源效率的締約方。

3. 另要求 UNEP 臭氧秘書處，**於 2023 年 MOP 會議舉辦一天的研討會，與各締約方分享履行吉佳利修正案期間提高能源效率產品與其低或零 GWP 值替代品的可用性與可取得性之經驗與挑戰，並提出削減 HFCs 與提高能源效率間之既有政策與其兩者間關聯性之評估報告**。

4. 鼓勵各締約方強化國內能源與 ODS 管理等政府部門間之合作協調機制，以削減 HFCs 同時提高設備能源效率，並支持國內設備之維運管理方案，包含技術人員培訓、提高能源效率、減少冷媒洩漏以及確認冷凍空調與熱泵設備之正確安裝與維修等服務。

（二）非法進口冷凍空調與熱泵設備（Decision XXXIV/4）

非洲國家迦納提案反傾銷無論新舊之低能源效率的設備，建議完全停止各締約方出口低能效設備，且應在各出口國國內妥善處理。針對此議題，MOP 34 決議：

1. 邀請已限制製造或進口內含管制物質之冷凍空調與熱泵設備（包括已執行最低源能效率標準）、且不想無償收到前述產品或設

備的締約方，於 2023 年 5 月 1 日前向 UNEP 臭氧秘書處提交有關禁止製造或進口的產品與其設備類型，包含 HS code 資訊、對於禁止製造或進口產品與設備之具體限制（例如允許使用 HFCs 之 GWP 上限值）、已立法訂定各產品或設備之最低能源效率標準以及非法將此類受限產品或設備進口至該國之任何企圖等資訊。

2. 於 2023 年 MOP 會議上審議此議題，並列入 OEWG 45 會議議程。

（三）鑑別全球列管物質大氣監測覆蓋之差距與強化此類監測的備選方案（Decision XXXIV/5）

依據蒙特婁議定書規範，CFCs 已在 2010 年全面禁用，不過 2018 年 Nature 期刊的研究報告指出大氣中 CFC 11 濃度增高，因此近年蒙特婁議定書聚焦討論 CFC 11 排放來源、各締約方是否遵約以及強化全球臭氧層破壞物質觀測能力（即監測機制）等。2021 年 MOP 33 會議通過一項強化全球與區域對蒙特婁議定書列管物質監測的決議，即請 UNEP 臭氧秘書處、綜合評估小組（SAP）、TEAP、臭氧研究管理小組（ORM）等專家於 MOP 34 報告提升 ODS 監測相關事宜，包含擇定既有大氣監測未覆蓋或未充分覆蓋區域之合適點，以強化 ODS 監測能力與網絡；以及既有監測基礎設施下，建立新監測能力與費用之方案。針對此議題，MOP 34 會議產生一項決議，即請 TEAP 評估小組於 OEWG 45 時提交相關報告，包括：

1. 可能發生大量列管物質排放之化學路徑

2. 可用於控制上述排放的最佳作法

3. 瞭解上述排放源與第 1 點提到之差距

（四）四氯化碳的持續排放（Decision XXXIV/6）

會議決定請 TEAP 評估全球排放量，包括四氯化碳的排放量，並建議減少四氯化碳排放量的措施，並鼓勵締約方審查其相關國家數據。

1. 請生產四氯化碳及其副產品或將四氯化碳用作其他物質的原料或加工劑的締約方於 2023 年 2 月 1 日前，向 UNEP 臭氧秘書處提供管理此類活動的國家程序和框架的資料。

2. 請秘書處與 TEAP 分享收到的資料。

3. 請 TEAP 審查收到的資料，並在其 2023 年進度報告中提交該資料，供 OEWG 45 會議審議。

（五）加強打擊非法走私（Decision XXXIV/8）

為強化蒙特婁議定書之管理機制，締約方於 MOP 34 會議上針對追蹤違法走私管制物質議題進行討論，最終會議決議：

1. **世界海關組織於 2022 年修正公告國際商品統一分類制度（HS 2022），其中已納入 HFCs，敦促尚未依 HS 2022 訂定 HFCs code 之國家儘快新增，以有效管控 HFCs 管制物質**。

2. 鼓勵各締約方互相交流與共同合作關於辨識、預防及打擊非法走私管制物質的手法。

3. 鼓勵各締約方向秘書處報告有國內違法走私案例，以杜絕非法走私，並在締約方能夠做到的範圍內提供更多非法貿易的資訊。

4. 請 UNEP 臭氧秘書處彙編前述第 3 點提到的資訊，以及該國處理非法走私所採取的作法；蒐研各締約方實施列管物質許可制度之共通點，以供希望改進許可制度之締約方參考；於 OEWG 45 舉辦為期一天的 workshop，加強打擊非法走私；以及於 MOP 35 提交相關報告，內容涵蓋 OEWG 45 舉辦 workshop 上討論的重點以及 MOP 34 與 OEWG 45 對於此議題之進展等。

（六）2023 年溴化甲烷關鍵用途豁免（Decision XXXIV/9）

針對各締約方申請溴化甲烷關鍵用途豁免，今年溴化甲烷技術委員會（MBTOC）決議核發溴化甲烷關鍵用途之必要豁免量，另考量應以削減溴化甲烷為目的，故以後**申請豁免的 A2 國家應提出溴化甲**

烷替代品之研究方案，**A5** 國家應提出國家削減溴化甲烷的管理方案。

（七）溴化甲烷庫存、檢疫及裝運前用途（Decision XXXIV/10）

TEAP 指出目前掌握的庫存訊息，無法準確顯示全球受管控、豁免用途之溴化甲烷總庫存。科學評估小組將向 OEWG 45 會議報告其每 4 年一次的評估，這可能會進一步提供由上而下（top down）和由下而上（bottom up）推估溴化甲烷排放量之差異。

1. **請各締約方在 2023 年 6 月 1 日前向 UNEP 臭氧秘書處提交一份各自國家需要或使用溴化甲烷的有害生物和商品組合清單。**
2. **請締約方在自願的基礎上，在 2023 年 6 月 1 日前向 UNEP 臭氧秘書處提交溴化甲烷淘汰前庫存量之數據。**
3. 將溴化甲烷庫存問題列入 OEWG 45 會議的議程。
4. 請 TEAP 中溴化甲烷技術選擇委員會與國際植物保護公約秘書處協商，於 OEWG 45 會議提交目前溴化甲烷替代品的檢疫和裝運前用途報告。
5. 請締約方在其國家進程中考慮《國際植物保護公約》規定的標準和指南，考量採用替代品減少溴化甲烷使用的可行性。

（八）更新安全標準規範（Decision XXXIV/12）

考量含 HCFCs 與 HFCs 替代品設備導入、製造、運轉、維修及棄置等各階段於市場上的安全性，以及近年因應替代品發展須更新國際安全標準的重要性，例如近期國際電工委員會更新 IEC 60335-2-40 標準，針對此議題決議如下：

1. **請 UNEP 臭氧秘書處於 2029 年 MOP 41 前，每年依據 XXIX/11 決議要求各締約方提供安全標準資訊。**
2. 當有締約方或組織有新的安全標準時，要求 **UNEP** 臭氧秘書處納入該資訊。

（九）**蒐集數據以掌握 COVID 19 疫情對開發中國家（A5 國家）HFCs 消**

費量潛在的影響（Decision XXXIV/13）

依吉佳利修正案規範，A5 國家之 HFCs 消費基準量為 2020~2022 年之 HFCs 年平均消費量加上 2009~2010 年之 65%的 HCFCs 年平均消費量進行計算。然 2020~2022 年全球因 COVID 19 導致全球經濟受到衝擊，尤其是 A5 國家經濟受疫情影響下使得 HFCs 的消費量減少，目前估計 A5 國家經濟將自 2023 年後開始復甦，而 HFCs 消費量也將大幅增加；若繼續依原修正案規範計算 A5 國家之 HFCs 消費基準量，則 A5 國家恐難達到 HFCs 削減目標。針對本議題，古巴提出靈活計算 A5 國家 HFCs 消費基準量之提案，重點摘要如下：

1. 未受 COVID 19 疫情影響的 A5 國家，可採以原規範採用 2020~2022 年之 HFCs 年平均消費量作為基準量。
2. 受 COVID 19 疫情有顯著影響的 A5 國家，可依 1.2 倍之 2018~2019 年之 HFCs 年平均消費量作為基準量。
3. 受 COVID 19 疫情有顯著影響的 A5 國家，可選取 1.2 倍之 2015~2019 年間選取 3 年 HFCs 最大量之年平均消費量作為基準量。
4. 上述靈活作法計算出 HFCs 年平均消費量後，仍需加上 2009~2010 年之 65% HCFCs 年平均消費量，作為 HFCs 消費量計算基準。

針對古巴提案，黎巴嫩、多明尼加共和國、格林納達、托巴哥、聖露西亞與馬來西亞等 A5 國家表達支持，並願意就此議題繼續討論；惟科威特持反對意見，其主張疫情確實對整個供應鏈造成影響，但不適合再討論或挑戰吉佳利修正案規範，建議在蒙特婁議定書之多邊基金下討論因非人為因素導致國家 HFCs 基準量下降，應如何補償受疫情顯著影響的 A5 國家。

美國表示同意以非正式方式與各 A5 國家討論所面臨的困境以解決基線問題，但強調不能在沒有法律基礎下修訂或調整議定書內容，

意即不能變更吉佳利修正案之基線計算原則，而澳洲、歐盟與加拿大也認同美國的作法，將以非正式討論方式進一步瞭解並掌握 A5 國家的困境以尋找解決方案。另加拿大表示從法律程序的角度來看，如欲修改現行計算基準，需在締約方大會開會前 6 個月提案，以提出修正案或調整案至締約方大會。

綜上，本案本次大會決議，說明如下：

1. 鼓勵 2020~2022 年受 COVID 19 影響 HFCs 消費量基準之 A5 締約方，於 2023 年 5 月 1 日前提交 2022 年 HFCs 消費量數據供 OEWG 45 會議上審議。

2. 基於第（1）點，請 UNEP 臭氧秘書處於 OEWG 45 準備：

   (1)A5 締約方 2020~2022 年 HFCs 消費量，並且計算其消費基準量。

   (2)A5 締約方 2018~2019 年 HFCs 消費量資訊。

3. 請執行委員會於第 91 次會議上考慮請多邊基金秘書處向 UNEP 臭氧秘書處提供 HFCs 消費量數據，以利 UNEP 臭氧秘書處提交前述第（2）點資料。

（十）吉佳利修正案批准現況（Decision XXXIV/22）

吉佳利修正案已於 2019 年 1 月 1 日正式生效，截至 MOP 34 會議落幕時（2022 年 11 月 4 日），計有 143 個締約方批准並履行吉佳利修正案的管制時程，包含歐盟、日本、加拿大、澳洲、紐西蘭、美國等已開發國家；其中，美國參議院於 MOP 34 會議前（9 月 21 日）通過加入「蒙特婁議定書吉佳利修正案」，並於 MOP 34 會議第一天（10 月 31 日）成為第 140 個批准吉佳利修正案的締約方。至於開發中國家部分，**中國、新加坡、越南、馬來西亞等已批准修正案，南韓、泰國尚未加入**。有關吉佳利修正案之批准，本次會議產生一項決議如下：

1. 2022 年 11 月 4 日共計 143 個締約方批准修正案。

2. **敦促尚未批准的締約方批准該修正案，以達逐步削減 HFCs 目標**。

（十一）蒙特婁議定書第 35 次締約方會議地點（Decision XXXIV/23）

MOP 35 預定於 2023 年 10 月 23 日至 27 日肯亞奈洛比（Nairobi, Kenya）舉行。

二、周邊會議

（一）銷毀庫存破壞臭氧層物質之機會與限制

Tradewater LLC 公司舉辦以「銷毀庫存破壞臭氧層物質之機會與限制」為題之周邊會議，由該公司分享其與泰國海關單位合作，**銷毀非法 ODS 以取得自願減碳額度**之案例。其中，該公司係以流體化床方式進行 R12 之銷毀，其污染排放均能符合泰國政府之標準，且其 DRE 可大於 99.993%。然該公司透過銷毀 ODS 以取得自願減碳額度機制之正當性，受到本團及在場出席人員之質疑，且所使用之處理技術亦非蒙特婁議定書所核可，同時面對 ODS 跨國運輸仍受到巴賽爾公約之限制、銷毀費用不明等因素下，其運作機制及可行性仍須進一步與蒙特婁議定書遵約機制委員會專家討論。

（二）910 億噸的機會：製冷劑生命週期管理

美國政府、治理與可持續發展研究所（Institute for Governance & Sustainable Development, IGSD）、環境調查署（Environmental Investigation Agency, EIA)與自然資源保護委員會（Natural Resources Defense Council, NRDC）舉辦之「910 億噸的機會：製冷劑生命週期管理（The 91 Billion Tonne Opportunity : Lifecycle Refrigerant Management）」周邊會議，其說明經由估算目前美國 HCFC 與 HFC 消費量為 36 億噸二氧化碳當量，且多作為冷凍製劑之用，而全球消費量為 240 億噸二氧化碳當量，並估計全球 2050 年消費量可達到 610 億噸二氧化碳當量。為有效避免該等化學物質進入大氣，該三個組織

提出製冷劑生命週期管理（Lifecycle Refrigerant Management, LRM）之概念，並專注於製冷劑之洩漏減少、促進回收、提升回收率等工作，並提出建立製冷劑生命週期管理之 6 大基石，包括：強化產品管理、提升製冷劑回收再利用與再使用、減少製冷劑洩漏、落實法令執行、增強人員培訓以及冷暖空調設備與製冷劑設備（Heating, ventilation, air conditioning and refrigeration，HVACR）正確的安裝與維護。

伍、重要議題國際交流

本次 MOP 34 會議期間，我團特別針對吉佳利修正案所管制之 HFC 使用於半導體製程之消費量認定、再生冷媒管理以及冷媒銷毀技術等議題，分別與英國、美國、日本與新加坡等各締約方代表，以及 TEAP 專家進行資訊交流。各議題交流內容與成果如下：

一、半導體製程使用 HFCs 之消費量認定

我國半導體產業分別向日本、美國與中國進口 HFCs 以作為蝕刻製程之用，其中，近 6 成來自日本。惟製程中使用的 HFCs 是否可認定為原物用途而免納入消費量計算一事，經本次會議洽日本經產省代表指出，因蒙特婁議定書並未將原料用途（feedstock）納入國家消費量計算，惟原料用途之定義未臻明確，且半導體製程所使用之 HFCs 會反應成為另一種物質，僅認定未排放至大氣之 HFCs 為原料，因此需進一步確認其反應率與排放情形，始能計算其消費量。惟此認定方式非經蒙特婁議定書明確決議，且尚未成為各國共通之作法；另新加坡代表團亦表示此項消費量與核配管理於該國尚未定案，希望後續與我國持續交流管制作法。

二、冷媒銷毀實績交流

TEAP 前共同主席 Dr. Stephen O. Andersen 獲知我國已針對非法走私冷媒以水泥窯與旋轉窯進行銷毀，特利用本次會議期間與我團就我國執行實績進行交流，A 氏除就我國執行冷媒銷毀之成果予以肯定外，並表示渠將同步蒐集日本 METI、我國工研院、TEAP 專家 Dr. Helen Tope 及其他國家具執行銷毀經驗單位之冷媒銷毀方式與成果集結成冊，以向各國宣達冷媒銷毀實為具體減少冷媒排放至大氣而減輕對於地球環境傷害之方式，同時我國亦可透過此一實績向全球宣揚我國對保護臭氧層的貢獻並與其他國家交流銷毀經驗。

三、HCFCs 再生冷媒之管理

近兩年國內業者陸續自英國、美國與新加坡輸入 HCFCs 再生冷媒以供國內如漁船冷凍設備維修之用，為瞭解各國對於 HCFCs 再生冷媒之使用管

制情形，於本次會議分別洽詢英國、美國與新加坡其對於 HCFCs 再生冷媒之管制作為。其中，英國代表指出該國已依循歐盟之規定，禁止於境內使用任何 HCFCs 冷媒，包括回收純化或再精製類型，但未限制於其境內執行 HCFCs 冷媒純化、再生等工作；美國則表示禁止 HCFCs 再生冷媒於境內販售，但許可既有設備自行回用；至於新加坡代表則表示該國未禁止於境內使用 HCFCs 再生冷媒，故各國 HCFCs 再生冷媒之管制政策可作為我國後續管理再生冷媒之參考。

四、溴化甲烷用途管理

依我國溴化甲烷管理辦法第 9 條之規定「溴化甲烷之使用限於檢疫、裝運前處理或學術研究」，為使溴化甲烷用於檢疫、裝運前處理（以下稱 QPS）之定義與國際相同，經本次會議洽 TEAP 共同主席 Ms. Marta Pizano 表示，各國在 QPS 之定義上仍未明確，甚至部分國家有將庫存量使用於非 QPS 之情形。另 P 氏亦提及哥倫比亞已停止出口花卉使用溴化甲烷，惟花卉輸入國如以檢疫名義要求燻蒸，則與輸入國就檢疫作業建立溝通機制，以瞭解其燻蒸之主要原因，以減少溴化甲烷的使用。

表 4、與國際專家交流紀錄

單位	與談人	討論內容
TEAP 醫藥與化學分組共同主席	Dr. Helen Tope	半導體製程使用 HFCs 之消費量認定
日本經產省代表	田村修司室長	半導體製程使用 HFCs 之消費量認定
TEAP 前共同主席	Dr. Stephen O. Andersen	冷媒銷毀技術
美國代表	Mr. Jeremy Arling	銷毀與回收管理的作法
英國代表	Mr. Steve Cowperthwaite	冷媒回收與再使用之管理
新加坡代表	Ms. Tan Sok Huang、Ms. Lim Jia Fang	回收冷媒之管理
TEAP 共同主席	Ms. Marta Pizano	全球各國使用溴化甲烷之情形

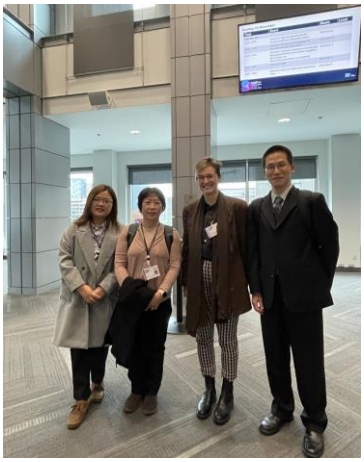

圖 3、與 TEAP 醫藥與化學分組共同主席 Dr. Helen Tope（右二）討論半導體製程使用 HFCs 認定為原物料之疑義

圖 4、與日本經產省代表田村修司室長（右二）討論半導體製程使用 HFCs 之消費量認定疑義及 HFCs 管理

圖 5、與 TEAP 前共同主席 Dr. Stephen O. Andersen（右一）分享我國冷媒銷毀處理實績

圖 6、與美國代表 Mr. Jeremy Arling（右二）交流再生冷媒管理作法

圖 7、與英國代表 Mr. Steve Cowperthwaite（右二）交流再生冷媒管理作法

圖 8、與新加坡代表 Ms. Tan Sok Huang（右二）、Ms. Lim Jia Fang（右一）交流半導體製程使用 HFCs 之消費量認定疑義與再生冷媒管理作法

陸、心得及建議

一、本次會議計有超過 160 多個國家及 60 多個民間單位，共計 500 多位代表參與，共產出 24 個決議文件，主要包含：強化推動高能效與低 GWP 替代技術下，要求 TEAP 提供締約方深入研究資料，並鼓勵各締約方強化合作機制；強化打擊非法走私，鼓勵各國技術分享；請各締約方於 2023 年 5 月 1 日前向 UNEP 秘書處提交其限制含有管制物質之冷凍冷藏空調或熱泵設備進口相關資訊，以作為各締約方於 MOP 35 討論訂定相關規範之參考；請各締約方提交使用溴化甲烷之有害生物與商品清單、溴化甲烷庫存量，並由 TEAP 提交溴化甲烷替代品之檢疫與裝運前處理用途報告等資訊，以利後續於 OEWG 45 進行討論並減少各締約方之溴化甲烷使用量；議定書運作之相關組織提名作業、吉佳利修正案之批准進展與各締約方建立進出口許可制度進展、請秘書處持續更新提供替代品安全標準相關資訊、多邊基金運作相關機制等。

二、本次 MOP 34 為世界各國受新型冠狀肺炎疫情影響兩年來，首次以實體會議方式辦理，多數開發中國家更以新型冠狀肺炎影響其經濟發展為由，提出吉佳利修正案之消費基準量計算方式修正而成為本次會議之焦點。鑑於我國刻正依吉佳利修正案之內容研訂「氫氟碳化合物消費管理辦法（草案）」，本決議之後續發展值得我國高度關注並做為我國設定 HFCs 消費基準量之參考。

三、MOP 34 會議期間，我團特別針對吉佳利修正案所管制之 HFC 使用於半導體製程之消費量認定、再生冷媒管理以及冷媒銷毀技術等議題，分別與英國、美國、日本與新加坡等各締約方代表以及 TEAP 專家進行資訊交流，除對於我國研訂 HFCs、再生冷媒等管理策略與精進冷媒銷毀技術具有極大之助益外，後續我國可持續透過蒙特婁議定書訂約方會議期間，就所關注之議題或具體推動成果（如 ODS 銷毀處理技術），與相關國家、關鍵指標人物進行深入交流對談，以達到對內可精進我國 ODS 管理制度，對外則向國際間展現我國 ODS 管理成效並可提供實質協助之成效。

柒、附錄

附錄一、會議議程

附錄二、MOP-34 會議紀錄報告

附錄三、MOP-34 會議決議文件

附錄四、ENB 會議紀錄

UNITED NATIONS

UNEP

UNEP/OzL.Pro.34/1

Montreal Protocol on Substances that Deplete the Ozone Layer

Distr.: General
25 July 2022

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Thirty-Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer
Montreal, Canada, 31 October–4 November 2022

Provisional agenda

I. Preparatory segment (31 October–2 November 2022)

1. Opening of the preparatory segment:

   Statement by a representative of the United Nations Environment Programme.

2. Organizational matters:

   (a) Adoption of the agenda of the preparatory segment;

   (b) Organization of work.

3. Administrative matters:

   (a) Budget of the Trust Fund for the Montreal Protocol and financial reports;

   (b) Consideration of the membership of Montreal Protocol bodies for 2023:

      (i) Members of the Implementation Committee;

      (ii) Members of the Executive Committee of the Multilateral Fund;

      (iii) Co-chairs of the Open-ended Working Group.

4. Terms of reference for the study on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the triennium 2024–2026.

5. Energy efficiency:

   (a) Response to the report of the Technology and Economic Assessment Panel on decision XXXIII/5 on the continued provision of information on energy-efficient and low-global-warming-potential technologies;

   (b) Dumping of new and old inefficient refrigeration and air-conditioning appliances (proposal by a group of African States parties to the Montreal Protocol).

6. Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring.

7. Institutional processes to strengthen the effective implementation and enforcement of the Montreal Protocol.

8. Ongoing emissions of carbon tetrachloride.

9. Future availability of halons and their alternatives.

10. Issues related to exemptions under Articles 2A–2I of the Montreal Protocol:
    (a) Nominations for critical-use exemptions for methyl bromide for 2023 and 2024;
    (b) Stocks and quarantine and pre-shipment uses of methyl bromide.
11. Strengthening the Technology and Economic Assessment Panel and its technical options committees for the phase-down of hydrofluorocarbons and other future challenges related to the Montreal Protocol and the climate.
12. Consideration of nominations by parties of experts to the Technology and Economic Assessment Panel.
13. Compliance and data reporting issues: the work and recommendations of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol.
14. Implementation of the Kigali Amendment:
    (a) Periodic review on alternatives to hydrofluorocarbons (decision XXVIII/2, para. 4);
    (b) Status of ratification;
    (c) Impact of the coronavirus disease (COVID-19) pandemic on hydrofluorocarbon baselines for parties operating under paragraph 1 of Article 5 (proposal by Cuba).
15. Safety standards (decision XXIX/11).
16. Recognition of the achievements of Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland, winners of the Nobel Prize in Chemistry in 1995.
17. Other matters.

II. High-level segment (3 and 4 November 2022)

1. Opening of the high-level segment:
    (a) Statement by the President of the Thirty-Third Meeting of the Parties to the Montreal Protocol;
    (b) Statement by a representative of the United Nations Environment Programme;
    (c) Statement by a representative of the Government of Canada.
2. Organizational matters:
    (a) Election of officers for the Thirty-Fourth Meeting of the Parties to the Montreal Protocol;
    (b) Adoption of the agenda of the high-level segment;
    (c) Organization of work;
    (d) Credentials of representatives.
3. Presentations by the assessment panels on progress in their work and key issues emanating from their 2022 quadrennial assessments.
4. Presentation by the Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the work of the Executive Committee, the Multilateral Fund secretariat and the Fund's implementing agencies.
5. Statements by heads of delegation and discussion on key topics.
6. Report by the co-chairs of the preparatory segment and consideration of the decisions recommended for adoption by the Thirty-Fourth Meeting of the Parties.
7. Dates and venue for the Thirty-Fifth Meeting of the Parties to the Montreal Protocol.
8. Other matters.
9. Adoption of decisions by the Thirty-Fourth Meeting of the Parties to the Montreal Protocol.
10. Adoption of the report of the meeting.
11. Closure of the meeting.

UNITED NATIONS

UNEP

UNEP/OzL.Pro.34/9

Montreal Protocol on Substances that Deplete the Ozone Layer

Distr.: General
9 November 2022

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Thirty-Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer
Montreal, Canada, 31 October–4 November 2022

Report of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer

Introduction

1. The Thirty-Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer was held at the headquarters of the International Civil Aviation Organization in Montreal, Canada, from 31 October to 4 November 2022.

Part one: preparatory segment (31 October–2 November 2022)

I. Opening of the preparatory segment

2. The preparatory segment was opened by its Co-Chairs, Martin Sirois (Canada) and Osvaldo Álvarez-Pérez (Chile), at 10 a.m. on Monday, 31 October 2022.

Statement by a representative of the United Nations Environment Programme

3. Megumi Seki, Executive Secretary of the Ozone Secretariat, welcomed participants to Montreal, noting that the current meeting was the parties' second to be held in person since the lockdowns imposed as a result of the coronavirus disease (COVID-19) pandemic. Expectations for the meeting were high, in part because it marked the thirty-fifth anniversary of the Montreal Protocol. Part of the agenda would be dedicated to celebrating that milestone, including through a round-table discussion focused on maximizing the potential of the Kigali Amendment to mitigate climate change.

4. The year 2022 was also the fiftieth anniversary of the United Nations Conference on the Human Environment, held in Stockholm in 1972, which had given birth to UNEP and ushered in a new era of increased environmental awareness. During the international event celebrating that anniversary, "Stockholm+50: a healthy planet for the prosperity of all – our responsibility, our opportunity", the Montreal Protocol had been recognized many times as both a success and a source of useful lessons for the global community in addressing the looming environmental crises and the Sustainable Development Goals. Lessons learned could be made even more useful by a targeted approach and fit-for-purpose analyses. The Protocol was currently supporting efforts to establish a science-policy panel for chemicals, waste and pollution by providing detailed information on the assessment process and the work of the assessment panels, which was the cornerstone of informed and sound decision-making by the parties. Noting that the Scientific Assessment Panel had issued the executive summary of its 2022 assessment in time for the current meeting, Ms. Seki took the opportunity to thank it and the other assessment panels for their hard work.

5. Turning to the agenda for the meeting, she observed that, in addition to the key findings of the assessment panels and further work on issues forwarded to the Thirty-Fourth Meeting of the Parties by the Open-ended Working Group at its forty-fourth meeting, the parties had three new issues on their agenda for the meeting, namely alternatives to hydrofluorocarbons (HFC); safety standards; and a proposal by Cuba on the impact of the COVID-19 pandemic on the HFC baselines for parties operating under paragraph 1 of Article 5 (Article 5 parties). She also provided a brief update on staffing at the Secretariat, informing the parties that Gilbert Bankobeza, the acting Deputy Executive Secretary, was set to retire after more than 30 years of service, mainly as the Senior Legal Officer. Maria Socorro Manguiat, a legal expert with over 20 years of experience in international processes, was expected to join the Secretariat from 2023.

II. Organizational matters

A. Attendance

6. The following parties to the Montreal Protocol were represented: Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Bahamas, Bahrain, Bangladesh, Barbados, Belgium, Brazil, Brunei Darussalam, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Chad, Chile, China, Colombia, Cook Islands, Costa Rica, Cuba, Czechia, Denmark, Dominican Republic, Ecuador, Egypt, Estonia, Eswatini, Ethiopia, European Union, Fiji, Finland, France, Gambia, Germany, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Holy See, Hungary, India, Indonesia, Iran (Islamic Republic of), Ireland, Italy, Japan, Kenya, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Lebanon, Lesotho, Liberia, Liechtenstein, Luxembourg, Malawi, Malaysia, Maldives, Mauritius, Mexico, Micronesia (Federated States of), Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Niger, Nigeria, North Macedonia, Norway, Pakistan, Palau, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Russian Federation, Rwanda, Saint Lucia, Samoa, Saudi Arabia, Senegal, Seychelles, Singapore, Somalia, South Africa, Spain, Sri Lanka, State of Palestine, Sudan, Suriname, Sweden, Switzerland, Thailand, Timor-Leste, Togo, Trinidad and Tobago, Tunisia, Türkiye, Turkmenistan, Tuvalu, Ukraine, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Vanuatu, Viet Nam, Yemen, Zambia, Zimbabwe.

7. The following United Nations bodies and specialized agencies were represented: secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol, United Nations Development Programme, UNEP, United Nations Industrial Development Organization, World Bank, World Meteorological Organization. The Montreal Protocol assessment panels were also represented.

8. The following intergovernmental, non-governmental, industry, academic and other bodies were also represented: ADC3R; A-Gas America; A-Gas International; AGC Chemicals; Air-Conditioning Heating and Refrigeration Institute; Alliance for Responsible Atmospheric Policy, Arkema – Innovative Chemistry; ATMOsphere; Canadian Space Agency; Chemours, LLC.; Chilean Refrigeration and HVAC Chamber; CLASP; Clean Cooling Collaborative; Climalife; Climate and Clean Air Coalition secretariat; Climate Change Policy and Finance; Concordia University; Daikin; Danfoss (Denmark); Environmental Investigation Agency; European Partnership for Energy and the Environment; Employment and Social Development Canada; GIZ Proklima; Glencoe Strategies, LLC.; Global Policy Associates; Guidehouse; HEAT International; Honeywell Advanced Materials; Industrial Technology Research Institute; Institute for Governance and Sustainable Development; International Institute of Refrigeration; International Pharmaceutical Aerosol Consortium; Japan Fluorocarbon Manufacturers Association; Japan Society of Refrigerating and Air Conditioning Engineers; LAB University of Applied Sciences; Lawrence Berkeley National Laboratory; Leiden University; Lennox International Inc.; Manitoba Ozone Protection Industry Association; McGill University; MEBROM Corporation; Mexichem UK Ltd.; Middlebury College; Natural Resources Defense Council; New York University; Nolan Sherry and Associates Ltd.; NYBRA Consulting; PureSphera; Quimobásicos S.A. de C.V.; Rand Consulting; Refrigerant Gas Manufacturers Association; Refrigerant Reclaim Australia; Refrigerants Australia; Rheem Manufacturing Company; Sessions Educational Services; Shaffie Law and Policy, LLC.; SilverLining; SRF Ltd.; The Energy and Resources Institute; The Japan Refrigeration and Air Conditioning Industry Association; Tradewater; TRANE; University of Massachusetts-Amherst.

B. Adoption of the agenda of the preparatory segment

9. The following agenda for the preparatory segment was adopted on the basis of the provisional agenda set out in document UNEP/OzL.Pro.34/1:

1. Opening of the preparatory segment:

   Statement by a representative of the United Nations Environment Programme.

2. Organizational matters:

   (a) Adoption of the agenda of the preparatory segment;

   (b) Organization of work.

3. Administrative matters:

   (a) Budget of the Trust Fund for the Montreal Protocol and financial reports;

   (b) Consideration of the membership of Montreal Protocol bodies for 2023:

      (i) Members of the Implementation Committee;

      (ii) Members of the Executive Committee of the Multilateral Fund;

      (iii) Co-chairs of the Open-ended Working Group.

4. Terms of reference for the study on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the triennium 2024–2026.

5. Energy efficiency:

   (a) Response to the report of the Technology and Economic Assessment Panel on decision XXXIII/5 on the continued provision of information on energy-efficient and low-global-warming-potential technologies;

   (b) Dumping of new and old inefficient refrigeration and air-conditioning appliances (proposal by a group of African States parties to the Montreal Protocol).

6. Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring.

7. Institutional processes to strengthen the effective implementation and enforcement of the Montreal Protocol.

8. Ongoing emissions of carbon tetrachloride.

9. Future availability of halons and their alternatives.

10. Issues related to exemptions under Articles 2A–2I of the Montreal Protocol:

   (a) Nominations for critical-use exemptions for methyl bromide for 2023 and 2024;

   (b) Stocks and quarantine and pre-shipment uses of methyl bromide.

11. Strengthening the Technology and Economic Assessment Panel and its technical options committees for the phase-down of hydrofluorocarbons and other future challenges related to the Montreal Protocol and the climate.

12. Consideration of nominations by parties of experts to the Technology and Economic Assessment Panel.

13. Compliance and data reporting issues: the work and recommendations of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol.

14. Implementation of the Kigali Amendment:

   (a) Periodic review on alternatives to hydrofluorocarbons (decision XXVIII/2, para. 4);

   (b) Status of ratification;

(c) Impact of the coronavirus disease (COVID-19) pandemic on hydrofluorocarbon baselines for parties operating under paragraph 1 of Article 5 (proposal by Cuba).

15. Safety standards (decision XXIX/11).

16. Recognition of the achievements of Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland, winners of the Nobel Prize in Chemistry in 1995.

17. Other matters.

10. Under agenda item 17, "Other matters", the parties agreed to consider a proposal by Armenia regarding co-opting at meetings of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol to ensure equal participation of all the regional networks.

C. Organization of work

11. The parties agreed to follow their customary procedure and to establish contact groups as necessary.

III. Administrative matters

A. Budget of the Trust Fund for the Montreal Protocol and financial reports

12. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 10 to 15 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), the notes by the Secretariat on the revised budget for 2022; proposed budgets for 2023 and 2024 of the Trust Fund for the Montreal Protocol (UNEP/OzL.Pro.34/4 and UNEP/OzL.Pro.34/4/Add.1) and on the financial report for the trust funds for the Vienna Convention for the Protection of Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer for the fiscal year 2021 (UNEP/OzL.Pro.34/5), and notes by the Secretariat entitled "Proposed budgets for 2023 of the trust funds for the Vienna Convention for the Protection of Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer: fact sheets" (UNEP/OzL.Pro.34/INF/1) and "Trust funds for the Vienna Convention for the Protection of the Ozone Layer and for the Montreal Protocol on Substances that Deplete the Ozone Layer: updated indicative financial report for the fiscal year 2022 as at 30 September 2022" (UNEP/OzL.Pro.34/INF/2). A draft decision on the matter was set out in document UNEP/OzL.Pro.34/3 (draft decision XXXIV/[AA]).

13. The parties agreed to follow their standard practice and establish a budget committee to review the proposed budget for the Montreal Protocol trust fund and the financial reports for the Vienna Convention and Montreal Protocol trust funds and to prepare a draft decision on financial matters for the Protocol. It was decided that the committee's work would be facilitated by Nicole Folliet (Canada).

14. Subsequently, after the budget committee had discussed the matter, the facilitator introduced the draft decision, which included the revised budget for 2022 and the budget for 2023 as agreed by the budget committee and the budget for 2024 as taken note of by the budget committee. She noted that the committee, in addition to making a small number of changes to the budget, had developed a new contribution option and that a document had been posted on the budget portal specifying parties' 2023 contributions according to the new option.

15. At a later stage in the meeting, the Co-Chair reported that the budget committee had been able to complete its work and had produced a draft decision and budget for consideration by the parties. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

B. Consideration of the membership of Montreal Protocol bodies for 2023

1. Members of the Implementation Committee

16. Introducing the sub-item, the Co-Chair said that the parties needed to decide on the membership of the Implementation Committee for 2023. Information on the positions to be filled was presented in paragraphs 16 to 19 of document UNEP/OzL.Pro.34/2 and a draft decision on the matter was set out in document UNEP/OzL.Pro.34/3 (draft decision XXXIV/[BB]).

17. Subsequently, the representative of the Secretariat reported that, upon receipt of the nominations from the regional groups, a draft decision thereon had been included in the compilation of decisions for the parties' consideration and possible adoption during the high-level segment.

2. Members of the Executive Committee of the Multilateral Fund

18. Introducing the sub-item, the Co-Chair said that the parties needed to decide on the membership of the Executive Committee of the Multilateral Fund for 2023. Information on the positions to be filled was presented in paragraphs 20 to 23 of document UNEP/OzL.Pro.34/2 and a draft decision on the matter was set out in document UNEP/OzL.Pro.34/3 (draft decision XXXIV/[CC]).

19. Subsequently, the representative of the Secretariat reported that, upon receipt of the nominations from the regional groups, a draft decision thereon had been included in the compilation of decisions for the parties' consideration and possible adoption during the high-level segment.

3. Co-chairs of the Open-ended Working Group

20. Introducing the sub-item, the Co-Chair said that the parties needed to decide on the co-chairs of the Open-ended Working Group for 2023. Information on the positions to be filled was presented in paragraphs 24 and 25 of document UNEP/OzL.Pro.34/2 and a draft decision on the matter was set out in document UNEP/OzL.Pro.34/3 (draft decision XXXIV/[DD]).

21. Subsequently, the representative of the Secretariat reported that, upon receipt of the names of the nominations from the groups of Article 5 and non-Article 5 parties, a draft decision thereon had been included in the compilation of decisions for the parties' consideration and possible adoption during the high-level segment.

IV. Terms of reference for the study on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the triennium 2024–2026

22. Introducing the item, the Co-Chair drew attention to the information contained in paragraphs 26 to 29 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2) and paragraphs 105 and 106 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP/OzL.Pro.WG.1/44/4). A draft decision on the terms of reference was set out in annex I to document UNEP/OzL.Pro.34/2 and had also been posted on the online forum to facilitate an exchange of views by parties prior to the current meeting. No comments on the draft decision had been received on the online forum.

23. The parties agreed to reconstitute the contact group that had discussed the matter at the forty-fourth meeting of the Open-ended Working Group to continue work on the terms of reference. The contact group would be co-chaired by Samuel Paré (Burkina Faso) and Cindy Newberg (United States of America).

24. The co-chair of the contact group informed the parties that participation in the group, which had previously been open-ended, would henceforth be open only to parties.

25. At a later stage in the meeting, the co-chair of the contact group reported that the contact group had been able to complete its work. She expressed her gratitude to participants in the contact group for their hard work and willingness to overcome difficult issues. Welcoming the draft decision, the Co-Chair called on the Technology and Economic Assessment Panel to start work on the study as soon as possible in order to be able to present a preliminary report to the Open-ended Working Group of the Parties to the Montreal Protocol at its forty-fifth meeting.

26. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

V. Energy efficiency

A. Response to the report of the Technology and Economic Assessment Panel on decision XXXIII/5 on the continued provision of information on energy-efficient and low-global-warming-potential technologies

27. Introducing the sub-item, the Co-Chair drew attention to the information contained in paragraphs 30 to 34 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 60 to 88 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4) and the report of the Technology and Economic Assessment Panel of May 2022 entitled "Volume 3: Decision XXXIII/5 – Continued provision of information on energy-efficient and low-global-warming-potential technologies".

28. He recalled that in decision XXXIII/5, the parties had requested the Technology and Economic Assessment Panel to prepare a report on energy-efficient and lower-global-warming-potential (GWP) technologies and on measures to enhance and maintain energy efficiency during hydrofluorocarbon (HFC) transition in equipment for consideration by the Open-ended Working Group at its forty-fourth meeting. In response to the decision, the Panel had established a task force to prepare the requested report, which had been presented to the Open-ended Working Group at its forty-fourth meeting and was set out in volume 3 of its May 2022 report. At the forty-fourth meeting, a contact group had been established to consider matters raised during the discussion in plenary. The contact group had developed a list of feedback and ideas for further work arising from the Panel's report. The Working Group had agreed to forward the list to the Thirty-Fourth Meeting of the Parties for further consideration. The list was set out in annex II to the document UNEP/OzL.Pro.34/2 and had also been posted on the online forum to facilitate an exchange of views by parties prior to the current meeting. No comments on the list had been received on the online forum.

29. In the ensuing discussion, many representatives reiterated their appreciation for the work on energy efficiency carried out by Technology and Economic Assessment Panel.

30. In response to a request by the Co-Chair for an update on any additional intersessional work related to the list of feedback and ideas for further work, the representative of the United States of America introduced a conference room paper containing a draft decision, submitted by Canada, Norway, the United Kingdom of Great Britain and Northern Ireland and the United States, that focused on a subset of the elements on the list of feedback and ideas for further work produced by the contact group at the forty-fourth meeting of the Open-ended Working Group. The proposal requested the Technology and Economic Assessment Panel to include in its 2023 progress report information on enhancements to energy efficiency associated with improvements in building insulation and appliance foams; information on testing procedures for the validation of energy-efficiency claims to enforce minimum energy-efficiency standards and labels; information on voluntary labelling programmes; information on barriers to the acceptability, to consumers and businesses, of the adoption of more energy-efficient equipment and possible solutions; and analysis of the potential benefits of reducing greenhouse-gas emissions related to the use of refrigeration, air-conditioning and heat-pump equipment. The Panel was also requested to integrate regular updates on energy efficiency in the refrigeration, air-conditioning and heat-pump equipment sector into its progress and quadrennial assessment reports from 2023 onwards. The Secretariat was requested to prepare a report describing examples of existing policies that addressed the interlinkages between the phase-down of HFCs and the enhancement of energy efficiency. Furthermore, parties were encouraged to undertake domestic actions to ensure coordination between energy and ozone officials to enhance energy efficiency in the phase-down of HFCs; to support domestic servicing programmes, including technician training, in order to enhance energy efficiency, improve installation, reduce refrigerant leaks and ensure proper installation and maintenance; and, when phasing down HFCs, to take into account the information contained in volume 3 of the May 2022 report of the Technology and Economic Assessment Panel, as appropriate. The proponents hoped that their proposal could be discussed in a contact group.

31. Another draft decision was introduced by the representative of the Federated States of Micronesia also on behalf of Samoa. It too requested regular reporting by the Technology and Economic Assessment Panel and the provision of information on specific issues required by the parties. The Executive Committee of the Multilateral Fund was requested to strengthen the capacity of national ozone units and Article 5 parties to work on energy-efficiency issues and to leverage energy efficiencies during the HFC phase-down. The Secretariat was requested to support knowledge-building and the exchange of opportunities, an experience that some countries had already

had in the form of initiatives such as buyers' clubs. The proponents also sought to discuss their proposal further in a contact group.

32. Several representatives expressed their concern at the breadth and variety of the elements on the list of feedback and ideas for further work produced by the contact group at the forty-fourth meeting of the Open-ended Working Group. Among their concerns were that the implementation of the Kigali Amendment was already an enormous undertaking and that the vast array of elements in the list would serve only to complicate the task. Furthermore, many of the elements in the list were ill-defined, and it was not clear what they entailed or which entities would be involved in their implementation. Some expressed concern that much of the action fell outside the purview of the Montreal Protocol and the work of national ozone units, such as those relating to minimum energy performance standards, labelling, cooling plans, cold-chain management and nationally determined contributions. Nevertheless, the national ozone units bore the burden of new tasks relating to energy efficiency, including having to coordinate and seek synergies with climate change, energy efficiency or design and planning authorities. They were not equipped to take on such coordination roles.

33. Some representatives also considered that many of the ideas proposed went beyond the scope of the Montreal Protocol. Other representatives expressed the view that the adoption of the Kigali Amendment clearly constituted an agreement by the parties to address energy efficiency issues despite their being outside the core mandate of the Montreal Protocol. Another representative recalled that Article 5 parties had always stepped up to the climate challenge, first by accelerating the phase-out of HCFCs and then by phasing down HFCs. It was now time for them to focus on their core obligations. Energy efficiency was not a compliance issue, yet it was taking up a great deal of time and resources. Another representative stressed the need to strike an appropriate balance between efforts to achieve objectives under the Kigali Amendment and those under the Montreal Protocol and the Vienna Convention.

34. Many representatives, including one speaking on behalf of a group of parties, said that they appreciated the efforts to streamline the focus of future work, but felt that more discussion was required regarding the precise elements to be included in any future draft decision. One proposed that the task force of the Technology and Economic Assessment Panel could engage in demonstration projects; develop a methodology for assessing energy efficiency gains in the implementation of projects supported by the Multilateral Fund; provide an update on the status of adoption of low-GWP alternatives in parties not operating under paragraph 1 of Article 5 (non-Article 5 parties) and the challenges and barriers faced, including in relation to flammable technologies, to help guide industry in developing countries in its choice of alternatives; and provide information on the benefits of energy efficiency in the context of HFC phase-down and on how energy efficiency could be sustained. The representative speaking on behalf of the group of parties proposed focusing on the coupling of different legislative measures on HFC phase-down and energy efficiency requitements; on standards that enabled the safe use of alternatives, especially in high ambient temperatures; and on the technologies that would be most appropriate in the future, not just those readily available at present. Another representative was in favour of a review of energy-efficient and low-GWP technologies.

35. Several representatives drew attention to the need for, and complete lack of, capacity-building and financial support to assist Article 5 parties in undertaking action to enhance energy efficiency. One said that local equipment manufacturers required support in order not to be disadvantaged by the importation of more energy-efficient equipment, while another specified the need for capacity-building in relation to the optimization of energy consumption in buildings. Several representatives stressed the importance of considering the local context when devising action related to energy-efficiency.

36. Many representatives said that they were convinced of the importance of enhancing energy efficiency for climate co-benefits. Several representatives of small island developing States and very-low-volume-consuming countries said that, given the challenges that they faced, any advances in energy efficiency would make a huge difference in their countries. Other representatives highlighted the timely nature of the opportunity to find ways to reduce electricity use and energy costs.

37. The parties agreed to reconstitute the contact group that had discussed energy efficiency matters at the forty-fourth meeting of the Open-ended Working Group, entrusting it with a mandate to discuss the proposed draft decisions, taking into account the comments and ideas expressed in plenary to see whether any of the items needed to be considered further. The contact group would again be co-chaired by Annie Gabriel (Australia) and Bitul Zulhasni (Indonesia).

38. At a later stage in the meeting, the Co-Chair reported that the contact group had been able to complete its work and had produced a draft decision for consideration by the parties.

39. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

B. Dumping of new and old inefficient refrigeration and air-conditioning appliances (proposal by a group of African States parties to the Montreal Protocol)

40. Introducing the sub-item, the Co-Chair drew attention to the information contained in paragraphs 35 to 39 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 94 to 99 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4), and the report of the Technology and Economic Assessment Panel of May 2022 entitled "Volume 3: Decision XXXIII/5 – Continued Provision of Information on Energy-efficient and Low-global-warming-potential Technologies".

41. He recalled that a draft decision containing a proposal by a group of African States parties to the Montreal Protocol had been introduced for the first time at the Thirty-Third Meeting of the Parties, in 2021, and re-introduced and discussed further at the forty-fourth meeting of the Open-ended Working Group. The Working Group had established a contact group to consider the report of the Technology and Economic Assessment Panel on decision XXXIII/5 and the proposal by a group of African States. The contact group had held a discussion on the general context and background to the proposal and the various elements thereof. Subsequently, the Working Group had agreed to forward the proposal to the Thirty-Fourth Meeting of the Parties for its consideration. The proposal was set out in annex III to document UNEP/OzL.Pro.34/2 and had been posted on the online forum to facilitate an exchange of views by parties prior to the current meeting. Subsequently, however, the proponents had submitted a new version of the proposal, updated in the light of the discussions at the forty-fourth meeting of the Working Group. The new version had been posted on the online forum to replace the original draft and was set out in a conference room paper.

42. The representative of Ghana introduced the conference room paper containing the revised draft decision, saying that the dumping of obsolete, new and used cooling appliances in African and other developing countries through exports by parties that had transitioned to more efficient, lower-GWP refrigerants during early phase-out or phase-down of controlled substances represented the exportation of poverty and non-compliance. Differentiated phase-out schedules should not result in the burden of obsolete equipment being shifted to the most vulnerable. He called on the parties to pursue a truly cooperative strategy of stopping dumping in the form of the export of inefficient, high-GWP used and new cooling equipment, and engaging in institutional-strengthening in the form of enabling activities to respond to dumping, stressing that the two parts of the strategy were not interchangeable and would not solve the problem in isolation.

43. One representative indicated her willingness to discuss the matter further in a contact group and proposed that a new contact group be established for that purpose, as substantial work had already been assigned to the contact group established under item 5 (a). Another representative, speaking on behalf of a group of countries, supported the proposal, adding that the submission by the group of African States parties merited the time and attention needed to arrive at a meaningful decision at the current meeting.

44. The parties agreed to establish a contact group, to be co-chaired by Cornelius Rhein (European Union) and Tumau Herownna Neru (Samoa), to further discuss the draft decision submitted by Ghana on behalf of the group of African States parties.

45. At a later stage in the meeting, the co-chair of the contact group reported that the contact group had run out of time to consider the full text that had been proposed, but had been able to reach agreement on a short draft decision reflecting the core proposal under discussion, on considering the issue further at the Thirty-Fifth Meeting of the Parties and including the item on the agenda of the forty-fifth meeting of the Open-Ended Working Group, taking into account the information requested from parties.

46. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

VI. Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring

47. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 40 to 43 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 4 to 8 of the addendum to the note by the Secretariat (UNEP/OzL.Pro.34/2/Add.1) and paragraphs 30 to 42 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4).

48. He recalled that at the forty-fourth meeting of the Working Group, the Secretariat had presented a progress report in response to the request by the parties in decision XXXIII/4, on enhancing the global and regional atmospheric monitoring of substances controlled by the Montreal Protocol. The Secretariat's report had included information on the implementation of the pilot project developed by the Secretariat in 2021 and funded by the European Union, on the regional quantification of emissions of controlled substances. As requested by the Working Group at its forty-fourth meeting, the Secretariat had provided an update to its progress report, which was set out in document UNEP/OzL.Pro.34/2/Add.1.

49. In addition, during the forty-fourth meeting, the European Union had introduced a conference room paper containing a draft decision on identifying sources of emissions originating from industrial processes. The Working Group had agreed to expand the mandate of the contact group established for the carbon tetrachloride discussion to include consideration of the proposal by the European Union, because of the potential links between those two proposals, which both addressed industrial emissions. Owing to time constraints, the contact group had not been able to discuss the proposal and the Working Group had agreed to forward the draft decision to the Thirty-Fourth Meeting of the Parties for its consideration. The draft decision was set out in annex IV to the note by the Secretariat (UNEP/OzL.Pro.34/2) and had also been posted on the online forum to facilitate an exchange of views by parties prior to the current meeting. No comments on the draft decision had been received on the online forum.

50. One representative welcomed the opportunity to discuss the draft decision submitted by the European Union in a contact group at the current meeting, but said that while her delegation considered the European Union pilot project a good first step in addressing gaps in monitoring, they also felt that the broader issue of gaps in global monitoring of global substances required further discussion, so requested that the issue be added to the agenda of future Montreal Protocol meetings.

51. Another representative suggested that discussion of the European Union proposal be deferred in view of parties' existing capacities and the ongoing work on the HCFC phase-out and HFC phase-down, particularly as some parties had national systems in place to monitor emissions originating from industrial processes.

52. The parties agreed to reconstitute the contact group established for the carbon tetrachloride discussion at the forty-fourth meeting of the Open-ended Working Group meeting, entrusting it with the mandate of considering the proposal by the European Union. The group would again be co-chaired by Liana Ghahramanyan (Armenia) and Michel Gauvin (Canada).

53. At a later stage in the meeting, the Co-Chair reported that the contact group had been able to complete its work and had produced a draft decision for consideration by the parties.

54. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

VII. Institutional processes to strengthen the effective implementation and enforcement of the Montreal Protocol

55. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 44 to 47 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), the note by the Secretariat on "Possible ways of dealing with illegal production of and illegal trade in controlled substances under the Montreal Protocol, identifying potential gaps in the non-compliance procedure, challenges, tools, ideas and suggestions for improvement" (UNEP/OzL.Pro.34/8) and paragraphs 49 to 53 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4).

56. He recalled that the issue had been considered by the Open-ended Working Group at its forty-fourth meeting. At that meeting, the discussion had been based on the information prepared by the Secretariat for the Implementation Committee in 2019, on possible ways of dealing with illegal trade and production of controlled substances. The same information had been reproduced in document UNEP/OzL.Pro.34/8. The Working Group had produced and forwarded to the Thirty-Fourth Meeting of the Parties a list of ideas for areas of improvement, which was set out in annex V to document UNEP/OzL.Pro.34/2 and had also been posted on the online forum to facilitate an exchange of views by parties prior to the current meeting. No comments on the list of ideas had been received on the online forum from parties, although one non-governmental organization had provided comments.

57. The representative of Australia, speaking on behalf also of Norway, the United Kingdom and the United States, introduced a conference room paper setting out a draft decision on the matter. She explained that it contained two main sets of proposals. The first was a series of actions that could be undertaken by parties in the short term: the introduction in their national customs classification system of separate subdivisions for HFCs and blends; encouragement to exchange information and intensify joint efforts to improve means of identification and prevention of illegal trade; and encouragement for the reporting to the Secretariat of fully proved cases of illegal trade. The second was a proposal to continue discussion of the issue in 2023, with the Secretariat updating the information provided in 2019 and providing additional information, all to be discussed at a workshop on further strengthening the effective implementation and enforcement of the Montreal Protocol, to be held back-to-back with the forty-fifth meeting of the Open-ended Working Group.

58. The representative of the United States, speaking on behalf also of Australia and the United Kingdom, introduced a conference room paper setting out a draft decision designed to take forward one of the items raised during the discussions at the forty-fourth meeting of the Open-ended Working Group on this issue. The proposal requested the Technology and Economic Assessment Panel to prepare a report for the Thirty-Fifth Meeting of the Parties providing information on the chemical pathways used at facilities that produced Annex C Group I or Annex F substances that could generate HFC-23 as a by-product, and information on the amount of HFC-23 generated and emitted from such facilities. She suggested that the proposal could be discussed in a contact group together with the proposal introduced by Australia.

59. Representatives welcomed both proposals for draft decisions, although some observed that the implications of the proposals for Article 5 parties, for timelines and for the inputs expected from the Secretariat all needed to be considered carefully. One representative suggested that while the proposal to update the information previously provided in 2019 was welcome, the Secretariat might also be requested to provide suggested guidance and recommendations for parties, which would stimulate more wide-ranging discussions. Another representative suggested that the two proposals for draft decisions were very different, and that the proposal on HFC-23 by-product might be more appropriately considered under agenda item 8, alongside the proposal on continued emissions of carbon tetrachloride, which also pertained to industrial emissions.

60. The Co-Chair thanked representatives for their proposals and comments and suggested that since both proposals had arisen from the same discussion at the Open-ended Working Group, it would be appropriate to continue considering them together. Accordingly, the parties agreed to establish a contact group on strengthening the institutions of the Montreal Protocol, to be co-chaired by Miruza Mohammed (Maldives) and Andrew Clark (United States), who had facilitated the informal group discussions at the forty-fourth meeting of the Open-ended Working Group.

61. Subsequently, after discussions in the contact group, the co-chair of the contact group introduced a revised draft decision on strengthening institutional processes with respect to information on HFC-23 by-product emissions.

62. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

63. At a later stage in the meeting, the co-chair of the contact group reported that the contact group had been able to complete its work. He introduced a draft decision on enhanced access and facilitating the transition to energy-efficient and low- and zero-global-warming potential technologies in parties operating under paragraph 1 of Article 5 of the Montreal Protocol.

64. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

VIII. Ongoing emissions of carbon tetrachloride

65. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 48 to 52 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2) and paragraphs 170 to 175 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4).

66. He recalled that a draft decision on carbon tetrachloride had first been introduced by Switzerland and discussed at the Thirty-First Meeting of the Parties, in 2019. Switzerland had revised the proposal a number of times before and during the forty-fourth meeting of the Open-ended Working Group, in order to reflect comments from their parties during which a contact group had been established to discuss the matter. The Open-ended Working Group, during which a contact group had been established to discuss the matter had agreed to forward the resulting draft decision, containing further changes, to the Thirty-Fourth Meeting of the Parties for further consideration. The draft decision was set out in annex VI to the note by the Secretariat (UNEP/OzL.Pro.34/2) and had also been posted on the online forum to facilitate an exchange of views by parties prior to the current meeting. No comments on the draft decision had been received on the online forum.

67. The representative of Switzerland said that further discussions intersessionally and at the current meeting had resulted in some proposed revisions to the draft decision, which would be presented to parties in a conference room paper. The parties agreed that the contact group established under item 6 would consider the matter further with the mandate to continue the discussion on the draft decision.

68. Subsequently, the representative of Switzerland introduced a draft decision set out in a conference room paper. He said that the draft decision aimed to help close existing knowledge gaps on emissions of carbon tetrachloride by inviting parties with industrial processes in their countries involving carbon tetrachloride to provide relevant information to the Secretariat to assist the Technology and Economic Assessment Panel in developing a greater understanding of the processes involved. As part of a step-wise approach, the data and information generated would assist parties in developing goal-oriented mitigation measures.

69. As previously agreed by the parties, the draft decision was forwarded to the contact group established under item 6 for further consideration.

70. At a later stage in the meeting, the Co-Chair reported that the contact group had been able to complete its work and had produced a draft decision on ongoing emissions of carbon tetrachloride for consideration by the parties.

71. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

IX. Future availability of halons and their alternatives

72. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 53 to 56 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 135 to 139 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4) and an advance version of volume 1, section 3, of the May 2022 progress report of the Technology and Economic Assessment Panel on the future availability of halons and their alternatives.

73. He recalled that, at the forty-fourth meeting of the Open-ended Working Group, in July 2022, when the parties had discussed the issue, it had been noted that the Technology and Economic Assessment Panel was due to provide updated information in its forthcoming 2022 quadrennial assessment report. In the light of that, the Working Group had agreed to defer further consideration of the item to 2023, but at the same time to add the issue to the agenda of the current Meeting of the Parties to allow the discussion to continue if needed before the publication of the report.

74. One representative observed that the issues of halon management that the Technology and Economic Assessment Panel had brought to the parties' attention remained paramount, and that the information and guidance that had been included in the report, including guidance from the Halon Recycling Corporation, was extremely useful and would be helpful to parties to reference in management of stocks of halons. She expressed the hope that all parties should exercise the utmost care in managing stocks of recovered, recycled and reused halons and should consider this in their domestic actions.

75. The parties took note of the information provided.

X. Issues related to exemptions under Articles 2A–2I of the Montreal Protocol

A. Nominations for critical-use exemptions for methyl bromide for 2023 and 2024

76. Introducing the sub-item, the Co-Chair drew attention to the information set out in paragraphs 57 to 59 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 9 to 18 of the addendum thereto (UNEP/OzL.Pro.34/2/Add.1), paragraphs 127 to 131 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4) and volume 4 of an advance version of the September 2022 final report of the Technology and Economic Assessment Panel on the evaluation of 2022 critical-use nominations for methyl bromide and related issues.

77. He recalled that, at the forty-fourth meeting of the Open-ended Working Group, the Methyl Bromide Technical Options Committee had presented its interim evaluation of the critical-use nominations received from three parties, comprising one nomination by an Article 5 party (South Africa) for 2023, and one nomination each by two non-Article 5 parties (Australia and Canada) for 2024 and 2023, respectively. The Committee had produced its final report and recommendations in September 2022.

78. The co-chairs of the Methyl Bromide Technical Options Committee, Marta Pizano and Ian Porter, gave a presentation on the Committee's final assessment of critical-use nominations for methyl bromide. A summary of the presentation is set out in section A of annex I to the present report.

79. In the ensuing discussion, one representative sought clarification of the statement in the presentation that 10,000 tonnes of methyl bromide was still used for exempted uses for quarantine and pre-shipment, but uncertainty over classification for that category meant that further critical-use nominations might arise in the future. Mr. Porter responded that while the definitions of the various categories under the Protocol were clear, several industries using methyl bromide still found it difficult to identify whether a treatment could be categorized as a quarantine or pre-shipment use or neither, as a consequence of which some critical uses were currently not being sought under the critical-use process.

80. The representative of South Africa said that the national plan to phase in alternatives to the use of methyl bromide for structural fumigation by 2024 was on track, and the party had agreed to the Committee's final recommendation of 19 tonnes for 2023.

81. The representative of Canada, referring to her country's critical-use nomination, said that Canada remained committed to phasing out methyl bromide, and had reduced usage of methyl bromide by 92 per cent since 2005. However, efforts to introduce alternatives to methyl bromide use in the strawberry runners industry on Prince Edward Island had faced a number of challenges. While the shift to indoor cultivation was yielding promising results, further time was needed to conduct research and undertake the necessary structural and technological investment. The party was therefore disappointed in the final recommendation of 3.857 tonnes, which was 25 per cent below the nomination of 5.017 tonnes and did not reflect the current needs of the industry. Furthermore, the process by which the Committee had reached its conclusion had lacked transparency and was not consistent with the working procedures of the Methyl Bromide Technical Options Committee relating to the evaluation of nominations for critical uses of methyl bromide as set out in annex I to the report of the Sixteenth Meeting of the Parties, in accordance with decision XVI/4. The party intended to discuss the matter further with the co-chairs of the Committee.

82. The representative of Australia, referring to his country's critical-use nomination, expressed disappointment at the decision of the Methyl Bromide Technical Options Committee not to recommend a critical-use exemption for 2024 for strawberry runner nurseries. With regard to the co-formulation of methyl iodide and chloropicrin as an alternative to methyl bromide, the process for registration of new chemicals in Australia was complex and potentially lengthy, as a consequence of which the timeline for transition to the new formulation was uncertain, with implications for the 2023 and 2024 nominations. As in the case of the Canada nomination, the decision of the Committee failed to adequately take into account the challenges facing the party in implementing alternatives in the industry, and was not in keeping with its established working procedures. Australia intended to submit

a conference room paper setting out a draft decision on the matter, also on behalf of Canada and South Africa.

83. One representative said that it was crucial that the Methyl Bromide Technical Options Committee follow its designated procedures and fully take into account the information submitted by parties. Another representative, speaking on behalf of a group of countries praised the efforts in phasing out methyl bromide of Argentina, which had not sought a critical-use nomination in the present round, and South Africa, which had not put forward a nomination for 2024. She expressed concern that some parties continued to seek critical-use nominations when alternatives existed for methyl bromide use, and she welcomed further discussion of how those parties could achieve alignment with the recommendations of the Committee and the requirements of decision IX/6.

84. The parties agreed that interested parties would undertake further informal discussions on the matter, led by Australia, with the objective of developing a draft decision on critical-use nominations for methyl bromide for the consideration of the parties.

85. Subsequently, the representative of Australia submitted, also on behalf of Canada and South Africa, for the consideration of the parties, a draft decision set out in a conference room paper presenting the proposed critical-use nominations for Australia, Canada and South Africa in line with the interventions made by those parties at the current meeting.

86. The parties agreed that the co-sponsors of the draft decision would continue to consult informally with interested parties in order to develop a revised version of the draft decision.

87. At a later stage in the meeting, the representative of Australia introduced a revised proposal for a draft decision. He explained that the revisions included the addition of more explanation about the situations in Australia and Canada, and also to note with appreciation that South Africa had committed not to apply for critical-use nominations of methyl bromide in the future. In addition, there were changes in the volumes of critical-use nominations for Australia and Canada for 2023, and Australia's nomination for 2024 had been withdrawn.

88. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

B. Stocks and quarantine and pre-shipment uses of methyl bromide

89. Introducing the sub-item, the Co-Chair drew attention to the information set out in paragraphs 60 to 65 of and annex VII to the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), and paragraphs 155 to 164 of the report of the forty-fourth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.WG.1/44/4).

90. He recalled that, at the forty-fourth meeting of the Open-ended Working Group, the European Union, Norway and Switzerland had submitted a draft decision on stocks and quarantine and pre-shipment uses of methyl bromide. After further discussion and revision of the draft decision, the Open-ended Working Group had agreed to forward the draft decision to the Meeting of the Parties for its consideration, on the understanding that interested parties could continue informal consultations on the matter during the intersessional period. The draft decision was set out in annex VII to document UNEP/OzL.Pro.34/2.

91. The representative of the European Union, introducing a conference room paper setting out the draft decision submitted by the European Union, Ecuador, Norway and Switzerland, said that action proposed in the draft decision would help increase knowledge of stocks and uses of methyl bromide and would assist parties in identifying alternatives to methyl bromide and reducing emissions.

92. In the ensuing discussion, several representatives expressed support for initiatives that would promote the use of alternatives and acknowledged the value of gathering data to support that process. It was necessary, however, to ensure that data were gathered and submitted on a voluntary basis, and to acknowledge the difficulties that might be faced in gathering proprietary data from businesses. Concern was also expressed about the value of the data gathered and how it might be used. One representative said that in developing the draft decision consideration needed to be given to whether the Methyl Bromide Technical Options Committee had the mix of skills in its membership necessary to address the issues, and whether clearer guidance needed to be given to the Committee.

93. The parties agreed to establish a contact group, to be co-chaired by Alain Wilmart (Belgium) and Diego Montes (Colombia), to further discuss the matter and produce a revised version of the draft decision for consideration by the parties.

94. At a later stage in the meeting, the Co-Chair reported that the contact group had been able to complete its work and had produced a draft decision for consideration by the parties.

95. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

XI. Strengthening the Technology and Economic Assessment Panel and its technical options committees for the phase-down of hydrofluorocarbons and other future challenges related to the Montreal Protocol and the climate

96. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 66 to 71 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), and section 8 of volume 1 of the May 2022 progress report of the Technology and Economic Assessment Panel.

97. He recalled that at the forty-fourth meeting of the Open-ended Working Group in July, the parties had considered a draft decision originally submitted by Morocco in 2020, on strengthening the Technology and Economic Assessment Panel and its technical options committees; recommendations made by the Technology and Economic Assessment Panel in its progress report on its restructuring to meet future challenges; and other ideas that parties had put forward during the meeting. The discussion was summarized in the report of the forty-fourth meeting of the Working Group. The proposal by Morocco was set out in annex VIII to document UNEP/OzL.Pro.34/2.

98. Parties had agreed to continue to work on the matter intersessionally and also to resume discussions at the current meeting. The co-chairs of the contact group that had been established to consider the matter had also collated a list of questions to be put to the Technology and Economic Assessment Panel, and, in October, the Panel had issued a response, which had been posted on the online forum, together with the Panel's own recommendations.

99. Several representatives expressed their desire to continue to discuss the matter following the very useful discussions at the forty-fourth meeting of the Open-ended Working Group. Issues that they said they would like to take up included the Panel's proposals for restructuring its technical options committees, and whether there were any alternative solutions to the challenges and means of ensuring the availability of sufficient expertise on new issues, such as energy efficiency. Representatives said that it was important to ensure that the work of the Technology and Economic Assessment Panel and its technical options committees remained in line with the needs of parties.

100. The parties agreed to establish a contact group, to be co-chaired by Paul Krajnik (Austria) and Maria del Mar Solano (Costa Rica), on strengthening the Technology and Economic Assessment Panel and its technical options committees for the phase-down of HFCs and other future challenges related to the Montreal Protocol and the climate. The Co-Chair of the preparatory segment encouraged the contact group to focus on identifying points of convergence, which could potentially be included in a draft decision, and also to identify proposals which were clearly not acceptable and which therefore would not need to be discussed further.

101. Subsequently, the representative of Australia, speaking also on behalf of Canada, the United Kingdom and the United States, introduced a proposal for a draft decision set out in a conference room paper. She explained that it was designed to take forward one of the proposals put forward by the Technology and Economic Assessment Panel in its progress report, namely the renaming of the Halons Technical Options Committee as the Fire Suppression Technical Options Committee, in recognition of the fact that the committee now had a broader scope than just halons.

102. With regard to the Panel's other proposals, she suggested that further consideration was needed, and the draft decision therefore requested the Panel to provide potential options for the future configuration of its foam and refrigeration technical options committees for consideration by the Open-Ended Working Group at its forty-fifth meeting, taking into account: previous discussions; the fact that the vast majority of HFC uses were in the refrigeration, air-conditioning and heat pumps sector; the expertise required to inform the parties of upcoming challenges related to the implementation of the Kigali Amendment; and guidance provided in its terms of reference on the structure and size of technical options committees as well as on gender and regional balance. She stated that she would welcome the views of other parties on the proposals.

103. At a later stage in the meeting, the co-chair of the contact group reported that the contact group had been able to complete its work and had produced a draft decision for consideration by the parties.

104. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

XII. Consideration of nominations by parties of experts to the Technology and Economic Assessment Panel

105. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 71 to 79 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 19 to 23 of the addendum thereto (UNEP/OzL.Pro.34/2/Add.1), the matrix of needed expertise and a primer on the operation of the Technology and Economic Assessment Panel.

106. The Co-Chair recalled that at the forty-fourth meeting of the Open-ended Working Group, in July 2022, the issue of nominations of experts by the parties to the Technology and Economic Assessment Panel had been briefly discussed. Parties wishing to nominate experts had been encouraged to consult the Panel and other interested parties in the margins of the Working Group meeting.

107. The list of members of the Panel whose membership expired at the end of 2022 was set out in document UNEP/OzL.Pro.34/2. A total of seven nominations had been received from parties to date. The Co-Chair urged the parties that were interested in making nominations to do so as soon as possible and to take the matrix of needed expertise that had been provided by the Panel into consideration when nominating experts. He suggested the establishment of an informal group of nominating and interested parties to discuss and agree on the nominations.

108. Representatives agreed to the proposal that further discussion was necessary. One observed that some experts who had been nominated to the Panel and its technical options committees, including some of senior experts put forward so far, did not appear to possess the expertise that was required, and said that she would welcome the chance to discuss the matter further. She also noted the linkage to the discussions under agenda item 11.

109. The parties agreed to establish an informal group of nominating and interested parties to discuss and agree on the nominations. The Secretariat would assist the group and prepare a draft decision containing the agreed nominations for appointment.

110. At a later stage in the meeting, the Co-Chair reported that the informal group had been able to complete its work and had produced a draft decision for consideration by the parties.

111. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

XIII. Compliance and data reporting issues: the work and recommendations of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol

112. The Vice-President and acting President of the Implementation Committee, Gene Smilansky (United States), presented a report on the outcomes of the sixty-eighth and sixty-ninth meetings of the Committee, including an overview of the draft decisions approved by the Committee for consideration by the Thirty-Fourth Meeting of the Parties. Both meetings had taken place in person, after two years of online meetings in 2020 and 2021.

113. The Committee had considered a broad range of issues this year, including various aspects of data reporting, compliance with control measures, and the establishment and operation of licensing systems for HFCs. It had also received a report from the secretariat of the Multilateral Fund on relevant decisions of the Executive Committee of the Fund and on activities carried out by the implementing agencies to facilitate compliance by parties. The Committee had reviewed existing decisions on non-compliance by a number of parties, dealing either with their data reporting obligations under Article 7 or with commitments contained in their respective plans of action to return to compliance. The Vice-President drew attention to a conference room paper setting out the three draft decisions which the Committee had forwarded for the consideration of the parties.

114. The first draft decision related to data reporting under Article 7 of the Montreal Protocol. It confirmed that parties had a strong record of reporting, with 194 of the 198 parties to the Protocol having reported data for 2022. It noted with concern a number of cases of non-compliance with parties' data reporting obligations: Afghanistan, the Democratic Republic of the Congo, Israel and the Russian Federation had not yet reported their 2021 data; San Marino, a party to the Kigali Amendment, had not submitted its baseline data for HFCs for the period 2011–2013; and Somalia, also a party to the Kigali Amendment, had not submitted its baseline data for HFCs for 2021. The draft decision urged those parties to submit the data as a matter of urgency, and requested the Committee to consider all the cases further at its seventieth meeting. The draft decision also highlighted the need for timely data reporting by parties for effective monitoring and assessment of parties' compliance with their obligations under the Montreal Protocol.

115. The second draft decision related to licensing systems for HFCs under Article 4B, paragraph 2 bis, of the Montreal Protocol. The Vice-President observed that the successful phase-out of most controlled substances by parties was largely attributable to the implementation of licensing systems to control their import and export. The draft decision therefore recognized the role of licensing systems in data collection and verification, monitoring of imports and exports of controlled substances, and the prevention of illegal trade.

116. Each party to the Kigali Amendment was required by 1 January 2019 or within three months of the date of entry into force of the Amendment for that party, whichever was later, to establish and implement a system for licensing the import and export of new, used, recycled and reclaimed controlled substances listed in Annex F. The draft decision noted with appreciation that 117 of the 139 parties to the Amendment had established such licensing systems, together with a further 8 parties that had not yet ratified the Amendment. It listed the 15 parties to the Amendment which should have reported the establishment of their licensing system but had not yet done so, and urged them to provide the information to the Secretariat as a matter of urgency and no later than 15 March 2023. The matter would be considered further by the Committee at its seventieth meeting.

117. The final draft decision concerned the request from Madagascar for the revision of its baseline data for hydrochlorofluorocarbons (HCFCs) for the year 2009. It stated that Madagascar had presented sufficient information, in accordance with decision XV/19, which set out the methodology for the submission of such requests, to justify its request for the revision of its consumption data for 2009, which was one of the HCFC baseline years for Article 5 parties, and approved the party's request to revise its HCFC consumption data for the baseline year 2009 accordingly.

118. The Vice-President concluded by thanking his colleagues on the Implementation Committee for their constructive engagement and support throughout the year. He also expressed his deep appreciation for the immense amount of help and advice that Mr. Bankobeza had given to the Committee, not just over the previous year, but since its inception.

119. The parties agreed to forward the set of draft decisions for further consideration and possible adoption during the high-level segment.

XIV. Implementation of the Kigali Amendment

A. Periodic review on alternatives to hydrofluorocarbons (decision XXVIII/2, para. 4)

120. Introducing the sub-item, the Co-Chair drew attention to the information set out in paragraphs 82 to 87 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 24 to 28 of and annex II to the addendum thereto (UNEP/OzL.Pro.34/2/Add.1) and volume 5 of the September 2022 report of the Technology and Economic Assessment Panel entitled "Decision XXVIII/2 TEAP Working Group Report Information on Alternatives to HFCs."

121. He recalled that the Panel had suggested that the parties might wish to consider aligning future periodic reviews, due every five years pursuant to decision XXVIII/2, with the quadrennial assessment reports, to enable the Panel to manage its workload better and to minimize duplication of effort.

122. The report on alternatives to HFCs was presented by Bella Maranion, Co-Chair of the Technology and Economic Assessment Panel; Ray Gluckman, senior expert and member of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee; Helen Walter-Terrinoni, co-chair of the Flexible and Rigid Foams Technical Options Committee; Helen Tope, co-chair of the Medical and Chemicals Technical Options Committee; and Adam Chattaway, co-chair of the Halons Technical Options Committee. A summary of the

presentation is set out in section B of annex I to the present report. Following their presentation, they provided additional information and clarifications in response to questions and comments from representatives.

1. Question-and-answer session

(a) Refrigeration, air conditioning and heat pumps

123. Following the presentation, in response to questions, Mr. Gluckman followed up on his assertion that there were suitable low-GWP solutions for small and large cooling systems but that medium-sized systems were more problematic. It was difficult, he said, to define what constituted a small or medium system, as it depended on technology and region. For instance, propane could be substitute for HFC-32 in smaller systems, with safety regulations allowing for a charge of up to 1 kg of propane, but once the system became larger or the layout more complex, a larger charge would likely be required. In high-ambient-temperature countries, a much bigger cooling load was required for a given room size, meaning that "medium" would have a different meaning in cooler regions than in high-ambient-temperature regions. With regard to the impact of using lower-GWP gases, he stressed the close link between reducing the size of refrigerant charge and the ability to maximize energy efficiency, and suggested that there might be a point at which the energy efficiency gains outweighed the benefits of HFC reduction.

124. Mr. Gluckman also expounded on his description of the use of flammable refrigerants as "more problematic" in medium-sized equipment. With a very small charge, he explained, the risk of what might occur as the result of a leak was very small, and there was thus high confidence when using highly flammable (class A3) refrigerants in domestic refrigerators and small stand-alone commercial equipment with a few hundred grams of refrigerant. As system size increased, however, design engineers needed to put more thought into design and what the safety code allowed for a given room size. Industry was still learning about the use of alternatives in larger systems: for instance, in variable refrigerant flow (VRF) air-conditioning systems, which used 40–50 kg of refrigerant and were very popular for hotels and mid-sized office blocks, industry was just beginning to use A2L class (mildly flammable) refrigerants like HFC-32. Responding to a question about mobile air conditioning, Mr. Gluckman confirmed that low-GWP alternatives were currently in use in electric vehicles.

125. Asked about commercial refrigeration, Mr. Gluckman said that there were generally more very-low-GWP options for refrigeration than for air conditioning. Small stand-alone commercial refrigeration equipment was already rapidly migrating to hydrocarbons, much like domestic refrigerators. Technically, however, the recommendation would almost always be to avoid retrofitting equipment designed for non-flammable refrigerant with a flammable refrigerant, which immediately placed constraints on retrofitting given that many of the alternatives were flammable. There were also non-flammable alternatives that could be retrofitted, however, such as R-448A and R-449A, which could easily be retrofitted into existing R-404A systems. For a range of technical reasons, it was easier to retrofit HFC systems to new HFC-HFO blends than it had been to retrofit HCFC systems to HFCs.

126. Addressing a question on the accessibility of alternatives given the working group's finding that limited accessibility for Article 5 parties was a key issue, Mr. Gluckman said that training needed to be put in place, for technicians, clearly, but also for the engineering teams that designed and specified refrigeration systems, who needed to be made aware of the alternative technologies. Mature technologies were available, and the development of Kigali HFC implementation plans (KIPs) and the activities of OzonAction should help to raise awareness of such technologies and begin to increase accessibility. He noted that technology maturity was regional, however, with some alternative technologies mature in places like Europe or Japan but not yet in high-ambient-temperature regions. Countries might consider indicating their interest to the technology providers to help accelerate the process.

127. Regarding the split of technologies within the air-conditioning sector, the situation varied considerably from country to country. In northern European climates, for instance, heat pumps could be expected to become dominant, while in Article 5 parties, air conditioning would dominate. Air-conditioning systems could be subdivided into room air conditioning and commercial (non-residential) building air conditioning, with the split again varying from one country to another depending on market maturity and climate. Flammable refrigerants had only been used in air-conditioning applications for five or six years and the size range of what suppliers were able to safely install was rising steadily, making it difficult to estimate how the market would evolve; nevertheless, the new international safety standard for household and similar electrical appliances (IES 60335-2-40) could be expected to have an impact.

(b) Foams

128. Asked about the energy performance and thermal conductivity of alternatives to HFCs in the foam sector, Ms. Walter-Terrinoni said that the working group's report contained a number of relevant comments for each sector. She confirmed that HFCs and hydrocarbons were sometimes being used in foam blends to balance cost and energy. Refining the blend of blowing agents to maximize energy efficiency was especially challenging in high ambient temperatures, as was the high temperature and pressure relationship and off gassing of the foam blowing agent. The unique challenges of high-ambient-temperature countries would be discussed in more detail in the final assessment report, which would also have a section on life-cycle analysis and balancing cost and energy efficiency.

129. On the question of the accessibility of alternatives, she noted that there had been supply chain problems in the foam sector throughout the pandemic, as well as what the technical options committee viewed as a likely mismatch between capacity and demand. The committee intended to discuss the matter in more depth in the assessment report, as well as what might be done to resolve some of the accessibility issues.

130. Responding to a question about the importance of foams for energy efficiency in appliances, Ms. Walter-Terrinoni noted that energy efficiency standards generally considered the thermal performance of foams to be a design feature of equipment and often supplied a menu of design feature options. Good foam performance could be paramount in meeting newer, more stringent energy efficiency standards. She confirmed that there was potential for foam insulation manufacturers to revert to fluorocarbons, particularly in areas where energy efficiency was especially important, such as in building panels, appliances and refrigeration equipment. The issue was currently an emerging one and it was not yet clear how it would evolve.

(c) Medical and chemical

131. Providing additional information on the use of alternatives in aerosols in the medical sector, Ms. Tope said that dry powder inhalers and aqueous soft mist inhalers were alternatives to HFCs in aerosols but were not universally available, accessible or suitable. Various factors influenced the choice of inhaler, including the way doctors prescribed medicines, availability, accessibility, cost, patient preference, and even national government guidance for applicable treatments. A lot of work was being done on new, in-kind alternative propellants with lower-GWP for metered-dose inhalers, although they were still in the early stages of development; additional information would be provided in the final assessment report.

132. Regarding accessibility, inhaled therapy was not universally accessible across all products, drugs or regions, with substantial variations globally. The underlying reasons included regulatory drug approvals, health policy, the presence of pharmaceutical companies in a given market, and patient and prescriber preferences. In some Article 5 parties, metered dose and dry powder inhalers were less accessible than in non-Article 5 parties. Commercially available medications in soft mist inhaler format were limited to short- or long-acting bronchodilators, which were primarily used for the treatment of chronic obstructive pulmonary disease and could not replace asthma attack treatments, for instance. Soft mist inhalers were also likely to be far less commercially available and successful in Article 5 parties than in non-Article 5 parties. In terms of cost, single-dose dry powder inhalers could be more affordable than metered-dose inhalers; in India, for instance, the market was very reliant on single-dose dry powder inhalers, which were a very affordable alternative to both the HFC metered-dose inhalers and multi-dose dry powder inhalers. In addition, in Article 5 parties, locally made metered-dose inhalers were more affordable than imported brands. A few companies had indicated that they planned to launch new metered-dose inhalers with lower-GWP alternatives in 2025, although that outlook presumed their successful completion of the complicated approval process in each country.

133. Regarding the use of HFCs in semi-conductor production, Ms. Tope explained that HFCs were used with a plasma to generate reactive fluorine species, with emissions arising from HFC gas that was not converted into the reactive species to etch the silicon wafers. Emission abatement systems were increasingly but not always used. More information would be provided in the final assessment report.

(d) Halons

134. Asked why 2-BTP was not cited as an alternative for fire suppression for aircraft engine nacelles and auxiliary power units even though it had been approved for use under the United States Environmental Protection Agency's Significant New Alternatives Policy Program in 2016, Mr. Chattaway explained that 2-BTP had been under active investigation for aircraft engine nacelle fire protection almost two decades ago but had failed a key minimum performance standard test that was a necessary stepping stone to commercialization and use. As a result, 2-BTP was not currently

under active investigation for that particular application and had therefore not been considered in the report. Two alternative agents, CF3I and a sodium bicarbonate-based dry chemical aerosol, were currently under active investigation and were likely to be commercialized.

(e) Per- and polyfluoroalkyl substances (PFAS)

135. Members of the working group addressed concerns raised by a number of representatives regarding the impact of developments in the identification and regulation of per- and polyfluoroalkyl substances (PFAS). They acknowledged that the issue was of concern across all sectors, particularly because of the way in which PFAS was defined, and was likely to have an impact on the alternatives considered in the report. The Technology and Economic Assessment Panel was monitoring how PFAS definitions were developing and the related policies were evolving, but relied heavily on the scientific expertise of the Environmental Effects Assessment Panel, which was closely following the matter. The working group members also noted that the review of alternatives to HFCs had been limited in scope, and that the final assessment report would contain more information on the implications of PFAS definition and regulation.

2. General discussion

136. Following the question-and-answer session, the Co-Chair opened the floor for a more general discussion on the report by the Technology and Economic Assessment Panel and the periodic review of alternatives to HFCs.

137. All the representatives who took the floor, both in the question-and-answer session and the general discussion, thanked the Panel for its work. Several of them noted the importance of the issue of alternatives to HFCs. It had been critical at the time of adoption of the Kigali Amendment and remained so six years later.

138. Referring to the situation faced by small and medium-sized enterprises in the foam sector, one representative stated that access to hydrochlorofluoro-olefins (HCFOs) was a major challenge for her country, owing to the prohibitive prices caused by production backlogs and exacerbated by delays in cargo shipments following the COVID-19 pandemic. The cost of such alternatives was much higher than had been foreseen by HCFO enterprises at the time of the adoption of the Kigali Amendment, and it was imperative that the issue be addressed under the Montreal Protocol.

139. One representative said that, although he saw merit in aligning the periodic review of alternatives to HFCs with the preparation of the quadrennial assessment reports, he did not consider that there was an urgent need to reach a decision on the matter at the current meeting. He proposed that the timing of the periodic review be considered in 2023 when the parties would consider the next quadrennial assessment reports. That proposal met with support from another representative. The quadrennial assessment reports were usually presented to the Open-ended Working Group, and, if the timing of the two types of report were to be aligned, parties would benefit from a longer period to consider the review of alternatives to HFCs before taking it up at the Meeting of the Parties. Both representatives were of the opinion that, in order not to dilute the initial intent of decision XXVIII/2, the issue of the periodic review of alternatives to HFC should remain a stand-alone item or sub-item on meeting agendas. They also said that they looked forward to the additional, updated information on alternatives that would be provided in the quadrennial assessment report.

140. The parties agreed to defer to 2023 consideration of the alignment of future periodic reviews with the quadrennial assessment reports.

B. Status of ratification

141. Introducing the sub-item, the Co-Chair drew attention to the information set out in paragraphs 88 and 89 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), and the note by the Secretariat on the status of ratification, acceptance, accession or approval of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP/OzL.Pro.34/INF/4) and on draft decisions for consideration by the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/3, draft decision XXXIV/[EE]).

142. The Co-Chair provided an update on the status of ratification of the Kigali Amendment as at 1 November 2022. He informed the parties that, at that date, a total of 140 parties had ratified, accepted or approved the Kigali Amendment. The representatives of Brazil and the United States, two countries that had recently become parties to the Amendment, expressed their pleasure at their countries' new status, with the representative of Brazil stating that the support of the Multilateral Fund would be crucial for his country in implementing its new obligations.

143. The parties agreed to include the updated number of parties to the Kigali Amendment in the related draft decision and to forward the draft decision for consideration and possible adoption during the high-level segment.

C. Impact of the coronavirus disease (COVID-19) pandemic on hydrofluorocarbon baselines for parties operating under paragraph 1 of Article 5 (proposal by Cuba)

144. Introducing the sub-item, the Co-Chair drew attention to the information set out in paragraphs 90 to 92 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2). He recalled that at the closing session of the forty-fourth meeting of the Open-ended Working Group, the representative of Cuba had spoken about the impact of the COVID-19 pandemic on HFC baselines for Article 5 parties and had proposed that the issue be placed on the agenda of the current meeting. Cuba had subsequently submitted a proposal for a draft decision, which had been posted on the online forum prior to the meeting.

145. The representatives of Cuba introduced the draft decision set out in a conference room paper. They explained that the pandemic had affected the majority of countries very significantly, resulting in a fall in the consumption of HFCs in 2020 and 2021. Since those were two of the three baseline years for Article 5 parties that had ratified the Kigali Amendment, the baselines would be set artificially low, which would pose challenges for countries as their consumption rose in line with the recovery from the pandemic and would probably lead to a situation of non-compliance.

146. They suggested that the parties should show flexibility towards countries thus affected, and their proposal suggested three options in that regard. Parties whose consumption levels had not been affected by the pandemic could maintain the baseline years as 2020 to 2022; parties whose consumption levels had been greatly affected could use an average of consumption for the years 2018 and 2019, plus 20 per cent; or parties whose consumption levels had been significantly affected could use the average consumption for the period 2015–2019, with the option of choosing the average of that period's three best years, plus a 20 per cent increase. In all cases the baseline would include 65 per cent of the baseline consumption of HCFCs, as set out in the Kigali Amendment.

147. Many representatives thanked Cuba for introducing the proposal and expressed their support for it. They emphasised that the pandemic had had a profound effect on many countries' economies, particularly those that were heavily dependent on tourism, with a resulting sharp fall in volumes of HFC imports in 2020 and 2021, and possibly even in 2022. One representative commented that his country had seen a reduction of 30 per cent in HFC imports, while another observed that her country's HFC consumption had been lower in 2021 than in 2020. The Montreal Protocol had a proud record of providing assistance to parties facing challenges in complying with their obligations, and this totally unprecedented event surely warranted such support.

148. One representative suggested that it would be undesirable to reopen the negotiations over the Kigali Amendment, and that other routes to provide assistance could be explored, such as support from the Multilateral Fund. Another called for an imaginative approach to the problem, including the consideration of all options, such as the possible use of exemptions.

149. Some representatives, while recognizing the need to address the problem, stressed the need for more evidence of the effects of the pandemic on HFC consumption in Article 5 parties, including the magnitude of the impacts and whether the pandemic had affected all Article 5 parties equally.

150. Some representatives also observed that the formulas for calculating baseline consumption levels were set out in the text of the Montreal Protocol, and could not, therefore, be changed through a decision of a Meeting of the Parties. This would need, instead, either an adjustment or an amendment to the Protocol which, in turn, would need to be submitted to the Secretariat six months in advance of a Meeting of the Parties. This would allow sufficient time for consideration of the issue, and could be done prior to the next Meeting of the Parties in 2023. A number of representatives raised the issue of whether an assessment and review of the control measures, as stipulated in Article 6 of the Montreal Protocol, would be necessary before an adjustment or amendment could be considered.

151. All the representatives who spoke said that they would welcome the opportunity to discuss the proposal further in greater detail.

152. The representative of Cuba thanked the parties for their comments. He stressed the unprecedented nature of the pandemic and the drastic effects it had had, not just on economic growth but on all aspects of society. Some parties had seen imports of refrigerants fall almost to zero. There

was an urgent need to adapt the Montreal Protocol to the new reality. He expressed the view that, with the first HFC compliance target coming up in 2024, parties could not wait another year to take action.

153. The Co-Chair thanked the parties for their comments and concluded that there was clearly a need for further discussion in an informal setting. Accordingly, the parties agreed to establish an informal group on the impact of the COVID-19 pandemic on HFC baselines, to be co-chaired by Ralph Brieskorn (Netherlands) and Daniel López Vicuña (Mexico).

154. Subsequently, after discussion of both the proposal and a counter proposal in the informal group, the co-chair of the group introduced a draft decision on the matter agreed by the group.

155. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

XV. Safety standards (decision XXIX/11)

156. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 93 to 95 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2), paragraphs 29 to 32 of and annex III to the addendum thereto (UNEP/OzL.Pro.34/2/Add.1), and the system safety standards tool.

157. He recalled that, by decision XXIX/11, the Secretariat had been requested to develop a tabular overview of relevant safety standards that would be made available on its website and updated prior to each Meeting of the Parties. Pursuant to that decision, at the current meeting parties would consider whether to renew that request to the Secretariat.

158. In the ensuing discussion, the representative of the European Union said that the Secretariat had undertaken helpful work in keeping parties informed of safety standards, and the European Union intended to submit, for consideration by the parties, a conference room paper containing a draft decision on renewing the mandate of the Secretariat to undertake the task set out in decision XXIX/11. Another representative said that the information gathered by the Secretariat had proved useful in assisting parties to the Kigali Amendment to conduct training and establish safety standards for potentially flammable low-GWP alternatives to HFCs. Another representative, expressing support for the extension of the Secretariat's mandate, said that the knowledge-sharing work of the Secretariat had been beneficial in a rapidly evolving field where safety concerns, including flammability, might act as a barrier to the broader adoption of low-GWP alternatives.

159. Subsequently, the representative of the European Union introduced a draft decision set out in a conference room paper submitted by her party. The proposal recalled existing decisions related to safety standards; stressed the importance of ensuring safety in the market introduction, manufacturing, operation, maintenance and handling of equipment using very-low-GWP refrigerants that were alternatives to HCFCs and HFCs and the importance of being informed of progress in the updating of relevant standards; and requested the Ozone Secretariat to continue providing information on relevant safety standards, as requested in decision XXIX/11, including when notified thereof by a party or a group of parties.

160. The Co-Chair encouraged parties to consider the proposed draft decision and, in the margins of the meeting, to seek any necessary clarifications from the European Union and propose any desired modifications.

161. Subsequently, after discussions in the margins of the meeting, the representative of the European Union [f] introduced a revised draft decision on the matter.

162. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

XVI. Recognition of the achievements of Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland, winners of the Nobel Prize in Chemistry in 1995

163. Introducing the item, the Co-Chair drew attention to the information set out in paragraphs 96 to 100 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/2) and the note by the Secretariat on draft decisions for consideration by the Thirty-Fourth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.34/3, draft decision XXXIV/[A]).

164. He recalled that at the forty-fourth meeting of the Open-ended Working Group there had been unanimous support for the draft decision, co-sponsored by the European Union, Mexico and the United States, to honour the work of the three heroes of ozone protection, Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland, and he proposed that the draft decision be forwarded to the high-level segment for consideration.

165. The parties agreed to the forward the draft decision for further consideration and possible adoption during the high-level segment.

XVII. Other matters

Co-option mechanism to ensure equal participation at meetings of the Executive Committee

166. Under the item, the parties considered a conference room paper setting out a draft decision submitted by Armenia on behalf of a group of Article 5 parties from Eastern Europe and Central Asia, which proposed modalities for enhancing participation by those parties in the work of the Executive Committee of the Multilateral Fund through the co-option mechanism.

167. Introducing the conference room paper, the representative of Armenia said that the draft decision proposed the provision in the budget of the secretariat of the Multilateral Fund of funding to support the participation in Executive Committee meetings of two parties from among the Article 5 parties of Eastern Europe and Central Asia through the co-opting of one of the seven seats allocated to Article 5 parties in the years in which the Article 5 parties of Eastern Europe and Central Asia did not hold a seat on the Executive Committee.

168. In the ensuing discussion there was general acknowledgement that the proposal represented a promising way forward, given the need to ensure equitable geographical representation in the Executive Committee, as set out in decision XVI/38. Several representatives spoke of the need to approach the issue in a flexible, equitable and participatory manner. A number of issues would require further discussion, however, including how the co-opting proposal would work in practice, the need to work within the procedures and modalities of the Executive Committee, and the articulation of the "region" of Eastern Europe and Central Asia, given that it was not an official United Nations region. On the matter of the articulation of the "region," the representative of Armenia responded that the proposed draft decision retained the language of decision XVI/38 in that regard.

169. The parties agreed that the representative of Armenia would take the lead in conducting informal consultations with interested parties with a view to refining the draft decision for further consideration by the parties.

170. Subsequently, the representative of Armenia introduced a revised proposal for a draft decision, following bilateral discussions with several parties. She observed that the revision represented a refinement of the language rather than a substantive change in the original proposal.

171. Several representatives welcomed the revised proposal and thanked Armenia for showing flexibility. Some of them requested confirmation that the draft decision, if adopted, would represent the solution to the issue raised in a previous proposal by Armenia regarding changing the composition of the Executive Committee of the Multilateral Fund, and that Armenia and other parties from the Eastern Europe and Central Asia network would no longer pursue this previous proposal. In response, the representative of Armenia drew attention to the first preambular paragraph of the draft, which acknowledged that the Executive Committee comprised seven Article 5 parties and seven non-Article 5 parties. Another representative asked whether the preceding intervention meant that the representative of Armenia was satisfied with that composition moving forward, and the latter confirmed that that was the case.

172. The parties agreed to forward the draft decision for consideration and possible adoption during the high-level segment.

Part two: high-level segment (3 and 4 November 2022)

I. Opening of the high-level segment

173. The high-level segment of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol was opened at 10.10 a.m. on Thursday, 3 November 2022, by Samuel Paré (Burkina Faso), President of the Thirty-Third Meeting of the Parties.

A. Statement by the President of the Thirty-Third Meeting of the Parties to the Montreal Protocol

174. In his remarks, Mr. Paré welcomed participants, expressing his pleasure at meeting in person once again following a number of online meetings held due to pandemic-related restrictions. He noted that, in addition to items regularly on the agenda of a Meeting of the Parties, items that parties had been unable to discuss in 2020 and 2021 owing to restricted agendas had been included in the agenda of the current meeting. He noted that he had been encouraged by the preliminary work on those issues that had taken place at the forty-fourth meeting of the Open-ended Working Group and he highlighted the adoption by the Fifth Extraordinary Meeting of the Parties of a decision on the replenishment of the Multilateral Fund for the triennium 2021−2023, an issue that had been pending since 2020.

175. Highlighting the agenda item on recognizing the achievements of Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland, winners of the Nobel Prize in Chemistry in 1995, Mr. Paré expressed the hope that the related draft decision would receive unanimous support at the current meeting and that parties would uphold the legacy of the Nobel laureates by renewing their commitment to the work of the Vienna Convention and the Montreal Protocol.

176. Recalling the sixth anniversary of the adoption of the Kigali Amendment on 15 October 2022, he congratulated the 140 parties to the Amendment and emphasized the importance of universal ratification of the Amendment for maximum impact. Apart from protecting the climate, the replacement of HFCs would create an opportunity to increase the energy efficiency of cooling equipment and to significantly reduce energy costs for consumers and businesses. He urged the parties that had not yet done so to ratify the Amendment. In closing, he thanked his fellow Bureau members and the Ozone Secretariat for their support during his presidency.

B. Statement by a representative of the United Nations Environment Programme

177. In her opening remarks, Inger Andersen, Executive Director of UNEP, said that, on the thirty-fifth anniversary of the Montreal Protocol, it was fitting that the Meeting of the Parties be held in the city where the instrument's journey had begun. Efforts since that time had delivered invaluable benefits, protecting the planet from ultraviolet radiation and avoiding millions of cases of skin cancer and billions of dollars' worth of damage to agriculture, fisheries and other resources. Actions under the Protocol had also significantly contributed to avoiding climate change on a massive scale through the phase-out of climate-warming, ozone-depleting substances, and to protecting carbon sinks. Furthermore, the Kigali Amendment was expected to avoid global warming of up to 0.5°C through the phase-down of HFCs, which would be a huge contribution, given how far behind the global community was in decarbonizing its economies and societies. The achievement of universal ratification of the Kigali Amendment was a key issue, and she urged countries that had not yet done so to ratify and start implementing the Amendment. The adoption of more energy-efficient cooling technology to accompany the HFC phase-down was also crucial with a view to doubling the climate gains of the Kigali Amendment. Ms. Andersen noted that participants were discussing the enhancement of energy efficiency and other challenges and opportunities related to the Kigali Amendment at the current meeting.

178. Highlighting that activities under the Montreal Protocol would continue to be supported by sound science and funding, Ms. Andersen thanked the members and experts of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel for providing the information needed for sound policymaking. She also thanked the parties for finalizing the replenishment of the Multilateral Fund for the triennium 2021–2023, noting that funding was crucial to enabling many Article 5 parties to begin implementing the Kigali Amendment. She also wished parties well in their discussions on the terms of reference for the study on the next replenishment of the Multilateral Fund.

C. Statement by a representative of the Government of Canada

179. Cécile Siewe, Associate Assistant Deputy Minister for Environmental Protection, Department of Environment and Climate Change Canada, welcomed participants to Canada and thanked the Ozone Secretariat for organizing the Thirty-Fourth Meeting of the Parties in Montreal. She expressed gratitude to participants for their dedication in finding solutions to complex problems in order to protect both the ozone layer and the climate. The Montreal Protocol was not only the blueprint for successful global environmental cooperation but also a template for how to bring together government, industry, science and civil society to address imminent environmental threats. She then

introduced a video message by Steven Guilbeault, Canadian Minister of Environment and Climate Change.

180. In his address, Mr. Guilbeault also welcomed participants to Montreal, thanking the Ozone Secretariat for holding a Meeting of the Parties in the city for a fourth time. The Montreal Protocol was a testament to the success that could be achieved when Governments, scientists, industry and civil society collaborated to address an urgent environmental threat. The executive summary of the report *Scientific Assessment of Ozone Depletion: 2022* not only confirmed that the ozone layer was on a path to recovery thanks to the implementation of the Montreal Protocol but also highlighted that the phase-out of substances controlled under the Protocol would avoid global warming of 0.5–1 C by the mid-century. In addition to that benefit, the recovery of the ozone layer would reduce ultraviolet radiation damage to carbon sinks, which would also help to avoid global warming. Through the Kigali Amendment, the Montreal Protocol was expected to contribute further to climate protection through the phase-down of HFCs, thus preventing an increase in temperature of up to 0.5°C by 2100. That climate benefit could be increased tenfold if the energy efficiency of products and equipment were to be improved during the transition away from HFCs. Such ambitions came with challenges, however, including, in the short-term, the need for developing countries to comply with the 2024 freeze in HFC consumption. In that respect, Mr. Guilbeault said that Canada was committed to continuing to contribute financially to the Multilateral Fund and to working with international partners, including the United Nations Development Programme (UNDP), to share and promote climate-friendly alternative technologies and technical expertise to reduce the use of HFCs in developing countries. Canada itself had already achieved a reduction of 38 per cent in HFC consumption from its baseline levels, significantly surpassing its Montreal Protocol target of 10 per cent. In closing, he reiterated his Government's strong commitment to the success of the Montreal Protocol.

II. Organizational matters

A. Election of officers for the Thirty-Fourth Meeting of the Parties to the Montreal Protocol

181. At the opening session of the high-level segment of the meeting, in accordance with paragraph 1 of rule 21 of the rules of procedure, the following officers were elected, by acclamation, to the Bureau of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol:

President:	Hassan Mubarak (Bahrain) (Asia-Pacific States)
Vice-Presidents:	Jana Mašíčková (Czechia) (Eastern European States)
	Adrian Forde (Barbados) (Latin American and Caribbean States)
	Alain Wilmart (Belgium) (Western European and other States)
Rapporteur:	Cyrus Mageria (Kenya) (African States)

B. Adoption of the agenda of the high-level segment

182. The following agenda for the high-level segment was adopted on the basis of the provisional agenda set out in section II of document UNEP/OzL.Pro.34/1:

1. Opening of the high-level segment:
   - (a) Statement by the President of the Thirty-Third Meeting of the Parties to the Montreal Protocol;
   - (b) Statement by a representative of the United Nations Environment Programme;
   - (c) Statement by a representative of the Government of Canada.
2. Organizational matters:
   - (a) Election of officers for the Thirty-Fourth Meeting of the Parties to the Montreal Protocol;
   - (b) Adoption of the agenda of the high-level segment;
   - (c) Organization of work;
   - (d) Credentials of representatives.

3. Presentations by the assessment panels on progress in their work and key issues emanating from their 2022 quadrennial assessments.

4. Presentation by the Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the work of the Executive Committee, the Multilateral Fund secretariat and the Fund's implementing agencies.

5. Statements by heads of delegation and discussion on key topics.

6. Report by the co-chairs of the preparatory segment and consideration of the decisions recommended for adoption by the Thirty-Fourth Meeting of the Parties.

7. Dates and venue for the Thirty-Fifth Meeting of the Parties to the Montreal Protocol.

8. Other matters.

9. Adoption of decisions by the Thirty-Fourth Meeting of the Parties to the Montreal Protocol.

10. Adoption of the report of the meeting.

11. Closure of the meeting.

C. Organization of work

183. The parties agreed to follow their customary procedures.

D. Credentials of representatives

184. The Bureau of the Thirty-Fourth Meeting of the Parties to the Montreal Protocol approved the credentials of the representatives of 79 of the 127 parties represented at the meeting. The Bureau provisionally approved the participation of 1 party on the understanding that it would forward its credentials to the Secretariat as soon as possible. The Bureau urged all parties attending future meetings of the parties to make their best efforts to submit credentials to the Secretariat as required under rule 18 of the rules of procedure. The Bureau further recalled that the rules of procedure required that credentials be issued either by a head of State or Government or by a minister for foreign affairs or, in the case of a regional economic integration organization, by the competent authority of that organization. The Bureau recalled that representatives of parties not presenting credentials in the correct form could be precluded from participating fully in the meetings of the parties, including with regard to the right to vote.

III. Presentations by the assessment panels on progress in their work and key issues emanating from their 2022 quadrennial assessments

185. On behalf of the Montreal Protocol's three assessment panels, Bonfils Safari, John Pyle and Paul Newman, co-chairs of the Scientific Assessment Panel, Janet Bornman, co-chair of the Environmental Effects Assessment Panel, and Bella Maranion, co-chair of the Technology and Economic Assessment Panel, delivered presentations on the work of the panels in preparing the 2022 quadrennial assessments. Summaries of the presentations are set out in section C of annex I to the present report.

186. Responding to questions about potential additions to the report of the Scientific Assessment Panel, Mr. Pyle clarified that the document had already been finalized, and was now in production, so no further additions were feasible, although it would always be possible to provide updates on specific issues. A paper on regional emissions of methyl bromide, mentioned by the questioner, had not been reviewed for the report because it had been published too recently.

187. Responding to further questions, Mr. Newman observed that iodine was a very powerful ozone-depleting agent, and was therefore carefully monitored, but so far it was present in the stratosphere only in small concentrations. Top-down estimates of concentrations of carbon tetrachloride were reasonably accurate at the global level, but more monitoring stations would be needed for more precise regional estimates; he acknowledged the finance recently made available by the European Union for monitoring stations.

188. On the impact of volcanoes and wildfires, Mr Newman commented that the eruption of the Hunga Tonga-Hunga Ha'apai volcano in December 2021 had injected a huge volume of water into the stratosphere, which was gradually spreading throughout the Southern hemisphere and beginning to

leak into the Northern hemisphere too. This was expected to increase the extent of the Antarctic ozone hole in 2023, although the impact would have been much lower in the absence of anthropogenic chlorine. David Fahey, co-chair of the Scientific Assessment Panel, added that the scientific community had been fortunate in being able to benefit from measurements taken from balloon instruments launched directly into the volcanic plume soon after the eruption, which had greatly assisted their understanding of the impact; since eruptions were unpredictable, this was not always possible. Wildfires also injected large volumes of material into the stratosphere, although of different types; the very extensive fires in Australia in 2019 had resulted in a very intense plume which had affected the chemistry of the stratosphere, but only for a relatively short period.

189. Responding to a question about very short-lived chlorine-containing substances, Mr. Pyle explained that it was impossible to make accurate future predictions. While increased emissions of dichloromethane had now been observed for more than 10 years, their sources were not fully understood, but it seemed likely to be a mix of natural and artificial origins. Similarly, the very large increase in HFC-23 emissions was not fully understood, but was assumed to be largely from feedstock. In response to a question about other fluorinated substances, such as sulphur hexafluoride, Mr. Pyle drew attention to the annex that would accompany the report of the Scientific Assessment Panel, which would include a vast amount of information on that and many other substances.

190. Ms. Maranion added that the panels collaborated closely on their assessment reports. The Technology and Economic Assessment Panel was currently updating its bottom-up estimates of emissions of carbon tetrachloride. Responding to a question on sources of halon emissions, Adam Chattaway, co-chair of the Halons Technical Options Committee, stated that the committee thought that emissions of halon 1301 were mostly from feedstock, while emissions of halon 2402 were probably mainly from the decommissioning of old equipment. In each case further information would be welcome.

191. The President thanked the co-chairs of the assessment panels for their presentation and all the panel members for the assessment work they had been carrying out and for all their efforts to aid in the protection of the ozone layer. He said that the co-chairs and members of the panels would be present at the meeting until its conclusion and he encouraged participants to take advantage of their presence to follow up on any questions directly with them.

192. The parties took note of the information presented.

IV. Presentation by the Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the work of the Executive Committee, the Multilateral Fund secretariat and the Fund's implementing agencies

193. Mr. Hassan Mubarak, Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol, reported on the work of the Executive Committee, the Multilateral Fund secretariat and the implementing agencies of the Fund since the Thirty-Third Meeting of the Parties, summarizing the information set out in document UNEP/OzL.Pro.34/7. His statement is set out in annex II to the present report.

194. The parties took note of the information presented.

V. Statements by heads of delegation and discussion on key topics

195. Under the agenda item, the parties, in addition to hearing statements by heads of delegation and their representatives, engaged in a 90-minute round-table discussion.

A. Statements by heads of delegation

196. During the high-level segment, statements were made by the heads of delegation or their representatives of the following parties: Angola, Bahamas, Barbados, Brazil, Burundi, Cambodia, Canada, China, Cuba, Eswatini, European Union, Grenada, Indonesia, Malaysia, Mongolia, Myanmar, Nepal, Philippines, Samoa, Saudi Arabia, South Africa, State of Palestine, Tunisia, Türkiye, Turkmenistan, United Republic of Tanzania, Viet Nam and Zambia. A statement was also delivered by the representative of the International Institute of Refrigeration.

197. Many of the representatives who spoke expressed their gratitude to the Government and the people of Canada for their hospitality. Appreciation was also extended to the Ozone Secretariat and the Bureau, the Secretariat and Executive Committee of the Multilateral Fund, UNEP, the

implementing agencies, donor partners, the assessment panels, international organizations, and other stakeholders for their role in ensuring the success of the current meeting in particular and of the Montreal Protocol in general. Several speakers expressed their satisfaction at being able to meet again in person after several years of online meetings due the COVID-19 pandemic.

198. Many representatives expressed their sincere gratitude to Mr. Bankobeza, the outgoing Senior Legal Officer, for his significant contribution to country activities to protect the ozone layer and for 30 years of dedicated service to the parties, to the Montreal Protocol and more broadly to environmental protection.

199. Many representatives paid tribute to the success of the Montreal Protocol and to the parties in controlling and phasing out ozone-depleting substances and assisting the recovery of the ozone layer, thereby contributing enormously to the safety and well-being of humanity, and asserted their continued commitment to supporting the goals of the Protocol. The thirty-fifth anniversary of the adoption of the Protocol in 1987 represented an opportunity to reflect on the critical achievements of the Protocol and what needed to be done in the future to ensure the continued protection and restoration of the ozone layer. In keeping with the theme of World Ozone Day 2022, "Global cooperation protecting life on earth", one representative stated that the Montreal Protocol offered unequivocal proof of the potential for international cooperation to protect the environment, while another said that the instrument had demonstrated, in its vision to contribute to reducing the impact of climate change, the ability to adapt to the new challenges facing the planet.

200. A number of factors contributing to that success were alluded to, including the strong commitment of all the institutions involved, the mutual understanding between governments, businesses, industry, and civil society organizations, and the scientific work that formed the basis of activities under the Protocol. In that regard it was timely to pay homage to the work of the Nobel laureates whose research had initially drawn attention to the threat to the ozone layer, namely Mario Molina, Frank Sherwood Rowland and Paul Crutzen. In addition, the admirable level of compliance of parties with their obligations under the Protocol demonstrated a robust alignment of objectives.

201. Many representatives described the continuing actions being taken in the own countries, with assistance from the Multilateral Fund and the implementing agencies, to phase out ozone-depleting substances, implement the various stages of their HCFC management plans and achieve compliance with the provisions of the Protocol, including through legislative, policy, institutional and programmatic measures. A wide range of activities were outlined, including the development of national programmes to eliminate ozone-depleting substances and convert existing technologies to more environment- and climate-friendly alternatives; legislative and regulatory action to control ozone-depleting substances within the wider environmental framework; the strengthening of institutions engaged in work related to the Montreal Protocol; the reinforcement of legal and policy frameworks; the introduction of import controls, monitoring mechanisms, and quota and licensing systems to combat illegal trade; effective action by and involvement of national ozone units in policy and programme development; strategic implementation of investment and non-investment projects; intersectoral collaboration involving a range of stakeholders, including through public-private partnership ventures; training and capacity-building for customs officers, and for service technicians in the refrigeration and air-conditioning sectors; the phase-out of methyl bromide, HCFC-141b and other potent ozone-depleting chemicals; the promotion of alternative substances and new technologies, particularly in the refrigeration, air-conditioning and foam sectors, with a focus on climate benefit and energy efficiency; educational and awareness-raising campaigns, including in the area of safety; and the use of electronic and online technologies to facilitate monitoring, enforcement and compliance.

202. With regard to the Kigali Amendment, many representatives said that they had now ratified the Amendment, recognizing its significance for the future direction of the Montreal Protocol and its critical role in global efforts to combat climate change through reduced greenhouse gas emissions. There was widespread acknowledgement by parties of the urgent need to undertake action to phase down the consumption and production of HFCs. The successful implementation of the Kigali Amendment could prevent a temperature increase of 0.4°C and associated energy efficiency improvements could greatly enhance climate benefits, making a substantial contribution to attaining the goal of the Paris Agreement. One representative said that the Kigali Amendment represented a path of great responsibility but also of great opportunity to modernize national industry, to promote the 2030 Agenda for Sustainable Development and its goals, and to combat climate change. Another observed that the success of the Montreal Protocol in protecting the environment, and its continued reputation as the most effective multilateral environmental agreement, would depend on how successful it was in implementing the phase-down of HFCs at the global level. Another representative highlighted the need to introduce HFC-related projects within a national environmental strategy that

adopted best international practices and was based on scientific foundations to protect human health and the environment while ensuring the sustainability of the activities undertaken.

203. A number of representatives described the national actions already being carried out to implement the Kigali Amendment and to introduce climate-friendly technologies, including demonstration projects for the conversion of manufacturing lines to environmentally friendly alternatives; data gathering on the current status of use of HFCs to support policy formulation; legislative measures, including regulating the import and disposal of HFCs; the inclusion of Kigali Amendment-related actions within wider environment and climate protection programmes, plans and strategies; establishing licensing systems; establishing facilities for the recovery and recycling of refrigerant and air-conditioning fluids; awareness-raising activities among relevant stakeholders; gap analysis to assess future needs in relation to the current market situation, and develop an action plan to bridge the gap; public procurement policies to promote alternative technologies in the public sector; improved data collection systems to facilitate monitoring and control mechanisms and regulate trade; the establishment of energy efficiency labelling standards and minimum energy performance standards for refrigeration and air-conditioning appliances; conducting multistakeholder seminars and workshops with the participation of national and international consultants; and the inauguration of a centre of excellence and regional training hub for capacity development in natural refrigerant technology.

204. There were, however, a number of challenges to the successful implementation of the Kigali Amendment. The transition to more energy-efficient equipment associated with the adoption of low-GWP technologies entailed adjustments to energy sectors and the overall economy that could prove testing for low-income countries. The current high cost of several alternative technologies currently available, especially in the refrigeration sector, heightened that challenge. New technologies, including the use of natural refrigerants with low GWP, required comprehensive theoretical and practical training of workers in the sector, with considerable financial implications. Recovery, regeneration and recycling were additional activities requiring financial and capacity support. Finally, safety standards related to flammability, toxicity and high pressure of alternative refrigerants could constitute a barrier to adoption.

205. Nevertheless, a number of representatives outlined innovative ways in which their countries were prioritizing action to promote energy efficiency and achieve socioeconomic and environment co-benefits, including through vocational training of a new cadre of specialists and the adoption of an interlinked, integrated approach combining HFC phase-down, technological development for low-GWP substances, and increased energy efficiency in the refrigeration and air-conditioning sectors. Cooperation between parties could assist in developing country-specific strategies that were practical and cost-effective. Shared data on trade, sources of technology, storage and the disposal of unwanted ozone-depleting substances would enable the global community to tailor approaches to situational needs. The representative of the International Institute of Refrigeration outlined recent developments in the refrigeration sector, specifically the cold chain for food and health products, with significant potential benefits for the well-being of humankind and the environment. One representative, speaking on behalf of a group of countries, said that opportunities should be taken to explore synergies between international environmental treaties and bodies and other relevant organizations and institutions to enhance energy efficiency and increase the impact of the work in phasing down HFCs.

206. More generally, burgeoning global challenges continued to have an impact on the work of the Montreal Protocol, requiring an agile, responsive and flexible approach. The COVID-19 pandemic had slowed economic growth in many sectors and jeopardized the ability of countries to fund projects. That in turn had led to a drop in the consumption of HCFCs and HFCs that might necessitate a reconsideration of national baselines. Small island developing States remained highly vulnerable to the impacts of ozone layer depletion and climate change, requiring further elucidation of the concept of climate justice and enhanced global cooperation to protect life on Earth. Conflict, also, continued to have severe negative impacts on human and environmental health, as illustrated by the current conflicts involving the Russian Federation and Ukraine, and Israel and the State of Palestine.

207. A further conundrum was presented by unexpected emissions of certain substances, for example trichlorofluoromethane (CFC-11) and methyl bromide, requiring action to identify gaps in the global coverage of atmospheric monitoring and put in place measures to enhance monitoring. One representative summarized the most recent scientific innovations that were being undertaken to monitor the ozone layer using a suite of high-resolution ground- and balloon-based instruments. One representative, speaking on behalf of a group of countries, said that it was vital that parties worked together to tackle the illegal production and trade in CFCs and other controlled substances, and to share information on such matters as carbon tetrachloride production and its links to CFC-11. It was

necessary to learn from those experiences in order to react quickly and decisively when similar events occurred in the future.

208. A number of representatives highlighted the role of financial and other support in enabling parties to comply with their obligations under the Montreal Protocol. The significant assistance offered by the Multilateral Fund and the implementing agencies was widely acknowledged. However, a number of representatives commented on the need for a reliable, sufficient flow of technical and financial assistance in order for parties to comply with their commitments under the Montreal Protocol, including the Kigali Amendment. One representative said that support in the areas of technical and knowledge solutions, developing competencies, transferring knowledge and localizing technology was fundamental to achieving environmental and economic sustainability, and constructive cooperation in providing such support was vital to the successful implementation of the Protocol and its amendments. Several representatives identified areas where funding would be particularly beneficial, including the generation of data on the performance of alternative technologies; addressing barriers to adoption due to limited availability of and access to ozone-friendly, low-GWP, energy-efficient technologies that were regionally appropriate; the destruction of stockpiles of refrigerants and other controlled substances; the introduction of customs data management systems to ensure accurate data reporting; and enhancing the knowledge of ozone officers and related stakeholders on new technologies and safety standards. Such activities could be specifically considered during the next replenishment of the Multilateral Fund for the period 2024–2026.

209. There was general acknowledgement of the role of partnership and collaboration in achieving environmental and human well-being objectives, including those of the Montreal Protocol. One representative, speaking on behalf of a group of countries, said that multilateral cooperation, based on mutual respect, was crucial to addressing the huge environmental challenges facing humanity. Another representative said that international environmental treaties were an effective means of protecting the planet and its environment if based on objective scientific proposals, parallel and fair support, and the avoidance of politicization outside the competence of agreements.

210. A number of representatives placed the actions to protect the ozone layer under the Montreal Protocol within the wider context of efforts to protect human health and the environment and to promote sustainable development. Some representatives alluded to the green economy as an appropriate framework in which to undertake activities relevant to the Montreal Protocol. One representative mentioned gender equality as a crucial component of inclusive efforts to achieve balanced growth and participatory decision-making.

211. Several representatives offered their thoughts on the way forward for the Montreal Protocol. One representative urged the Montreal Protocol community to avoid complacency and ensure that sufficient monitoring and enforcement measures were in place to dissipate any actions that might threaten the work already completed and slow down the recovery of the ozone layer. In that regard, it was essential to raise awareness among the international community of the significant benefits that could accrue from the implementation of the Kigali Amendment. Other desirable aims included continued capacity-building and technical assistance for developing countries, and providing training and strengthening of national capacity on issues related to energy efficiency, including through the development of pilot programmes. One representative, speaking on behalf of a group of countries, said that an essential element for the ongoing success of the Protocol was the implementation of new industrial standards enabling the uptake of innovative and natural refrigerants and encouraging the development of new ones where needed.

212. In conclusion, there was general optimism that the significant work undertaken thus far under the Montreal Protocol constituted a powerful foundation for continuing efforts to protect the ozone layer, combat climate change, and ultimately protect the environment of planet Earth for the benefit of present and future generations.

B. Round-table discussion on the Kigali Amendment and its potential impact on climate

213. The round-table discussion was moderated by Mona Nemer, Chief Science Adviser to Canada's Prime Minister, Minister of Innovation, Science and Industry, and Cabinet. The panellists were Kerryne James, Minister for Climate Resilience, Environment, and Renewable Energy, Grenada; Abdulla Naseer, Minister of State for Environment, Climate Change and Technology, Maldives; Jan Dusík, Deputy Minister for Climate Protection, Czechia; Cécile Siewe, Associate Assistant Deputy Minister, Environmental Protection, Environment and Climate Change Canada; Klaus Peter Schmid Spilker, President of the Chilean Chamber of Refrigeration and Air-Conditioning; Dawda Badgie,

Executive Director of the Environmental Protection Agency, Gambia; and Kylie Farrelley, General Manager of Refrigerant Reclaim Australia.

214. Ms. Nemer welcomed participants to Montreal and to the discussion on the Montreal Protocol's legacy of success, which she described as an illustration of the greatness that could ensue when scientists and policymakers worked together. Now celebrating its thirty-fifth anniversary, the implementation of the Montreal Protocol had led to the phase-out of 99 per cent of ozone-depleting substances, most of which were also highly potent greenhouse gases. It had also protected the vegetation that acted as a carbon sink, adding to the Protocol's significant contribution to climate change mitigation. The Kigali Amendment, which had come into effect in January 2019, had brought HFCs under the control of the Montreal Protocol and was expected to lead to the avoidance of up to 0.5°C of global warming by the end of the century, a figure that could potentially double if the HFC phase-down incorporated energy efficiency improvements in the cooling sector. The cooling sector was becoming increasingly important in a warming world, with energy demand forecast to triple by mid-century owing to the growing use of air conditioning. If the rate of energy consumption continued unabated and the current cooling system refrigerants did not switch to ozone- and climate-friendlier alternatives, the sector would contribute to global warming that could surpass the 1.5°C target of the Paris Agreement by 2030.

215. Ms. Nemer then proceeded to lead the discussion on the legacy of the Montreal Protocol and ways to maximize the positive impact of the implementation of the Kigali Amendment on the climate and sustainable development. The discussion took the form of four rounds of questions, with answers from the panellists and additional questions and comments from representatives.

1. First round

216. Ms. Nemer directed her first question to Ms. Siewe and Mr. Jan Dusík, asking them how parties could deliver on the drastic greenhouse gas emission reductions required to meet the Paris Agreement target of limiting warming to 1.5°C, including reductions in emissions from the HFCs to be phased down under the Kigali Amendment.

217. Ms. Siewe responded that it was important to effectively communicate what the Montreal Protocol had been able to achieve in the last 35 years. Talking about a 99 per cent reduction in ozone-depleting substances made it sound as though the Protocol had achieved its goal, but people should be made aware of its potential to prevent 0.5–1°C of warming, a significant contribution to limiting warming to 1.5°C, or even 2–3°C. Raising the Protocol's profile and enhancing the understanding and appreciation of its potential would lead more countries and parties to sign on to the various agreements, generate more resources for the work required to accelerate the development of lower-GWP technologies and products, and help countries to go beyond the strict compliance schedules of the Kigali Amendment and achieve greater HFC reductions. More resources and attention would also support the proper recovery and disposal of stocks of substances in older equipment, which, while not a compliance issue as such under the Protocol, also had the potential to contribute substantially to protecting the climate; in that regard, she welcomed the Executive Committee's recent decision to provide assistance for the development of disposal strategies and to consider a funding window for disposal pilot projects.

218. Mr. Jan Dusík recommended taking a holistic perspective to see how the Montreal Protocol could be integrated into the spectrum of instruments that had the potential to combat climate change in a way that created options for cooperation that could improve synergies between environmental instruments. The Kigali Amendment could serve as a bridge in that sense, being an important tool for avoiding the use of HFCs to replace the ozone-depleting substances being phased out. Progress in the ratification of the Kigali Amendment, the implementation of the Amendment at the national level and enforcement of the Montreal Protocol would demonstrate that the Protocol could continue to lead in the environmental arena and also be effective in addressing climate change. There were of course challenges, as well as a need for the right reporting, control measures, monitoring that addressed all aspects of life cycle – production, trade, use and emissions – and cooperation across borders. The European Union, which was putting in place a fluorinated greenhouse gases regulation that provided for HFC reduction with a quota system and bans for specific uses, could act as a role model, providing proof that high ambition and high bars could be reached.

219. Two representatives also took the floor to address the question, highlighting the importance of the Kigali Amendment in the fight against climate change. They mentioned a number of elements that they considered key to the realization of the Kigali Amendment's potential, including reliance on science; assistance for Article 5 parties through adequate, timely and predictable funding for the transition to HFC alternatives, capacity-building, readiness projects and institutional strengthening

activities; support for regional ozone networks; refrigerant recovery, reclamation and disposal; and the development of national cooling action plans, which would lead to the promotion of passive cooling measures, energy efficiency, green procurement and enhancement of refrigeration and air conditioning service technician servicing practices.

2. Second round

220. In the second round, Ms. Nemer asked Mr. Naseer, Mr. Badgie and Ms. James about their experiences with their countries' HFC phase-down processes and the associated challenges, and what domestic and international actions they felt were needed to overcome those challenges.

221. Mr. Badgie reported that in its HCFC phase-out and HFC phase-down efforts, the Gambia had found it very effective to engage a broad range of stakeholders across all sectors in order to achieve its aims. The country also provided training for customs officials and technicians, had created associations for them and provided them with financial support. The fishing and foam sectors in the Gambia had many facilities that used HFCs and therefore received special attention. The challenges encountered were mainly financial, as transformation to ozone-friendly substances was an expensive undertaking; hence, more financial support was required.

222. Mr. Naseer said that the HFC phase-down efforts of Maldives, a low-lying State that was highly vulnerable to the impact of climate change, were strongly motivated by the knowledge that the successful implementation of the Kigali Amendment would produce the dual benefit of protecting the ozone layer and mitigating climate change. In June 2022, the country had achieved an important milestone, concluding its implementation of the Kigali enabling activities initiated in November 2017. In Maldives, air conditioning was a key sector, with locally used air conditioners currently accounting for 68 per cent of equipment imports and demand expected to grow as the climate warmed. The introduction of low-GWP alternatives in the air-conditioning sector was therefore particularly important. The country faced challenges, however, related to access to alternative technologies and insufficient resources and capacity. In closing, Mr. Naseer added that for the Montreal Protocol to remain a success story over the next 35 years and beyond, parties would need to continue to broaden their goals for the Protocol.

223. Reporting on Grenada's efforts to implement the Kigali Amendment, Ms. James said that the country had been the thirty-seventh party to ratify the Amendment, attesting to the Government's commitment to efforts under the Montreal Protocol. The country had taken a number of steps to broaden its legislative and policy framework, including establishing national industry standards for the refrigeration and air-conditioning sector and preparing its national cooling action plan for reducing direct and indirect greenhouse gas emissions. The cooling action plan was very similar to the nationally determined contribution, which included the goal of reducing emissions by 40 per cent by 2030. As a small country, however, Grenada was limited in what it could do. Its domestic challenges included finding sufficient funding to implement the Kigali Amendment, strengthening control measures, particularly at the border, and increasing capacity and establishing a certification scheme for refrigeration and air-conditioning technicians.

224. Several representatives also commented on the challenges facing their countries in implementing the Kigali Amendment, citing the need for access to alternative technologies, including a call to the scientific community for more efforts to develop alternatives; additional funding, in particular for small island developing States and other small countries that were unable to benefit from economies of scale; training for service sector technicians; technical capacity-building and equipment for customs officials to enable control of imported gases; implementation of a quota and licensing system; addressing of risks associated with handling of hydrocarbons; strengthening of refrigerant recovery and recycling; development of standards for the certification of refrigeration and air-conditioning technicians; and more sharing of HFC phase-down success stories.

225. One representative called for a holistic approach that included reducing dependence on fossil fuels by ensuring that equipment used not only low-GWP alternatives but also power from renewable sources.

3. Third round

226. Recalling that the Kigali Amendment promised to prevent up to 0.5°C of global warming by 2100, an impact that could be amplified if the HFC phase-down were accompanied by energy efficiency enhancements, Ms. Nemer asked how Australia, Czechia and by extension the European Union, Chile and Grenada planned to address the energy aspect of the phase-down, as well as what business opportunities there were for the private sector and how they could be seized.

227. Mr. Jan Dusík began by sharing information on the European Green Deal, which included instruments aimed at reducing fluorinated greenhouse gases, including HFCs, across the European Union. The issues were complex and required complex solutions. Thus, for instance, the energy efficiency directive within the European Green Deal provided for assessments and planning for regional, national and local heating and cooling and the promotion of better heating and cooling efficiency, including the accelerated replacement of old and inefficient heating systems, phasing out of fossil fuel systems overall and an increase in the use of renewable energy in heating and cooling. There were opportunities for the business sector in connection with heating and cooling in building construction and renovation and the introduction of new technologies in support of low emissions, looking at the whole life cycle of the carbon footprint and identifying energy-saving measures. Such efforts were increasingly popular, particularly in the context of the current energy crisis and the impact of the Russian Federation's aggression in Ukraine.

228. In her comments, Ms. Farrelly supported taking a holistic view when developing policy for the HFC phase-down. Taking the example of reclamation, which might at first glance seem desirable, she cautioned that the Australian experience with the HCFC phase-out had revealed that reclamation had the effect of extending the life of old, inefficient equipment. Leakage also became a significant consideration. In the context of the HFC phase-down, particularly when high-global-warming-potential products were installed in equipment, the negative impact of reclamation on equipment energy efficiency and emissions was an important element to consider.

229. Mr. Schmidt acknowledged that Europe provided a good example but said that his country faced a different reality in that it was dealing with equipment that had to be replaced. His organization enjoyed a good partnership with the ozone units and was implementing projects and solutions, controlling leakage, providing training in good practices and partnering with the national energy efficiency agency. Fortunately, Chile had good sources of solar and wind energy and could thus move away from fossil fuels for energy generation, although it was currently experiencing transmission issues. In his view, however, refrigerant inventory control was key to HFC phase-down efforts.

230. Ms. James said that her Government, recognizing that improvements in energy efficiency of refrigeration and air-conditioning equipment could result in a significant reduction in greenhouse gas emissions, had moved swiftly to establish minimum energy performance standards, and had included energy efficiency in the cooling sector in the country's second nationally determined contribution. Energy efficiency was also covered in the national energy policy and the national sustainable development plan for the period 2020–2035. The Government had established a ministerial portfolio that included renewable energy, thereby demonstrating its political commitment and support for the energy sector and its understanding of the need for a mixed energy portfolio. She highlighted the need for a mix of financial resources that prioritized grant resources over loans, saying that while the country had the will to meet its obligations it lacked the fiscal space to take on additional debt. In terms of business opportunities for the private sector, the Government created an enabling environment by setting policy and providing incentives but expected private industry to be the driving force in achieving the targets under the Montreal Protocol. Thus, servicing companies and importers of air-conditioning equipment were expected to lead the way in introducing new climate-friendly energy-efficient technologies to the market. In her view, cooling as a service was a business opportunity where servicing companies made investment in the cooling equipment for the clients and were paid through the energy savings generated.

231. Mr. Badgie added that in the Gambia, addressing climate change was a matter of survival. It was clear that climate change was having an impact on all aspects of the country's livelihoods. Consequently, the Government had taken measures that included ratifying the Kigali Amendment and preparing its first and second nationally determined contributions, and identifying the sectors of key importance. Energy was one such sector. The Government aimed to develop renewable energy and had created incentives to that end. Projects with climate mitigating impacts were given priority in environmental permitting, and received financial concessions. Hydropower facilities would soon come online to replace thermal power production. The country had also established a climate-smart agricultural system and was developing integrated waste management. The Gambia was generally regarded as the country taking the most significant steps towards meeting its commitments under the Paris Agreement.

232. One representative said that in his experience, the process of developing a national cooling plan was complex but provided an excellent opportunity to engage stakeholders, explain the relevant activities to them and thus to raise their awareness of what was being done and what was needed. He therefore urged all parties to the Montreal Protocol to prepare and implement their national cooling plans as a means of communicating the achievements and the potential of the Montreal Protocol.

4. Fourth round

233. Ms. Nemer directed her fourth and final question to Mr. Naseer, Ms. Farrelley, Ms. Siewe and Mr. Schmidt. Noting that the private sector and businesses could be at the forefront of climate action thanks to their potential for innovation, replication and acting at scale, she asked the panellists what made the partnership between Government and industry successful in the implementation of the Montreal Protocol and how the private sector could be helped to fulfil or increase its potential for action under the Kigali Amendment.

234. Mr. Naseer said that the Montreal Protocol would not have achieved what it had without the private sector. His Government had identified two industries that were major users of refrigeration equipment – fisheries and tourism – and had worked very closely with them. It was important to ensure that the right incentives, such as technical help, financial incentives and capacity-building, were in place to encourage industry to collaborate. Given the current high prices of zero- and low-GWP refrigerants and equipment, it was difficult for consumers and companies to adopt the technologies. It was therefore important to ensure that new refrigerants and technologies were readily available in the market and that tax incentives were available to reduce their cost.

235. Ms. Farrelley said that good ideas could come either from Governments or from industry, but a good policy was more effective when all stakeholders were involved in its design.

236. Ms. Siewe said that one of ways in which a Government could support industry was by providing policy and regulatory certainty. The Montreal Protocol provided a vision and clear signals to the relevant industries as to how those industries needed to develop, while allowing them sufficient time to adjust. Governments could also encourage the private sector to develop and commercialize further low-GWP alternative technologies through the effective design of legislation to comply with the Kigali Amendment. She also said that the greater the number of Governments that put in place limits on the use of HFCs in products, where possible aligning themselves with one another, the clearer the signal to the private sector that by a certain deadline it would be essential to ensure sufficient production of alternative substances and the availability of alternative technologies.

237. Mr. Schmidt said that the success of the partnerships created under the Montreal Protocol lay in their cross-cutting nature. He gave the examples of the design of laws, standards, education programmes and pilot projects, which were designed to seek solutions to specific problems. The continuation of public–private cooperation was essential.

238. Two representatives made statements in response to the question. One spoke of the vital nature of engagement and close cooperation with relevant stakeholders. His Government was grateful for the support of the Multilateral Fund, which had enabled it to engage early and carry out various consultations and technology-transfer and awareness-raising programmes with the involvement of industry. Partnerships and mutual efforts and understanding between Governments and industry were key to obtaining accurate data input and formulating the most effective action plans and strategies for implementing the Protocol. The other representative highlighted the need not only for the transfer of technical skills but also for building more general awareness and knowledge. He proposed harnessing the power of social media to spread knowledge quickly.

239. A third representative asked the panellists whether any of the lessons learned during the implementation of projects under the Montreal Protocol could be applied to tackling other global environmental issues such as climate change. Mr. Dusík said that Governments working with the private sector to find solutions that gave predictability was a source of inspiration that needed to be shared. He also recalled that there was increasing demand for solutions and services that were non-polluting and did not harm the environment from service users and the public. Ms. Siewe stressed the need for communication and for showing the impact that the Montreal Protocol and the Kigali Amendment could have on addressing the global threats of climate change and biodiversity loss. She said that she was interested in the idea of engaging influencers and was sure that innovation was essential in the domain of communication too. Mr. Naseer was adamant that working together was the key to success, while Mr. Badgie expressed the view that the solution was mainstreaming the issues and potential solutions in easy-to-understand language and doing so right down to the grass-roots level.

5. Closure of the round-table discussion

240. In closing, Ms. Nemer thanked the panellists, noting that they had shown a clear policy direction with regard to addressing the implementation of the Kigali Amendment and related challenges. She said that she was energized by the continued desire for dialogue, collaboration, science, technology and innovation. New opportunities were brought about by new generations, and

she highlighted the opportunity in economies to build back better. The panellists had identified a suite of policy measures and actions that were at the parties' disposal for use in implementing the Kigali Amendment to ensure that the growing demand for cooling could be met in a sustainable manner by promoting zero- or low-GWP refrigerants and improvements to the energy efficiency of cooling systems and equipment, harnessing synergies and using renewable and green energy.

VI. Report by the co-chairs of the preparatory segment and consideration of the decisions recommended for adoption by the Thirty-Fourth Meeting of the Parties

241. The Co-Chair of the preparatory segment reported that the work of the segment had been concluded successfully, and that draft decisions had been approved for consideration and possible adoption during the high-level segment on the following topics: revised budget for 2022; budgets and contributions of the Trust Fund for the Montreal Protocol for 2023 and 2024; illegal imports of refrigeration, air-conditioning and heat pump products and equipment, and institutional processes to strengthen the effective implementation and enforcement of the Montreal Protocol, including with respect to HFC-23 and combating illegal trade; ongoing emissions of carbon tetrachloride; critical-use exemptions for methyl bromide for 2023 and 2024; stocks and quarantine and pre-shipment uses of methyl bromide; strengthening the Technology and Economic Assessment Panel and its technical options committees for the phase-down of HFCs and other future challenges related to the Montreal Protocol and the climate; nominations by parties of experts to the Technology and Economic Assessment Panel; the impact of the COVID-19 pandemic on HFC baselines for Article 5 parties; updating information on safety standards; recognition of the achievements of Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland; enhancing participation in the work of the Executive Committee of the Multilateral Fund; decisions on compliance-related matters recommended by the Implementation Committee; the status of ratification of the Kigali Amendment; and the membership of the Montreal Protocol bodies.

242. The parties had further approved draft decisions for consideration and possible adoption during the high-level segment on a series of challenging topics: the terms of reference for the study on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the triennium 2024–2026; enabling access to energy-efficient and low-GWP technologies; and gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring.

243. In closing, he thanked all those involved for their hard work and for the spirit of cooperation that had characterized the negotiations. This represented a fitting tribute to the Montreal Protocol on its thirty-fifth anniversary and helped to explain why the Protocol continued to be one of the most successful multilateral environmental agreements. He also thanked the secretariat for their brilliant work in support of the Parties.

VII. Dates and venue for the Thirty-Fifth Meeting of the Parties to the Montreal Protocol

244. Introducing the item, Ms. Seki recalled that the dates of the Thirty-Fifth Meeting of the Parties, which would be held from 23 to 27 October 2023, had been announced three years previously and that that information had been available on the website of the Ozone Secretariat since that time.

245. With regard to the venue, the Ozone Secretariat had made a booking at the United Nations conference facilities in Bangkok and Nairobi, having explored other United Nations venues without success for the chosen dates. Ms. Seki explained the forty-fifth meeting of the Open-ended Working Group would also be held either in Bangkok or Nairobi, from 3 to 7 July 2023. The Ozone Secretariat would communicate, through its website, early in 2023 which meeting would be held in Bangkok and which would be held in Nairobi.

246. Subsequently, the parties adopted a decision on the matter.

VIII. Other matters

247. No other matters were considered during the high-level segment.

IX. Adoption of decisions by the Thirty-Fourth Meeting of the Parties to the Montreal Protocol

248. The Thirty-Fourth Meeting of the Parties adopted the decisions approved during the preparatory segment. The decisions are available in document UNEP/OzL.Pro.34/9/Add.1.

X. Adoption of the report of the meeting

249. The parties adopted the present report on Saturday, 5 November 2022, on the basis of the draft report that had been circulated.

250. At the time of the adoption of the report, two representatives, each of whom spoke on behalf of a group of parties, requested that the parts of their statements, delivered during the current meeting, pertaining to the situation in Ukraine, be reflected in detail in the present report. Their statements are reproduced in annex III to the present report, without formal editing.

XI. Closure of the meeting

251. Ms. Seki, Executive Secretary of the Ozone Secretariat, expressed her appreciation of the role that Martin Sirois (Canada), who was retiring, had played in the implementation of the Montreal Protocol. His leadership, knowledge and experience, both as a delegate and co-chair of the Open-ended Working Group meetings and numerous contact groups, had been key in identifying sensible solutions and compromises, while his sense of humour had contributed to a convivial atmosphere in meetings, for which he would be remembered and missed. Several representatives joined her in recalling his skilled co-chairing of the Open-ended Working Group and various groups, which had contributed significantly to the success of the meetings and the Protocol itself. They expressed their best wishes for his retirement, and stated that they would greatly miss him, along with Mr. Bankobeza, Senior Legal Officer of the Secretariat, to whom many representatives had paid tribute during the course of the meeting. Ms. Seki also paid tribute to Mr. Ole-Kristian (Norway), who was leaving the ozone family for a new post working on climate change.

252. Following the customary exchange of courtesies, the meeting was declared closed at 1.05 a.m. on Saturday, 5 November 2022.

Annex I

Summaries of presentations by members of the assessment panels and technical options committees*

A. Presentation of the Methyl Bromide Technical Options Committee of the Technology and Economic Assessment panel on the 2022 critical-use nominations for methyl bromide

1. On behalf of TEAP, the Methyl Bromide Technical Options Committee co-chairs, Marta Pizano and Ian Porter presented the final recommendations for the 2022 critical use nomination requests for methyl bromide.

2. Ms Pizano showed that only three parties continue to apply for CUNs. Of the total amount nominated of 39.507 t in this round, MBTOC has recommended 22.857 t for the nominations from Canada (3.857 t) and Republic of South Africa (19.0 t). The Australian nomination for 2024 was not recommended.

3. For the Australian strawberry runners, the nomination of 14.49 t was not recommended. MBTOC received information from the party indicating the likelihood of methyl iodide (MI) registration in 2022 in a process that includes use in combination with co-injection of chloropicrin (Pic). The party indicated that a co-formulation of MI/Pic improves the dispersal efficacy compared to separate co-injection into soil. Registration is thus being sought for the co-formulation of MI /Pic and is expected to be approved by mid-2023. Also, it was indicated that MI meets certification requirements and will be accepted by the Victorian Certification Authority.

4. MBTOC considered that if these timelines are correct, then MI and/or MI/Pic will be available for use in 2024 and therefore did not recommend the nomination. If the timelines cannot be met, there is time for a new nomination to be submitted in 2024.

5. In continuing the presentation, Mr Porter then explained that for the Canadian strawberry runners, final recommendation had been reduced by approximately 25%. The reduction was based on adoption of soilless substrates to replace MB for the total G2 tip production (50% of MB Use) over a 2-year period. The party had shown that required production levels are now being reached for a variety which will now be the focus for the future.

6. After the OEWG the party supplied a national management plan that only provided for a small reduction in MB for the short term. MBTOC acknowledges that the party has applied for a permit to evaluate chloropicrin for efficacy and groundwater issues in a test area in 2023.

7. For the nomination from the Republic of South Africa the final recommendation was 19 t. After the OEWG, RSA did not seek reassessment of the nomination. The recommended amount was a 5% reduction (1 t) of the nomination for 2023. MBTOC considered alternatives, such as sulfuryl fluoride are available to preserve structural timber known to be infested by woodboring beetles. The remaining 19.0 t is recommended as it is for use for fumigation of houses being sold that require a Certificate of Compliance. MBTOC acknowledges that the Party has indicated that this is the last year for applying for a CUN for this sector.

8. The co-chair then indicated that phase out of over 60,000 t of MB has been achieved under the MP. Additionally, more than 18,600 t of MB has been phased out under the CUN process since 2005, with only 3 nominations left for 40 t. This has led to an approximate 70% reduction in anthropogenic MB in the atmosphere. A large amount, (approx. 10,000 t MB is still used for exempted uses for QPS, however uncertainty over classification for QPS means some CUN uses may arise in the future.

9. In finalizing the presentation, the timelines for submission of CUNs in 2023 was presented.

B. Presentation of the Technology and Economic Assessment Panel on alternatives to hydrofluorocarbons

10. Ms. Bella Maranion, co-chair of the Technology and Economic Assessment Panel (TEAP) and on behalf of the Decision XXVIII/2 TEAP Working Group, began the presentation of the report. She noted that this report was volume 5 of the TEAP's 2022 Report and is based on the five Technical Options Committees (TOCs) sector assessment reports to be completed by the end of 2022. She

* The summaries are presented as received, without formal editing.

introduced the members of the TEAP Working Group which included members of the TEAP including a Senior Expert and Co-chairs of the Flexible and Rigid Foams, Halons, Medical and Chemicals, and Refrigeration, Air Conditioning and Heat Pumps TOCs. Decision XXVIII/2, paragraph 4, requested the TEAP to conduct periodic reviews of alternatives, using the criteria set out in paragraph 1(a) of decision XXVI/9, beginning in 2022 and every five years thereafter, and to provide technological and economic assessments of the latest available and emerging alternatives to hydrofluorocarbons (HFCs). The criteria for assessing alternatives in Dec. XXVI/9, paragraph 1(a), includes the following: commercially available; technically proven; environmentally sound; economically viable and cost effective; safe to use in areas with high urban densities considering flammability and toxicity issues, including, where possible, risk characterization; easy to service and maintain; and also considering the potential limitations of their use and their implications for the different sectors, in terms of, but not limited to, servicing and maintenance requirements, and international design and safety standards.

11. Ms. Maranion described TEAP's approach in responding to this decision. She noted that the first periodic review in 2022 aligns with the preparation of quadrennial assessment reports of TEAP and its TOCs under Decision XXXI/2. Given the coincidental timing of these two decisions, TEAP convened a Working Group to prepare a report responding to decision XXVIII/2, drawing from the 2022 TOC quadrennial reports, which are in preparation. The current report provides a preview of more detailed information and discussion to in the 2022 TOC assessment reports to be completed by the end of the year and presented to parties in 2023. Previous estimates by the TEAP showed the proportion of HFC consumption in the various sectors of use with refrigeration, air conditioning, and heat pumps (RACHP) manufacturing and servicing about 80% of consumption global warming potential (GWP)-weighted in 2015. Behind RACHP consumption are foams, aerosols and pressurized metered-dose-inhalers (pMDIs) and fire protection. Reported 2020 country programme HFC consumption from 115 out of 147 A5 parties indicates up to 95% of HFC consumption in A5 parties is for RACHP.

12. Mr. Ray Gluckman then began a presentation of information on alternatives to HFCs in the RACHP sectors. He noted that lower GWP alternatives to the popular high GWP HFCs are available for most RACHP applications, but there is limited accessibility to alternatives in some geographic regions

13. There is continued rapid development of new lower GWP refrigerants. There are a number of significant RACHP applications with widely available alternatives with GWP < 10; these use hydrocarbons (HCs), CO_2 (R-744), ammonia (R-717) and hydrofluoro-olefins (HFOs). For some applications alternatives with GWP of up to 750 can quickly be adopted, while for a few small applications, progress to lower GWP alternatives is currently slow.

14. Mr. Gluckman noted that the Decision XXVIII/2 report contained considerable detail, and the presentation was meant to highlight key information on the current usage of the popular high GWP HFCs; the RACHP applications where there is already a clear pathway towards lower GWP alternatives; and the applications where technical progress is more challenging. Four high GWP refrigerants represent most of this consumption, all classified as A1 (low toxicity and non-flammable): HFC-134a and HFC blends R-404A, R-507A, and R-410A. He provided an image showing the proportion of HFC consumption within the refrigeration and air conditioning applications. While there is a very wide variety of RACHP applications, the proportion of each application varies between parties based on factors such as local climate conditions. Different refrigerants are required to enable each application to be optimised; some of these key differences include the required size, temperature level, and location. There has been rapid development of lower GWP refrigerants with many already available for almost all RACHP applications. The four popular high GWP HFCs can be avoided in most new equipment. However, there may be limited accessibility to equipment and refrigerants in some geographic regions. Many lower GWP refrigerants are flammable, however, equipment can be designed to safely use flammable refrigerants in small-sealed systems and large systems in controlled access areas (e.g., machinery room/rooftop). Using flammable refrigerants is more problematic in medium-sized equipment located in public access areas; however, lower flammability (A2L) refrigerants are becoming widely used, and higher flammability (A3) refrigerants can be used in limited quantities with more safety control measures. Technician training is an important requirement for use of flammable refrigerants.

15. Mr. Gluckman then provided some tables with examples of refrigeration applications with alternatives with GWP less than 150 available and examples of air-conditioning and heat pump applications with alternatives available with GWP less than 10. He made special note of alternatives to the HFC blend, R-410A (GWP 2088), a high-pressure refrigerant that is mainly used for small and medium sized air-conditioning and heat pump systems. Technologies with GWP between 450 and 750 are available and some perform more efficiently than R-410A, such as HFC-32 (GWP 675) and

HFO-HFC blends. There are refrigerants with GWP less than 150 but they are only suitable for limited R-410A applications. However, technical development is ongoing.

16. He then provided examples of air-conditioning and heat pump applications with available alternatives of GWP up to 750. There are some applications still reliant on high GWP refrigerants, including in sector with small consumption of HFCs. Transport refrigeration (vans, trucks, trailers, containers) was a major user of an HFC blend, R-404A (GWP 3922); HFO-HFC blend R-452A (GWP 2140) are now widely available, and lower GWP options are under development. For ultra-low temperature systems (e.g., freezers for vaccines at -70°C) utilise cascade refrigeration systems; these can use alternatives but are very high GWP gases, e.g., an HFC-PFC blend, R-508B (GWP 13,396) while lower GWP options remain mainly in the development stage.

17. Mr. Gluckman concluded his presentation noting that there could be minimal use of the popular high GWP HFCs in new equipment as the technical developments for lower GWP refrigerants mature for many RACHP applications. Accessibility issues need to be overcome by implementing, for example, measures to discourage import of equipment with high GWP HFCs, awareness programs related to lower GWP alternatives, and training related to use of flammable refrigerants.

18. Ms. Helen Walter-Terrinoni, co-chair of the Flexible and Rigid Foams Technical Options Committee (FTOC), provided an update on the status of alternatives to HFC foam blowing agents. She explained that there is no single foam blowing agent (FBA) substitute with the same technical properties and low cost of chlorofluorocarbons (CFCs), which made them a universal solution for foams, with every transition. This has led to a fragmentation of the FBA market.

19. She noted that there has been a continuing trend away from the use of fluorocarbon (FCs) use in foams. In fact, she commented that some markets, such as flexible foams, no longer use fluorocarbons (FCs) and are unlikely to be impacted by the HFC transition.

20. Ms. Walter-Terrinoni explained that foams are used in many ways: to provide structure (i.e., in appliances and boats), cushioning with a durable coating, thermal insulation etc. Foam manufacturers are working to optimize desired characteristics with cost, even creating new blends to develop a competitive advantage. She also commented that blends must be optimized for compliance with safety and performance testing, and testing requirements which can be different in different regions and nations.

21. She then explained that some manufacturers may revert to FCs to meet performance requirements (e.g., energy efficiency or structural requirements) from other FBAs.

22. Ms. Walter-Terrinoni then described the remaining challenges for the HFC transition especially for small- and medium-sized enterprises (SMEs) and Spray Foam. She went on to state that the transition in some regions and market segments (e.g., extruded polystyrene [XPS] and spray foam) may be delayed due to these ongoing challenges. She noted that SMEs are still facing challenges from the higher prices of HFOs/HCFOs or the potentially cost-prohibitive capital investment of HCs to address safety challenges for smaller companies. She then described the safety considerations for field-applied foams (e.g., spray foam), which limit alternatives.

23. Ms. Walter-Terrinoni commented on the evaluation of safety in high urban densities considering flammability and toxicity issues, including, where possible, risk characterization. She noted that HFO/HCFO foam blowing agents have similar toxicity exposure limits and routes to current FCs and that the same precautions should be taken to prevent exposure related to all the chemicals used in foam manufacturing.

24. She commented that hydrocarbons (HC) foam manufacture and use in densely populated areas can be challenging to mitigate. She specified that transportation of flammable FBAs in polyol blends can be limited by regulations in parties using the Global Harmonized System (GHS) definitions of flammability classes. She also explained that finished products are required to be tested for flammability and smoke in some jurisdictions to confirm that they are safe for use. Finally, she commented that HCs are volatile organic compounds (VOCs) and may require mitigation to avoid forming ground-level ozone or smog.

25. Ms. Walter-Terrinoni then shared summary tables of alternatives for HFCs in foams applications noting that there are alternatives to HFCs in commercial use in nearly every foam sector. She reiterated that challenges remain for SMEs due to cost, availability and safety considerations. She reminded parties that safety considerations limit options for field-applied foams (e.g., spray foam). Finally, she stated that the insufficient supply of HFO/HCFO FBAs has resulted in delayed conversions in some parties or reversion to HFCs for some companies.

26. Next Ms. Helen Tope, co-chair of the Medical and Chemicals Technical Options Committee (MCTOC), described the alternatives to HFCs in Medical and Chemical Use. Ms. Tope explained that she would discuss alternatives to HFC used in propellants and/or solvents in aerosols, propellants in pressurised metered dose inhalers (pMDIs) to treat asthma and chronic obstructive pulmonary disease (COPD), as solvents, including metal, electronics, and precision cleaning, in semiconductor and other electronics manufacturing (etching circuits, chamber cleaning, and heat transfer fluids to control temperature). Lastly, she said that she would provide an update on HFCs used as cover gases in magnesium production, casting processes and recycling to prevent oxidation and combustion of molten magnesium.

27. Ms. Tope explained that alternatives to HFCs in aerosols are widely available noting that most aerosols use HCs and dimethyl ether (DME) propellants, especially where these flammable propellants can be used safely. She clarified that a smaller proportion of aerosols use HFCs for VOC emissions mitigation (consumer), non-flammability (technical) or inhalation safety (topical medical).

28. She added more detail that VOC emission controls can limit use of HCs and DME, increasing use of compressed gases (nitrogen, nitrous oxide, carbon dioxide) and HFC-152a (GWP 124) in consumer aerosols. She then explained that some aerosols contain solvents, including HCFCs, HFCs, and a range of other alternatives.

29. Ms. Tope then provided additional information related to alternatives to HFCs for inhalers for asthma and COPD. She articulated that HFC pMDIs are the dominant option for inhaled therapy in most markets. She noted that Dry powder inhalers (DPI) and aqueous soft mist inhalers (SMIs) are alternatives, although, they are not all are universally available or suitable for use. She clarified that the proportion of pMDIs to DPIs and SMIs varies according to prescribing practices, availability, accessibility, cost, patient preference, or national government guidance for asthma and COPD treatments in different markets. She highlighted the fact that new in-kind alternative propellants with lower GWPs, HFC-152a and HFO-1234ze(E), are in early stages of development.

30. Next, Ms. Tope explained that alternatives to HFCs for solvents are widely available. She noted that HFCs are used as solvents to a much lesser extent than ODS, including for metal, electronics, and precision cleaning clarifying that HFCs are poor solvents: often mixed with chlorinated solvents to boost solvency. Solvents and technologies developed as ODS replacements are also HFC alternatives. There are a range of alternatives from which to choose.

31. Ms. Tope then described alternatives to HFCs used in semiconductor and other electronics manufacturing. She noted that HFCs -23 (GWP 14,800), HFC-32 (GWP 675), and HFC-41 (GWP 92) are used for etching and chamber cleaning. She then noted that alternatives include a range of fluorinated chemicals, many with higher GWPs, and one with a lower GWP <2. She clarified that HFCs might be a preferred environmental choice in this application.

32. Ms. Tope then provided an introduction to alternatives to HFCs used in Magnesium Production. She noted that sulfur hexafluoride (GWP 22,800) is the most widely used cover gas. She also explained that potential alternatives include HFC-134a (GWP 1430), a fluoroketone (GWP 0.1), sulfur dioxide (SO2), and carbon dioxide. She then noted that some of these options are not always suitable. She noted that HFCs could be a preferred environmental choice in this application.

33. Mr. Adam Chattaway, co-chair of the Halons Technical Options Committee (HTOC), then described alternatives to the HFCs used in fire protection by sub-sector including civil aviation, military, ground vehicles, naval applications, aviation applications, oil and gas, general industrial fire protection, merchant shipping.

34. Mr. Chattaway described HFC usage in fire protection noting that HFCs are not used in some sub-sectors or applications where halons are used and that may never be a viable alternative to halons. He noted that there are some HFC alternatives being developed that do not currently meet all the criteria and that their status in several categories ("commercial availability", "technically proven", "economically viable", and "easy to service") may change in the future as research and development progress. He then informed parties that alternatives must be "environmentally sound" and "safe to use" or their use, or development for use, would be discontinued. He noted that the availability of an HFC alternative within a sub-sector does not mean that an alternative exists in every specific application in that sub-sector and that availability of an alternative for new designs does not mean it is viable for retrofit. Finally, he noted that some applications only have HFCs or the original halon as viable options.

35. Mr. Chattaway then described the trends away from use of halons, HCFCs and HFCs noting that the summary presented was limited in breadth and would not fully describe alternatives for all uses and jurisdictions. He noted that alternatives approved in one jurisdiction or application may not

be approved in another, especially because fire protection can be very specific to an individual application. He noted that national approval processes often vary from party to party or within a party and that specific local conditions can drive approvals or viability, including ambient temperature, size and/or weight limitations, logistical constraints. He noted that alternatives that might be viable for a new design might not be viable for retrofit of existing equipment. Finally, he stated that changes in regulations on HFCs and their alternatives could change this analysis.

36. Mr. Chattaway concluded his presentation by highlighting that for some subsectors, HFCs have never been used to replace halons, e.g., civil aviation cargo bays and airport crash fire rescue vehicles. Many but not all subsectors that use HFCs have potential alternatives, but it is possible that not all applications can use them, e.g., very low temperature oil and gas production or specific cases for space or weight issues. Some subsectors that use HFCs only have the original halon or HFCs as options, e.g., military armoured vehicle crew compartment and civil aviation lavatory extinguishers. He raised concerns related to perfluoroalkyl and polyfluoroalkyl substances (PFAS) and the way that it may be defined by some jurisdictions. He noted that many HFCs and some of their widely used fire protection alternatives could be classified as PFAS under some definitions, e.g., the OECD, the European Union and some US State definitions. He noted that restricting or prohibiting production, consumption or use of these agents could significantly impact the ability to implement alternatives to HFCs and halons which might leave halons as the only viable option. Mr. Chattaway provides the example that the Civil Aviation industry raised concern with including approved and candidate halon alternatives as PFAS during the 41st ICAO General Assembly, in September. He concluded that civil aviation and other sub-sectors might consider continued reliance on halons to ensure they have effective fire protection systems, increasing the strain on the halon bank

37. Ms. Maranion concluded the presentation by providing the key highlights of the report. Lower GWP alternatives to the high GWP HFCs are available for most applications, but there is limited accessibility to some alternatives in some geographic regions. There is still rapid development of lower GWP alternatives. The challenges remain for transition to alternatives in some applications due to cost, availability and safety considerations. For some specific applications, alternatives to current HFCs have even higher GWP. Future policies and regulations could potentially limit or reverse transition to alternatives assessed in this review, e.g., evolving policies and regulations related to PFAS.

38. She noted to parties that future reviews of alternatives to HFCs under Decision XXVIII/2 would no longer align with the TEAP quadrennial assessment report timelines. To streamline reporting, avoid duplication, and take into account TEAP workload, parties may wish to consider options for future reviews such as continuing the quadrennial assessment schedule and only providing updates to Decision XXVIII/2 when significant new information is available or shifting the quadrennial reports to a quintennial schedule.

C. Presentations by the assessment panels on progress in their work and key issues emanating from their 2022 quadrennial assessments

1. Presentation by the Scientific Assessment Panel

39. The SAP presented a summary of their 2022 Assessment. Thanks to actions taken under the Montreal Protocol the total cumulative concentration of ODSs in the atmosphere continues to decline as does the chlorine and bromine available for ozone destruction. The high emissions of CFC-11 detected during 2013-2018 and attributed to illegal production have fallen back towards expected values although it is impossible to determine whether all illegal production has ceased. Some unresolved questions remain. Carbon tetrachloride concentrations are declining at a slower rate than expected, possibly associated with its use as a feedstock. HFC23 emissions are significantly higher than expected. Unexplained emissions of some low concentration ODS gases have also been identified.

40. The recovery of stratospheric ozone continues with clearest evidence found in Antarctic spring and, year round, in the upper stratosphere. Models and observations disagree in the low stratosphere where the trend uncertainty is very large; ozone there has not shown signs of recovery. HFCs are increasing in the atmosphere but at slower rates than anticipated before the Kigali amendment. The amendment, as assessed, will avoid up to about 0.5°C of global mean warming by the end of this century. The assessment includes discussion of the role played by anthropogenic very short-lived chlorine substances.

41. For the first time, as requested by the Parties, the SAP assessment includes a chapter on the possible impact of so-called solar radiation management schemes (SRM) on stratospheric ozone. Against a background of global heating, SRM schemes have been discussed as a means of cooling the Earth surface. We present the background and, importantly, discuss the risks and uncertainties of SRM via artificial introduction of aerosol into the stratosphere. This scheme would affect stratospheric ozone by modifying both atmospheric chemistry and atmospheric transport of ozone. Important potential consequences, such as a deepening of the Antarctic ozone hole and delay in ozone recovery, have been identified.

2. Presentation by the Environmental Effects Assessment Panel

42. On behalf of the Environmental Effects Assessment Panel Co-chairs, Paul Barnes and Krishna Pandey, Co-Chair Janet Bornman presented the 2022 Quadrennial Assessment on the environmental effects of stratospheric ozone depletion, UV radiation, and interactions with climate change.

43. The topics covered included solar radiation, human health, terrestrial and aquatic ecosystems, troposphere and air quality, natural and synthetic materials, and two topical sections, microplastics in the environment and COVID-19.

44. The Montreal Protocol has been instrumental in preventing further growth of the Antarctic ozone hole and consequent large increases in UV radiation. It has also contributed to reducing global warming by phasing out ozone-depleting substances with high global warming potentials. Furthermore, without the Montreal Protocol, the large increases in UV-B (280-315 nm) radiation would have resulted in substantial reduction of carbon dioxide uptake by vegetation, resulting in an enhanced global warming from the carbon dioxide not stored.

45. With respect to human health, millions of skin cancers and eye diseases have been avoided, although incidence of skin cancers is still high in many countries. UV radiation is associated with several eye diseases, especially cataract, which is the main cause of blindness globally. Drug-induced skin sensitivity to solar UV radiation also results in severe loss of quality of life. With regard to the corona virus, SARS-CoV-2, it was noted that the many positive outcomes of the Montreal Protocol far outweigh any potential advantage for disinfection of the virus by higher amounts of solar UV radiation.

46. The Assessment has continued to emphasise the interactive effects on ecosystems of UV radiation and extreme climate events (ECE) associated with increased global warming from greenhouse gas emissions and changes in stratospheric ozone. ECEs are occurring together with the more gradual changes in the environment, such as the rising surface temperatures and carbon dioxide.

47. Additional factors are contributing to the burden of changes in terrestrial and aquatic ecosystem as oil spills, sunscreens, pesticides, and plastic debris enter the environment and are degraded further by solar UV radiation, facilitating uptake by biological organisms. The risks to biodiversity and survival of tropical coral reefs from high amounts of UV radiation and pollution, as well as the sensitivity of the corals to small changes in temperature were also noted.

48. UV radiation is also important in controlling air quality in the troposphere, which has significant consequences for human health and the environment. UV-B radiation is responsible for generating the main cleaning agent, the hydroxyl radical (OH), in the troposphere. The OH radical removes many substances emitted by human activities and natural processes, such as methane, and the ODS replacements, HFCs, HCFCs, HFOs. However, in the process, these ODS replacements are degraded to trifluoroacetic acid (TFA). TFA continues to raise some concern because of its presence in the environment and potential toxicity. However, current assessments indicate that adverse effects in the foreseeable future are unlikely, but the possible risks should still be monitored. Apart from the high yields of TFA from certain of the HFCs, HCFCs, HFOs, high concentrations of TFA are also generated from substances not currently under the Montreal Protocol.

49. In conclusion, reference was made to the ongoing contributions of the Montreal Protocol to environmental sustainability, human health and well-being in alignment with many of the UN Sustainable Development Goals (SDGs).

3. Presentation by the Technology and Economic Assessment Panel

50. Ms. Bella Maranion, co-chair of the Technology and Economic Assessment Panel (TEAP) and on behalf of the other co-chairs Ms. Marta Pizano and Mr. Ashley Woodcock, introduced TEAP's presentation on the progress of work and key issues emerging from TEAP 2022 Assessment Reports. She presented a full list of the 20 current TEAP members, consisting of the three co-chairs, five Senior

Expert members, and twelve co-chairs of the five Technical Options Committees: Flexible and Rigid Foams, Halons, Methyl Bromide, Medical and Chemicals, and Refrigeration, Air Conditioning and Heat Pumps. On behalf of the TEAP co-chairs, she expressed their gratitude to the continuing efforts of the TOC co-chairs and their members to complete their sector assessment reports by the end of the year. On behalf of the panels, she expressed the appreciation for the continued support of the Ozone Secretariat on the work of all the panels. The 2022 Assessment Reports respond to Decision XXXI/2 which requests the panels to bring to the notice of the parties any significant developments. With regard to TEAP, the parties request that its assessment should include the following topics:

(a) Technical progress in the production and consumption sectors in the transition to technically and economically feasible and sustainable alternatives and practices that minimize or eliminate the use of controlled substances in all sectors;

(b) The status of banks and stocks of controlled substances and the options available for managing them so as to avoid emissions to the atmosphere;

(c) Challenges facing all parties to the Montreal Protocol in implementing Montreal Protocol obligations and maintaining the phase-outs already achieved, especially those on substitutes and substitution technologies, including challenges for parties related to feedstock uses and by production to prevent emissions, and potential technically and economically feasible options to face those challenges;

(d) The impact of the phase-out of controlled ozone-depleting substances and the phase down of HFCs on sustainable development;

(e) Technical advancements in developing alternatives to HFCs suitable for usage in countries with high ambient temperatures, particularly with regard to energy efficiency and safety. TEAP to Technology and Economic Assessment reports to consider,

51. Miss Maranion then introduced the highlights from each sectors upcoming Assessment Report.

52. For the foams sector, Miss Maranion described the substantial and continued progress in the adoption of low or zero GWP foam blowing agents. She described the challenges of the higher costs of hydrofluoro-olefins and hydrochloro-olefins and of flammable foam blowing agents for Small and Medium Enterprises, and for field-based spray foams. She emphasized that there are supply shortages of alternatives to HFC foam blowing agents in both A5 and non-A5 parties. The Foams Assessment Report will include technical progress, and information on banks, stocks and emissions.

53. For the halons sector, Miss Maranion described the evolution of fire suppressants from halons to high GWP HFCs in new systems in A5 parties. The size of the fire protection bank of HFC-227ea is estimated by the HTOC to be ~180,000 tonnes by the end of this 2022, much of which is in A5 parties. A new low-GWP blend is in early development. It has been added to the US EPA Significant New Alternatives Policy program list and has been adopted into internationally recognised fire protection standards.

54. In terms of individual emissions, halon-1301 is showing an irregular pattern, halon-1201 exceeds reported annual production, and halon-2402 has increased since 2017 which is inconsistent with a business-as-usual scenario. Proposed changes to legislation of molecules classed as PFAS could affect HFCs and HFC alternatives which might leave halons as the only viable option.

55. Recovered halons are reported to be increasingly contaminated and require additional effort to recycle with potentially additional losses. This could affect the future halon 1301 bank.

56. For methyl bromide (MB), Miss Maranion provided some key points from the Assessment Report. Global methyl bromide production for quarantine and pre-shipment (QPS) use is stable. One party has increased production dramatically from 2015 till 2020. MB consumption for controlled use was now only 43.6 t in 2021 compared to 16,050 t in 2005. Technical alternatives now exist for all pre-plant soil and non-QPS structural and commodity uses of MB. She reported that there are growing concerns about an important MB alternative Sulfuryl fluoride (SF; GWP 7510) which is widely registered and adopted around the world for treatment of empty structures (e.g., flour mills, food premises, etc.); adoption of emission reduction measures may be needed.

57. Miss Maranion noted that QPS consumption remains at 10,000 t/yr, with 95% of consumption in 17 parties, and 9,000 t emitted. In the absence of uptake of QPS alternatives, recapture technologies are available. Successful alternatives such as irradiation and ethane-dinitrile (EDN) are being implemented for important QPS uses,. EDN is a new alternative on timber for a major quarantine use (~700 t) in New Zealand and South Korea, and has the potential for similar uses globally.

58. For the medical and chemicals sector, Miss Maranion reported on the scope of the assessment report. This responds to decisions, including HFC Alternatives, HCFC availability, process agents, laboratory and analytical uses, n-propyl bromide, destruction technologies. It covers areas including Production, including feedstocks; Process agents; Solvents; Semiconductor and other electronics manufacturing; Magnesium production; Laboratory and analytical uses; End-of-life management and destruction; Aerosols; Pressurised metered dose inhalers and Sterilants.

59. The report will provide information on:

(a) production and trends, including feedstock, by-products, intermediates, carbon tetrachloride (CTC), very short-lived substances (VSLS) (including dichloromethane), and related emissions;

(b) detailed production processes that result in potential HFC-23 emissions;

(c) HFCs not listed in Annex F (decision XXIX/12);

(d) information on end-of-life chemicals management and related issues and challenges, available banks, and the destruction of controlled substances

(e) technical progress in solvents, laboratory and analytical uses, aerosols, MDIs, sterilants;.

(f) sectors not previously reported, semiconductor and electronics manufacturing and magnesium production.

60. For the refrigeration, air conditioning, and heat pumps sector, Miss Maranion indicated that the Assessment will include a review technology progress, a discussion on present refrigerant options for new and existing applications, and energy efficiency opportunities. A tool for refrigerant selection based on sustainability criteria is described, new refrigerants and refrigerant mixtures are reported along with their ODP, GWP, properties, and safety, and there will be an update in Not-in-Kind Technologies.

61. Ms. Maranion summarized that the TOCs are continuing their work on their sector assessments to be completed by the end of 2022. The crosscutting issues in the 2022 TEAP Assessment will include: the status of global and sector phaseout of ODS and phase-down of HFCs; technical and economic challenges to transition to alternatives; status of banks and stocks of controlled substances and options available for responsible management to avoid emissions; impact of the phase-out of controlled ODS and the phase down of HFCs on sustainable development. TEAP is coordinating with SAP and EEAP on crossover issues for its assessment, which will then form the basis for the Synthesis Report. The timeline for completing its assessment is for the TOCs to submit their reports to the Ozone Secretariat by 31 December 2022, for the TEAP Assessment Report to be submitted for the 45th Open Ended Working Group meeting, and to coordinate with the other panels to submit the Synthesis Report.

Annex II

Statement by the Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the work of the Executive Committee, the Multilateral Fund secretariat and the Fund's implementing agencies

Mr. President, distinguished delegates.

On behalf of the Executive Committee of the Multilateral Fund, I am pleased to report to the Parties on the relevant decisions taken since the Thirty-third Meeting of the Parties in 2021.

Since then, the Committee held three meetings, the 88th, the 89th and the 90th. The 88th meeting was held through a combination of online formal and virtual contact group meetings and an intersessional approval process. The first part of the 89th meeting was held in a virtual format, but the Committee was able to hold the second part of the 89th meeting and the 90th meeting back-to-back in person in Montreal in June of this year. The Committee was able to make progress on several policy issues at the 89th meeting, dedicated to discussing outstanding policy matters.

Mr. President, in my statement today I will share some of the significant results achieved on ongoing work related to HCFC phase-out and matters relating to the Kigali Amendment, which are described in document UNEP/OzL.Pro.34/7. Parties may wish to note that this document also includes full information on policy matters; projects approved, status on their implementation and monitoring; and business planning, financial and administrative matters, that have been considered by the Executive Committee.

Since the last Meeting of the Parties, the Executive Committee continued to focus its work on monitoring the implementation of the HCFC phase-out management plans, referred to as HPMPs, and an HCFC production phase-out management plan, referred to as an HPPMP, along with the preparation and planning for the HFC phase-down. At the 90th meeting, the Committee reaffirmed that the principles of eligible incremental costs of HCFC phase-out projects for stage II of HPMPs, established in decision 74/50, would continue to apply in the future stages.

The Executive Committee also held discussions on the draft HCFC production sector guidelines and the standard format used for the verification of ODS production phase-out but was unable to complete its discussion, which the Committee will continue at a future meeting.

The Committee also addressed the following issues: institutional strengthening; parallel or integrated implementation of HCFC phase-out and HFC phase-down activities; the draft cost-guidelines for funding the phase-down of HFCs in Article 5 countries; energy efficiency matters while phasing down HFCs; and key aspects related to HFC-23 by-product-control technologies.

I would like to briefly highlight the discussions and decisions made on these items.

- Regarding institutional strengthening projects, the Executive Committee requested the Secretariat to discuss with the bilateral and implementing agencies matters related to the review of the existing format of terminal reports and requests for extension of institutional strengthening funding and to the selection of a set of performance indicators that could be used consistently by all Article 5 countries and to report back to the Executive Committee at its 91st meeting. The Committee will continue its consideration of the review of institutional strengthening projects, including funding levels, at the 91st meeting, based on the working text that was being discussed at the 89th meeting.
- The Executive Committee also requested the Secretariat to prepare an analysis related to the capacity of the Multilateral Fund institutions to address HFC phase-down, for its consideration at the 91st meeting.
- When discussing the draft cost guidelines for the phase-out of HFCs, the Executive Committee considered the synthesis report describing best practices and ways to make operational paragraph 24 of decision XXVIII/2 on disposal and the analysis of the incremental capital costs and incremental operating costs, their duration, and the cost-effectiveness of all approved investment projects in the relevant manufacturing sectors and subsectors. The Committee came to agreement on the issue of disposal of used or unwanted controlled substances and decided to provide flexibility for Article 5 countries to include activities related to the environmentally sound management of these substances, including disposal, both in refrigeration servicing

sector plans under HPMPs and in stage I of Kigali HFC implementation plans, referred to as KIPs.

- The Committee also agreed on an interim basis on cost-effectiveness thresholds for the rigid polyurethane (PU) foam sector, with special consideration for small and medium-sized enterprises; the domestic refrigeration manufacturing sector; and on the use of a case by-case approach for the flexible PU foam, integral skin, extruded polystyrene foam, aerosol, fire extinguishing, solvent, metered-dose inhalers, and mobile air-conditioning sectors. The Committee also requested the Secretariat to develop, for its second meeting in 2022, criteria for a funding window to provide Article 5 countries with assistance to prepare an inventory of banks of used or unwanted controlled substances and to develop a plan for the collection, transport, and disposal of such substances. The Committee agreed to pursue, at the 91st meeting, consideration of the non-resolved issues based on the working documents on the cost-effectiveness thresholds and the starting point for sustained aggregate reductions in HFC consumption and production.
- Although agreement has yet to be reached, the Executive Committee continued to make progress on its discussion of the analysis of the level and modalities of funding for HFC phase-down in the refrigeration servicing sector, based on the updated information provided by the Secretariat. Discussion will continue this item at the 91st meeting.
- Regarding energy efficiency while phasing down HFCs, the Executive Committee noted the report identifying options, including the relevant procedures and conditions, for mobilizing financial resources to maintain and/or enhance energy efficiency when replacing HFCs with low-GWP alternatives. The recommendation of the Committee included three areas of work for the Secretariat. First, to develop, for consideration by the Executive Committee at its 91st meeting, criteria for pilot projects to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of the HFC phase-down. Second, to prepare an operational framework to further elaborate on institutional aspects and projects and activities that could be undertaken by the Multilateral Fund for maintaining and/or enhancing the energy efficiency of replacement technologies and equipment in the manufacturing and servicing sector when phasing down HFCs in specific categories set out in the report. Third, to request the Secretariat to continue its consultations with relevant funding institutions on opportunities for sharing information on policies, projects and relevant funding modalities relating to maintaining and/or enhancing energy efficiency while phasing down HFCs and to report back to the Executive Committee at its 91st meeting.
- The Executive Committee also decided on the level of additional funding to be provided to address specific needs that might arise during project implementation relating to introduction of alternatives to HCFCs with low- or zero-GWP and for maintaining energy efficiency in the refrigeration servicing sector in low-volume consuming countries. The level of additional funding was based on the level of HCFC baseline consumption in the refrigeration servicing sector.
- Regarding controlling HFC-23 by-product emissions, the Executive Committee noted a document on key aspects related to HFC-23 by-product control technologies. The Committee also invited the relevant Article 5 country to consider requesting additional funding for independent verification of the HFC-23 by-product generated, destroyed, sold, stored, and emitted, under the subsequent stage of its HPMP, until approval of its KIP, at which time verification would continue under the latter plan.

Before I conclude, I would like to thank and share with all parties the main achievements of the implementing agencies of the Multilateral Fund, despite the challenges faced by them during the reporting period.

UNDP

UNDP is providing technical support to 47 countries to meet their HCFC targets under the Montreal Protocol. UNDP is also supporting 19 countries to undertake enabling activities for ratification and early implementation of the Kigali Amendment, out of which 13 countries have ratified the Kigali Amendment. Four HFC investment projects in Bangladesh, China, Dominican Republic and Mexico have also been completed successfully on time, collected actual cost information, phased down HFCs, and achieved significant improvement of energy efficiency in their products. Furthermore, UNDP has received approval from the Multilateral Fund to provide support to 28 countries to prepare their KIPs as the lead or cooperating agency. UNDP has continued to enhance the capacity building of Article 5 countries by organizing more than 30 online webinars on technical

topics, including on the requirements for licensing and quota systems for HFCs to implement the Kigali Amendment, addressing the challenges of new technologies and energy efficiency in the refrigeration and air-conditioning sector, and delivering energy efficient and climate friendly cooling through National Cooling Action Plans in 12 countries, to exchange information among Article 5 countries and provide training to national ozone units and stakeholders remotely. Finally, to strengthen the application of the Multilateral Fund's new Operational Policy on Gender Mainstreaming for UNDP's Montreal Protocol portfolio, one webinar on gender and the Montreal Protocol was organized by UNDP in 2022.

UNEP

UNEP, through the OzonAction Compliance Assistance Programme, assists all Article 5 Parties to meet and sustain their compliance with Montreal Protocol obligations. It supported 103 countries with institutional strengthening projects, helped them report timely and accurate data, and assisted them to meet their HCFC phase-out commitments through 102 HPMPs, Regional Networks of Ozone Officers, Information Clearinghouse products, and compliance assistance services. UNEP promoted the Kigali Amendment ratification, provided guidance for HFC policy setting, and assisted with the establishment of HFC licensing systems. UNEP continued assisting 93 countries with enabling activities projects and supported 39 countries with the preparation of their KIPs. Through partnerships, UNEP continued to help the refrigeration and air-conditioning servicing sector safely adopt low-GWP, energy efficient technologies. Throughout the COVID-19 pandemic, UNEP continued to support Ozone Officers with continuity of their Montreal Protocol implementation using virtual means and innovative approaches.

UNIDO

UNIDO is currently implementing HPMPs in 64 countries, institutional strengthening projects in 13 countries, projects on HFC-23 by-product emission destruction in 2 countries and has almost completed HFC enabling activities in 31 countries. Despite the pandemic, UNIDO managed to maintain implementation of the portfolio with the main issues identified being equipment installation for industry conversions due to travel restrictions, supply chain problems as well as increasing freight prices. Further, at the 88th and 90th meetings of the Executive Committee UNIDO received approval for preparatory funding for KIPs for 23 countries, increasing the total number that UNIDO supports to 35 countries.

World Bank

The World Bank continues to assist its partner countries in delivering stage II of their HPMPs, not only to achieve HCFC consumption and production reductions in accordance with their obligations but also to sustain and even further reduce consumption and production towards the 2025 compliance target. The Bank also supports countries' readiness for HFC phase-down and the compliance with the Kigali Amendment through technical assistance and advisory services, as well as through KIP preparation activities. Through its institution-wide assistance to both large and low-volume consuming countries, the World Bank is also exploring ways to maximize climate mitigation co-benefits across key economic sectors through sustainable cooling alongside avoidance of high-GWP HFCs.

Mr. President, distinguished delegates,

Finally, I would like to take this opportunity to express my sincere appreciation to the members of the Executive Committee for their support in my role as the Chair, the Fund Secretariat, and the bilateral and implementing agencies, for their continued hard work and dedication to our common goals.

I would also like to thank the Parties for their strong commitment to the implementation of the Montreal Protocol.

Thank you

Annex III

National statements*

A. Statement on the situation in Ukraine by the representative of Canada on behalf of Australia, Canada, Japan, New Zealand, Norway, Switzerland, the United Kingdom and the United States of America

And now distinguished delegates, I will turn my attention to Russia's military aggression. My remaining statement is provided on behalf of Australia, Canada, Japan, New Zealand, Norway, Switzerland, the United Kingdom, and the United States of America:

We condemn the ongoing mounting casualties and widespread destruction, including environmental damage and transboundary harm, caused by Russia's military aggression against Ukraine. Our thoughts are with the people of Ukraine.

This aggression is a violation of international law, including the UN Charter. Russia's actions violate the prohibition of the use of force, and the territorial integrity and political independence of Ukraine, as enshrined in international law. We support efforts to hold those responsible to account.

We call once again on Russia to abide by its international obligations, cease all hostilities in Ukraine, withdraw its troops, facilitate the rapid, safe, and unhindered access of humanitarian assistance to those in need in Ukraine.

Thank you

B. Statement on the situation in Ukraine by the representative of the European Union and its member States

First of all, please, let me bring up an issue of the utmost concern about the crucial benefit of the multilateral cooperation regarding the environmental issues also including the Montreal Protocol.

Multilateral cooperation, based on mutual respect, is crucial to address the huge environmental challenges ahead of us. We therefore recall our deep concern and condemn Russia's unprovoked and unjustified act of aggression against Ukraine with the complicity of Belarus, which grossly violates international law and the UN Charter, and undermines international security and stability. We demand that Russia immediately ceases its military actions, withdraws all its troops from the entire territory of Ukraine and fully respects Ukraine's territorial integrity, sovereignty and independence within its internationally recognised borders. We likewise recall the resolution ES-11/4, supported by 143 Member States of the United Nations, reaffirming the territorial integrity of Ukraine within its internationally recognized borders, and welcoming the efforts of the United Nations, Member States, and other organizations to respond to the crisis.

* At the time of the adoption of the present report, the representatives of two parties, each of whom spoke on behalf of a group of parties, requested that their statements pertaining to the situation in Ukraine be reflected in the present report. The statements are reproduced as received, without formal editing.

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Thirty-Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer
Montreal, 31 October–4 November 2022

Decisions adopted by the Thirty-Fourth Meeting of the Parties to the Montreal Protocol

The Thirty-Fourth Meeting of the Parties decides:

Decision XXXIV/1: Recognition of the achievements of Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland, winners of the Nobel Prize in Chemistry in 1995

Deeply grateful for the pioneering contributions and the extraordinary, visionary and courageous scientific work of scientists Paul Jozef Crutzen (Netherlands), Mario José Molina (Mexico) and Frank Sherwood Rowland (United States of America) throughout their careers in atmospheric chemistry, and particularly for their work concerning the formation and decomposition of ozone, which led to their being awarded the Nobel Prize in Chemistry in 1995,

Aware that their scientific work paved the way for global action to protect the ozone layer and led to the adoption of the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer and that, furthermore, their work spurred related action by every United Nations Member State as a party to those global environmental treaties,

Acknowledging the importance of continuing work to restore the ozone layer and the many associated benefits of such work to the planet and therefore to humanity,

1. To express recognition of and gratitude for the invaluable scientific contributions of Paul Jozef Crutzen, Mario José Molina and Frank Sherwood Rowland, which inspired countries around the world to join in solidarity and cooperation to protect the ozone layer from depletion, thus making the planet safer for present and future generations;

2. To uphold their legacy by maintaining mutual trust in and commitment to the work of the Vienna Convention and the Montreal Protocol;

3. To strive to continue to strengthen the institutions that their achievements helped to establish in order to achieve the aims of those institutions and protect the atmosphere for the benefit of all.

Decision XXXIV/2: Terms of reference for the study on the 2024–2026 replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol

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 on Substances that Deplete the Ozone Layer,

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 Thirty-Fifth Meeting of the Parties to the Montreal Protocol, and to submit it through the Open-ended Working Group of the Parties to the Montreal Protocol at its forty-fifth meeting, to enable the Thirty-Fifth Meeting of the Parties to adopt a decision on the appropriate level of the 2024–2026 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:

   (a) All control measures and relevant decisions agreed upon by the parties to the Montreal Protocol and the Executive Committee of the Multilateral Fund, including paragraphs 9 through 25 of decision XXVIII/2, and the decisions of the Thirty-Fourth Meeting of the Parties and the Executive Committee at its meetings, up to and including its ninety-second meeting, insofar as those decisions will necessitate expenditure by the Multilateral Fund during the period 2024–2026;

   (b) The special needs of low-volume-consuming and very-low-volume-consuming countries;

   (c) The need to allocate resources to enable all parties operating under paragraph 1 of Article 5 of the Montreal Protocol (Article 5 parties) to comply with Articles 2A–2J of the Protocol, and the reductions and extended commitments made by Article 5 parties under approved hydrochlorofluorocarbon (HCFC) phase-out management plans and Kigali hydrofluorocarbon (HFC) Implementation plans;

   (d) Decisions, rules and guidelines agreed by the Executive Committee at all its meetings, up to and including its ninety-second meeting, in determining eligibility for the funding of investment projects and non-investment projects;

   (e) The need to allocate resources for activities to maintain and/or enhance energy efficiency while phasing down HFCs including those relating to pilot/demonstration projects in accordance with any energy efficiency cost guidance developed by the Executive Committee or, should the Executive Committee not adopt cost guidance in time to be considered in the report, for a scenario for a funding window to support such activities;

   (f) The need to allocate resources for supporting activities related to gender mainstreaming as part of the gender policy of the Multilateral Fund taking into account the implementing agencies' existing policies to promote gender mainstreaming and the mandate as per Executive Committee decision 84/92;

   (g) The need to allocate resources for a funding window for activities to support end-of-life management and disposal of controlled substances in an environmentally sound manner in accordance with any relevant decisions by the Executive Committee or, should the Executive Committee not adopt relevant decisions in time to be considered in the report, for a scenario for funding a limited number of demonstration projects;

   (h) A scenario to increase funding for institutional strengthening and the compliance assistance programme to assist Article 5 parties to strengthen their national capacities to address challenges associated with implementing the Kigali Amendment;

3. That in estimating the funding requirement associated with the HCFC and HFC targets, the Panel will use a clearly explained compliance-based methodology that is informed by, but independent of the business plan of the Multilateral Fund, taking into account policy guidance provided by the meeting of the parties and/or the Executive Committee;

4. That the Panel should provide indicative figures associated with enabling Article 5 parties to implement HPMPs and KIPs in a coordinated manner. Indicative figures should be provided for a range of typical scenarios, using all relevant data available to the Panel;

5. That, in preparing the report, the Panel should consult widely, including all relevant persons and institutions and other relevant sources of information deemed useful;

6. That the Panel should strive to complete the report in good time to enable it to be distributed to all parties two months before the forty-fifth meeting of the Open-ended Working Group;

7. That the Panel should provide indicative figures for the periods 2027–2029 and 2030–2032 to support a stable and sufficient level of funding, on the understanding that those figures will be updated in subsequent replenishment studies.

Decision XXXIV/3: Enabling enhanced access and facilitating the transition to energy-efficient and low or zero-global-warming-potential technologies

Recalling decisions XXVIII/3, XXIX/10, XXX/5, XXXI/7 and XXXIII/5 relating to energy efficiency and the phase-down of hydrofluorocarbons,

Recalling also paragraph 22 of decision XXVIII/2, in which the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol was requested to develop cost guidance associated with maintaining and/or enhancing the energy efficiency of low-global-warming-potential or zero-global-warming-potential replacement technologies and equipment, when phasing down hydrofluorocarbons,

Taking note of the *Scientific Assessment of Ozone Depletion: 2018*[1] report, which notes that improvements in the energy efficiency of refrigeration and air-conditioning equipment during the transition to low-global-warming-potential alternative refrigerants can potentially double the climate benefits of the Kigali Amendment,

Welcoming the reports of the Technology and Economic Assessment Panel in response to decisions XXVIII/3, XXIX/10 and XXX/5, inter alia, which provide valuable information on opportunities and pathways for enhancing or maintaining energy efficiency while phasing down HFCs,

Cognizant of the work under way by the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol to develop cost guidance on energy efficiency and further operationalize the aforementioned decisions, including decisions 89/6 and 90/50,

Taking note of Technology and Economic Assessment Panel 2018 report which indicates that coordinated investment in energy efficiency and refrigerant transition will cost manufacturers and consumers less than if such investments are made separately,

1. To request the Technology and Economic Assessment Panel to:

   (a) Include in its 2023 progress report:

      (i) Information on enhancements in energy efficiency associated with improvements in appliance foams;

      (ii) Updates relating to the availability, accessibility, electrical compatibility, and cost of energy efficient products and equipment containing low or zero Global Warming Potential (GWP) refrigerants in the refrigeration, air-conditioning and heat pump sectors;

      (iii) Information on testing equipment and procedures for validation of energy efficiency claims to enforce minimum energy efficiency standards and labels, and information on voluntary labelling programmes;

      (iv) Information on barriers to consumer and business acceptance of the adoption of more energy-efficient products and equipment containing low or zero GWP refrigerants, including barriers related to electrical compatibility of such products and equipment, and possible solutions for sustainable transition to such products and equipment;

      (v) Analysis of the potential benefits of introducing more energy efficient refrigeration, air-conditioning and heat pump equipment, including costs and related climate benefits while phasing down HFCs;

      (vi) Information on the range of, and trends, in GWP and energy efficiency of refrigeration, air-conditioning and heat pump equipment, for which there is available data.

[1] World Meteorological Organization, *Scientific Assessment of Ozone Depletion: 2018*, Global Ozone Research and Monitoring Project – Report No. 58 (Geneva, Switzerland, 2018).

(b) Integrate updates on energy efficiency while phasing down HFCs in the refrigeration, air conditioning and heat pump sectors in its progress and quadrennial assessment reports from 2023 onwards.

2. To request the Executive Committee to take into consideration the information prepared by the Technology and Economic Assessment Panel in the preparation and finalization of the energy efficiency cost guidance in the context of the Kigali Amendment (decision XXVIII/2, para. 22), and to report on its progress in the context of the annual report of the chair of the Executive Committee to the Meeting of the Parties.

3. To request the Executive Committee to continue to support activities to maintain and enhance energy efficiency while phasing down HFCs in countries wishing to do so.

4. To request the Secretariat to:

(a) Organize a one-day workshop in 2023 back-to-back with the Meeting of the Parties to share information, experiences and lessons learned, and assess challenges related to ways of improving availability and accessibility of energy efficient equipment and equipment using low or zero GWP alternatives during the implementation of the Kigali Amendment;

(b) Prepare a report of existing policies addressing the interlinkages between phasing down HFCs and enhancing energy efficiency.

5. To encourage parties:

(a) To enhance coordination between domestic energy and ozone officials to enhance energy efficiency while phasing down HFCs;

(b) To support upgrading domestic servicing including related certification programmes, including technician training to maintain and/or to enhance energy efficiency, reduce refrigerant leaks, and ensure proper installation and maintenance domestic servicing including related certification programmes of refrigeration, air-conditioning and heat-pump equipment; and

(c) When phasing down hydrofluorocarbons, to take into account, as appropriate, the information contained in volume 3 of the Technology and Economic Assessment Panel 2022 report responding to decision XXXIII/5.

Decision XXXIV/4: Illegal import of certain refrigeration, air-conditioning and heat pump products and equipment

2. To invite parties that have restricted the manufacture and/or import of certain refrigeration, air-conditioning and heat pump products and equipment containing or relying on controlled substances, including with respect to energy efficiency, and that do not want to receive such products and equipment from other parties against payment or free of charge, to submit to the Secretariat by 1 May 2023 the information listed below**:**

(a) The types of products and equipment concerned, including their Harmonized System codes where applicable;

(b) The specific domestic restrictions on the controlled substances (i.e. maximum global warming potential of HFCs permitted to be used) for each category of products and equipment;

(c) The minimum energy efficiency performance standard permitted under domestic legislation for each category of products and equipment;

(d) Any attempted illegal imports of such restricted products and equipment to their countries.

3. To consider this issue at the Thirty-Fifth Meeting of the Parties and include the item on the agenda of the forty-fifth meeting of the Open-ended Working Group taking into account the information requested in paragraph 1 above.

Decision XXXIV/5: Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring

To request the Technology and Economic Assessment Panel to prepare a report for the forty-fifth meeting of the Open-ended Working Group on:

(a) Chemical pathways in which substantial emissions of controlled substances are likely to occur;

(b) Best practices available to control these emissions;

(c) Gaps in understanding the sources of emissions referred to in point (a) above.

Decision XXXIV/6: Ongoing emissions of carbon tetrachloride

Recalling decisions XVI/14, XVIII/10, XXI/8, XXIII/8 and XXVII/7, in which the Meeting of the Parties, inter alia, requested the assessment panels to assess global emissions, including emissions of carbon tetrachloride, and to suggest measures for reducing carbon tetrachloride emissions, and encouraged the parties to review their relevant national data,

1. To invite parties that have production of carbon tetrachloride, as well as by-production, or use of carbon tetrachloride as a feedstock for other substances or as a process agent, to provide to the Ozone Secretariat on a voluntary basis, by 1 February 2023, information on the national procedures and frameworks in place for management of such activities in their respective countries;

2. To request the Secretariat to share with the Technology and Economic Assessment Panel the information received in accordance with paragraph 1 of the present decision;

3. To request the Technology and Economic Assessment Panel to review the information received and to present this information in its 2023 progress report for consideration by the Open-ended Working Group at its forty-fifth meeting.

Decision XXXIV/7: Strengthening institutional processes with respect to information on HFC-23 by-product emissions

Recalling the provisions under paragraphs 6 and 7 of Article 2J of the Montreal Protocol on Substances that Deplete the Ozone Layer on destruction, to the extent practicable, of HFC-23 by-product emissions from each production facility that manufactures Annex C, Group I, or Annex F substances,

To request the Technology and Economic Assessment Panel to prepare a report for the Thirty-Fifth Meeting of the Parties to include:

(a) Information on the possible chemical pathways that could be used in the production of Annex C, Group I, or Annex F substances that may generate HFC-23 as a by-product;

(b) Compilation of information on the amount of HFC-23 generation and emissions from facilities that manufacture Annex C, Group I, or Annex F substances, the reporting of which is required under Article 7 of the Montreal Protocol; and

(c) Best practices available to control these emissions.

Decision XXXIV/8: Strengthening Montreal Protocol institutions, including for combatting illegal trade

Recalling decision XXXI/3, which encourages parties to take action to discover and prevent the illegal production, import, export and consumption of controlled substances and to report fully proved cases of illegal trade in controlled substances to the Secretariat,

Recalling also decision XIV/7, which requests the Secretariat to collect information on illegal trade in ozone-depleting substances received from parties and disseminate it to all parties, and recognizing the need to apply similar provisions to all controlled substances,

Understanding the importance of preventing illegal trade for ensuring the timely and smooth phase-out of ozone-depleting substances and phase-down of hydrofluorocarbons,

Recalling decision XIV/7, which states that illegally traded quantities should not be counted against a Party's consumption provided the party does not place the said quantities on its own market,

Taking into account the note by the Secretariat on possible ways of dealing with illegal production of and illegal trade in controlled substances under the Montreal Protocol, identifying potential gaps in the non-compliance procedure, challenges, tools, ideas and suggestions for improvement,[2]

1. To urge parties that have not already done so to introduce into their national customs classification systems the separate subdivisions for HFCs and blends contained in the amendments to the Harmonized Commodity Description and Coding System adopted by the World Customs Organization in 2019 that entered into force on 1 January 2022, and use more specific classifications for controlled substances and blends containing controlled substances, where possible, to better identify and track imports and exports of controlled substances;

2. To encourage all parties to exchange information and strengthen joint efforts to improve means of identification, prevention and combating of illegal trade in controlled substances, including addressing the mislabelling of containers of controlled substances as other chemicals;

3. To encourage parties to facilitate the exchange of information to prevent illegal trade of controlled substances by reporting to the Secretariat fully proved cases of illegal trade and, to the extent that parties are able to do so, to provide additional information about illegal trade situations;

4. To request the Secretariat to:

   (a) Compile and regularly summarize the practices of illegal trade reported under paragraph 3 of the present decision, as well as the approaches taken by national authorities to identify and address such cases;

   (b) Identify common features of licensing systems to assist parties wishing to improve their national licensing systems for controlled substances;

   (c) Organize a one-day workshop on further strengthening effective implementation and enforcement of the Montreal Protocol back-to-back with the forty-fifth meeting of the Open-ended Working Group; and

   (d) Prepare a background information paper outlining issues to be discussed at the workshop and reflecting discussions at the forty-fourth meeting of the Open-ended Working Group and the Thirty-Fourth Meeting of the Parties for consideration at the forty-fifth meeting of the Open-ended Working Group.

Decision XXXIV/9: Critical-use exemptions for methyl bromide for 2023

Noting with appreciation the work of the Technology and Economic Assessment Panel and its Methyl Bromide Technical Options Committee and the report it presented 'TEAP September 2022: Evaluation of 2022 critical use nominations for methyl bromide and related issues - Final report (Volume 5)',

Acknowledging that the Technology and Economic Assessment Panel, and specifically its Methyl Bromide Technical Options Committee, produce reports that are science-based, independent and robust and that all parties should strive to respect the results of this work,

Recognizing the significant reductions in critical-use nominations for methyl bromide by many parties,

Recalling paragraph 10 of decision XVII/9 on critical-use exemptions for methyl bromide,

Recalling that parties nominating critical-use exemptions are requested to report data on stocks of methyl bromide using the accounting framework agreed on by the Sixteenth Meeting of the parties,

Recognizing that parties operating under critical-use exemptions should, in licensing, permitting or authorizing the production and consumption of methyl bromide for critical uses, take into account the extent to which methyl bromide is available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide,

[2] UNEP/OzL.Pro.34/8.

Recalling decision Ex.I/4, on conditions for granting and reporting critical-use exemptions for methyl bromide, by which parties with critical-use exemptions were requested to submit annual accounting frameworks and national management strategies,

Recalling also decision IX/6, by which the parties to the Montreal Protocol decided that production and consumption of methyl bromide for critical uses was to be permitted only if methyl bromide was not available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide,

Recalling further decision XVI/4 on the working procedures of the Methyl Bromide Technical Options Committee, as set out in annex I to the report of the Sixteenth Meeting of the Parties, related to the evaluation of nominations for critical uses of methyl bromide,

Noting that the Technology and Economic Assessment Panel has identified successful chemical and non-chemical alternatives to methyl bromide and that the use of such alternatives in combination provides excellent results,

Noting that Australia's transition away from methyl bromide in 2023 has been delayed as a result of the registration of an alternative not having been finalized as originally planned in January 2022, thus requiring its use of the full amount of methyl bromide in 2023,

Noting that assessment and a decision on the application for registration of an effective alternative in Australia is expected to be completed in 2023,

Noting that the Government of Canada takes into account, to the extent feasible, available stocks of methyl bromide in licensing, permitting or authorizing the production and consumption of methyl bromide for critical uses,

Noting the progress made under the Canadian research programme aiming at developing alternatives to methyl bromide, and that Canada is committed to continuing its research programme aiming at a full phase-out of methyl bromide for critical use nominations, and is committed to a further reduction of the amount nominated in 2023 and in subsequent years, but also noting that Canada, for reasons linked to the economic impact of shifting towards soilless substrates use in strawberry runners production for a single producer and in the absence of authorized fumigant alternatives, has asked to diverge from the recommendations of the Methyl Bromide Technical Options Committee,

Noting with appreciation that Republic of South Africa is committed not to apply in the future years for critical use nominations of methyl bromide,

Recognizing that some parties have recently stopped requesting critical-use exemptions and that the efforts to develop alternatives and substitutes by parties that continue to apply for exemptions are designed to achieve the same outcome,

1. To permit, for the agreed critical-use categories for 2023 set forth in table A of the annex to the present decision for each party, subject to the conditions set forth in the present decision and in decision Ex.I/4, to the extent that those conditions are applicable, the levels of production and consumption for 2023 set forth in table B of the annex to the present decision, which are necessary to satisfy critical uses, with the understanding that additional production and consumption and categories of use may be approved by the Meeting of the Parties in accordance with decision IX/6;

2. That parties shall endeavour to licence, permit, authorize or allocate quantities of methyl bromide for critical uses as listed in table A of the annex to the present decision;

3. That each party that has an agreed critical-use exemption shall renew its commitment to ensuring that the criteria specified in paragraph 1 of decision IX/6, in particular the criterion specified in paragraph 1 (b) (ii) of decision IX/6, are applied in licensing, permitting or authorizing critical uses of methyl bromide, with each party requested to report on the implementation of the present provision to the Secretariat by 1 February for the years to which the present decision applies;

4. That parties submitting future requests for critical-use nominations for methyl bromide shall also comply with paragraph 1 (b) (iii) of decision IX/6 and that parties not operating under paragraph 1 of Article 5 of the Montreal Protocol shall demonstrate that research programmes are in place to develop and deploy alternatives to and substitutes for methyl bromide;

5. To reiterate the reminder in decision XXXII/3 that parties operating under paragraph 1 of Article 5 of the Protocol requesting critical-use exemptions are required to submit their national management strategies in accordance with paragraph 3 of decision Ex.I/4.

Annex to decision XXXIV/9

Table A
Agreed critical-use categories

Party/year	*Category*	*Amount[a] (tonnes[b])*
2023		
Australia	Strawberry runners	28.98*
Canada	Strawberry runners	4.65
South Africa	Structures	19.00

[a] Minus available stocks.

[b] Tonnes = metric tons.

*Includes the amount of 14.49 previously agreed for 2023.

Table B
Permitted levels of production and consumption

Party/year	*Amount[a] (tonnes[b])*
2023	
Australia	28.98*
Canada	4.65
South Africa	19.00

[a] Minus available stocks.

[b] Tonnes = metric tons.

*Includes the amount of 14.49 previously agreed for 2023 in Decision XXXIII/6.

Decision XXXIV/10: Stocks and quarantine and pre-shipment uses of methyl bromide

Noting that the Technology and Economic Assessment Panel's Methyl Bromide Technical Options Committee has pointed out that it is likely that the available information it has on stocks does not accurately show the total stocks of methyl bromide held globally for controlled and exempted uses,

Noting that the Scientific Assessment Panel will be reporting to the forty-fifth meeting of the Open-ended Working Group on its quadrennial assessment which could provide further opportunity to present information on any discrepancies between top-down and bottom-up estimates of methyl bromide emissions.

Noting further that some parties may not be aware of specific alternatives for some quarantine and pre-shipment uses of methyl bromide~~,~~

Noting that parties are required to report statistical data on the production, imports and exports of controlled substances as well as on the annual amount of methyl bromide used for quarantine and pre-shipment applications under paragraph 3 of Article 7 of the Montreal Protocol on Substances that Deplete the Ozone Layer,

1. To invite parties to submit to the Ozone Secretariat, on a voluntary basis by 1 June 2023, a list of the pest and commodity combinations in which methyl bromide is needed or used in their respective countries;

2. To invite parties to submit, on a voluntary basis, accessible data on the volumes of pre-phase-out methyl bromide stocks at the country level to the Ozone Secretariat by 1 June 2023;

3. To include the issue of methyl bromide stocks in the agenda of the forty-fifth meeting of the Open-ended Working Group;

4. To request the Technology and Economic Assessment Panel and its Methyl Bromide Technical Options Committee, in consultation with the secretariat of the International Plant Protection

Convention, to provide updated information, as part of its progress report to the Open-ended Working Group at its forty-fifth meeting, on current quarantine and pre-shipment uses for which alternatives are available;

5. To invite parties to take into account the standards and guidelines under the International Plant Protection Convention in their national processes and to consider the potential for uptake of practices to minimize the use of methyl bromide.

Decision XXXIV/11: Composition, balance and workload of the Technology and Economic Assessment Panel and its technical options committees

Acknowledging the important role of the Technology and Economic Assessment Panel and its technical options committees and temporary subsidiary bodies in the provision of independent technical and scientific assessments, which have assisted the parties in arriving at well-informed decisions,

Recalling decision XXIV/8, in which the parties set out the terms of reference, a code of conduct, and disclosure and conflict of interest guidelines for the Panel and its technical options committees and temporary subsidiary bodies,

Recalling decision XXVIII/1, by which parties adopted the Kigali Amendment to the Montreal Protocol, and decision XXVIII/2, which set out elements associated with the Kigali Amendment,

1. To request the Technology and Economic Assessment Panel, including through consultation by the co-chairs of the technical options committees with their members, to provide more information on existing challenges and potential options for the future configuration and function of its technical options committees for consideration by the Open-ended Working Group at its forty-fifth meeting, taking into account:

   (a) Discussions and questions raised by parties at the forty-fourth meeting of the Open-ended Working Group and the Thirty-Fourth Meeting of the Parties concerning the Panel's recommendations in its 2022 progress report;

   (b) The fact that the vast majority of HFC uses are in the refrigeration, air-conditioning and heat-pump sector;

   (c) Expertise required to provide technical and cost-related information to the parties, including in the context of implementation of the Kigali Amendment;

   (d) Guidance provided in its terms of reference; and

   (e) The need to ensure continued collaboration and coordination across the technical options committees;

2. To rename the Halons Technical Options Committee the Fire Suppression Technical Options Committee.

Decision XXXIV/12: Updating the information on relevant safety standards

Recalling decision XXVIII/4 on the establishment of regular consultations on safety standards,

Recalling also the continued importance of ensuring the safe market introduction, manufacturing, operation, maintenance, and handling of equipment containing refrigerants that are alternatives to hydrochlorofluorocarbons and hydrofluorocarbons,

Taking note of the importance of being informed on progress in updating relevant standards, such as the recent revision of International Electrotechnical Commission standard 60335-2-40,

Recalling decision XXIX/11 requesting the Secretariat to hold regular consultations with the relevant standards bodies referred to in paragraph 7 of decision XXVIII/4 with a view to providing, with regard to standards for flammable low-global-warming-potential refrigerants, a tabular overview of relevant safety standards,

1. To request the Secretariat to continue providing information on relevant safety standards as requested by decision XXIX/11 at least prior to each meeting of the parties up until the Forty-First Meeting of the Parties, when parties should consider whether to renew that request to the Secretariat;

2. To request the Secretariat to include further relevant safety standards when notified by a party or a group of parties of the adoption of a standard.

Decision XXXIV/13: Collecting data to understand potential impacts of the coronavirus disease (COVID-19) pandemic on hydrofluorocarbon consumption for Group 1 Article 5 parties

Recalling that the calculated HFC consumption baselines for Group 1 Article 5 parties (parties operating under paragraph 1 of Article 5 of the Montreal Protocol) are determined on the basis of reported HFC consumption for 2020, 2021 and 2022 plus 65 per cent of the country's HCFC baselines to account for HFC growth and fluctuations,

Noting the coronavirus disease (COVID-19) pandemic,

Noting that the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol has taken no decision concerning the years for the starting point that will be used to determine maximum HFC consumption eligible for funding, and that this issue will continue to be considered at the ninety-first meeting of the Executive Committee,

1. To encourage Article 5 parties that believe that their reduced consumption of HFCs during the baseline years of 2020–2022, stemming from the effects of the COVID-19 pandemic, could hinder their ability to comply with the freeze in the consumption of HFCs in 2024 under the Kigali Amendment to submit to the Ozone Secretariat as soon as possible, and no later than 1 May 2023, their HFC consumption data for 2022 in time for consideration at the forty-fifth meeting of the Open-ended Working Group;

2. For parties that provide to the Ozone Secretariat by 1 May 2023 their HFC consumption data for 2022, in accordance with paragraph 1 of the present decision, to request the Ozone Secretariat to prepare for consideration at the forty-fifth meeting of the Open-ended Working Group:

   (a) Information on the HFC consumption for the years 2020, 2021, and 2022 and the calculated baselines of Group 1 Article 5 parties that have reported relevant data;

   (b) Information on HFC consumption for the years 2018 and 2019 of Group 1 Article 5 parties where information is available;

3. To request the Executive Committee of the Multilateral Fund, at its ninety-first meeting, to consider requesting the secretariat of the Multilateral Fund to provide to the Ozone Secretariat any HFC consumption data it has available that could assist the Ozone Secretariat in preparing the information requested under paragraph 2 of the present decision.

Decision XXXIV/14: Data and information provided by the parties in accordance with Article 7 of the Montreal Protocol

1. To note that 194 parties of the 198 parties that should have reported data for 2021 have done so, and that 175 of those parties had reported their data by 30 September 2022 as required under paragraph 3 of Article 7 of the Montreal Protocol on Substances that Deplete the Ozone Layer;

2. To note with appreciation that 117 of those parties had reported their data by 30 June 2022, in accordance with the encouragement in decision XV/15, and that reporting by 30 June each year greatly facilitates the work of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol in assisting parties operating under paragraph 1 of Article 5 of the Protocol to comply with the Protocol's control measures;

3. To note with concern that four parties, namely Afghanistan, the Democratic Republic of the Congo, Israel and the Russian Federation, have not reported their 2021 data as required under paragraph 3 of Article 7 of the Montreal Protocol, and that this places them in non-compliance with their data reporting obligations under the Montreal Protocol until such time as the Secretariat receives their outstanding data;

4. To also note with concern that one non-Article 5 party, namely San Marino, that is a party to the Kigali Amendment and should have submitted baseline data for Annex F substances (HFCs) for the years 2011 to 2013 has not done so as required under paragraph 2 of Article 7 of the Montreal Protocol, and that this places it in non-compliance with its data reporting obligations

under the Montreal Protocol until such time as the Secretariat receives its outstanding baseline data for HFCs;

5. To note that a lack of timely data reporting by parties impedes the effective monitoring and assessment of parties' compliance with their obligations under the Montreal Protocol;

6. To urge the parties listed in paragraphs 3 and 4 of the present decision to report the required data to the Secretariat as soon as possible;

7. To request the Implementation Committee to review the situation of those parties at its seventieth meeting;

8. To encourage parties to continue to report consumption and production data as soon as the figures are available, and preferably by 30 June each year, as agreed in decision XV/15.

Decision XXXIV/15: Status of the establishment of licensing systems under Article 4B, paragraph 2 bis, of the Montreal Protocol

Noting that Article 4B, paragraph 2 bis, of the Montreal Protocol on Substances that Deplete the Ozone Layer requires each party, by 1 January 2019 or within three months of the date of entry into force of that paragraph for the party, whichever is later, to establish and implement a system for licensing the import and export of new, used, recycled and reclaimed controlled substances listed in Annex F to the Protocol,

Noting with appreciation that 117 of the 143 parties to the Kigali Amendment to the Montreal Protocol have established import and export licensing systems for Annex F (HFCs) controlled substances as required, and that eight parties that have not yet ratified the Kigali Amendment have also reported the establishment and implementation of such licensing systems,

Noting, however, that the 15 parties listed in the annex to the present decision have not yet reported to the Secretariat on the establishment and operation of their licensing systems pursuant to Article 4B, paragraph 3,

Recognizing that licensing systems provide for data collection and verification, the monitoring of imports and exports of controlled substances, and the prevention of illegal trade,

Recognizing also that the successful phase-out of most controlled substances by parties is largely attributable to the establishment and implementation of licensing systems to control the import and export of ozone-depleting substances,

1. To take note with appreciation of the efforts made by the parties in the establishment and implementation of licensing systems under Article 4B, paragraph 2 bis, of the Montreal Protocol for the import and export of new, used, recycled and reclaimed controlled substances listed in Annex F to the Montreal Protocol;

2. To urge the 15 parties listed in the annex to the present decision to provide information to the Secretariat on the establishment and implementation of licensing systems as a matter of urgency, and no later than 15 March 2023, for consideration by the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol at its seventieth meeting;

3. To urge all remaining parties to the Kigali Amendment that have not yet established and implemented the licensing systems referred to in paragraph 1 of the present decision to do so, and to report that information to the Secretariat within three months of doing so;

4. To request the Secretariat to review periodically the status of the establishment and implementation of the licensing systems referred to in paragraph 1 of the present decision by all parties to the Protocol.

Annex to draft decision XXXIV/15

Parties that have not yet reported on the establishment and implementation of licensing systems pursuant to Article 4B, paragraph 2 bis

1. Angola
2. Botswana
3. Burundi
4. Côte d'Ivoire
5. El Salvador
6. Ethiopia
7. Lesotho
8. Liberia
9. Mali
10. Mozambique
11. San Marino
12. Sao Tome and Principe
13. Somalia
14. Türkiye
15. Zambia

Decision XXXIV/16: Revision of the baseline data for Madagascar

Noting that, in decision XIII/15, the Thirteenth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer decided to advise parties that request changes in reported baseline data for base years to present their requests before the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol, which in turn would work with the Secretariat of the Montreal Protocol and the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol to confirm the justification for the changes and present them to the Meeting of the Parties for approval,

Noting also that decision XV/19 sets out the methodology for the submission of such requests,

1. That Madagascar has presented sufficient information, in accordance with decision XV/19, to justify its request for the revision of its consumption data for hydrochlorofluorocarbons for 2009, which are part of the baseline for parties operating under paragraph 1 of Article 5 of the Montreal Protocol;

2. To approve the request by Madagascar and to revise its consumption data for hydrochlorofluorocarbons for the baseline year 2009 as indicated in the following table:

	Previous hydrochlorofluorocarbon data (ODP-tonnes)			*New hydrochlorofluorocarbon data (ODP-tonnes)*		
Party	2009	2010	**Baseline[a]**	2009	2010	**Baseline[a]**
Madagascar	33	16.8	**24.9**	16.49	16.8	**16.6**

[a] HCFC baselines established after the Twenty-Third Meeting of the Parties are presented to two decimal places, whereas those established earlier are presented to one decimal place (see decision XXIII/30).

Abbreviation: ODP – ozone-depleting potential.

Decision XXXIV/17: Enhancing participation in the work of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol through co-option

Acknowledging that the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol consists of seven parties from the group of parties operating under paragraph 1 of Article 5 of the Protocol and seven parties from the group of parties not so operating,

Recalling decision XVI/38, which modified the rotation system for allocating Executive Committee seats among the group of parties operating under paragraph 1 of Article 5 of the Protocol,

To request the Executive Committee to consider increasing the funding allocated for travel by parties operating under paragraph 1 of Article 5 of the Protocol in the budget of the secretariat of the Multilateral Fund, with a view to supporting the participation in Executive Committee meetings of one party operating under paragraph 1 of Article 5 of the Protocol that is not eligible through the existing rotation system for a seat on the Executive Committee for the year in question, on the understanding that the Party concerned could be co-opted by another Party operating under paragraph 1 of Article 5 of the Protocol holding the rotating seat for the year in question.

Decision XXXIV/18: Changes in the membership of the Technology and Economic Assessment Panel

1. To thank the Technology and Economic Assessment Panel for its outstanding reports, and to thank the co-chairs and members of the Panel for their outstanding service and dedication;

2. To endorse the appointment of Ms. Marta Pizano (Colombia) as co-chair of the Technology and Economic Assessment Panel for an additional term of four years;

3. To endorse the appointment of Mr. Ashley Woodcock (United Kingdom of Great Britain and Northern Ireland) as co-chair of the Technology and Economic Assessment Panel for an additional term of four years;

4. To endorse the appointment of Mr. Fabio Polonara (Italy) as co-chair of the Refrigeration Technical Options Committee for an additional term of four years;

5. To endorse the appointment of Mr. Ray Gluckman (United Kingdom of Great Britain and Northern Ireland) as a senior expert for an additional term of one year;

6. To endorse the appointment of Mr. Marco González (Costa Rica) as a senior expert for an additional term of one year;

7. To endorse the appointment of Ms. Shiqiu Zhang (China) as a senior expert for an additional term of one year.

Decision XXXIV/19: Membership of the Implementation Committee

1. To note with appreciation the work carried out by the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol in 2022;

2. To confirm the positions of China, Costa Rica, Egypt, Poland and the United States of America as members of the Committee for one further year and to select Chile, Lebanon, Netherlands, Senegal and Suriname as members of the Committee for a two-year period beginning on 1 January 2023;

3. To note the selection of Mr. Gene Smilansky (United States of America) to serve as President and Mr. Osvaldo Alvarez-Perez (Chile) to serve as Vice-President and Rapporteur of the Committee for one year beginning on 1 January 2023.

Decision XXXIV/20: Membership of the Executive Committee of the Multilateral Fund

1. To note with appreciation the work carried out by the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol with the assistance of the Fund secretariat in 2022;

2. To endorse the selection of Brazil, Burkina Faso, China, Cuba, Ghana, Kenya, and Kuwait as members of the Executive Committee representing parties operating under paragraph 1 of Article 5 of the Protocol and the selection of Australia, Belgium, Estonia, Finland, Italy, Japan and United States of America as members representing parties not so operating, for one year beginning 1 January 2023;

3. To note the selection of Ms. Annie Gabriel (Australia) to serve as Chair and Mr. Matheus Bastos (Brazil) to serve as Vice-Chair of the Executive Committee for one year beginning 1 January 2023.

Decision XXXIV/21: Co-Chairs of the Open-ended Working Group of the Parties to the Montreal Protocol

To endorse the selection of Mr. Ralph Brieskorn (Netherlands) and Mr. Ameh Djossou (Togo) as Co-Chairs of the Open-ended Working Group of the Parties to the Montreal Protocol in 2023.

Decision XXXIV/22: Status of ratification of the Kigali Amendment to the Montreal Protocol

1. To note that, as at 4 November 2022, 143 parties had ratified, approved or accepted the Kigali Amendment to the Montreal Protocol;

2. To urge all parties that have not yet done so to consider ratifying, approving or accepting the Kigali Amendment in order to ensure broad participation and achieve the goals of the Amendment.

Decision XXXIV/23: Thirty-Fifth Meeting of the Parties to the Montreal Protocol

To convene the Thirty-Fifth Meeting of the Parties to the Montreal Protocol from 23 to 27 October 2023, at the seat of the Secretariat in Nairobi, unless other arrangements are made by the Secretariat in consultation with the Bureau.

Decision XXXIV/24: Financial reports and budgets for the Montreal Protocol on Substances that Deplete the Ozone Layer

Recalling decision XXXIII/14 on financial reports and budgets for the Montreal Protocol on Substances that Deplete the Ozone Layer,

Taking note of the financial report for the Trust Fund for the Montreal Protocol on Substances that Deplete the Ozone Layer for the fiscal year 2021,[3]

Recognizing the voluntary contributions of parties as an essential complement for the effective implementation of the Montreal Protocol,

Welcoming the continued efficient management by the Secretariat of the finances of the Trust Fund for the Montreal Protocol,

Recognizing that the exceptional circumstances arising from the coronavirus disease pandemic has resulted in a higher cash balance due to a lower utilization of the budget in 2020 and 2021 and taking this into account with respect to the level of contributions for 2023,

Also recognizing that maintaining the level of contribution at the 2023 level will result in a significant reduction in the cash balance, and that there may be a need to increase the level of contributions in the coming years,

1. To approve the revised budget, including the additional activities of $5,855,129 for 2022 and the budget of $5,729,665 for 2023 and to take note of the indicative budget for 2024, as set out in table A of the annex to the present decision, to be considered further by the Thirty-Fifth Meeting of the Parties,

2. To authorize the Executive Secretary, on an exceptional basis, to draw upon the available cash balance for 2022 in an amount of up to $406,235 for specific activities listed in table A of the annex to the present decision, which includes an indicative amount for workshops in 2023 as called for in decisions XXXIV/6 para 4(a) and XXXIV/10 para 6(c) provided that the cash balance is not reduced below the working capital reserve;

3. To approve the contributions to be paid by the parties in the amount of $3,170,390 for 2023 and to take note of the contributions for 2024 as set out in table B of the annex to the present decision;

4. To authorize the Secretariat to draw down from the cash balance the funds required to cover the shortfall between the level of contributions agreed upon in paragraph 3 of the present decision and the approved budget for 2023 as set out in paragraph 1 of the present decision;

5. To reaffirm that a working capital reserve shall be maintained at a level of 15 per cent of the annual budget, to be used to meet the final expenditures under the Trust Fund, noting that the working capital reserve shall be set aside from the existing cash balance;

6. To encourage parties and other stakeholders to contribute financially and by other means to assist the members of the three assessment panels and their subsidiary bodies with a view to ensuring their continued participation in assessment activities under the Montreal Protocol;

7. To express its appreciation regarding the fact that a number of parties have paid their contributions for 2022 and prior years, and to urge those parties that have not done so to pay their outstanding contributions promptly and in full and all parties to pay their future contributions promptly and in full;

8. To request the Executive Secretary to enter into discussions with any party whose contributions have been outstanding for two or more years with a view to finding a way forward, and to report to the Thirty-Fifth Meeting of the Parties on the outcome of those discussions to enable further consideration by the parties of how to address the matter;

9. To request the Executive Secretary to continue to provide regular information on earmarked contributions and to include that information, where relevant, in the budget proposals of the Trust Fund to enhance transparency with regard to the actual income and expenses of the Trust Fund;

[3] UNEP/OzL.Pro.34/5.

10. To request the Executive Secretary to continue to prepare fact sheets for the presentation of future budgets;

11. To request the Secretariat to ensure the full utilization of the programme support resources available to it in 2023 and in later years and, where possible, to offset programme support resources against the administrative components of the approved budget;

12. To request the Secretariat to indicate in future financial reports of the Trust Fund the amounts of cash on hand and the status of contributions to the Trust Fund;

13. To request the Executive Secretary to prepare budgets and work programmes for the years 2024 and 2025, based on the projected needs, for two budget scenarios:

    (a) A zero-nominal-growth scenario based on the 2023 approved budget;

    (b) A scenario based on recommended adjustments to the zero-nominal-growth scenario, indicating the added costs or savings related thereto;

14. To stress the need to continue to ensure that the budget proposals are realistic and represent the agreed priorities of all parties to help to ensure a sustainable and stable fund and cash balance, including contributions.

Annex to draft decision XXXIV/24

Table A
Approved revised 2022, 2023 and noted 2024 budgets
(United States dollars)

Budget line	*Cost category*	*2022*	*2023*	*2024*	
		Approved Revised	*Approved*	*Zero nominal growth*	*Proposed*
1100	**Employee salaries, allowances and benefits**	1 371 985	1 725 000	1 759 500	1 759 500
1200	**Consultants**	80 551	85 000	85 000	85 000
1300	**Meeting costs**				
1321	Conference services costs: Open-ended Working Group meetings	649 620	730 000	610 000	610 000
1322	Conference services costs: preparatory meetings and meetings of the parties	859 800	663 000	676 000	676 000
1323	Communication costs of Article 5 assessment panel members and organizational costs of panel meetings	59 416	55 000	55 000	55 000
1324	Conference services costs: Bureau meetings	33 514	25 000	25 000	25 000
1325	Conference services costs: Implementation Committee meetings	210 714	125 000	125 000	125 000
5401	Hospitality	24 785	25 000	25 000	25 000
	Subtotal: meeting costs	**1 837 849**	**1 623 000**	**1 516 000**	**1 516 000**
3300	**Travel of Article 5 parties and experts**				
3301	Travel of Article 5 parties: assessment panel meetings	252 648	350 000	350 000	350 000
3302	Travel of Article 5 parties: preparatory meetings and meetings of the parties	468 286	400 000	400 000	400 000
3303	Travel of Article 5 parties: Open-ended Working Group meetings	430 142	365 000	365 000	365 000
3304	Travel of Article 5 parties: Bureau meetings	15 000	15 000	15 000	15 000
3305	Travel of Article 5 parties: Implementation Committee meetings	62 802	65 000	65 000	65 000
	Subtotal: travel of Article 5 parties and experts	**1 228 878**	**1 195 000**	**1 195 000**	**1 195 000**
1600	**Travel on official business**				
1601	Staff travel on official business	219 426	195 000	30 000	180 000
1602	Conference services staff travel on official business	13 656	15 000	-	15 000
	Subtotal: travel on official business	**233 082**	**210 000**	**30 000**	**195 000**

Budget line	*Cost category*	*2022*	*2023*	*2024*	
		Approved Revised	*Approved*	*Zero nominal growth*	*Proposed*
4100–5300	**Other operating costs**				
4100	Expendable equipment	4 219	15 000	7 000	15 000
4200	Non-expendable equipment	9 895	15 000	10 000	25 000
4300	Rental of premises	28 824	32 000	32 000	32 000
5100	Operation and maintenance of equipment	9 756	20 000	20 000	20 000
5200	Reporting costs	69 986	75 000	30 500	75 000
5300	Sundry	15 245	20 000	-	20 000
	Subtotal: other operating costs	**137 925**	**177 000**	**99 500**	**187 000**
5201	**Public awareness and communication**	**57 292**	**55 500**	**25 000**	**65 000**
	Total direct costs	**4 947 562**	**5 070 500**	**4 710 000**	**5 002 500**
	Programme support costs	643 183	659 165	612 300	650 325
	Grand total	**5 590 745**	**5 729 665**	**5 322 300**	**5 652 825**
	Additional activities funded from the cash balance				
5201-7	Communication campaign	26 312	30 000	30 000	30 000
5201-8	Digital tools: enhancements	37 500	40 000	40 000	40 000
5201-9	Communication toolkit		7 500		
5201-10	Assessment Panel report -design		2 000		
5407	Temp Website Officer (P3)	(8 195)			
5409	UNV Science	18 109			
5411	Registration & Contacts Management System	24 800			
5413	Conference services costs & travel of Article 5 parties – ExMOP5	135 442			
3306	Conference services costs & travel of Article 5 parties – Energy Efficiency Workshop		140 000		
3307	Conference services costs & travel of Article 5 parties – Institutional Processes Workshop		140 000		
	Total direct costs – additional activities	**233 968**	**359 500**	**70 000**	**70 000**
	Programme support costs	30 416	46 735	9 100	9 100
	Total additional activities	**264 384**	**406 235**	**79 100**	**79 100**
	Grand total	**5 855 129**	**6 135 900**	**5 401 400**	**5 731 925**

Appendix to table A

Explanatory notes for the 2023 budget of the Trust Fund for the Montreal Protocol on Substances that Deplete the Ozone Layer

Cost category	*Budget line*	*Notes*
Employee salaries, allowances and benefits	1100	The estimates under this category has been increased by two per cent over the approved 2022 budget to allow for inflation. The costs of the existing United Nations volunteers, to support the work of the Secretariat, are included in this category. The category also includes other costs directly related to staff (e.g., medical services, stress counselling, host country services and security).
Consultants	1200	The estimate for consultants remains at the level of the 2022 approved amount.

Cost category	*Budget line*	*Notes*
Meeting costs	1300	This category includes venue costs, editing and translation of meeting documents, interpretation during the meeting, report writing and meeting platform to allow online participation. Conference servicing staff time and travel costs are also included in this category.
	1321	The estimates for the forty-fifth meeting of the Open-ended Working Group are based on: (a) the quote for the venue received from the International Civil Aviation Organisation in Montreal; and (b) the quote for the documentation received from the Division of Conference Services of the United Nations Office at Nairobi.
	1322	The estimates for the Thirty-Fifth Meeting of the Parties have been increased by $13,000 from the approved 2022 budget. The cost is based on the quote received from the Division of Conference Services of the United Nations Office at Nairobi. As the hosting arrangements are not known at the time of preparing and approving the budget, it is assumed that the meeting will be held at the seat of the Secretariat, Nairobi.
	1323	Communications and meeting costs for the assessment panels, associated technical options committees and subsidiary bodies are maintained at the level of the 2022 approved amount. The budget is used for the organization of meetings and for an allowance to co-chairs from Article 5 parties to cover communication costs related to the work of assessment panels.
	1324	The budget for the meeting of the Bureau of the Thirty-Fourth Meeting of the Parties is kept at the same level as the 2022 approved amount owing to uncertainty regarding the translation and interpretation requirements.
	1325	The proposed budget for Implementation Committee meetings in 2023 includes the cost of two meetings, one held back to back with forty-fifth meeting of the Open-ended Working Group and the other held back to back with the Thirty-Fifth Meeting of the Parties. The budget amount is kept at the same level as the 2022 approved amount.
	5401	The hospitality cost covers receptions at the meeting of the Open-ended Working Group and the Meeting of the Parties and has been maintained at the level of the 2022 approved amount.
Travel of Article 5 participants	3300	The participation of representatives of parties operating under paragraph 1 of Article 5 and countries with economies in transition in various Montreal Protocol meetings is budgeted at $6,500 per representative per meeting calculated on the basis of economy-class fares using the most direct and economical route and United Nations daily subsistence allowances.
	3301	The cost of travel by experts to meetings of the assessment panels has been decreased by $30,000, as 2023 is not an assessment year.
	3302	The cost of travel by representatives to the Thirty-Fifth Meeting of the Parties is kept at the level of the approved 2022 amount.
	3303	The cost of travel by representatives to the forty-fifth meeting of the Open-ended Working Group is kept at the level of the approved 2022 amount.
	3304	Includes the cost of travel of Bureau members to the Bureau meeting and to the Thirty-Fourth Meeting of the Parties, kept at the level of the approved 2022 amount.
	3305	Includes the cost of travel of Implementation Committee members from Article 5 countries to participate in its seventy and seventy-one meetings, to be held back to back with the forty-fifth meeting of the Open-ended Working Group and the Thirty-Fifth Meeting of the Parties, respectively. The budget has been kept at the level of the approved 2022 amount.

Cost category	*Budget line*	*Notes*
Travel on official business	1600	The budget includes travel by Secretariat staff to organize and/or participate in meetings of the Montreal Protocol and other relevant meetings, such as the meetings of the ozone officers under the regional networks of the OzonAction programme, to provide substantive support for meetings of importance to the ongoing work of the Secretariat to implement the decisions and requests of the parties.
	1601–1602	Staff travel budget line has been increased by $15,000 while the Conference Service staff travel is maintained at the level of 2022 approved amount
Other operating costs	4100–5300	The category includes expendable/non-expendable equipment, the rental of office premises, the operation and maintenance of equipment, reporting costs, sundry costs, public awareness campaigns and communication.
	4100	The budget includes the cost of software licences, stationery, office supplies and consumables. The cost has been decreased by $3,000 from 2022 approved amount.
	4200	This budget line provides for the cost of computers, peripherals and furniture. The cost has been decreased by $10,000 from 2022 approved amount.
	4300	The rental cost for the Secretariat's offices in Nairobi has been maintained at the level of the 2022 approved amount.
	5100	For the operation and maintenance of equipment, the budget includes the service-level agreements for printers and photocopying machines, information technology support provided by the United Nations Office at Nairobi, and insurance of equipment. The cost is at the same level as for 2022.
	5200	The reporting costs include reporting and coverage at the forty-fifth meeting of the Open-ended Working Group and the Thirty-Fifth Meeting of the Parties; assessment panel reports; ad hoc translation and editing of documents not related to meetings; and publications. The cost is at the same level as for 2022.
	5300	The sundry budget includes telecommunication costs, freight costs and staff training costs. The cost has been decreased by $5,000 from 2022 approved amount.
Public awareness and communication	5201	Includes website and web tools maintenance and hosting, awareness-raising campaigns, visual materials and the World Ozone Day celebration.
Additional activities funded by cash balance	5201-7 5201-10	The budget will be used for: (i) Awareness-raising campaigns to complement the funds under the core budget; (ii) Enhancement & maintenance of existing digital tools; (iii) Communication toolkit; and (iv) Design of Assessment Panel report
	3306 – 3307	The budget will cover the costs for meeting servicing and travel of A5 parties to the two workshops

Table B

Parties' contributions to the Trust Fund for the Montreal Protocol on Substances that Deplete the Ozone Layer

(United States dollars)

(Pursuant to General Assembly resolution 76/238 of 24 December 2021, with a maximum assessment rate of 22 per cent)

	Name of party	*Adjusted United Nations Scale with 22 per cent maximum assessment rate considered*	*2023 contributions by the parties*	*2024 contributions by the parties equal to the zero nominal growth budget*	*2024 contributions by the parties equal to the proposed budget*
1	Afghanistan	-	-	-	-
2	Albania	-	-	-	-
3	Algeria	0.109	3 456	5 801	6 162
4	Andorra	-	-	-	-
5	Angola	-	-	-	-
6	Antigua and Barbuda	-	-	-	-
7	Argentina	0.718	22 763	38 214	40 587
8	Armenia	-	-	-	-
9	Australia	2.107	66 800	112 141	119 105
10	Austria	0.678	21 495	36 085	38 326
11	Azerbaijan	-	-	-	-
12	Bahamas	-	-	-	-
13	Bahrain	-	-	-	-
14	Bangladesh	-	-	-	-
15	Barbados	-	-	-	-
16	Belarus	-	-	-	-
17	Belgium	0.827	26 219	44 015	46 749
18	Belize	-	-	-	-
19	Benin	-	-	-	-
20	Bhutan	-	-	-	-
21	Bolivia (Plurinational State of)	-	-	-	-
22	Bosnia and Herzegovina	-	-	-	-
23	Botswana	-	-	-	-
24	Brazil	2.010	63 725	106 978	113 622
25	Brunei Darussalam	-	-	-	-
26	Bulgaria	-	-	-	-
27	Burkina Faso	-	-	-	-
28	Burundi	-	-	-	-
29	Cabo Verde	-	-	-	-
30	Cambodia	-	-	-	-
31	Cameroon	-	-	-	-
32	Canada	2.624	83 191	139 657	148 330
33	Central African Republic	-	-	-	-
34	Chad	-	-	-	-
35	Chile	0.419	13 284	22 300	23 685
36	China	15.228	482 787	810 480	860 812
37	Colombia	0.246	7 799	13 093	13 906
38	Comoros	-	-	-	-
39	Congo	-	-	-	-
40	Cook Islands	-	-	-	-
41	Costa Rica	-	-	-	-
42	Côte d'Ivoire	-	-	-	-
43	Croatia	-	-	-	-
44	Cuba	-	-	-	-
45	Cyprus	-	-	-	-

	Name of party	*Adjusted United Nations Scale with 22 per cent maximum assessment rate considered*	*2023 contributions by the parties*	*2024 contributions by the parties equal to the zero nominal growth budget*	*2024 contributions by the parties equal to the proposed budget*
46	Czechia	0.339	10 748	18 043	19 163
47	Democratic People's Republic of Korea	-	-	-	-
48	Democratic Republic of Congo	-	-	-	-
49	Denmark	0.552	17 501	29 379	31 204
50	Djibouti	-	-	-	-
51	Dominica	-	-	-	-
52	Dominican Republic	-	-	-	-
53	Ecuador	-	-	-	-
54	Egypt	0.139	4 407	7 398	7 857
55	El Salvador	-	-	-	-
56	Equatorial Guinea	-	-	-	-
57	Eritrea	-	-	-	-
58	Estonia	-	-	-	-
59	Eswatini	-	-	-	-
60	Ethiopia	-	-	-	-
61	European Union	2.496	79 133	132 845	141 095
62	Fiji	-	-	-	-
63	Finland	0.416	13 189	22 141	23 516
64	France	4.311	136 676	229 444	243 693
65	Gabon	-	-	-	-
66	Gambia	-	-	-	-
67	Georgia	-	-	-	-
68	Germany	6.101	193 426	324 714	344 879
69	Ghana	-	-	-	-
70	Greece	0.324	10 272	17 244	18 315
71	Grenada	-	-	-	-
72	Guatemala	-	-	-	-
73	Guinea	-	-	-	-
74	Guinea-Bissau	-	-	-	-
75	Guyana	-	-	-	-
76	Haiti	-	-	-	-
77	Holy See	-	-	-	-
78	Honduras	-	-	-	-
79	Hungary	0.228	7 229	12 135	12 888
80	Iceland	-	-	-	-
81	India	1.042	33 035	55 458	58 902
82	Indonesia	0.548	17 374	29 166	30 978
83	Iran (Islamic Republic of)	0.370	11 730	19 693	20 916
84	Iraq	0.128	4 058	6 813	7 236
85	Ireland	0.438	13 886	23 312	24 759
86	Israel	0.560	17 754	29 805	31 656
87	Italy	3.184	100 945	169 462	179 986
88	Jamaica	-	-	-	-
89	Japan	8.019	254 234	426 795	453 300
90	Jordan	-	-	-	-

	Name of party	*Adjusted United Nations Scale with 22 per cent maximum assessment rate considered*	*2023 contributions by the parties*	*2024 contributions by the parties equal to the zero nominal growth budget*	*2024 contributions by the parties equal to the proposed budget*
91	Kazakhstan	0.133	4 217	7 079	7 518
92	Kenya	-	-	-	-
93	Kiribati	-	-	-	-
94	Kuwait	0.234	7 419	12 454	13 228
95	Kyrgyzstan	-	-	-	-
96	Lao People's Democratic Republic	-	-	-	-
97	Latvia	-	-	-	-
98	Lebanon	-	-	-	-
99	Lesotho	-	-	-	-
100	Liberia	-	-	-	-
101	Libya	-	-	-	-
102	Liechtenstein	-	-	-	-
103	Lithuania	-	-	-	-
104	Luxembourg	-	-	-	-
105	Madagascar	-	-	-	-
106	Malawi	-	-	-	-
107	Malaysia	0.347	11 001	18 468	19 615
108	Maldives	-	-	-	-
109	Mali	-	-	-	-
110	Malta	-	-	-	-
111	Marshall Islands	-	-	-	-
112	Mauritania	-	-	-	-
113	Mauritius	-	-	-	-
114	Mexico	1.219	38 647	64 879	68 908
115	Micronesia (Federated States of)	-	-	-	-
116	Monaco	-	-	-	-
117	Mongolia	-	-	-	-
118	Montenegro	-	-	-	-
119	Morocco	-	-	-	-
120	Mozambique	-	-	-	-
121	Myanmar	-	-	-	-
122	Namibia	-	-	-	-
123	Nauru	-	-	-	-
124	Nepal	-	-	-	-
125	Netherlands	1.375	43 593	73 182	77 726
126	New Zealand	0.308	9 765	16 393	17 411
127	Nicaragua	-	-	-	-
128	Niger	-	-	-	-
129	Nigeria	0.182	5 770	9 687	10 288
130	Niue	-	-	-	-
131	North Macedonia	-	-	-	-
132	Norway	0.678	21 495	36 085	38 326
133	Oman	0.111	3 519	5 908	6 275
134	Pakistan	0.114	3 614	6 067	6 444
135	Palau	-	-	-	-

	Name of party	*Adjusted United Nations Scale with 22 per cent maximum assessment rate considered*	*2023 contributions by the parties*	*2024 contributions by the parties equal to the zero nominal growth budget*	*2024 contributions by the parties equal to the proposed budget*
136	Panama	-	-	-	-
137	Papua New Guinea	-	-	-	-
138	Paraguay	-	-	-	-
139	Peru	0.163	5 168	8 675	9 214
140	Philippines	0.212	6 721	11 283	11 984
141	Poland	0.836	26 504	44 494	47 258
142	Portugal	0.352	11 160	18 735	19 898
143	Qatar	0.269	8 528	14 317	15 206
144	Republic of Korea	2.570	81 479	136 783	145 278
145	Republic of Moldova	-	-	-	-
146	Romania	0.311	9 860	16 552	17 580
147	Russian Federation	1.863	59 064	99 155	105 312
148	Rwanda	-	-	-	-
149	Saint Kitts and Nevis	-	-	-	-
150	Saint Lucia	-	-	-	-
151	Saint Vincent and the Grenadines	-	-	-	-
152	Samoa	-	-	-	-
153	San Marino	-	-	-	-
154	Sao Tome and Principe	-	-	-	-
155	Saudi Arabia	1.182	37 474	62 910	66 816
156	Senegal	-	-	-	-
157	Serbia	-	-	-	-
158	Seychelles	-	-	-	-
159	Sierra Leone	-	-	-	-
160	Singapore	0.503	15 947	26 771	28 434
161	Slovakia	0.155	4 914	8 250	8 762
162	Slovenia	-	-	-	-
163	Solomon Islands	-	-	-	-
164	Somalia	-	-	-	-
165	South Africa	0.244	7 736	12 986	13 793
166	South Sudan	-	-	-	-
167	Spain	2.130	67 529	113 365	120 405
168	Sri Lanka	-	-	-	-
169	State of Palestine	-	-	-	-
170	Sudan	-	-	-	-
171	Suriname	-	-	-	-
172	Sweden	0.870	27 582	46 304	49 180
173	Switzerland	1.132	35 889	60 248	63 990
174	Syrian Arab Republic	-	-	-	-
175	Tajikistan	-	-	-	-
176	Thailand	0.367	11 635	19 533	20 746
177	Timor-Leste	-	-	-	-
178	Togo	-	-	-	-
179	Tonga	-	-	-	-
180	Trinidad and Tobago	-	-	-	-

	Name of party	*Adjusted United Nations Scale with 22 per cent maximum assessment rate considered*	*2023 contributions by the parties*	*2024 contributions by the parties equal to the zero nominal growth budget*	*2024 contributions by the parties equal to the proposed budget*
181	Tunisia	-	-	-	-
182	Turkey	0.844	26 758	44 920	47 710
183	Turkmenistan	-	-	-	-
184	Tuvalu	-	-	-	-
185	Uganda	-	-	-	-
186	Ukraine	-	-	-	-
187	United Arab Emirates	0.634	20 100	33 743	35 839
188	United Kingdom of Great Britain and Northern Ireland	4.368	138 483	232 478	246 915
189	United Republic of Tanzania	-	-	-	-
190	United States of America	21.958	696 155	1 168 671	1 241 247
191	Uruguay	-	-	-	-
192	Uzbekistan	-	-	-	-
193	Vanuatu	-	-	-	-
194	Venezuela (Bolivarian Republic of)	0.175	5 548	9 314	9 892
195	Vietnam	-	-	-	-
196	Yemen	-	-	-	-
197	Zambia	-	-	-	-
198	Zimbabwe	-	-	-	-
	Total	**100.00**	**3 170 390**	**5 322 300**	**5 652 825**

MOP 34 FINAL

IISD Earth Negotiations Bulletin

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Summary of the 34th Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer: 31 October – 4 November 2022

As parties to the Montreal Protocol on Substances that Delete the Ozone Layer celebrated the 35th anniversary of one of the world's most successful environmental treaties, their work at the 34th Meeting of the Parties (MOP 34) demonstrated their commitment to building on their achievements and evolving to meet new challenges. Delegates worked intensively throughout the week, making use of every available minute for work in plenary, contact groups, and bilateral consultations on weighty issues. While many of the issues required extensive negotiation and, in some cases, significant compromise, by the end of the meeting, parties were able to reach agreement on elements of every issue on the MOP 34 agenda.

Parties adopted 24 decisions, including on:

- illegal import of certain refrigeration, air-conditioning, and heat pump products and equipment;
- identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring;
- collecting data to understand potential impacts of the COVID-19 pandemic on hydrofluorocarbon (HFC) consumption in developing countries;
- strengthening institutional processes with respect to information on HFC-23 by-product emissions;
- strengthening Montreal Protocol institutions, including for combatting illegal trade;
- ongoing emissions of carbon tetrachloride (CTC);
- critical-use exemptions (CUEs) for methyl bromide;
- stocks and quarantine and pre-shipment uses of methyl bromide;
- enabling enhanced access and facilitating the transition to energy-efficient and low or zero-global-warming-potential (GWP) technologies; and
- financial reports and budgets.

After extensive negotiations that ran into the early hours of Saturday morning, delegates also adopted the terms of reference for the study on the replenishment of the Multilateral Fund (MLF) for 2024-2026, which will allow the Technology and Economic Assessment Panel (TEAP) to establish a Replenishment Task Force and begin laying the groundwork for replenishment negotiations at MOP 35.

Delegates were buoyed throughout the week by the light jokes of the Open-ended Working Group (OEWG) Co-Chairs presiding over the preparatory segment. Their enthusiastic and good-humored approach to facilitating discussions offered moments of comic relief during complex negotiations on highly technical issues.

The work of the Protocol's expert panels, which are regarded as central to the instrument's success, provided the foundation for negotiations. Their previews of their 2022 quadrennial assessment reports also provided compelling insights into future work, including highlighting potential connections to a wide range of issue areas, such as food security, plastic pollution, and ecosystem health.

MOP 34 convened from 31 October – 4 November 2022 in Montreal, Canada. Over 500 people participated. While most delegates attended the meeting in person, a small number of parties and observers followed the proceedings online due to the ongoing COVID-19 pandemic.

A Brief History of the Ozone Regime

Concerns that the Earth's stratospheric ozone layer could be at risk from chlorofluorocarbons (CFCs) and other anthropogenic substances first arose in the early 1970s. At that time, scientists warned that releasing these substances into the atmosphere could deplete the ozone layer, hindering its ability to prevent harmful ultraviolet (UV) rays from reaching the Earth. This would adversely affect ocean ecosystems, agricultural productivity, and animal populations, and harm humans through higher rates of skin cancers, cataracts, and weakened immune systems. In response, a UN

In this Issue

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Environment Programme (UNEP) conference held in March 1977 adopted a World Plan of Action on the Ozone Layer and established a Coordinating Committee to guide future international action.

Vienna Convention: Negotiations on an international agreement to protect the ozone layer were launched in 1981 under the auspices of UNEP. In March 1985, the Vienna Convention for the Protection of the Ozone Layer was adopted. It calls for cooperation on monitoring, research, and data exchange, but does not impose obligations to reduce the use of ozone-depleting substance (ODS). The Convention has 198 parties, which represents universal ratification.

Montreal Protocol: In September 1987, efforts to negotiate binding obligations to reduce ODS usage led to the adoption of the Montreal Protocol, which entered into force in January 1989. The Montreal Protocol introduced control measures for some CFCs and halons for developed countries (non-Article 5 parties). Developing countries (Article 5 parties) were granted a grace period, allowing them to increase their ODS use before taking on commitments. The Protocol has been ratified by 198 parties.

Since 1987, several amendments and adjustments have been adopted, adding new obligations and additional ODS and adjusting existing control schedules. Amendments require ratification by a certain number of parties before they enter into force; adjustments enter into force automatically. All amendments except the newest, the Kigali Amendment, have been ratified by 197 parties.

Key Turning Points

London Amendment and Adjustments: At the second MOP, held in London, UK, in 1990, delegates tightened control schedules and added ten more CFCs to the list of ODS, as well as CTC and methyl chloroform. MOP 2 also established the MLF, which meets the incremental costs incurred by Article 5 parties in implementing the Protocol's control measures and finances clearinghouse functions. The Fund is replenished every three years.

Copenhagen Amendment and Adjustments: At MOP 4, held in Copenhagen, Denmark, in 1992, delegates tightened existing control schedules and added controls on methyl bromide, hydrobromofluorocarbons, and hydrochlorofluorocarbons (HCFCs). MOP 4 also agreed to enact non-compliance procedures. It established an Implementation Committee (ImpCom) to examine possible non-compliance and make recommendations to the MOP aimed at securing full compliance.

Montreal Amendment and Adjustments: At MOP 9, held in Montreal, Canada, in 1997, delegates agreed to: a new licensing system for importing and exporting ODS, in addition to tightening existing control schedules; and banning trade in methyl bromide with non-parties to the Copenhagen Amendment.

Beijing Amendment and Adjustments: At MOP 11, held in Beijing, China, in 1999, delegates agreed to controls on bromochloromethane, additional controls on HCFCs, and reporting on methyl bromide for quarantine and pre-shipment applications.

Kigali Amendment: At MOP 28, held in Kigali, Rwanda, in 2016, delegates agreed to amend the Protocol to include HFCs as part of its ambit and to set phase-down schedules for HFCs. HFCs are produced as replacements for HCFCs and thus a result of ODS phase-out. HFCs are not a threat to the ozone layer but have a high GWP. To date, 141 parties to the Montreal Protocol have ratified the Kigali Amendment, which entered into force on 1 January 2019.

Recent Meetings

MOP 31: MOP 31 met in November 2019 in Rome, Italy. The MOP adopted several decisions, the most significant of which were on the terms of reference for the study on the 2021-2023 MLF replenishment, unexpected trichlorofluoromethane (CFC-11) emissions, and the areas of focus for the 2022 quadrennial assessment reports. MOP 31 also addressed: ongoing reported emissions of CTC; CUEs for methyl bromide; and issues of non-compliance. Parties were invited to sign the Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Management.

COP 12/MOP 32: Due to the COVID-19 pandemic, the first part of the 12th meeting of the Conference of the Parties to the Vienna Convention (COP 12) and MOP 32 convened online from 23-27 November 2020. Delegates addressed only those issues deemed essential, including the replenishment of the MLF for 2021-2023. Parties authorized the Secretariat to arrange an extraordinary MOP in 2021 to take a decision on the final programme and budget for 2021-23. MOP 32 also addressed: methyl bromide CUEs for 2021-2022; compliance and data reporting issues; and membership of the Montreal Protocol bodies and assessment panels.

ExMOP 4 and OEWG 43: The Fourth Extraordinary MOP to the Montreal Protocol (ExMOP 4) and OEWG 43, held on 21, 22 and 24 May 2021, convened online due to the COVID-19 pandemic. ExMOP 4 agreed to facilitate payments to the MLF to ensure its continued functioning during 2021. Parties agreed that any contributions made in advance of the 2021-2023 replenishment decision should count toward future contributions and should not affect the overall level of the replenishment or the agreed level of contributions by parties. OEWG 43 discussed the scope and content of guidance to the TEAP Replenishment Task Force on further work on its replenishment report. Parties agreed on an updated report, rather than a more comprehensive supplemental report.

COP 12/MOP 33: This combined meeting convened virtually from 23-29 October 2021, with a high-level segment on the last day. The meeting took key decisions related to monitoring of controlled substances and energy efficiency, as delegates requested the assessment panels to work out what would be needed to increase the monitoring capacities in regions where capacity is limited or altogether absent.

Delegates also continued work on what is becoming an increasing focus of the Montreal Protocol: low-GWP and energy-efficient technologies. The meeting considered two draft decisions, which addressed: trading of soon-to-be obsolete technologies that could be a threat to the future implementation of the Kigali Amendment and broadening the list of sectors required to implement more energy-efficient technologies. The meeting also adopted 18 decisions on administrative and technical matters, including: replenishment of the MLF; financial reports and budgets of the trust funds for the Vienna Convention and Montreal Protocol; compliance and reporting; membership of Montreal Protocol bodies; and recommendations of the Ozone Research Managers of the Vienna Convention.

ExMOP 5 and OEWG 44: The Fifth Extraordinary MOP to the Montreal Protocol (ExMOP 5) and OEWG 44 convened in Bangkok, Thailand, from 11-16 July 2022. ExMOP 5 adopted decisions on the replenishment of the MLF for the triennium 2021-2023 and extension of the fixed-exchange-rate mechanism to the 2021-2023 replenishment. OEWG 44 addressed issues including

terms of reference for a study of MLF replenishment needs in the 2024-2026 triennium; energy efficiency; ongoing emissions of CTC; potential restructuring of the TEAP's technical options committees; and a proposal from African states to address dumping of inefficient refrigeration and air-conditioning appliances.

Preparatory Segment Report

OEWG Co-Chairs Martin Sirois (Canada) and Osvaldo Álvarez-Pérez (Chile) opened the preparatory segment on Monday, 31 October. Highlighting that 2022 marks the 35th anniversary of the Montreal Protocol and the 50th anniversary of the Stockholm Conference on the Human Environment, Megumi Seki, Executive Secretary, Ozone Secretariat, welcomed participants to Montreal. She stressed that the "ozone family" can contribute to environmental governance by distilling and analyzing lessons to provide targeted information on global issues. She noted that the Secretariat is supporting the ongoing process to establish a science-policy panel for the sound management of chemicals and waste and prevention of pollution.

Organizational Matters

Adoption of the Agenda of the Preparatory Segment: On Monday, Co-Chair Álvarez-Pérez introduced the proposed agenda (UNEP/OzL.Pro.34/1). ARMENIA proposed, and delegates agreed, to add an item on the distribution of seats in the Executive Committee to the MLF (ExCom). Parties adopted the agenda as amended.

Organization of Work: Co-Chair Sirois outlined, and delegates adopted, the proposed organization of work for the preparatory segment.

Administrative Matters

Budget of the Trust Fund for the Montreal Protocol and Financial Reports: On Monday, Co-Chair Sirois introduced this item (UNEP/ OzL.Pro.34/2; 34/4; 34/INF/1; 34/INF/2; 34/5). A budget committee, chaired by Nicole Folliet (Canada), met throughout the week.

On Friday morning, Chair Folliet reported to plenary that the group had agreed to the Secretariat's recommended 2023 budget with three changes, including a USD 16,000 increase to cover higher travel costs, a placeholder for two potential workshops on energy efficiency and strengthening institutional processes to combat illegal trade at USD 130,000 each from the cash balance, and a shift of USD 9,500 from the core budget to the cash balance for two one-off communications projects.

On the decision text, she outlined the two changes to the preamble that: explain the higher cash balance due to lower utilization rate during the pandemic; and recognize that maintaining the level of contributions at the 2023 level will result in a significant reduction in the cash balance.

On operative paragraphs, she noted an addition to reflect the revised 2022 budget, placeholder text should the workshops be approved by parties at MOP 34, and a clarification to the Secretariat that in preparing a zero nominal growth budget, it should be against the 2023 budget rather than 2019.

Parties agreed to entrust the Secretariat with making necessary adjustments to the placeholder text depending on the outcome of negotiations on the workshops in relevant contact groups, and to forward the draft decision to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.14), MOP 34, *inter alia*:

- approves the revised budget, including the additional activities, of USD 5,855,129 for 2022 and the budget of USD 5,729,665 for 2023, and takes note of the indicative budget for 2024;
- authorizes the Executive Secretary, on an exceptional basis, to draw upon the available cash balance for 2022 in an amount of up to USD 406,235 for specific activities, including an indicative amount for workshops in 2023 as called for in the decisions on energy efficiency and strengthening institutional processes to combat illegal trade, provided that the cash balance is not reduced below the working capital reserve;
- approves the contributions to be paid by the parties in the amount of USD 3,170,390 for 2023 and takes note of the contributions for 2024;
- authorizes the Secretariat to draw down from the cash balance the funds required to cover the shortfall between the level of contributions agreed upon in the present decision and the approved budget for 2023;
- reaffirms that a working capital reserve shall be maintained at a level of 15% of the annual budget, to be used to meet the final expenditures under the Trust Fund, noting that the working capital reserve shall be set aside from the existing cash balance;
- requests the Secretariat to ensure the full utilization of the programme support resources available to it in 2023 and in later years and, where possible, to offset programme support resources against the administrative components of the approved budget; and
- requests the Executive Secretary to prepare budgets and work programmes for the years 2024 and 2025, based on the projected needs, for two budget scenarios: zero-nominal-growth based on the 2023 approved budget and a scenario based on recommended adjustments to the zero-nominal-growth scenario.

Consideration of the Membership of the Montreal Protocol Bodies for 2023: Co-Chair Álvarez-Pérez introduced this agenda item (UNEP/OzL.Pro.34/2; 34/3) on Monday, urging regional consultations and submission of nominations for the ImpCom, ExCom, and Co-Chairs of the OEWG as early as possible. On Friday morning, the Secretariat reported it had received nominations from regional consultations for the Montreal Protocol bodies and OEWG Co-Chairs, and parties agreed the nominations would be forwarded to the high-level segment. In the evening, the high-level segment adopted the related decisions.

Final Decisions: Members of the Implementation Committee: In its decision (UNEP/OzL.Pro.34/L.2), MOP 34:

- confirms the positions of China, Costa Rica, Egypt, Poland, and the US as members of the ImpCom for one additional year and selects Chile, Lebanon, Netherlands, Senegal, and Suriname as members of the Committee for a two-year period beginning on 1 January 2023; and
- notes the selection of Gene Smilansky (US) to serve as President and Osvaldo Álvarez-Pérez (Chile) to serve as Vice President and Rapporteur of the Committee for one year beginning on 1 January 2023.

Members of the Executive Committee of the Multilateral Fund: In its decision (UNEP/OzL.Pro.34/L.2), MOP 34:

- endorses the selection of Brazil, Burkina Faso, China, Cuba, Ghana, Kenya, and Kuwait as members of the ExCom representing Article 5 parties and the selection of Australia, Belgium, Estonia, Finland, Italy, Japan, and the US as members representing non-Article 5 parties for one year beginning 1 January 2023; and
- notes the selection of Annie Gabriel (Australia) to serve as Chair and Matheus Bastos (Brazil) to serve as Vice-Chair of the ExCom for one year beginning 1 January 2023.

Co-Chairs of the Open-Ended Working Group: In its decision (UNEP/OzL.Pro.34/L.2), MOP 34 endorses the selection of Ralph Brieskorn (Netherlands) and Ameh Djossou (Togo) as Co-Chairs of the OEWG in 2023.

Terms of Reference for the Study on the MLF Replenishment for the Triennium 2024-2026

Co-Chair Sirois introduced this item (UNEP/OzL.Pro.34/2; WG.1/44/4) on Monday, proposing that the contact group established at OEWG 44, chaired by Samuel Paré (Burkina Faso) and Cindy Newberg (US), be reestablished and use the draft text forwarded from OEWG 44 as a starting point for discussions. Parties agreed.

The contact group met throughout the week, closing to non-parties on Wednesday.

On Friday morning, Co-Facilitator Paré reported good progress in the contact group and said he and Co-Facilitator Newberg were working informally to ensure consensus would be reached. He requested additional time to consolidate ideas and finish work.

On Friday evening, Co-Facilitator Newberg expressed confidence that the Terms of Reference could be completed that night and encouraged parties to continue bilateral consultations.

Early Saturday morning, Co-Facilitator Newberg reported to the preparatory segment that the group had completed its work and thanked parties for their willingness to consult in the margins of the meeting and find creative solutions to work through very difficult issues. Delegates agreed to forward the draft decision to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.15), MOP 34 requests the TEAP to prepare a report for submission to MOP 35, and to submit it through OEWG 45 to enable MOP 35 to adopt a decision on the appropriate level of the 2024-2026 replenishment of the MLF.

MOP 34 also requests that, in preparing the report, the TEAP should take into account, among other things:

- all control measures and relevant decisions agreed upon by the parties to the Montreal Protocol and the ExCom, including paragraphs 9 through 25 of decision XXVIII/2, and the decisions of MOP 34 and the ExCom at its meetings, up to and including ExCom 92, insofar as those decisions will necessitate expenditure by the MLF during the period 2024-2026;
- the special needs of low volume-consuming and very low volume-consuming countries;
- the need to allocate resources to enable all Article 5 parties to comply with Articles 2A-2J of the Protocol, and the reductions and extended commitments made by Article 5 parties under approved HCFC phase-out management plans (HPMPs) and Kigali HFC implementation plans (KIPs);
- decisions, rules and guidelines agreed by the ExCom at all its meetings, up to and including ExCom 92, in determining eligibility for the funding of investment projects and non-investment projects;
- the need to allocate resources for activities to maintain and/or enhance energy efficiency while phasing down HFCs including those relating to pilot/demonstration projects in accordance with any energy efficiency cost guidance developed by the ExCom or, should the ExCom not adopt cost guidance in time to be considered in the report, for a scenario for a funding window to support such activities;
- the need to allocate resources for supporting activities related to gender mainstreaming as part of the gender policy of the MLF, taking into account the implementing agencies' existing policies to promote gender mainstreaming and the mandate as per ExCom decision 84/92;
- the need to allocate resources for a funding window for activities to support end-of-life management and disposal of controlled substances in an environmentally sound manner in accordance with any relevant decisions by the ExCom or, should the ExCom not adopt relevant decisions in time to be considered in the report, for a scenario for funding a limited number of demonstration projects; and
- a scenario to increase funding for institutional strengthening and the compliance assistance programme to assist Article 5 parties to strengthen their national capacities to address challenges associated with implementing the Kigali Amendment.

MOP 34 also decides that:

- in estimating the funding requirement associated with the HCFC and HFC targets, the TEAP will use a clearly explained compliance-based methodology that is informed by but independent of the business plan of the MLF, taking into account policy guidance provided by the MOP and/or the ExCom;
- the TEAP should provide indicative figures associated with enabling Article 5 parties to implement HPMPs and KIPs in a coordinated manner. Indicative figures should be provided for a range of typical scenarios, using all relevant data available to the TEAP;
- in preparing the report, the TEAP should consult widely, including all relevant persons and institutions and other relevant sources of information deemed useful;
- the TEAP should strive to complete the report in good time to enable it to be distributed to all parties two months before OEWG 45; and
- the TEAP should provide indicative figures for the periods 2027-2029 and 2030-2032 to support a stable and sufficient level of funding, on the understanding that those figures will be updated in subsequent replenishment studies.

Energy Efficiency

Response to the TEAP report on decision XXXIII/5 on the Continued Provision of Information on Energy-Efficient and Low-Global-Warming-Potential Technologies: Co-Chair Álvarez-Pérez introduced this item on Monday (UNEP/OzL.Pro.34/2; WG.1/44/4; Report of the TEAP, May 2022, Volume 3: Decision XXXIII/5), noting the contact group at OEWG 44 developed a list of feedback and ideas in response to the report by the TEAP (UNEP/OzL.Pro.34/2).

The US, on behalf of Norway, Canada, and the UK, introduced a conference room paper (CRP) (UNEP/OzL.Pro.34/CRP.4) which, among other things: requests specific information and updates from the TEAP in its 2023 progress report and quadrennial assessment reports; requests a Secretariat report on existing policies; and encourages parties to take domestic action.

FEDERATED STATES OF MICRONESIA introduced a draft text (UNEP/OzL.Pro.34/CRP.6) that included a request to the TEAP for regular reporting and asks for further support for knowledge-building.

Parties agreed to reestablish OEWG 44's contact group on energy efficiency, co-facilitated by Annie Gabriel (Australia) and Bitul Zulhasni (Indonesia). The contact group met on Monday, Wednesday, and Friday.

On Friday morning, Co-Facilitator Gabriel reported agreement on some elements of the draft joint decision combining the two CRPs and requested additional time for the remaining work. On Friday evening, Co-Facilitator Gabriel reported the group had completed work on a number of additional paragraphs, but bracketed text remained. She requested additional time to meet.

On Friday night, Co-Facilitator Gabriel introduced a revised draft decision, which parties agreed to forward to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.6/Rev.1) MOP 34 requests the TEAP to include in its 2023 progress report:

- information on enhancements in energy efficiency associated with improvements in appliance foams;
- updates relating to the availability, accessibility, electrical compatibility, and cost of energy efficient products and equipment containing low or zero GWP refrigerants in the refrigeration, air-conditioning and heat pump sectors;
- information on testing equipment and procedures for validation of energy efficiency claims to enforce minimum energy efficiency standards and labels, and information on voluntary labeling programmes;
- information on barriers to consumer and business acceptance of the adoption of more energy-efficient products and equipment containing low or zero GWP refrigerants, including barriers related to electrical compatibility of such products and equipment, and possible solutions for sustainable transition to such products and equipment;
- analysis of the potential benefits of introducing more energy efficient refrigeration, air-conditioning and heat pump equipment, including costs and related climate benefits while phasing down HFCs; and
- information on the range of, and trends, in GWP and energy efficiency of refrigeration, air-conditioning and heat pump equipment, for which there is available data.

In the decision, MOP 34 also requests the TEAP to integrate updates on energy efficiency while phasing down HFCs in the refrigeration, air conditioning and heat pump sectors in its progress and quadrennial assessment reports from 2023 onwards.

MOP 34 also:

- requests the ExCom to take into consideration information prepared by the TEAP in the preparation and finalization of the energy efficiency cost guidance in the context of the Kigali Amendment and to report on its progress in the context of the ExCom Chair's annual report to the MOP;
- requests the ExCom to continue to support activities to maintain and enhance energy efficiency while phasing down HFCs in countries wishing to do so;
- requests the Secretariat to organize a one-day workshop in 2023 back-to-back with the MOP to share information, experiences and lessons learned, and assess challenges related to ways of improving availability and accessibility of energy efficient equipment and equipment using low or zero GWP alternatives during the implementation of the Kigali Amendment;
- requests the Secretariat to prepare a report of existing policies addressing the interlinkages between phasing down HFCs and enhancing energy efficiency;
- encourages parties to enhance coordination between domestic energy and ozone officials to enhance energy efficiency while phasing down HFCs;
- encourages parties to support upgrading domestic servicing including related certification programmes, including technician training to maintain and/or to enhance energy efficiency, reduce refrigerant leaks, and ensure proper installation and maintenance, including related certification programmes of refrigeration, air-conditioning and heat-pump equipment; and
- encourage parties, when phasing down HFCs, to take into account, as appropriate, the information contained in Volume 3 of the TEAP 2022 report responding to decision XXXIII/5.

Dumping of New and Old Inefficient Refrigeration and Air-Conditioning Appliances: Co-Chair Álvarez-Pérez introduced this item on Monday (UNEP/OzL.Pro.34/2; WG.1/44/4), explaining that the draft decision had been updated following discussions at OEWG 44. GHANA, on behalf of the African States, introduced a revised draft decision (UNEP/OzL.Pro.34/CRP.2). He said that policies to curb dumping are not interchangeable with institutional strengthening to respond to dumping, emphasizing that neither is adequate alone.

Parties agreed to establish a contact group, co-facilitated by Cornelius Rhein (EU) and Tumau Herownna Neru (Samoa). It met on Tuesday, Wednesday, and Friday.

On Friday morning, Co-Facilitator Rhein reported progress on compromise text but, given remaining brackets, requested additional time to reach agreement on the final text. On Friday evening, he reported that the group had reached agreement on a "very short" draft decision, as it had run out of time to consider the full decision text. He said the group had agreed on the core element of the proposal, which aims to generate information for consideration at OEWG 45.

On Friday night, Co-Facilitator Rhein proposed to change the title of the CRP from the name of the agenda item to "Illegal import of certain refrigeration, air conditioning and heat pump products and equipment." He explained that while the title had not been addressed in the contact group, this revised title would better reflect the content of the draft decision.

Parties agreed to forward the draft decision with the revised title to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.2/Rev.1), MOP 34 invites parties that have restricted the manufacture and/or import of certain refrigeration, air-conditioning and heat pump products and equipment containing or relying on controlled substances, including with respect to energy efficiency, and that do

not want to receive such products and equipment from other parties against payment or free of charge, to submit to the Secretariat by 1 May 2023 information on:

- the types of products and equipment concerned, including their Harmonized Item Description and Coding System codes, where applicable;
- the specific domestic restrictions on the controlled substances (i.e., the maximum GWP of HFCs permitted to be used) for each category of products and equipment;
- the minimum energy efficiency performance standard permitted under domestic legislation for each category of products and equipment; and
- any attempted illegal imports of such restricted products and equipment to their countries.

MOP 34 also decides to consider this issue at MOP 35 and include the item on the agenda of OEWG 45, taking into account the information requested under this decision.

Identification of Gaps in the Global Coverage of Atmospheric Monitoring of Controlled Substances and Options for Enhancing Such Monitoring

Co-Chair Sirois introduced this item on Monday (UNEP/OzL.Pro.34/2; 34/2/Add.1; WG.1/44/4), noting that at OEWG 44, the EU had presented a draft decision on identifying sources of emissions originating from industrial processes, but the contact group at that meeting had not had time to discuss it. He suggested, and parties agreed, to reestablish the contact group co-facilitated by Michel Gauvin (Canada) and Liana Ghahramanyan (Armenia) to pursue discussions on the proposal.

The contact group met on Tuesday, Wednesday, and Friday.

On Friday, Co-Facilitator Gauvin requested additional time for the contact group to address the EU's proposal. On Friday evening, the EU reported that it was consulting with interested parties on its CRP and was confident a result could be achieved in "a reasonably short time." The contact group was given additional time to conclude its work.

Later that evening, Co-Chair Álvarez-Pérez introduced the revised draft decision and parties agreed to forward the proposal to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.16), MOP 34 decides to request the TEAP to prepare a report for OEWG 45 on:

- chemical pathways in which substantial emissions of controlled substances are likely to occur;
- best practices available to control these emissions; and
- gaps in understanding the sources of emissions referred to in the first point of the decision.

Institutional Processes to Strengthen the Effective Implementation and Enforcement of the Montreal Protocol

On Monday, Co-Chair Sirois opened this item (UNEP/OzL.Pro.34/2; 34/8; WG.1/44/4), saying an informal group at OEWG 44 had produced an unprioritized list of ideas for further discussion at MOP 34.

AUSTRALIA, on behalf of Norway, the UK, and the US, introduced a draft decision (UNEP/OzL.Pro.34/CRP.7), outlining its two approaches: urging or encouraging parties to take certain actions that are consistent with previous decisions on CFCs and HCFCs, but apply those to HFCs; and also re-visiting the issue next year, including through a workshop.

The US, on behalf of Australia and the UK, introduced a draft decision (UNEP/OzL.Pro.34/CRP.5) requesting the TEAP to provide additional information on HFC-23 by-product emissions and prepare a report ahead of MOP 35.

Parties agreed to take up these two CRPs in the same contact group co-facilitated by Andrew Clark (US) and Miruza Mohamed (Maldives). The contact group met on Tuesday, Wednesday, and Friday.

On Friday morning, Co-Facilitator Clark introduced a revised draft decision on strengthening institutional processes with respect to HFC-23 by-product emissions and delegates agreed to forward it to the high-level segment for adoption. Co-Facilitator Clark explained the group needed additional time to discuss the draft decision on strengthening Montreal Protocol institutions. The group was given more time to meet.

On Friday evening, Co-Facilitator Clark reported the group had completed its work on their second draft decision, stating it had been titled "Strengthening Montreal Protocol institutions including for combating illegal trade." Parties agreed to forward the text to the high-level segment for adoption.

Final Decisions: In its decision (UNEP/OzL.Pro.34/CRP.5/Rev.1) on strengthening institutional processes with respect to information on HFC-23 by-product emissions, MOP 34 requests the TEAP to prepare a report for MOP 35 to include:

- information on the possible chemical pathways that could be used in the production of Annex C, Group I, or Annex F substances that may generate HFC-23 as a by-product;
- compilation of information on the amount of HFC-23 generation and emissions from facilities that manufacture Annex C, Group I, or Annex F substances, the reporting of which is required under Article 7 of the Montreal Protocol; and
- best practices available to control these emissions.

In its decision on strengthening Montreal Protocol institutions including for combating illegal trade (UNEP/OzL.Pro.34/CRP.7/Rev.1), MOP 34:

- urges parties that have not already done so to introduce into their national customs classification systems the separate subdivisions for HFCs and blends contained in the amendments to the Harmonized Commodity Description and Coding System adopted by the World Customs Organization in 2019 that entered into force on 1 January 2022, and use more specific classifications for controlled substances and blends containing controlled substances, where possible, to better identify and track imports and exports of controlled substances;
- encourages all parties to exchange information and strengthen joint efforts to improve means of identification, prevention and combating of illegal trade in controlled substances, including addressing the mislabeling of containers of controlled substances as other chemicals; and
- encourages parties to facilitate the exchange of information to prevent illegal trade of controlled substances by reporting to the Secretariat fully proved cases of illegal trade and, to the extent that parties are able to do so, to provide additional information about illegal trade situations.

MOP 34 also requests the Secretariat to:

- compile and regularly summarize the practices of illegal trade reported, as well as the approaches taken by national authorities to identify and address such cases;
- identify common features of licensing systems to assist parties wishing to improve their national licensing systems for controlled substances;
- organize a one-day workshop on further strengthening effective implementation and enforcement of the Montreal Protocol back-to-back with OEWG 45; and
- prepare a background information paper outlining issues to be discussed at the workshop and reflecting discussions at OEWG 44 and MOP 34 for consideration at OEWG 45.

Ongoing Emissions of Carbon Tetrachloride

On Tuesday, Co-Chair Sirois invited Switzerland to present its CRP (UNEP/OzL.Pro.34/CRP.10). SWITZERLAND explained that the draft decision invites parties to provide general information on procedures related to CTC emissions. This issue was taken up in the contact group on gaps in atmospheric monitoring, co-facilitated by Michel Gauvin (Canada) and Liana Ghahramanyan (Armenia).

On Friday, Co-Facilitator Gauvin reported that the group had achieved agreement on a draft decision on ongoing emissions of CTC. Parties agreed to forward it to the high-level segment for adoption.

Final Decision: In the decision (UNEP/OzL.Pro.34/CRP.10/Rev.1), MOP 34:

- invites parties that have production of CTC, as well as by-production, or use of CTC as a feedstock for other substances or as a process agent, to provide to the Ozone Secretariat on a voluntary basis, by 1 February 2023, information on the national procedures and frameworks in place for management of such activities in their respective countries;
- requests the Secretariat to share with the TEAP the information received; and
- requests the TEAP to review the information received and to present this information in its 2023 progress report for consideration by OEWG 45.

Future Availability of Halons and their Alternatives

Co-Chair Sirois introduced this item (UNEP/OzL.Pro.34/2) on Monday, noting the May 2022 TEAP report on halon availability. The US said the report would be helpful in guiding domestic action to manage halon stocks. Consideration of the item was closed.

Issues Related to Exemptions under Articles 2A–2I of the Montreal Protocol

Nominations for Critical-Use Exemptions for Methyl Bromide for 2023 and 2024: On Monday, Marta Pizano and Ian Porter, Co-Chairs of the Methyl Bromide Technical Options Committee (MBTOC), presented the Committee's recommendations (UNEP/OzL.Pro.34/2/Add.1). Co-Chairs Pizano and Porter reported critical-use nominations (CUNs) had been submitted by South Africa, Canada, and Australia, noting that the MBTOC recommendation was, in each case, for a smaller amount than requested in the nomination.

AUSTRALIA and CANADA expressed disappointment with MBTOC's final recommendations regarding their respective nominations. The US said it is crucial for MBTOC to follow agreed procedures and fully take into account information submitted to it.

On Tuesday, AUSTRALIA presented a CRP, submitted jointly with Canada and South Africa (UNEP/OzL.Pro.34/CRP.9). Co-Chair Álvarez-Pérez requested that interested parties discuss the CRP with its three sponsors and return to plenary with consensus on the decision text.

On Friday evening, AUSTRALIA reported that interested parties had reached agreement on a revised version of the joint CRP (CRP.9/Rev.1). He noted: the addition of a preambular paragraph recognizing the TEAP and MBTOC for their work; modifications to the country-specific paragraphs explaining the circumstances surrounding their request for CUEs; and changes to the amounts requested for Australia and Canada.

Parties agreed to forward this to the high-level segment for a decision.

Final Decision: In the preamble to the decision (UNEP/OzL.Pro.34/CRP.9/Rev.1), MOP 34, *inter alia*:

- notes with appreciation the work of the TEAP and its MBTOC;
- acknowledges that the TEAP, and specifically its MBTOC, produce reports that are science-based, independent and robust and that all parties should strive to respect the results of this work;
- notes that the TEAP has identified successful chemical and non-chemical alternatives to methyl bromide and the use of such alternatives in combination provides excellent results;
- notes Australia's transition away from methyl bromide in 2023 has been delayed as a result of the registration of an alternative not having been finalized as originally planned in January 2022, thus requiring its use of the full amount of methyl bromide in 2023;
- notes Canada is committed to continuing its research programme aiming at a full phase-out of methyl bromide for CUNs, and that Canada, for reasons linked to the economic impact of shifting towards soilless substrates use in strawberry runners for a single producer and in the absence of authorized fumigant alternatives, has asked to diverge from the MBTOC recommendations;
- notes with appreciation that South Africa is committed not to apply in the future years for CUNs of methyl bromide; and
- recognizes that some parties have recently stopped requesting CUEs and that the efforts to develop alternatives and substitutes by parties that continue to apply for exemptions are designed to achieve the same outcome.

In the decision, MOP 34 agrees:

- to permit, for each party, for the agreed critical-use categories set out in Table A of the annex, the levels of production and consumption for 2023 set out in Table B of the annex, which are necessary to satisfy critical uses, with the understanding that additional production and consumption and categories of use may be approved by the MOP in accordance with decision IX/6;
- parties shall endeavor to license, permit, authorize, or allocate quantities of methyl bromide for critical uses as listed in table A;
- each party that has an agreed CUE shall renew its commitment to ensuring that specified criteria are applied in licensing, permitting, or authorizing critical uses of methyl bromide, with each party requested to report on the implementation to the Secretariat by 1 February for the years to which the decision applies;
- parties submitting future requests for methyl bromide CUNs shall also comply with paragraph 1(b)(iii) of decision IX/6

and that non-Article 5 parties shall demonstrate that research programmes are in place to develop and deploy alternatives to and substitutes for methyl bromide; and
- to reiterate the reminder in decision XXXII/3 that Article 5 parties requesting CUEs are required to submit their national management strategies in accordance with paragraph 3 of decision Ex.I/4.

The annex to the decision contains two tables. Table A lists the following agreed critical-use categories for 2023: strawberry runners for Australia and Canada, and structures for South Africa. Table B sets out the permitted levels of production and consumption for 2023 for those three parties: 29.98 tonnes for Australia (which includes the amount of 14.49 tonnes previously agreed for 2023 in decision XXXIII/6); 4.65 tonnes for Canada; and 19.00 tonnes for South Africa.

Stocks and Quarantine and Pre-Shipment Uses of Methyl Bromide: On Monday, Co-Chair Álvarez-Pérez introduced a revised draft decision (UNEP/OzL.Pro.34/2) forwarded by OEWG 44 and arising from informal consultations led by the EU. After a brief discussion, delegates agreed to establish a contact group on the issue, co-facilitated by Alain Wilmart (Belgium) and Diego Montes Ferro (Colombia).

The contact group met on Tuesday, Wednesday, and Friday.

On Friday morning, Co-Facilitator Montes reported that the group was "seeing the shadow of the finish line" and requested more time to work. Co-Chair Álvarez-Pérez confirmed that the group could have an additional 30 minutes. On Friday evening, Co-Facilitator Montes reported that the group had reached consensus on the draft decision in less than ten minutes thanks to parties' flexibility and parties agreed to forward this draft decision to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.17), MOP 34 invites parties to submit to the Ozone Secretariat, on a voluntary basis, by 1 June 2023:
- a list of the pest and commodity combinations in which methyl bromide is needed or used in their respective countries; and
- accessible data on the volumes of pre-phase-out methyl bromide stocks at the country level to the Ozone Secretariat by 1 June 2023.

MOP 34 also:
- includes the issue of methyl bromide stocks on the agenda of OEWG 45;
- requests the TEAP and its MBTOC, in consultation with the Secretariat of the International Plant Protection Convention, to provide updated information, as part of its progress report to OEWG 45, on current quarantine and pre-shipment uses for which alternatives are available; and
- invites parties to take into account the standards and guidelines under the International Plant Protection Convention in their national processes and to consider the potential for uptake of practices to minimize the use of methyl bromide.

Strengthening the Technology and Economic Assessment Panel and its Technical Options Committees for the Phase-Down of HFCs and Other Future Challenges Related to the Montreal Protocol and the Climate

On Monday, Co-Chair Sirois introduced this item (UNEP/OzL.Pro.34/2; 34/2/Add.1; Report of the TEAP, May 2022, Volume 1: Progress Report), noting that OEWG 44 had considered a draft decision by Morocco that included proposals to merge the Halons Technical Options Committee and the MBTOC into the Medical and Chemicals Technical Options Committee, to restructure the Flexible and Rigid Foams Technical Options Committee, and to create an energy efficiency technical options committee. Parties reestablished the OEWG 44 contact group so that the TEAP Co-Chairs could answer parties' questions on the Panel's restructuring recommendations contained in their 2022 progress report. The contact group was co-facilitated by Paul Krajnik (Austria) and María del Mar Solano (Costa Rica).

On Wednesday, AUSTRALIA presented a proposal (UNEP/OzL.Pro.34/CRP.12) on behalf of the UK, Canada, and the US, which helped guide the contact group's work in meetings on Wednesday and Friday.

On Friday evening, Co-Facilitator del Mar Solano reported the group had completed its work. Parties agreed to forward the draft decision submitted by the contact group to the high-level segment for adoption.

Final Decision: In the decision (UNEP/OzL.Pro.34/CRP.12/Rev.1), MOP 34 requests the TEAP, including through consultations by the Co-Chairs of the technical options committees with their members, to provide more information on existing challenges and potential options for the future configuration and function of its technical options committees for consideration by OEWG 45, taking into account:
- discussions and questions raised by parties at OEWG 44 and MOP 34 concerning the TEAP's recommendations in its 2022 progress report;
- the fact that the vast majority of HFC uses are in the refrigeration, air conditioning and heat-pump sector;
- expertise required to provide technical and cost-related information to the parties, including in the context of implementation of the Kigali Amendment;
- guidance provided in its terms of reference; and
- the need to ensure continued collaboration and coordination across the technical options committees.

MOP 34 also decides to rename the Halons Technical Options Committee to the Fire Suppression Technical Options Committee.

Consideration of Nominations by Parties of Experts to the Technology and Economic Assessment Panel

On Monday, Co-Chair Álvarez-Pérez noted that seven experts had been nominated for membership on the TEAP (UNEP/OzL.Pro.34/2; 34/2/Add.1). He said the nominations would be discussed in an informal group, which met on Friday.

On Friday evening, Co-Chair Álvarez-Pérez informed parties that a draft decision with the names of selected experts had been uploaded to the meeting website. Parties agreed to forward the document to the high-level segment for adoption.

Final Decision: In the decision (UNEP/OzL.Pro.34/CRP.18), MOP 34:
- endorses the appointments of Marta Pizano (Colombia) and Ashley Woodcock (UK) as Co-Chairs of the TEAP for an additional four-year term;
- endorses the appointment of Fabio Polonara (Italy) as Co-Chair of the Refrigeration Technical Options Committee for an additional term of four years; and

- endorses the appointments of Ray Gluckman (UK), Marco González (Costa Rica), and Shiqiu Zhang (China) as senior experts for additional terms of one year.

Compliance and Data Reporting Issues: The Work and Recommendations of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol

On Monday, Gene Smilansky, US, Vice-President of the Implementation Committee, reported ImpCom 68 and ImpCom 69 had adopted 13 formal recommendations, including three draft decisions for consideration by MOP 34 (UNEP/OzL.Pro.34/CRP.3). These address: data and information provided by parties; establishment of licensing systems of HFCs; and a request from Madagascar to revise its baseline data. Parties agreed to forward the draft decisions to the high-level segment for adoption.

Final Decisions: **Data and information provided by the parties in accordance with Article 7 of the Montreal Protocol:** In its decision (UNEP/Oz.L.Pro.34/CRP.3), MOP 34:

- urges the parties listed in paragraphs 3, 4 and 5 of the decision to report the required data to the Secretariat as soon as possible;
- requests ImpCom 70 to review the situation of those parties; and
- encourages parties to continue to report consumption and production data as soon as the figures are available, and preferably by 30 June each year, as agreed in decision XV/15.

Status of the establishment of licensing systems under Article 4B, paragraph 2 bis, of the Montreal Protocol: In its decision (UNEP/Oz.L.Pro.34/CRP.3), MOP 34:

- takes note with appreciation of the efforts made by the parties in the establishment and implementation of licensing systems under Article 4B, paragraph 2 bis, of the Montreal Protocol for the import and export of new, used, recycled, and reclaimed controlled substances listed in Annex F to the Montreal Protocol;
- urges the 15 parties listed in the annex to the decision to provide information to the Secretariat on the establishment and implementation of licensing systems as a matter of urgency, and no later than 15 March 2023, for consideration by ImpCom 70;
- urges all remaining parties to the Kigali Amendment that have not yet established and implemented the licensing systems referred to in the present decision to do so, and to report that information to the Secretariat within three months of doing so; and
- requests the Secretariat to review periodically the status of the establishment and implementation of the licensing systems referred to in this decision by all parties to the Protocol.

Revision of the baseline data for Madagascar: In its decision (UNEP/Oz.L.Pro.34/CRP.3), MOP 34 decides to approve the request by Madagascar to revise its consumption data for HFCs for the baseline year 2009 as indicated in a table set out in the decision document.

Implementation of the Kigali Amendment

Periodic Review on Alternatives to HFCs (Decision XXVII/2, para. 4): On Tuesday, Co-Chair Martin Sirois opened this item (UNEP/OzL.Pro.34/2; 34/2/Add.1), inviting TEAP members to present their report on information on alternatives to HFCs. After asking TEAP a number of technical and detailed questions, with a focus on accessibility of alternatives, parties discussed the timing of future reporting on this item. Co-Chair Sirois then closed the item.

Status of Ratification: On Tuesday, noting that to date 140 parties had ratified the Kigali Amendment, OEWG Co-Chair Álvarez-Pérez presented a draft decision (UNEP/OzL.Pro.34/3) to be forwarded to the high-level segment for adoption. He explained the number of ratifications would be updated to reflect the number of ratifications on Friday. The draft decision was forwarded to the high-level segment. By Friday, the number of parties had grown to 141.

Final Decision: In the decision (UNEP/OzL.Pro.34/L.2), the MOP notes that, as of 4 November 2022, 141 parties had ratified, approved or accepted the Kigali Amendment to the Montreal Protocol and urges all parties that have not yet done so to consider ratifying, approving, or accepting the Kigali Amendment in order to ensure broad participation and achieve the goals of the Amendment.

Impact of the COVID-19 Pandemic on HFC Baselines for Article 5 Parties (Proposal by Cuba): Co-Chair Álvarez-Pérez opened discussion on the proposal by Cuba (UNEP/OzL.Pro.34/CRP.1) on Tuesday. Parties agreed to convene an informal group on baselines, co-facilitated by Ralph Brieskorn (Netherlands) and Daniel López Vicuña (Mexico), to continue discussions on this matter. The informal group met on Wednesday and Friday.

On Friday morning, Co-Facilitator López Vicuña reported that, after the group's first meeting, parties had come up with a proposal to gather data on Article 5 parties' consumption of HFCs. Delegates agreed to forward the draft decision to the high-level segment for adoption.

Final Decision: In the decision (UNEP/OzL.Pro.34/CRP.13), MOP 34:

- recalls that the calculated HFC consumption baselines for Article 5 parties are determined on the basis of reported HFC consumption for 2020, 2021 and 2022 plus 65% of the country's HCFC baselines to account for HFC growth and fluctuations;
- notes the COVID-19 pandemic; and
- notes that the ExCom has taken no decision concerning the years for the starting point that will be used to determine maximum HFC consumption eligible for funding, and that this issue will continue to be considered at ExCom 91.

MOP 34 also encourages Article 5 parties that believe their reduced consumption of HFCs during the baseline years of 2020-2022, stemming from the effects of the COVID-19 pandemic, could hinder their ability to comply with the freeze in the consumption of HFCs in 2024 under the Kigali Amendment to submit to the Ozone Secretariat as soon as possible, and no later than 1 May 2023, their HFC consumption data for 2022 in time for consideration at OEWG 45.

MOP 34 also requests, for parties that provide the information above by 1 May 2023, the Ozone Secretariat to prepare for OEWG 45:

- information on the HFC consumption for the years 2020, 2021, and 2022 and the calculated baselines of Article 5 parties that have reported relevant data; and
- information on HFC consumption for the years 2018 and 2019 of Article 5 parties where information is available.

MOP 34 also requests ExCom 91 to consider requesting the Secretariat of the MLF to provide to the Ozone Secretariat any HFC consumption data it has available that could assist the Ozone Secretariat in preparing the information requested under this decision.

Safety Standards (Decision XXIX/11)

On Tuesday, Co-Chair Sirois introduced this item (UNEP/OzL.Pro.34/2; 34/2/Add.1) and recalled the work completed by the Secretariat to date, including creating an interactive online tool to facilitate access to information on safety standards. On Wednesday, the EU presented a CRP on this item (UNEP/OzL.Pro.34/CRP.11) and Co-Chair Sirois requested that parties engage directly with the EU on questions or textual considerations.

On Friday, the EU reported that parties discussing this issue had added a deadline for the mandate being given to the Secretariat and introduced the resulting revised draft decision. Parties agreed to forward the draft decision to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.11/Rev.1), MOP 34 requests the Secretariat:

- to continue providing information on relevant safety standards as requested by decision XXIX/11 at least prior to each MOP up until MOP 41, when parties should consider whether to renew that request; and
- to include further relevant safety standards when notified by a party or a group of parties of the adoption of a standard.

Recognition of the Achievements of Paul Jozef Crutzen, Mario José Molina, and Frank Sherwood Rowland, Winners of the Nobel Prize in Chemistry in 1995

On Tuesday, Co-Chair Sirois open this item (UNEP/ OzL.Pro.34/2; 34/3) and parties forwarded the draft decision to the high-level segment for adoption.

Final Decision: In the decision (UNEP/OzL.Pro.34/L.2), MOP 34:

- expresses recognition of and gratitude for the invaluable scientific contributions of Paul Jozef Crutzen, Mario José Molina, and Frank Sherwood Rowland, which inspired countries around the world to join in solidarity and cooperation to protect the ozone layer from depletion, thus making the planet safer for present and future generations;
- upholds their legacy by maintaining mutual trust in and commitment to the work of the Vienna Convention and the Montreal Protocol; and
- strives to continue to strengthen the institutions that their achievements helped to establish in order to achieve the aims of those institutions and protect the atmosphere for the benefit of all.

Other Matters

Co-Chair Álvarez-Pérez opened discussion of this item on Tuesday, reminding parties that the agenda was adopted with the addition of a sub-item under Other Matters from Armenia. ARMENIA introduced a draft decision on the item (UNEP/OzL.Pro.34/CRP.8). Co-Chair Álvarez-Pérez proposed, and parties agreed, that Armenia would lead bilateral discussions on the issue with interested parties and report progress to the OEWG Co-Chairs, who would then advise on next steps. On Wednesday, ARMENIA shared a revised draft proposal that parties agreed to forward to the high-level segment for adoption.

Final Decision: In its decision (UNEP/OzL.Pro.34/CRP.8/Rev.1), MOP 34 requests the ExCom to consider increasing the funding allocated for travel by Article 5 parties in the budget of the Secretariat of the MLF, with a view to supporting the participation in ExCom meetings of an Article 5 party that is not eligible through the existing rotation system for a seat on the ExCom for the year in question, on the understanding that the party concerned could be co-opted by another Article 5 party holding the rotating seat for the year in question.

High-Level Segment Report

MOP 33 President Samuel Paré (Burkina Faso) opened the high-level segment on Thursday morning.

Cécile Siewe, Environment and Climate Change Canada, highlighted that the Montreal Protocol demonstrates how to unite government, science, business, and civil society. Speaking via video message, Steven Guilbeault, Minister, Environment and Climate Change Canada, highlighted the Kigali Amendment's role in reducing HFCs and thus avoiding further global warming. He underscored the importance of enabling developing countries to comply with the upcoming freeze on HFC consumption.

Inger Andersen, Executive Director, UNEP, congratulated participants via video message for their work, and underlined the importance of supporting the Protocol through sound science and the replenishment of the MLF.

President Paré reflected on intersessional work since MOP 33, highlighting ongoing efforts to achieve universal ratification of the Kigali Amendment and the celebration of the pioneering work of the winners of the 1995 Nobel Prize in Chemistry.

Organizational Matters

Election of Officers for the 34th Meeting of the Parties to the Montreal Protocol: President Paré presented the names of nominated officers, who were subsequently elected by acclamation: President: Hassan Mubarak (Bahrain); Vice Presidents: Jana Mašíčková (Czechia); Adrian Forde (Barbados); Alain Wilmart (Belgium); and Rapporteur: Cyrus Mageria (Kenya).

Taking the floor, MOP 34 President Mubarak thanked the outgoing President and parties for the confidence they had shown by electing him.

Adoption of the Agenda for the High-Level Segment: President Mubarak introduced the agenda (UNEP/OzL.Pro.34/1), which was adopted as presented.

Organization of Work: President Mubarak introduced this item (UNEP/OzL.Pro.34/2), outlining a plan for the final two days of MOP 34. As the preparatory segment had not yet completed its work, he explained some contact groups would be working in parallel to the high-level segment, and suspension of the high-level segment could be required at times.

Credentials of Representatives: On Friday evening, the Secretariat reported on the Bureau's review of credentials, noting it approved the credentials of 79 out of 127 parties represented at MOP 34. He said one party's participation was approved provisionally on the condition that it forward credentials as soon as possible.

Presentations by the Assessment Panels on Progress in their Work and Key Issues Emanating from their 2022 Quadrennial Assessments

On Thursday, experts from the Montreal Protocol's three assessment panels presented key findings from their forthcoming reports.

Scientific Assessment Panel (SAP): Co-Chair Bonfils Safari (Rwanda) introduced the SAP's forthcoming quadrennial assessment. Co-Chair Paul Newman (US) highlighted declines in

ODS since the Protocol's adoption. Underscoring that ozone in the upper stratosphere continues to recover, he noted ozone in the lower stratosphere does not show signs of recovery, but the uncertainty is large.

Co-Chair John Pyle (UK) presented a chapter on climate intervention or "geoengineering," specifically Stratospheric Aerosol Injection (SAI). He noted that while SAI could lead to 0.5°C surface cooling, it could result in ozone depletion comparable to that in the 1990s.

Environmental Effects Assessment Panel (EEAP): Co-Chair Janet Bornman (Australia) presented highlights from the EEAP's forthcoming quadrennial assessment. She provided a brief overview of the report's key findings relating to the interactive effects of stratospheric ozone and climate change on a number of issues, including human health, ecosystems, natural and synthetic materials, and microplastics in the environment.

Technology and Economic Assessment Panel (TEAP): Co-Chair Bella Maranion (US) outlined the TEAP's forthcoming quadrennial assessment. On foams, she noted progress in the adoption of low-GWP foam blowing agents, but continued challenges in the accessibility of these alternatives. On halons, she noted that proposed changes to legislation around perfluoroalkyl and polyfluoroalkyl substances (PFAS) could leave halons as the only viable alternative to HFCs. She further explained that viable technical alternatives now exist for uses of methyl bromide but some present concerns due to their GWP.

After President Mubarak opened the floor for questions, participants discussed, among other items, information available on unknown emissions of CTC; projections on short-lived substances; and the impacts of volcanoes and wildfires on the stratosphere.

Presentation by the Chair of the Executive Committee on the MLF for Implementation of the Montreal Protocol on the Work of the Executive Committee, the MLF Secretariat and the Fund's Implementing Agencies

President Mubarak opened this item (UNEP/OzL.Pro.34/2; 34/7) and, as Chair of the Executive Committee of the MLF (ExCom), presented relevant intersessional decisions and updates, with a focus on efforts to phase down HFCs.

Chair Mubarak highlighted that the ExCom requested the Secretariat to develop criteria for pilot projects on the energy efficiency of replacement technologies and to prepare an operational framework on institutional activities that could be undertaken by the MLF in the manufacturing and servicing sectors for the phase-down.

Chair Mubarak reported that: the UN Development Programme had enhanced capacity building through more than 30 online webinars; UNEP had continued to assist 93 countries with enabling projects; the UN Industrial Development Organization is helping to implement HPMPs in 64 countries; and the World Bank has been exploring ways to maximize climate change mitigation co-benefits.

Statements by Heads of Delegations and Discussions on Key Topics

High-level Roundtable: On Thursday morning, Mona Nemer, Chief Science Advisor of Canada, moderated a high-level roundtable discussion on the theme: "Montreal Protocol @35: The Kigali Amendment and its potential impact on climate." Panelists included: Cécile Siewe, Associate Assistant Deputy Minister, Environmental Protection, Environment and Climate Change Canada; Jan Dusík, Deputy Minister, Climate Protection, Czechia; Dawda Badgie, Executive Director, Environmental Protection Agency, The Gambia; Kerryne James, Minister, Climate Resilience, Environment, and Renewable Energy, Grenada; Abdulla Naseer, Minister of State, Environment, Climate Change and Technology, Maldives; Kylie Farrelley, General Manager, Refrigerant Reclaim Australia; and Klaus Peter Schmid Spilker, President, Chilean Chamber of Refrigeration and Air Conditioning.

Participants addressed themes including: the Montreal Protocol's contribution to delivering on the Paris Agreement's 1.5°C target for limiting global warming; challenges to phasing down HFCs; energy-related aspects of the HFC phase-down; and applying the Protocol's successful partnership between governments and industry to implementation of the Kigali Amendment.

Delegations' statements: Heads of delegations delivered statements on Thursday and Friday. The statements delivered on Thursday are summarized here.

On Friday morning, MALAYSIA announced substantial progress on the country's HPMP, but noted challenges such as availability and cost of new technologies.

TANZANIA expressed pride in his country's various programmes and regulations established to meet its obligations, highlighting successful cooperation with the MLF, Secretariat, and implementing agencies. He called for a continuation of such capacity building for the implementation of the Kigali Amendment.

TÜRKIYE highlighted the country's implementing actions, such as establishing a licensing system for the export/import of HFCs that will be implemented at the beginning of 2023.

NEPAL also spoke on domestic actions on ODS and noted a country assessment report that identifies gaps that will need to be filled for the country to implement the Kigali Amendment.

Emphasizing that we stand on the brink of a changing environment that is threatening the existence of every nation on the planet, the BAHAMAS outlined its work to implement the Montreal Protocol and called for action to ensure a brighter tomorrow for our successors.

TURKMENISTAN described its work on ODS and highlighted policies to promote gender equality and participation of women in training, consultation, and decision-making.

VIET NAM highlighted its achievements to manage ODS, flagged challenges related to alternative technologies and financial and human resources, and said technical and financial support would enable his country to implement the Kigali amendment.

BRAZIL highlighted that it has eliminated 63% of its consumption of HCFCs through its HPMP, noted its recent ratification of the Kigali Amendment, and said the upcoming replenishment of the MLF represents an opportunity to raise ambition.

TUNISIA expressed concern about the high cost of alternative technologies, particularly in the refrigeration sector, and affirmed its commitment to protecting the climate from HFCs.

PALESTINE highlighted its adoption of laws, regulations and technical directives to manage the import, export and illegal trade of ODS, and emphasized that Israeli occupation has led to massive destruction of refrigerants and other dangerous substances in commercial and residential buildings. He underscored the need for cooperation and called for greater support for Article 5 parties.

BURUNDI expressed appreciation for capacity-building mechanisms for cooling, such as provision of equipment, training, and awareness-raising.

INDONESIA announced the country's president had signed its instrument of ratification of the Kigali Amendment on 1 November 2022 and it would be submitted to the depositary as soon as possible.

MONGOLIA stressed the theme of global cooperation, calling on parties to cooperate to protect Mother Earth.

GRENADA outlined steps her country has taken toward Kigali Amendment implementation, including a strategic gap analysis in the refrigeration and air-conditioning sector and the establishment of a national cooling action plan and strategy, noting the co-benefits these will have for the climate.

CUBA underscored that current HFC baselines are unsustainable for many member countries, pointed to its draft decision on this issue, and emphasized the importance of financing to support the transition away from HFCs.

CHINA outlined its domestic work to support accelerated phase out of HCFCs and full control of HFCs, including through improved regulation.

ZAMBIA highlighted that it is ahead of schedule in its work to phase out ODS and said it is working hard to phase down HFCs.

The INTERNATIONAL INSTITUTE OF REFRIGERATION highlighted that refrigeration is now recognized by the UN as a development priority due to its benefits to human life and as an environmental priority due to its impact on climate change.

Report by the Co-Chairs of the Preparatory Segment and Consideration of the Decisions Recommended for Adoption by MOP 34

On Friday evening, President Mubarak introduced this item (UNEP/OzL.Pro.34/2). Co-Chair Álvarez-Pérez listed the substantive work that the preparatory segment had completed, and the decisions forwarded for adoption by the MOP. He noted that the consideration of aligning panels' periodic reviews and quadrennial assessment reports was deferred to 2023. He highlighted the spirit of compromise on several extremely challenging issues that parties considered, including the terms of reference for the study of MLF replenishment; enabling enhanced access to energy-efficient and low and zero GWP alternatives for Article 5 parties; and gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring.

Dates and Venue for MOP 35

On Friday, the Secretariat reported that MOP 35 is scheduled to be held 23-27 October 2023 in Nairobi, Kenya, unless other arrangements are made by the Secretariat in consultation with the Bureau. She also reported that OEWG 45 is scheduled for 3-7 July 2023 in Bangkok, Thailand. She said the location for each meeting is tentative.

Adoption of Decisions by MOP 34

On Friday evening, MOP 34 Rapporteur Cyrus Mageria (Kenya) led delegates in adopting the MOP decisions forwarded to the high-level segment by the preparatory segment (contained in UNEP.OzL.Pro.34/L.2). Early Saturday morning, MOP 34 Rapporteur Mageria presented the decision on the terms of reference for the study on the replenishment of the MLF for 2024-2026. It was adopted.

Delegates adopted 24 decisions in total, which have been summarized under the relevant agenda items above.

Adoption of the Report of the Meeting

MOP 34 Rapporteur Mageria led delegates through the adoption of the report (UNEP/OzL.Pro.34/L.1 and L.1/Add.1). While reviewing the report, several parties suggested edits for accuracy and completeness to better reflect their interventions. When considering the section of the report on statements from heads of delegation, the EU and CANADA asked for their statements on Russia's military aggression to be reflected in the report. Parties adopted the report as amended.

Closure of the Meeting

In her closing remarks, Executive Secretary Seki paid tribute to OEWG Co-Chair Sirois ahead of his impending retirement, saying it is "with thanks to his leadership, knowledge, and expertise that we have achieved successful outcomes in our meetings." Several delegations expressed deep appreciation for the contributions of both Sirois and Gilbert Bankobeza, Ozone Secretariat Legal Officer, who will be retiring from the Secretariat, wishing both men well.

President Mubarak thanked the OEWG Co-Chairs for their outstanding leadership, the co-facilitators for successfully negotiating agreements on a host of issues, and expressed appreciation for the work of the Secretariat, interpreters, and report writers. Wishing all participants well, he closed the meeting at 1:03 am on Saturday morning, 5 November 2022.

A Brief Analysis of MOP 34

Thirty-five years after the adoption of the Montreal Protocol on Substances that Deplete the Ozone Layer, parties reconvened in the treaty's namesake city for the first in-person Meeting of the Parties (MOP) since 2019. The salience of many issues on the MOP's agenda was high; delegates to were gathering immediately before the opening of the high-profile Sharm el-Sheikh Climate Change Conference, and only days after the release of the UN Environment Programme (UNEP) Emissions Gap report, which warns that "the international community is falling far short" of the goals set by the 2015 Paris Agreement on Climate Change, "with no credible pathway to 1.5°C in place."

In this alarming context, many delegates highlighted two lesser-known achievements of the Montreal Protocol: the 0.5-1°C warming by mid-century already avoided thanks to its long-term implementation, and the additional benefits promised by implementation of the 2016 Kigali Amendment on hydrofluorocarbons (HFCs), which are powerful greenhouse gases. Still, despite incredible work in phasing out 98% of ozone depleting substances (ODS) worldwide relative to a 1990 baseline and, in doing so, making major inroads in avoiding catastrophic climate change, parties had to grapple with a number of important issues. These included: scientific findings that underscored the importance of maintaining focus on the treaty's core purpose; whether and how to build on the Protocol's success to tackle other environmental issues; and ensuring parties deliver on the Kigali commitments.

Thirty-Five Years of Pioneering and Impactful Work

The scientific work of the Montreal Protocol was most prominently displayed during the high-level segment, when experts from the Montreal Protocol's three panels—the Scientific

Assessment Panel (SAP), the Environmental Effects Assessment Panel (EEAP), and the Technology and Economic Assessment Panel (TEAP)—summarized their soon-to-be-released 2022 quadrennial assessment reports. These presentations provided rich documentation of key achievements under the Protocol, while also highlighting the challenges ahead.

The SAP opened with a striking yet familiar graph showing the continued decline of ODS emissions from their peak in the 1990s. The SAP also reported the good news that the Antarctic ozone hole is well on the path to recovery: it is expected to recover fully by about 2066. Arctic ozone is expected to recover even earlier, by about 2045.

The EEAP's 2022 report also emphasized successes, such as how avoided solar ultraviolet (UV) radiation has prevented harm to ecosystems, human health, and even infrastructure. For instance, the EEAP highlighted a recent study that concludes that, without the Protocol, increases in UV-B radiation would have led to drastic reductions in CO2 uptake by terrestrial ecosystems, resulting in atmospheric levels of as much as 610 ppm of CO2 today. The EEAP also reported on a US study that estimates, for people born in the US between 1890 and 2100, the implementation of the Montreal Protocol translates into 443 million avoided cases of skin cancer and the prevention of 63 million cases of cataracts. In addition, noting how much of the infrastructure necessary for a green transition relies on plastics, the EEAP underscored that avoided UV radiation has decreased the generation of micro- and nano-plastics by photodegradation.

In addition to the preview of its 2022 report, the TEAP also delivered several targeted reports during the preparatory segment. Underscoring the central role industry and scientific innovation have played in the Protocol's success, the TEAP relayed in a presentation on HFC alternatives that, by and large, many alternatives exist that have low or zero global-warming potential.

However, all panels also noted important caveats. For example, the SAP reported on unexplained emissions of certain ODS, as well as the fact that ozone in the lower stratosphere is not showing signs of recovery, despite modeling that shows it should be. Meanwhile the EEAP's happy news on what "the world avoided" because of the Montreal Protocol was a reminder of the importance of continued phase-out and sustained compliance. Finally, the TEAP's report clearly conveyed that while alternatives to HFCs exist, lack of accessibility is a formidable obstacle for Article 5 countries' implementation of the Kigali Amendment.

Expanding the "Ozone Family"?

The Kigali Amendment, adopted just a year after the Paris Agreement, marked a significant turning point for the Protocol and significant step toward breaking down the silos that so often characterize global environmental governance. The Kigali Amendment sets out a phase-down schedule for HFCs. While HFCs are not ODS, they have been used as a substitute for hydrochlorofluorocarbons (HCFCs), which are ODS scheduled to be phased out worldwide by 2030, and both are very potent greenhouse gases. The Kigali Amendment challenges parties to identify alternatives that are not just ozone-friendly but also climate-friendly. These alternatives must also be accessible, technically feasible, cost effective, and safe.

The Kigali Amendment entered into force in 2019 and had been ratified by 141 parties by the close of MOP 34, demonstrating countries' strong commitment to tackle the climate challenge under the auspices of the ozone regime. However, the linkages between ozone and other environmental processes on display throughout the week caused some friction. Some parties questioned whether the ozone family was reaching too far outside its remit, with frequent entreaties to stay within the Protocol's scope, and, when making requests to the panels, to stay within their established spheres of expertise.

Just as with climate, the Protocol can yield co-benefits in other issue areas, including agriculture and food security, biodiversity, non-chemical insecticides and herbicides, renewable energy, plastic pollution, and human health. While some parties supported building on these contributions to sustainable development outcomes by expanding some areas of the Protocol's work, others were more hesitant to take on what they described as "tangential" concerns. Issues that prompted such tensions included cold chain management, energy efficiency, and the extent to which the Montreal Protocol should consider pending regulation on per- and polyfluoroalkyl substances (PFAS) that might impact the range of viable alternatives to controlled substances, especially in the fire-suppression sector.

Catching up on Kigali Amendment Implementation

Interventions during the high-level segment consistently attributed the successes of the Montreal Protocol to the support available to developing countries through the Multilateral Fund (MLF). The various ways in which the Protocol has served as an engine for technological innovation, and its flexibility to tighten mandates when alternatives became readily available, were also underscored. The Kigali Amendment provides for most Article 5 parties to freeze their HFC production and consumption by 1 January 2024. This looming deadline gave additional weight to anxious voices warning that this "scope creep" could come at the expense of success in meeting Kigali Amendment milestones. How much more, a few asked, could realistically be asked of the Secretariat, the expert panels, the MLF, and already overburdened party focal points?

Others characterized these concerns as being a reflection of MOP 34's unusually heavy agenda. To be sure, some of the issues on the table related to the built-in cycles of the Protocol, such as the terms of reference for the study on the next replenishment of the MLF and the previews of the panels' quadrennial assessments. The unusually high number of contact groups at MOP 34 could also be ascribed to a backlog of work that was postponed over the past two years due to the COVID-19 pandemic. Some parties indicated that they were feeling the pressure of lost time and changed circumstances due to the pandemic, and with impending milestones under the Kigali Amendment, many underscored the importance of funding, capacity building, and potentially even adjusted baselines.

Indeed, parties repeatedly contrasted the arduous road ahead to ensure the Kigali Amendment's successful implementation with the Protocol's past successes. Some called for sticking with the Protocol's proven template for success, seeking to build on what Steven Guilbeault, Canada's Minister of Environment and Climate Change, characterized in his welcome address as a "blueprint for effective cooperation." Others highlighted the need to forge new connections and pursuing more holistic solutions. While recognizing

that the intimacy of the "ozone family" facilitated agreement on resolutions at MOP 34, they suggested the expansion of the Protocol's scope to include HFCs should go hand-in-hand with broadening the range of stakeholders and experts guiding parties in their work.

As MOP 34 concluded, many participants talked about their plans to travel directly to Egypt for the Sharm el-Sheikh Climate Change Conference, demonstrating the close connections between the instruments. This is the first of several meetings in a crowded schedule of negotiations with increasingly obvious connections to the Montreal Protocol, including plastics, biodiversity, the science-policy panel on chemicals, waste and prevention of pollution; and meetings of the Basel, Rotterdam and Stockholm Conventions. When parties convene again, it will be for the Open-ended Working Group in July 2023. By this time, it is expected that the Secretariat and the TEAP will have gathered substantial information, as specified in a range of decisions taken at MOP 34, that will underpin the next phase of the Montreal Protocol's work.

Upcoming Meetings

Sharm el-Sheikh Climate Change Conference (UNFCCC COP 27): The 27th session of the Conference of the Parties (COP 27) to the UN Framework Convention on Climate Change (UNFCCC), the 17th meeting of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP 17), and the fourth meeting of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA 4) will begin work on the Global Stocktake, among other matters. **dates:** 6-18 November 2022 **location:** Sharm El-Sheikh, Egypt **www:** unfccc.int/cop27

63rd meeting of the Global Environment Facility (GEF) Council: The 63rd GEF Council meeting will be the first under the GEF's eighth replenishment. **dates:** 28 November – 2 December 2022 **location:** virtual **www:** thegef.org/events/63rd-gef-council-meeting

UN Biodiversity Conference (CBD COP 15): This meeting includes the 15th meeting of the COP to the Convention on Biological Diversity (CBD), the 10th meeting of the COP serving as the MOP to the Cartagena Protocol on Biosafety, and the 4th meeting of the COP serving as the MOP to the Nagoya Protocol on Access and Benefit-sharing. The meetings will be preceded by the fifth meeting of the OEWG on the Post-2020 Global Biodiversity Framework from 3-5 December 2022. The meetings are scheduled to review the achievement and delivery of the CBD's Strategic Plan for Biodiversity 2011-2020. They are also expected take a final decision on the post-2020 global biodiversity framework, as well as decisions on related topics, including capacity building and resource mobilization. **dates**: 7-19 December 2022 **location**: Montreal, Canada **www:** cbd.int/conferences/2021-2022

Science-Policy Panel to Contribute Further to the Sound Management of Chemicals and Waste and to Prevent Pollution, OEWG 1.2: The Second Segment of the first session of the Open-Ended Working Group (OEWG) on a Science-Policy Panel to Contribute Further to the Sound Management of Chemicals and Waste and to Prevent Pollution (OEWG 1.2) will address procedural matters, including the election of its Chair, as well as the rules of procedure for the conduct of its work. **dates:** 30 January – 3 February 2023 **location:** Bangkok, Thailand **www:** unep.org/events/conference/oewg1-science-policy-panel-contribute-further-sound-management-chemicals-and

IPCC-58: The 58th session of the Intergovernmental Panel on Climate Change (IPCC) is expected to approve the Synthesis Report for the sixth assessment cycle. **dates:** 13-17 March 2023 (TBC) **location:** Interlaken, Switzerland **www:** ipcc.ch

Basel COP-16, Rotterdam COP-11 and Stockholm COP-11: The next TripleCOP will address the listing of chemicals under the Rotterdam and Stockholm Conventions as well as technical guidelines for the sound management of wastes, including plastics. Technical and financial support, among other issues, will also be addressed. **dates:** 1-12 May 2023 **location:** Geneva, Switzerland **www:** brsmeas.org

45th Meeting of the Open-Ended Working Group of the Parties to the Montreal Protocol: This meeting is expected to consider reports from the assessment panels and engage in preparatory work for the 35th Meeting of the Parties. **dates:** 3-7 July 2023 **location:** TBC **www:** ozone.unep.org

ICCM-5: The Strategic Approach to International Chemicals Management's (SAICM) governing body, the International Conference on Chemicals Management (ICCM), is due to consider recommendations for a post-2020 platform or instrument for the sound management of chemicals and waste. **dates:** 25-29 September 2023 **location:** Bonn, Germany **www:** saicm.org

35th Meeting of the Parties to Montreal Protocol: MOP 35 will convene to discuss issues related to the implementation of the Montreal Protocol. **dates:** 23-27 October 2023 **location:** TBC **www:** ozone.unep.org/

For additional upcoming events, see sdg.iisd.org

Glossary

CFC	Chlorofluorocarbon
COP	Conference of the Parties
CRP	Conference room paper
CTC	Carbon tetrachloride
CUE	Critical-use exemption
CUN	Critical-use nomination
EEAP	Environmental Effects Assessment Panel
ExCom	Executive Committee of the Multilateral Fund
ExMOP	Extraordinary Meeting of the Parties
GWP	Global warming potential
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
HPMP	HCFC phase-out management plan
ImpCom	Implementation Committee
MBTOC	Methyl Bromide Technical Options Committee
MLF	Multilateral Fund
MOP	Meeting of the Parties
ODS	Ozone-depleting substance
OEWG	Open-ended Working Group
SAP	Scientific Assessment Panel
TEAP	Technology and Economic Assessment Panel
UNEP	UN Environment Programme