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次締約國會議」報告

出國人服務機關、職稱及姓名：

行政院環境保護署　副處長 謝炳輝

環境技術師 謝議輝

外 交 部　秘書 朱進良

出國地點：厄瓜多基多（Quito,Ecuador）

出國期間：107 年 11 月 2 日至 11 月 13 日

報告日期：107 年 1 月 23 日

摘要

蒙特婁議定書第 30 次締約方會議（以下簡稱 MOP-30），由聯合國環境規劃署臭氧秘書處（Ozone Secretariat, UNEP）於西元(下同)2018 年 11 月 5 日至 9 日在厄瓜多基多（Quito,Ecuador）舉行，計有來自全球超過 250 多個國家及民間單位，包括各締約國政府機關代表、聯合國周邊組織、政府間組織、非政府組織（Non-Governmental Organization，NGOs）及相關產業團體共襄盛舉，共計 500 多位代表參與，共同協商研擬更具有執行效力之管制規範，以達成削減破壞臭氧層物質（Ozone Depleting Substances，ODS）及保護生態環境與人類健康免受紫外線危害的目標。

保護臭氧層之維也納公約（Vienna Convention for the Protection of the Ozone Layer）在聯合國環境規劃署(UNEP)的召集下，於 1985 年在各國協議下通過，然而此公約只是促進國家研究臭氧機制、掌握排放現況及資訊交流協議文，並未具任何約束力的減量目標，直到 1987 年通過具有實質管制規定及約束力的蒙特婁破壞臭氧層物質管制議定書（Montreal Protocol on Substances that Deplete the Ozone Layer），且公約於 1988 年及議定書於 1989 年正式生效，在 2013 年 9 月，全部 197 個聯合國會員皆已批准與承諾遵循管制規範的議定書，更讓全球禁止生產氟氯碳化物(Chlorofluorocarbons，CFCs)與海龍且消費量降為零，且大幅展開削減氟氯烴(Hydrochlorofluorocarbons，HCFCs)。歷年來，議定書的締約方至 2016 年底期間，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，並分階段削減列管化學物質，更是全球公認最成功的國際環保協議。

為能掌握蒙特婁議定書發展動態，且向其他開發中國家宣傳我國管制列管化學物質的成果，我國組團以聯合國環境署認可之非政府組織（Non-governmental organization，NGOs）名義觀察員（Observer）身分參加此會議。主要目的在蒐集分析會議討論之議題內容、各國替代技術與管制趨勢資訊，俾作為未來研擬我國因應管理策略與方案時之參考，並提出對我國後續管理方案有效之建議。

本次會議共計產出 21 個決議文，包括吉佳利修正案批准情況、修訂 0.5%之 HCFCs 消費量允許用途、CFC-11 不當排放決議、氫氟碳化物（Hydrofluorocarbons，HFCs）與溴化甲烷之銷毀技術評估、海龍與替代品之可取得性、全球實驗室與分析用途之豁免、溴化甲烷關鍵用途豁免、列管物質 ODS 與 HFCs 之生產及消費量申報、MOP-31 舉辦地點等。

目　　錄

壹、 前言

一、 1930 年美國 DuPont 開發氟氯碳化物後，由於穩定性高，不助燃、不自燃、不易起化學變化及對人體傷害小等優點，廣泛應用在塑膠發泡、噴霧推進、冷凍空調系統、電子金屬零組件清洗溶劑、氣喘醫療、海龍滅火器等用途，便以氟氯碳化物(Freon)為商品名，並大量製造取代當時普遍使用的二氧化硫與氨等具毒性溶劑。

二、 1970 年代隨著 CFCs 大量在消費市場使用，其中又以 CFC-11（CCl_3F）、CFC-12（CCl_2F_2）及 CFC-113（$C_2Cl_3F_3$）三種為最大使用量，除了氟氯碳化物（CFCs）外，會破壞臭氧層還包括氟氯烴（HCFCs）、海龍（Halon）、四氯化碳(Carbon Tetrachloride)（CCl_4）、1,1,1-三氯乙烷（Methyl Chloroform）、氟溴烴(Hydrobromofluorocarbons，HBFCs)和溴化甲烷。其中以海龍對於臭氧層的破壞力最強，是常見的滅火劑；溴化甲烷則主要使用於農業及檢疫用途，這些物質使用後在大氣環境中不斷累積，經科學家研究發現對全球環境的改變及潛在衝擊，於對流層中幾乎不會與任何物質反應，惟擴散至平流層後，受到紫外線照射而釋出高活性氯原子與溴原子，再與臭氧反應，致使臭氧層的濃度變稀薄，而含有氫的 HCFCs 及氟溴烴對臭氧層破壞力相對較小。

三、 1980 年代南北極臭氧層厚度急遽變化，由其在春季時南極上空的大氣臭氧含量約減少 40%以上，急遽減少的區域面積甚至大於南極大陸，臭氧層破洞首度被觀察，而其實臭氣洞並不是真正有個「洞」，而是表示臭氧含量反常稀少的區域。南極臭氧層厚度變化極大，從 100 至 400 Dobson Unit，如果厚度低至 220 Dobson Unit 以下，即稱為臭氧層破洞。所謂 Dobson Unit (DU)是指標準狀態下(0℃,1 大氣壓)，氣體厚度為 0.01mm 之氣體量單位。

四、 1985 年聯合國環境規劃署召集與協調各國共同攜手研商對策，在奧地利維也納連署 28 個國家通過維也納保護臭氧層公約，以保護臭氧層持續遭受到破壞，並研擬具體管制措施管制臭氧層破洞，至今維也納公約已受到 197 個國家批准。

五、 1987 年 9 月 16 日聯合國環境規劃署於在加拿大蒙特婁市進一步通過具有實質管制規範及約束力的「蒙特婁議定書」，簽屬國家包括當時的 24 個國家及歐洲經濟體，管制納入氟氯碳化物（CFCs）及海龍 Halons-1301、1211、2402 等 8 種列管物質，致力減少產生及使用破壞臭氧層物質（ODS），以促進國家間合作研究臭氧機制、檢視排放現況及相關資訊交流的架構協議。

六、 1989 年 1 月 1 日蒙特婁議定書正式生效後，包括已開發國家（Article 2 國家）及開發中國家（Article 5），每年召開一次締約國會議，檢討議定書執行現況、並協商其他破壞臭氧層物質（Ozone Depleting Substances，ODS）管制方案及管制議題，分別自 1989 年及 1996 年起分階段削減 CFCs 與 Halons 之生產與消費量，至今「蒙特婁議定書」已成為聯合國 197 個國家皆已承諾遵循之國際環保公約。

七、 國家一旦提出批准 ratification（R）或接受 acceptance（At）或認同 approval（Ap）或同意 accession（Ac）等任何一份文件至臭氧秘書處，即顯示其願意接受公約、議定書或修正案規範的責任與義務。不過，臭氧層尚未恢復，各國仍應持續為保護臭氧層而努力，且蒙特婁議定書已新增管制物質與管制時程，各過仍應強化管制 ODS 之最終排放，並針對 HFCs 展開管制與替代工作，以達永續環境與保護地球的目標。

八、 公約、議定書及各修正案通過情形，包括 1990 年的倫敦修正案、1992 年的哥本哈根修正案、1997 年的蒙特婁修正案、1999 年的北京修正案及 2016 年吉佳利修正案，如表 1：

(一) 倫敦修正案：1990 年 6 月於英國倫敦召開第 2 次締約國大會（MOP-2），修訂議定書之管制措施，擴大管制物質範圍，新增 10 種四氯化碳、四氯化碳、三氯乙烷於 ODS 管制清單中，並決議五種 CFCs 及三種海龍(Halons)於 2000 年之前停止生產。此外，設立多邊基金（Multilateral Fund）促進議定書的推廣執行，資助開發中國家執行議定書減量方案時可能需承擔的部分與支持資訊流通活動，包括：技術援助、教育訓練及秘書處行政工作等。基金每三年重新審議編列。已於 1992 年 10 月 8 日正式生效，至今有 197 個締約國批准此修正案。

(二) 哥本哈根修正案：1992 年 11 月於丹麥哥本哈根召開第 4 次締約國大會（MOP-4），再度擴大管制物質範圍，包括新增溴化甲烷(Methyl Bromide)、氟溴烴（Hydrobromofluorocarbons，HBFCs）及氟氯烴（HCFCs）管制，另決議將現有管制物質之削減時程大幅提前，自 1994 年 1 月 1 日起除必要用途外禁止生產海龍，自 1996 年 1 月 1 日起將 CFCs、四氯化碳、1,1,1-三氯乙烷、HBFC 等物質的消費量削減至零，並啟動「未遵約程序」（non-compliance procedure），成立推展委員會（Implementation Committee），來審查締約國未遵守約定之案例與相關後續處置。已於 1994 年 6 月 14 日正式生效，截至 2012

年 1 月 12 日止，共計有 197 個締約國批准此修正案。

(三) 蒙特婁修正案：1997 年第 9 次締約國大會（MOP-9）於加拿大蒙特婁舉行，也同意增加建置 ODS 進口與出口的許可制度之要求條文（Article 4B），決議對未批准哥本哈根修正案的締約國進行溴化甲烷貿易禁止。已於 1999 年 11 月 10 日正式生效，共計有 197 個締約國批准此修正案。

(四) 北京修正案：1999 年 11 月於中國大陸北京召開之第 11 次締約國會議通過北京宣言，同意納入管制 HCFCs 生產管制及 BCM（Bromochloromethane）生產量的條文，並訂定期削減期程，此外，要求締約國提報使用於檢疫及裝運前處理（Quarantine and Preshipment，QPS）的溴化甲烷用量。已於 2002 年 2 月 25 日正式生效，共計有 197 個締約國批准此修正案。

表 1、蒙特婁議定書及其修正案之批准情形

公約/修正案	通過年	批准之締約國總數
維也納公約	1985	197
蒙特婁議定書	1987	197
倫敦修正案	1990	197
哥本哈根修正案	1992	197
蒙特婁修正案	1997	197
北京修正案	1999	197
吉佳利修正案	2016	65

資料來源：http://ozone.unep.org/en/about-secretariat

(五) MOP-19 調整案：2007 年 9 月第 19 次締約國會議，因「聯合國技術與經濟評估委員會 2006 年評估報告」指出，多數 HCFCs 用途已具有經濟有效之環境友善替代品或技術，於 MOP19 決議加速 HCFCs 廢除時程，已開發國家（Article 2 所列國家）HCFCs 消費量與生產量削減時程由 2010 年達成基準量 65%的削減率，提高為削減 75%，至 2015 年達成 90%的削減率，在 2020 至 2030 年間得保留基準量 0.5%供既有設備維護需求，2030 年後完全消減 HCFCs，該項決議文業於 2008 年 3 月正式生效。

(六) 吉佳利修正案：2016 年 10 月 15 日第 28 次締約國會議，在盧安達吉佳利決議納入 17 種溫室氣體氫氟碳化物（HFCs）為管制物質，列入受控物質清單要逐步淘汰的協議，並考量全球各國的因應能力不同，針對已開發國家(Article2)、開發中國家(Article5)(分為非高溫國家及高溫國家)給予不同削減時程，如圖 1，另新增高溫國家豁免準則，讓連續 10 年中每年有兩個月之月平均氣溫最高峰超過 35℃的國家，針對特定的冷凍空調設備使用量允許豁免，該豁免允許該國可延遲管制凍結年四年期限。此修正案於 2019 年 1 月 1 日前，至少有 20 個締約方批准才可生效，此外，還新增一個針對蒙特婁第 4 條限制與非締約方進行 HFCs 貿易條款生效日，在 2033 年 1 月 1 日以前有 70 個締約方核准吉佳利修正案，貿易限制條款即生效，或 70 個締約方批准後 90 天生效，截至 2018 年 12 月 26 日止，計有 65 個國家批准，已於 2019 年 1 月 1 日起正式生效。

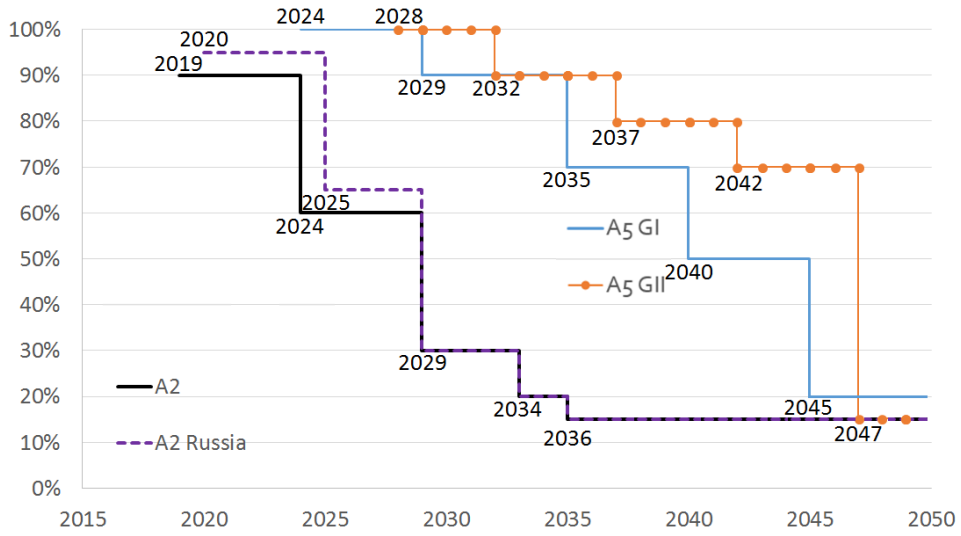

圖 1、吉佳利修正案削減時程圖

(七) MOP-30 調整案：2018 年 11 月蒙特婁議定書第 30 次締約方會議決議，2020 年後 0.5%之 HCFCs 消費量與生產量之使用用途範疇除 2020 年 1 月 1 日以前使用中之冷凍空調設備維修使用外，擴增 2020 年 1 月 1 日以前使用中之滅火和消防設備維修使用、火箭引擎製造之溶劑使用、及治療燒燙傷之藥用噴霧罐等用途。

九、 聯合國環境規劃署（UNEP）臭氧秘書處於 2018 年 11 月 5 日至 9 日在厄瓜多基多（Quito,Ecuador）舉行蒙特婁議定書第 30 次締約方會議，約計有來自全球超過 250 多個國家及民間單位，包括各締約國政府機關代表、聯合國周邊組織、政府間組織、非政府組織及相關產業團體共襄盛舉，圖 2、3。

圖 2、會議地點：厄瓜多基多 Quorum Quito Convention Centre

圖 3、大會會場

貳、 我國代表團

本署為掌握蒙特婁議定書管制趨勢，並向國際宣揚我國的遵循成果，以財團法人工業技術研究院名義，以非政府組織(NGOs)身分參加，由本署空保處謝副處長 炳輝率團，謝環境技術師 議輝；外交部朱秘書 進良；工業技術研究院胡副組長 文正、楊經理斐喬，徐副研究員 麗瀅，共計 6 人與會參加，成員任務分工及行程，如表 2、3。

表 2、成員任務分工表簡要說明

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	副處長	謝炳輝	團長/對外交流
	環境技術師	謝議輝	資訊蒐集/會議紀錄
外交部	秘書	朱進良	法律/對外交流
工業技術研究院 能源與環境研究所	副組長	胡文正	技術資訊/對外交流
	經理	楊斐喬	技術資訊/對外交流
	副研究員	徐麗瀅	資訊蒐集/庶務行政

參、出國行程

表 3、行程簡要說明

2018 年 11 月 02 日至 11 月 04 日	啟程
2018 年 11 月 05 日至 11 月 09 日	報到、出席會議/活動
2018 年 11 月 10 日至 11 月 13 日	返程

肆、 與會目的

為密切掌握國際公約管制發展趨勢，並建立我國與其他國家管制與替代技術資訊分享管道，我國由 UNEP 認可之 NGO 工業技術研究院以觀察員身分參加蒙特婁議定書第 30 次締約方大會（MOP-30），參與此會議。主要目的在蒐集分析本次會議討論之議題內容、各國替代技術與管制趨勢資訊，並提出對我國後續管理方案有效之建議，俾作為未來研擬我國因應管理策略與方案時之參考。

伍、 會議議程

本(2018)年度蒙特婁議定書締約國會議於厄瓜多基多召開，2018 年 11 月 5-9 日為期 5 天的會議，分為 2018 年 11 月 5-7 日 3 天的預備會議及 11 月 8-9 日 2 天的高層會議。會議議程，如表 4：

表 4、蒙特婁議定書第三十次締約國會議議程

日期	議程
11/5	1. 厄瓜多政府代表的發言、聯合國環境規劃署代表的發言。 2. 組織事項：會議架構：蒙特婁議定書締約方第 30 次會議討論確認、預備會議討論議題項目、會議工作程序與架構。 3. 審議蒙特婁議定書各信託基金的財務報告及預算：2017 年信託基金財務報告、修訂 2018 年預算及 2019 年和 2020 年信託基金預算及增編說明。 4. ODS 銷毀技術。 5. 多邊基金執行委員會制定逐步減少 HFCs 技術資金進展。 6. 蒙特婁議定書吉加利修正的批准情況。
11/6	7. 海龍及其替代品取得性。 8. 2019 年及 2020 年溴化甲烷關鍵用途豁免提名。 9. 受控物質的實驗室及分析程序的開發。 10. 低 GWP 值替代品過渡期間 HCFCs 及 HFCs 之間替代。 11. 減少 HFCs 的能源效率問題。

	12. 技術和經濟評估小組關於冷媒、空調和熱泵能源效率報告。
11/7	13. HFCs 內容的擬議調整。 14. CFC-11 意外排放。 15. 財政及技術援助資格的問題。 16. 各評估小組及職權範圍、組成、平衡及專業領域。 17. 審議技術和經濟評估小組專家的提名及其他提名。 18. 蒙特婁議定書不遵守情事程序及建議通過的決議。
11/8	1. 高階會議開幕。 2. 開幕典禮： 厄瓜多爾政府總統致詞、聯合國環境規劃署的代表致詞、蒙特婁議定書締約方第 29 次會議主席致詞。 3. 會議架構：選舉蒙特婁議定書締約方第 30 次會議的主席團成員。 4. 通過蒙特婁議定書締約方第 30 次會議的高級別會議議程。 5. 各評估小組介紹其工作進展和通過 2018 年四年期評估發現的任何關鍵問題。 6. 執行蒙特婁議定書多邊基金執行委員會主席介紹執行委員會、多邊基金秘書處以及多邊基金各執行機構的工作情況。 7. 各代表團團長發言和關鍵議題討論。
11/9	8. 預備會議共同主席的報告和審議和蒙特婁議定書締約方第 30 次會議通過的各項決定。 9. 其他事項。 10. 通過蒙特婁議定書締約方第 30 次會議的各項決定。 11. 通過蒙特婁議定書締約方第 30 次會議的報告。 12. 蒙特婁議定書締約方第 31 次會議的日期和地點。 13. 會議閉幕。

陸、 會議過程及重要決議

MOP 從早期傳真報名表、E-mail 報名表至 2014 年起改為使用網路填單報名，臭氧秘書處自 2017 年起提供專屬工業技術研究院之報名網址，我國以非政府組織（NGOs）的選項完成報名，並收到臭氧秘書處回復順利取得 Priority Pass 報名完成，而至本次 MOP-30 大會地點 Quorum Quito Convention Centre 報到，現場也以 Pass 順利領取會議名牌順利入場參與會議，如圖 4。

圖 4、我國出席人員取得識別證情形

一、 會議重點內容

本次會議共計產出 21 個決議文，包括吉佳利修正案最新批准情況、蒙特婁議定書調整案修訂 0.5%之 HCFCs 消費量允許用途、要求 TEPA 針對 CFC-11 進行潛在排放源推估、適用於 HFCs 與溴化甲烷之銷毀技術、未來海龍與其替代品之可取得性、更新全球實驗室與分析用途之豁免、2019 年與 2020 年溴化甲烷必要用途豁免、ODS 與 HFCs 之生產及消費量申報、MOP-30 舉辦地點等，重點說明如下：

(一) 吉佳利修正案批准情況（Decision XXX/1）

1. 2017 年 11 月 18 日已有 20 個會員國提交批准或接受文件，超過修正案生效的門檻，故吉佳利修正案自 2019 年 1 月 1 日正式生效，包括：

(1) 歐洲：挪威、英國、芬蘭、德國、盧森堡、斯洛伐克、瑞典、荷蘭、愛爾蘭、法國、保加利亞、比利時、葡萄牙、立陶宛、拉脫維亞、匈牙利、奧地利、捷克、愛沙尼亞、歐盟、匈牙利、希臘、瑞士、丹麥、克羅埃西亞、

斯洛維尼亞等完成核准程序，但歐盟 28 個會員國中僅有 22 國完成，歐洲地區尚有 6 國：義大利、西班牙、賽普勒斯、馬爾他、波蘭、羅馬尼亞尚未完成核准程序。

(2) 北美洲：加拿大，但美國為吉佳利修正案發起國之一，卻因政治因素，至今尚未完成核准程序。

(3) 中美洲、拉丁美洲及加勒比海地區：巴貝多、千里達及托巴哥、格瑞納達、墨西哥、巴拿馬、巴拉圭。

(4) 南美洲：智利、哥斯大黎加、厄瓜多、烏拉圭。

(5) 亞洲： 朝鮮人民共和國（北韓）、寮國、馬爾地夫、日本，但中國大陸、印度、南韓及新加坡皆尚未核准。其中新加坡已研議特定稅則號列之 HFCs 進口許可證規範。

(6) 非洲：馬利、盧安達、葛摩、馬拉威、象牙海岸、貝南共和國、加彭、多哥、格瑞那達、烏干達、布吉納法索、尼日、塞內加爾、奈及利亞。

(7) 大洋洲：澳大利亞、密克羅尼西亞、馬紹爾群島（我邦交國）、帛琉（我邦交國）、薩摩亞、萬那杜共和國、紐埃、吐瓦魯（我邦交國）、斯里蘭卡、東加王國。

2. 有關吉佳利修正案之批准，本次會議產生一項決議，說明如下：

(1) 截至 2019 年 1 月 8 日計有 65 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

(二) 蒙特婁議定書調整案修訂 0.5%之 HCFCs 消費量允許用途（Decision XXX/2）

1. 依據蒙特婁議定書之規範，A2 國家將自 2020~2030 年間控制 HCFCs 消費量與生產量在 0.5%以內，且僅限冷凍空調維修用途使用；澳洲、加拿大及美國提出蒙特婁議定書調整案，針對仍使用 HCFCs 之滅火系統，希望也能納入 0.5%消費量與生產量使用用途。

2. 關於此議題，美國強調滅火攸關安全與公眾健康的議題，建議於 2020~2030

年間可持續生產與使用；另俄羅斯也要求納入藥用噴霧罐（medical aerosols）和火箭引擎（rocket engine）之溶劑等兩種用途；然而歐盟表示，考量蒙特婁議定書的目的是逐步削減 HCFCs 的用量，若現在調整 A2 國家的需求，未來十年後 A5 國家也會面臨相同的問題，建議是否以關鍵用途豁免的方式進行申請。

3. 奈及利亞提醒，在這種情況下允許的豁免用途可能造成其他用途豁免請求的大門；隨後乃成立工作小組（contact group）針對此調整案議題持續進行討論。歷經 5 天的密集討論，最後決議如下：

(1) 通過蒙特婁議定書調整案：同意 2020 年後 0.5%之 HCFCs 消費量與生產量之使用用途範疇除 2020 年 1 月 1 日以前使用中之冷凍空調設備維修使用外，擴增 2020 年 1 月 1 日以前使用中之滅火和消防設備維修使用、火箭引擎製造之溶劑使用、治療燒燙傷之藥用噴霧罐等用途。

(2) 鼓勵發展製造火箭引擎之溶劑與治療燒燙傷之藥用噴霧罐之 HCFCs 替代品，以減少和停止此類用途之 HCFCs 使用。

(3) 鼓勵 HCFCs 之回收、回用與再精製，及使用其替代品。

(4) 要求技術暨經濟評估委員會（Technology and Economic Assessment Panel，TEAP）於下一期四年期報告、2023 年 MOP-35 及 2027 年 MOP-39 時提供 HCFCs 相關資訊，包括回收、回用與再精製的數量、國家庫存量、以及 0.5%之 HCFCs 消費量與生產量之使用用途範疇的替代品。

(5) 應依循吉佳利修正案下審查氟氯烴調整案的靈活性。

(三) 多邊基金逐步減少 HFCs 供資（DecisionXXVIII/2）

1. 印度、阿根廷、巴林、巴西、黎巴嫩和沙烏地阿拉伯提案，回顧第 XXVIII/2 號決議，請執行蒙特婁議定書多邊基金執委會在吉佳利修正獲得通過之後的兩年內，制定逐步減少 HFCs 消費及生產供資準則，包括成本效益等，並將這些準則提交締約大會，徵求締約方意見及建議。

2. 本案由多邊基金執行委員會編寫報告，由執委會主席確認，以提交至蒙特婁

議定書第三十次會議，說明制定逐步減少 HFCs 供資準則的進展，並決議：

(1) 請多邊基金執委會繼續開展工作，制定逐步減少 HFCs 消費及生產的供資準則，包括成本效益閾值，並介紹成本準則每項要素的進展詳情，作為執行委員會向締約方第三十一次會議所提交報告的部分內容，並於此後繼續工作，直至這些準則得到最後確定。

(2) 請多邊基金執委會向締約方會議提交所制定的準則，以徵求締約方的意見和建議，最後由執委會確認這些準則。

(四) CFC-11 不當排放（Decision XXX/3）

1. 依據蒙特婁議定書之規範，A2 國家與 A5 國家已分別自 1996 年與 2010 年將 CFCs 削減為零，然而 2018 年 5 月 Stephen A. Montzka 等人於 Nature 期刊發表，自 2013 年起大氣中 CFC-11 濃度每年下降的速度較 2002~2011 年間的降幅減少 50%，且推測是東亞地區有大量排放造成，隨後英國環保團體環境調查局（Environmental Investigation Agency，EIA）的調查報告指出中國大陸仍有發泡廠商因成本考量而非法使用 CFC-11 作為發泡劑，此發現悖離議定書下設多邊基金提供資金補助開發中國家加速與達成削減 CFCs 之目的及成果。

2. 有關此議題，約旦提及 CFC-11 具穩定性，此排放結果是否是早期造成的，要求應考量 CFC-11 生命周期澄清其量測結果；美國要求釐清 CFC-11 與 CFC-12 相互作用的關聯；中國大陸請 TEAP 說明 CFC-11 量測的方法論，關於 1980 年 CFC-11 排放的峰值約 35 萬噸到 40 萬噸，是否有評估不同應用領域下使用 CFC-11 的情況與其生命週期；發泡產品於使用與棄置階段皆會排放，發泡的排放應隨時間而減少，建議 TEAP 說明計算過程的排放因子，如不同發泡產品的生命週期與報廢之排放比例，及不同區域排放的情形。此議題歷經 5 天的密集討論，最後決議如下：

(1) 要求 TEAP 於下一期四年期報告說明 CFC-11 排放量增加的資訊，包含大氣監測和推估模擬（例如假設條件），並於 2019 年蒙特婁議定書不限成員工作小組會議（Open-ended Working Group，OEWG 41）時報告、於 MOP 31 提出更新報告、以及於後（2020）年 MOP-32 提出最終報告。

(2) 要求 TEAP 向各締約方提供 CFC-11 排放的潛在來源、可能造成 ODS 排放之潛在生產與使用、以及相關區域之 ODS 庫而導致不當 CFC-11 排放等相關資訊，並於蒙特婁議定書不限成員工作小組第 41 次會議時提供初步報告、於 MOP-31 提出最終報告。

(3) 請各締約方提供上述有助於 TEAP 釐清 CFC-11 不當排放之科學和技術的訊息，並於 2019 年 3 月 1 日以前提供給臭氧秘書處。

(4) 鼓勵各締約方在適當且可行的情況下支持科學研究，包含大氣量測以進一步研究近年 CFC-11 不當排放。

(5) 鼓勵相關的科學/大氣組織與機構進一步研究並說明目前 CFC-11 排放相關的發現，以促進上述(1)的評估結果。

(6) 請臭氧秘書處與蒙特婁議定書下執行多邊基金的祕書處協商，向各締約方概述議定書之程序及與 ODS 有關的基金以供各締約方審查，並確保各締約方持續履行議定書的義務，以及基金的協議條款，包括監測、報告與確證，並於 OEWG 41 時提出報告、於 MOP 31 提出最終報告。

(7) 要求各締約方：

i. 採取適當措施，確保國內 CFC-11 的管控措施是持續有效且按規定執行，以符合議定書賦予削減 ODS 的義務。

ii. 提報秘書處可能造成不當 CFC-11 排放量增加之違法行為。

(五) ODS 銷毀技術（Decision XXX/6）

1. 有關銷毀 HFCs 可行的技術，TEAP 已於 2018 年 4 月公布評估報告，並陸續依締約方提供的銷毀資訊修訂該評估報告。MOP 30 會議中，TEAP 報告在 A2 國家已有以液體注射焚化（Liquid Injection Incineration）與旋轉窯（Rotary Kiln Incineration）銷毀 HFCs 的案例，且其破壞去除率與其他污染物排放量皆能符合標準，建議該兩項銷毀技術適用於任何 HFCs（包含 HFC-23）。

2. 約旦請 TEAP 說明在 A5 國家以液體注射焚化與旋轉窯之研究案例；尼泊爾提及 TEAP 在報告中提到部分銷毀技術的適用性很強所以具銷毀潛力，此部

分是否是說需要在特定條件下才能銷毀。

3.TEAP 回覆，列為具銷毀潛力的技術皆已批准銷毀 ODS，但尚未有銷毀 HFCs 達破壞去除率的證明，或者該技術已可銷毀 ODS 以外的氯化有機物且達破壞去除率，但尚未有銷毀 HFCs 的實績，然而從技術面綜合評估後若可行則會列入具高潛力；經過多方的討論，隨後成立技術小組針對此 HFCs 銷毀議題持續進行討論，最後決議如下：

(1) 針對高濃度 HFCs（HFC-23 除外）批准水泥窯、旋轉窯等 12 項可行的銷毀技術；針對高濃度 HFC-23 批准液體注射焚化等 8 項銷毀技術；針對溴化甲烷批准 1 項銷毀技術，詳如表 5。

(2) 請 TEAP 持續評估本決議中尚未核准或尚未決定的銷毀技術，以及其他可行的銷毀技術，並於 OEWG 時報告（須於 MOP 33 之前）；另若締約方可提供更多銷毀 ODS 技術的資訊，尤其是水泥窯銷毀 HFC-23 的資訊，則 TEAP 應提早報告

(3) 請各締約方向秘書處提供上述(2)的相關資料。

表 5、TEAP 評估適用於 HFCs 與溴化甲烷之銷毀技術

技術	適用性				
	Concentrated Sources			Dilute Sources	
	附件 E	附件 F			附件 F
	Group 1	Group 1	Group 2		Group 1
	Methyl Bromide	HFCs	HFC-23	ODS	HFCs
破壞去除率 (Destruction & Removal Efficiency,DRE)	99.99%	99.99%	99.99%	95%	95%
水泥窯	未定	認可	未定		
氣體 /煙氣氧化法	未定	認可	認可		
液體注射焚化	未定	認可	認可		
都市廢棄物焚化爐	未定			認可	認可
多孔熱反應	未定	認可	未定		
反應爐裂解	未定	認可	認可		
旋轉窯	未定	認可	認可	認可	認可

技術	適用性				
	Concentrated Sources			Dilute Sources	
	附件 E	附件 F			附件 F
	Group 1	Group 1	Group 2		Group 1
	Methyl Bromide	HFCs	HFC-23	ODS	HFCs
氬電漿	未定	認可	認可		
感應式耦合射頻電漿	未定	未定	未定		
微波電漿	未定	未定	未定		
氮電漿	未定	認可	未定		
便攜式電漿	未定	認可	未定		
H_2 和 CO_2 化學反應	未定	認可	認可		
氣相催化脫鹵	未定	認可	未定		
熱蒸汽反應	未定	認可	認可		
甲烷熱反應	未定	未定	未定		
溴化甲烷熱反應	認可	未定	未定		

(六) 未來海龍與替代品之可取得性（Decision XXX/7）

1. 依據 TEAP 評估報告指出，估計 2018 年底海龍庫（海龍 1301）僅剩 37,750 公噸，其中有 16,250 公噸（43%）在日本。

2. 此外 TEAP 以 8 種情境推估海龍 1301 使用情形，估計 2032~2054 年將會用完，詳如表 6。有關海龍與其替代品取得性的議題，隨後成立接觸小組針對此議題持續討論，最後決議如下：

(1) 臭氧秘書處與國際海事組織（International Maritime Organization，IMO）聯絡，以相互交流海龍的供應現況。

(2) TEAP 技術評估小組：

(1)持續與國際海事組織、國際民航組織（International Civil Aviation Organization，ICAO）聯繫，已掌握海龍可使用的數量以及其替代品資訊。

(2)強化船舶回收海龍的方法。

(3)評估各締約方對海龍的需求、可回收海龍的其他來源及機會。

(4)在 OEWG 42 以前，提供上述海龍可取得之評估報告。

表 6、TEAP 推估全球海龍 1301 使用情境

Scenario	Total Availabe Worldwide supply in 2018	Annual emission rate(aviation)	Annual emission rate (non-aviation)	Global overall emission rate	Year available supply runs out
1	11,500	2.3~2.8%	0.1~3%	1.6%	2048
2	11,500	7.6%	0.1~3%	1.9%	2038
3	11,500	5.0%	1~5%	2.3%	2040
4	11,500	15.0%	1~5%	3.9%	2032
5	13,750	2.3~2.8%	0.1~3%	1.6%	2054
6	13,750	7.6%	0.1~3%	2.0%	2042
7	13,750	5.0%	1~5%	2.3%	2045
8	13,750	15.0%	1~5%	3.8%	2034

(七) 更新全球實驗室與分析用途之豁免（Decision XXX/8）

1. 實驗室及分析用途（laboratory and analytical uses , LAU）包含校正、溶劑萃取、稀釋劑及特定化學分析之載流氣體，豁免申請的 ODS 主要是四氯化碳、CFC-113 與 1,1,1-三氯乙烷；依據 2018 年 TEAP 報告指出，過去 HCFCs 被要求作為實驗室及分析用途豁免的項目如下：

2. 分析使用之標準品，如 HCFC-21、HCFC-22、HCFC-31、HCFC-122、HCFC-123、HCFC-124、HCFC-133a、HCFC-141b、HCFC-142b、HCFC-151a、HCFC-23。

   (1) 原料用途（實驗室化學合成之試劑），如 HCFC-22、HCFC-242、HCFC-252。

   (2)溶劑（實驗室化學合成之惰性溶劑），如 HCFC-31。

   (3)毒性物質研究之標準品，如 HCFC-21。

   (4)需要被檢測的樣品含有 HCFCs 成份。

3. 由於上述 HCFCs 之替代品進度緩慢，考量 A2 國家 2020 年後仍有需求，且

過去 HCFCs 也未豁免作為 LAU 使用，故最後決議將 HCFCs 納入 LAU 之豁免項目，申請豁免至 2021 年 12 月 31 日。

(八) 2019 年與 2020 年溴化甲烷關鍵用途豁免（Decision XXX/9）

1. 現有庫存或再循環利用的溴化甲烷在數量和質量上不足以滿足需要時，才應准許為關鍵用途生產和消費溴化甲烷，實行關鍵用途豁免的締約方在發放許可、准許或授權為關鍵用途生產和消費溴化甲烷時，應考慮現有庫存或再循環利用的溴化甲烷在數量和質量上可在多大程度上滿足需要，請有關鍵用途豁免的締約方提交年度核算框架以及國家管理策略，有些締約方最近不再提交關鍵用途豁免請求，而申請方開發替代品或代用品的努力也是為了實現同樣的目標，相關國家進展情形如下：

   (1)澳大利亞草莓匍匐莖行業研究方案取得進展，澳大利亞規劃 2018 年及 2019 年試驗成功而且替代品註冊完畢，將轉向使用替代品。

   (2)2019 年加拿大將致力於繼續開展研究方案，以取得進一步的進展推動替代品。

   (3)阿根廷研究方案繼續尋求開發溴化甲烷替代品的目標。

2. 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，如表 7。

3. 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。

表 7、2019 年與 2020 年溴化甲烷關鍵用途豁免

單位：公噸

	用途	2019 年	2020 年
澳大利亞	草莓走莖分株苗（匍莖）	-	28.98
阿根廷	草莓走莖分株苗（匍莖）	15.71	-
	番茄	25.6	-
加拿大	草莓走莖分株苗（匍莖）	5.261	-
南非	碾磨（Mills）	1	-
	農場（structures）	40	-

(九) 逐步減少 HFCs 的能源效率有關的問題（Decision XXIX/10）

1. 冷媒、空調和熱泵能效技術的問題，聯合國所有機構在全球氣候變化的威脅及其對全世界造成日益嚴重的影響方面，針對執行吉佳利修正將作出更多努力來減少溫室氣體排放，並創造更多機會以解決能源效率問題，積極推動溫室氣體的減排，從發展中國家所面臨低能效、倚賴技術大量推廣進入市場的挑戰。

2. 技術和經濟評估小組在 2018 年 5 月及 2018 年 9 月修訂版中提到，舉行逐步減少 HFCs 的能源效率機遇講習班，強調通過批量採購計畫進行投資，可有利於資金流動，並集中處理大量小型專案來降低交易成本，克服能源效率方面的主要障礙。

3. 在 2018 年臭氧消耗科學評估中確認，在低全球暖化潛勢（Global warming potential，GWP）值替代冷媒的過程中改進冷媒和空調設備的能源效率，可有效推動吉佳利修正案改善氣候變遷效益，以指導如何在逐步減少 HFCs 過程中保持及提高低 GWP 值和零 GWP 值替代技術和設備的能源效率，並決議下列事項：

(1)請多邊基金執行委員會提供資金支持，按蒙特婁議定書第 5 條第 1 款的國家能夠制定及執行政策規章，避免低能效的冷媒、空調和熱泵設備進入市場，並推動這些單位獲得節能技術。

(2)請技術和經濟評估小組在年度報告中列入各單位與各地理區域（包括高環境溫度國家）中高能效替代技術和設備的成本和可得性的最新資訊。

(3)請多邊基金執行委員會要求執行機構協助在認證、安全性和標準、提高意識和能力建設方面提供有針對性的培訓，幫助蒙特婁議定書第 5 條第 1 款行事的締約方保持和提高冷媒、空調和熱泵設備的能源效率。

(4)建立一個多邊基金供資窗口，用於按蒙特婁議定書第 5 條第 1 款行事的締約方開展的示範項目，以保持和（或）提高維修保養部門的能源效率，從而提供關於成本和成本效益的資訊以及實踐經驗。

(5)請多邊基金執行委員會制定大宗採購流程的指導方針，以便集中處理以可承受價格購買高能效和較低 GWP 值設備的需求。

(6)請多邊基金執行委員會與其他基金和金融機構聯絡，探討增加改進多邊基金資助專案的能源效率而提供的共同資助的問題。

(十) 列管物質 ODS 與 HFCs 之生產及消費量申報（Decision XXX/10 與 XXX/11）

1. 依據蒙特婁議定書第 7 條規範，各締約方每年應向秘書處申報列管化學物質進口量、出口量及消費量，因應吉佳利修正案自 2019 年生效，有關 HFCs 之基準量與消費量申報議題最後產出 2 個決議。

2. 有關申報消費量之注意事項也通過了 1 個決議，重點摘要如下：

(1) CFC-123、HCFC-124、HCFC-141 及 HCFC-142 消費量申報表格修正與 GWP 值（Decision XXX/10）。

i. 臭氧秘書處在計算締約方之 HFCs 基準量時，HCFC-123** 和 HCFC-124**之 GWP 值分別用 HCFC-123 和 HCFC-124 計算之。

ii. 臭氧秘書處在計算締約方之 HFCs 基準量時，HCFC-141 和 HCFC-142 之 GWP 值分別用 HCFC-141b 和 HCFC-142b 計算之。

(2) A5 國家提報 HFCs 消費基準量的時間點（Decision XXX/11）。

i. 吉佳利修正案自 2019 年正式生效後，各締約方應依蒙特婁議定書第 7 條規定自生效日起 3 個月內向秘書處申報基準年之 HFCs 生產量、消費量及 HFC-23 排放量，然而 A5 國家計算 HFCs 基準量的年份尚未發生（A5 Group I 國家計算的年份為 2020 至 2022 年、A5 Group II 國家為 2024 至 2026 年）。

ii. 考量消費基準量應以實際的數據來計算，為此本次會議最後決議，請執行委員會與締約方會議，延後審議 A5 國家之 HFCs 基準量，即 A5 Group I 國家之 HFCs 消費基準量於 2023 年 9 月以後（基準年結束 9 個月以後）再進行審議；A5 Group II 國家於 2027 年 9 月以後再進行審議。

(3)HFCs 混合物申報

i. CFCs 和 HCFCs 貿易皆以純物質為主，含 CFCs 或 HCFCs 混合物的貿易量較少，因此過去締約方申報混合物時皆計算混合物中純物質的含量，並納入純物質中計算。

ii. 考量 HFCs 貿易大多以混合物為主，因此締約方可以選擇申報 HFCs 混合物的數量，或者申報混合物中所含 HFCs 純物質的數量，即以申報 R 410A (50% HFC 32; 50% HFC 125)為例，可以申報 R 410A 的總量，或申報 R 410A 總量中各別 HFC 32、HFC 125 的數量，秘書處已提供 HFCs 混合物之各成份與占比供申報時參考，表 8、9。

表 8、HFCs 消費量申報表格

(1) Annex/group	*(2) Substance*	*Total quantity imported for all uses*		*(5) Quantity of new substance imported for feedstock uses*	*Quantity of new substance imported for exempted essential, critical or other uses**	
		(3) New	*(4) Recovered and reclaimed*		*(6) Quantity*	*(7) Decision / type of use* or remarks*
F-Group I	HFC-32 (CH_2F_2)					
	HFC-41 (CH_3F)					
	HFC-125 (CHF_2CF_3)					
	HFC-134 (CHF_2CHF_2)					
	HFC-134a (CH_2FCF_3)					
	HFC-143 (CH_2FCHF_2)					
	HFC-143a (CH_3CF_3)					
	HFC-152 (CH_2FCH_2F)					
	HFC-152a (CH_3CHF_2)					
	HFC-227ea (CF_3CHFCF_3)					
	HFC-236cb ($CH_2FCF_2CF_3$)					
	HFC-236ea (CHF_2CHFCF_3)					
	HFC-236fa ($CF_3CH_2CF_3$)					
	HFC-245ca ($CH_2FCF_2CHF_2$)					
	HFC-245fa ($CHF_2CH_2CF_3$)					
	HFC-365mfc ($CF_3CH_2CF_2CH_3$)					
	HFC-43-10mee ($CF_3CHFCHFCF_2CF_3$)					
F-Group II	HFC-23 (CHF_3)					
Mixtures containing any controlled substance(s) – applicable to all substances, not just HFCs (add additional rows or pages as required for mixtures not listed below)						
R-404A (HFC-125 = 44%, HFC-134a = 4%, HFC-143a = 52%)						
R-407A (HFC-32 = 20%, HFC-125 = 40%, HFC-143a = 40%)						
R-407C (HFC-32 = 23%, HFC-125 = 25%, HFC-143a = 52%)						
R-410A (HFC-32 = 50%, HFC-125 = 50%)						
R-507A (HFC-125 = 50%, HFC-143a = 50%)						
R-508B (HFC-23 = 46%, PFC-116 = 54%)						

表 9、HFCs 混合物之各成份與其佔比

No.	*Refrigerant*	*Composition*							
		Component 1		*Component 2*		*Component 3*		*Component 4*	
1.	R-401A	HCFC-124	34%	HCFC-22	53%	HFC-152a	13%		
2.	R-401B	HCFC-124	28%	HCFC-22	61%	HFC-152a	11%		
3.	R-401C	HCFC-124	52%	HCFC-22	33%	HFC-152a	15%		
4.	R-402A	HC-290	2%	HCFC-22	38%	HFC-125	60%		
5.	R-402B	HC-290	2%	HCFC-22	60%	HFC-125	38%		
6.	R-403A	HC-290	5%	HCFC-22	75%	PFC-218	20%		
7.	R-403B	HC-290	5%	HCFC-22	56%	PFC-218	39%		
8.	R-404A	HFC-125	44%	HFC-134a	4%	HFC-143a	52%		
9.	R-405A	HCFC-142b	6%	HCFC-22	45%	HFC-152a	7%	PFC-C318	43%
10.	R-406A	HC-600a	4%	HCFC-142b	41%	HCFC-22	55%		

No.	*Refrigerant*	*Composition*							
		Component 1		*Component 2*		*Component 3*		*Component 4*	
11.	R-407A	HFC-125	40%	HFC-134a	40%	HFC-32	20%		
12.	R-407B	HFC-125	70%	HFC-134a	20%	HFC-32	10%		
13.	R-407C	HFC-125	25%	HFC-134a	52%	HFC-32	23%		
14.	R-407D	HFC-125	15%	HFC-134a	70%	HFC-32	15%		
15.	R-407E	HFC-125	15%	HFC-134a	60%	HFC-32	25%		
16.	R-407F	HFC-125	30%	HFC-134a	40%	HFC-32	30%		
17.	R-407G	HFC-125	2.5%	HFC-134a	95%	HFC-32	2.5%		
18.	R-408A	HCFC-22	47%	HFC-125	7%	HFC-143a	46%		
19.	R-409A	HCFC-124	25%	HCFC-142b	15%	HCFC-22	60%		
20.	R-409B	HCFC-124	25%	HCFC-142b	10%	HCFC-22	65%		
21.	R-410A	HFC-125	50%	HFC-32	50%				
22.	R-410B	HFC-125	55%	HFC-32	45%				
23.	R-411A	HO-1270	1.5%	HCFC-22	87.5%	HFC-152a	11%		

(4)申報注意事項（Decision XXX/14）：依據秘書處指出，2017 年共有 20 個締約方的消費量申報表格有出現空白，各締約方申報時應依 XXIV/14 規定，確保在所有的表格中填入數字，包含在適當的地方填寫零，而不是留空白。

二、 臭氧層及紫外線管理策略

(一) 科學評估小組撰寫 4 年「臭氧消耗科學評估」執行摘要，擬增加平流層氣溶膠，以增進反射陽光中的宇宙射線減緩全球變暖情形（稱太陽輻射管理），可能會影響平流層臭氧的恢復，在國家及國際間採取之臭氧層保護措施，需繼續進行研究及系統性觀察，以進一步蒐集相關臭氧層及變化情形所帶來的影響，當然科學評估小組的結論，也涉及使用氣溶膠減緩氣候變遷對臭氧層保護影響情形。

(二) 鑒於相關科學技術考量，蒙特婁議定書透過國際合作及行動的效益，影響全球升溫 1.5℃至 2℃的氣候變遷情形，包括極端溫度、降雨、強烈颱風及海平面上升等，進而影響陸地、海洋生物多樣性和生態系統，為保護人類生活環境、健康永續及免受臭氧層變化造成的不利影響，決議事項如下：

1. 請科學評估小組向締約方提供一份摘要報告，列出以下內容：

(1)提出有關太陽輻射管理研究及未來 10 年降低全球升溫的氣候變遷改善策略。

(2)太陽輻射管理行動（包括未報告的使用太陽能輻射管理情況）對平流層臭氧破壞及全球環境變遷造成的影響。

(3)科學評估小組可補充 4 年期評估以外的其他必要資料，即時向不限成員工作小組第四十二次會議主動提供摘要報告，並向蒙特婁議定書第 32 次締約方會議提供進一步的最新情況，並向蒙特婁議定書第 33 次締約方會議提供最後報告。

2. 應掌握相關科學技術資訊，有助於本決議第 1 段提到的報告提供所有締約方參考，並於 2019 年向秘書處提供完整訊息。

3. 鼓勵各締約方在適當及可行的情況下，支持環境科學、大氣測量、技術諮詢等工作，進一步研究探討平流層與全球氣候變遷有關的進程及影響。

三、 蒙特婁議定書多邊基金執委會及締約方公平代表性

(一) 依據締約方會議第 IX/16 號、第 XVI/38 號和第 XIX/11 號決議修訂的執行蒙特婁議定書多邊基金執委會職權範圍第 1 段，設立多邊基金執委會是為了制定具體業務政策、準則和行政安排並監測其執行情況，包括資源撥付，以達成財務機制下多邊基金的目標。

(二) 聯合國會員國區域組都享有以下平等權利，參與制定具體業務政策、準則和行政安排並監測其執行情況，以及制定項目資格標準和多邊基金所支持活動的實施方針，以確保來自東歐和中亞區域的締約方在執委會中享有平等的地域代表性，以便來自該區域的締約方按照輪換席位原則，每 4 年 1 次參與執委會的工作，修訂的執行委員會職權範圍，內容如下：

1. 執行委員會應按蒙特婁議定書第 5 條第 1 款行事的締約方，8 個締約方和來自非按該條款行事的締約方集團的 8 個締約方組成，應推選其執行委員會成員。

2. 按第 5 條第 1 款行事的締約方 8 個席位應按下列方式進行分配：非洲區域締約方 2 席、亞洲和太平洋區域締約方 2 席、拉丁美洲和加勒比區域締約方 2 席、上述區域中輪換 1 席、東歐和中亞區域締約方 1 席。執行委員會成員的推選應得到締約方會議核可。

3. 委員會成員應從其得到締約方會議核可之日後的下一個年度 1 月 1 日起開始任職，任期為 1 個年度。

四、 吉佳利修正案各國立場

2016 年通過的吉佳利修正案，截至 2018 年 12 月 26 日，已有 65 個締約方完成遞交批准文件程序，本次 MOP30 會議期間，也有不少國家發言時表示該國已經陸續與該國各部會、產業及立法民意機關溝通中，大部分已取得共識，將於近期完成遞交批准文件的程序，我國於會議期間也與幾個國家代表詢問該國對吉佳利修正案的立場。

(一) 日本：該國近幾年已陸續完成相關法規制訂與公告後實施的工作，該國參眾議會已於 6 月完成同意日本批准吉佳利修正案議案，待其國內完成其他程序後即會將批准文件送交秘書處。

(二) 美國：本次會議中，美國代表雖未提及該國批准吉佳利修正案之進度，不過，我國與美國環保署前任臭氧層秘書處處長暨蒙特婁議定書技術與經濟評估委員會（TEAP）前任共同主席，目前為 IGSD（管理與永續發展諮詢機構）主席 Dr. Stephen Andersen 會晤時表示美國過去布希總統、柯林頓總統、歐巴馬總統皆支持的蒙特婁議定書，現任川普總統尚未支持，因此美國無法確定何時會批准吉佳利修正案，但該國環保署與參與蒙特婁議定書的團隊仍會積極參與蒙特婁議定書議案討論，以達 HFCs 管制目標。事實上，該國內加州、紐約州、馬里蘭州皆已陸續制訂遵循新替代品政策（Significant New Alternatives Policy，SNAP）而限制製造含高 GWP 值冷媒的設備，因此美國國內也支持管制 HFCs 的立場。

(三) 歐盟：蒙特婁議定書已將全球 98%的破壞臭氧層物質逐步淘汰，也對減少溫室氣體做出了巨大貢獻，以科學和技術評估為基礎及已開發國家向開發中國家提供的多邊基金支助，隨著新產品的開發，這些業者將繼續向締約方提供新技術。吉加利修正案將於 2019 年 1 月 1 日生效，歐盟於亦批准了該修正案，迄今已有 19 個成員國交存了批准書，成功的納入 HFCs 管制，優先逐步淘汰破壞臭氧層物質，更應鼓勵所有締約方蒐集及分享科學技術，對減少高 GWP 物質以及 HFCs 的排放是減緩氣候變遷具有莫大貢獻，未來歐盟認為，全球可以

繼續在議定書保護臭氧層方面取得成功，通過吉加利修正案促使快速實施巴黎協議，並在全球提供卓越的成果。

(四) 韓國：我國與韓國代表討論 HFCs 管制方案時，該國工業局、外交部及智庫：韓國特殊化學工業協會 ODS 管理組表示，該國當初使用大量 CFCs 與 HCFCs，且技術能力上無法要求廠商早日完成替代，因此與臭氧秘書處協議在早日削減 CFCs 下，以遵循 A5（開發中國家）管制時程參與蒙特婁議定書。目前，韓國家電產品已多數轉換為使用 R410A，但該國也刻正研究低 GWP 值替代品，在持續遵循吉佳利修正案方面，有信心依 A5 國家管制時程，於 2024 年開始凍結。

(五) 中國大陸：蒙特婁議定書的成功，成為構建人類命運共同體及國際應對全球環境問題的典範，中國大陸先後對 10 多個行業、上千家企業開展破壞臭氧層物質替代，如期完成了 5 大類破壞臭氧層物質的淘汰，累計淘汰受控物質約 28 萬噸，此外，自 2019 年 1 月 1 日起已公告禁止，生產 HCFC-141b 作為發泡劑的冰箱冷凍櫃、冷藏設備及電熱水器產品等，會議中該國代表發言表示目前已經啟動吉佳利修正案國內批准程序，爭取儘早成為修正案締約方，該國仍須持續強化遵約能力的建構，以及對大氣中 ODS 物質濃度監測能力，及其國內監督管理能力，保護臭氧層和應對氣候變化是世界各國共同的責任，中國大陸願與國際社會一道，履行蒙特婁議定書，切實維護履約成果，推動綠色低碳和可持續發展，為共建清潔美麗世界做出新的貢獻。

(六) 印尼：自 2013 年以來，印尼實施了氟氯烴淘汰管理計劃，政府通過讓所有業者參與淘汰氟氯烴，為實現目標，制定了加速消除氟氯烴的戰略，其中包括氟氯烴淘汰管理計劃，以實現 2018 年減少 20%的目標，到 2020 年減少 37.5%，到 2023 年減少 55%。目前印尼能夠在 2015 年實現氟氯烴減少 10%的目標，並在 2017 年實現了 20%以上的減排目標，並在 2020 年完全淘汰 HCFC-141b。低 GWP 值技術，需要技術和設計改進以實現更好的能量效率，呼籲採取集體合作和建設性接觸的具體行動，在這項努力中取得重大進展，全世界應該共同努力。

(七) 塞內加爾：蒙特婁議定書締約國為逐步淘汰破壞臭氧層的物質作出了相當大的努力，如廣泛用於空調行業的 HCFCs 已被 HFCs 替代，這些物質沒有臭氧層

破壞潛勢值，但卻是溫室氣體，而第 5 條國家逐步淘汰 HCFCs 是採用新的氣候友好型技術，提高能源效率，並促進創造就業機會，也發展綠色經濟(更經濟、低毒性，有助於電器的能量效率的冷媒)，使用天然冷媒作為具有低全球變暖潛力的替代製冷劑不僅會對氣候產生積極影響，而且還將避免向雙重過渡過渡，從而導致巨大的投資成本和不久的將來實施。塞內加爾於 2018 年 6 月批准了吉加利修正案，並鼓勵各締約方批准它採取行動，如果各方及時履行承諾，將把溫度上升降低 0.5℃。他還感謝國際社會，特別是臭氧秘書處提供所有所有資訊，並感謝多邊基金提供財政支持，使其能夠執行各種行動計劃。

(八) 史瓦帝尼：本次會議期間，本團與史瓦帝尼環境部臭氧處官員 Ms.Thabli Dlamini 會晤時肯定該國在削減 HCFCs 的進展成果，因該國在 2017 年是南非第一個國家達成冷凍空調設備全面削減 HCFCs 的國家，因此獲得蒙特婁議定書 30 週年成果獎。另外，我方也提供我國執行蒙特婁議定書管制規範的努力成果。會後 Ms. Dlamini 再寄送電子信件表示該國希望台灣能夠在空污控制技術與空品監測方面提供支持或協助能力建構，我國代表團謝副處長炳輝與外交部駐厄瓜多朱秘書進良隔日在會場時，告知我國在空污管制方面有長期的經驗，史國可先洽我國駐史國代表處，溝通討論協助的方式後再與環保署聯繫合作可能。

(九) 環境調查機構（EIA）：該機構在國家海洋暨大氣總署（National Oceanic and Atmospheric Administration，NOAA）發表大氣中 CFC-11 濃度削減趨緩顯示東亞地區疑似大量排放 CFC-11 事件後，前往中國大陸深入調查國內仍有廠商違法生產與使用 CFC-11 發泡劑，促使中國大陸官方強力掃蕩違法業者。此外，應改進對原料生產及使用監測，並尋找替代使用 ODS 的原料，因為副產品排放存在風險，並且 ODS 原料可能被轉用於非法的自發光市場。環境影響評估還認為，現在正是解決 ODS 和 HFCs 庫存持續問題的適當時機，這可能在 2020 年至 2050 年期間避免全球高達 96.5 億噸二氧化碳當量，EIA 在本次會議中發言表示執行吉佳利修正案約可協助減少 0.5℃的增溫，然而在此時刻也是蒙特婁議定書建置完善遵約監督機制之時，讓締約方能負起責任確實查核其國內業者是否違法生產和使用管制物質。

(十) 政府間氣候變化專門委員會（Intergovernmental Panel on Climate Change，

IPCC）：本次會議期間聯合國氣候變化綱要公約專家委員會 IPCC 也舉辦一場說明最新發表之全球暖化 1.5℃特別報告，也在大會中發言表示研究顯示要維持增溫 1.5℃，除了 2050 年時 CO_2 排放應達到淨零排放的情形外，其他種溫室氣體（包括 HFCs）也需大幅減少其排放量。雖然目前 HFCs 占總溫室氣體排放量的比例很低，但若沒有執行吉佳利修正案，預計 HFCs 排放量將大幅增加。

五、 宣傳交流事項

本次會議計有超過 250 多個國家及民間單位，共計 500 多位代表參與。我國參與 MOP-30 的任務除掌握議題的發展對我國政府與產業的影響外，現場與各方代表交流，如表 10，說明我國努力遵循國際公約的削減成果，以及積極參與國際公約的重要性，並建立與各方代表的聯繫管道，作為我國與其討論管制策略與必要管制物質之進出口作業溝通管道。

圖 5、MOP-30 主席科威特 Mr. Yaqoub Almatouq


圖 6、史瓦帝尼環境部臭氧處 Ms.Thabli Dlamini（左圖）、美國環保署國際事務 Mr. Tom Land（右圖）

L-R: **Ping-Fei Shieh**, Taiwan; **Wen-Cheng Hu**, Industrial Technology Research Institute (ITRI); and **Stephen Montzka**, Scientific Assessment Panel

圖 7、美國國家海洋暨大氣總署地球系統研究實驗室（NOAA）Dr. Stephen A. Montzka（左圖）、韓國代表團（右圖）並刊登於 IISD-ENB 專屬大會紀錄（網址：http://enb.iisd.org/ozone/mop30/7nov.html）


圖 8、日本環境省中村祥（Sho Nakamura）（右邊起第二位）與其智庫 PREC(左圖)、聯合國環境規劃署技術產業經濟部門 Division of Technology, Industry and Economics（DTIE）能源與臭氧分部 Energy and Ozone Action Branch 前主席 Dr. Rajendra Shende（右圖）

表 10、與國際專家交流之會議紀錄

單位	與談人	討論內容摘要
MOP-30 主席	Mr. Yaqoub Almatouq	宣揚我國積極推動臭氧層保護之決心與成果，如圖 5。
厄瓜多工業貿易	部次長 Mr. Juan Sebastián Salcedo 與司長 Mr. Carlos Diaz Guevara	交流我國工業技術，並宣揚我國積極推動臭氧層保護之決心與成果
史瓦帝尼環境部臭氧處官員	Ms.Thabli Dlamini	肯定史瓦帝尼削減 HCFCs 的進展成果，並交流我國執行蒙特婁議定書管制規範的努力成果，如圖 6。
美國環保署國際事務主管	Mr. Tom Land	交流討論該國對吉佳利修正案的立場，並宣揚我國遵循蒙特婁議定書的成果，如圖 6。
美國國家海洋暨大氣總署地球系統研究實驗室（NOAA）	Dr. Stephen A. Montzka	交流我國鹿林山 CFC-11 採樣觀測結果，如圖 7。
韓國代表團	-	交流討論該國對吉佳利修正案的立場，並宣揚我國遵循蒙特婁議定書的成果，如圖 7。
日本環境省	中村祥 Sho Nakamura	交流討論該國對吉佳利修正案的立場，並宣揚我國遵循蒙特婁議定書的成果，如圖 8。
UNEP 技術產業經濟部門能源與臭氧分部前主席	Dr. Rajendra Shende	交流 ODS 銷毀技術與宣揚我國遵循蒙特婁議定書的成果，如圖 8。
TEAP 前主席	Dr. Stephan Andersen	交流 ODS 銷毀技術與宣揚我國遵循蒙特婁議定書的成果

柒、 心得與建議

一、 通過蒙特婁議定書調整案：同意 2020 年後 0.5%之 HCFCs 消費量與生產量之使用用途範疇除 2020 年 1 月 1 日以前使用中之冷凍空調設備維修使用外，擴增 2020 年 1 月 1 日以前使用中之滅火和消防設備維修使用、火箭引擎製造之溶劑使用、治療燒燙傷之藥用噴霧罐等用途。我國管制 HCFCs 也與加拿大、美國一樣削減至 2020 年以後僅剩 0.5%消費量，國內極小部分使用 HCFCs 作為滅火設施，因應本次蒙特婁議定書調整案的內容，將同步修訂我國蒙特婁議定書相關管理辦法。

二、 CFC-11 不當排放：有鑑於 2018 年 5 月 Stephen A. Montzka 等人於 Nature 期刊發表，

自 2013 年起大氣中 CFC-11 濃度每年下降的速度較 2002~2011 年間的降幅減少 50%，且推測是東亞地區有大量排放造成；為確實掌握全球大氣中 CFC-11 的排放量，除了強化科學監測數據研究外，也請締約方堅持並監督 CFC-11 消費量削減的有效性以確認符合遵約機制，並請臭氧秘書處掌握各締約方可能的遵約偏差情況，也請各締約方提供有助於 TEAP 釐清 CFC-11 不當排放之科學和技術的訊息。我國鹿林山有長期監測 CFC-11 的觀測資料，可進一步與相關單位討論，若數據可行且具代表性則可供秘書處參考。

三、 ODS 銷毀技術：針對高濃度 HFCs（HFC-23 除外）批准水泥窯、旋轉窯等 12 項可行的銷毀技術；針對高濃度 HFC-23 批准液體注射焚化等 8 項銷毀技術；針對溴化甲烷批准 1 項銷毀技術。

四、 更新全球實驗室與分析用途之豁免：考量 A2 國家 2020 年後仍有實驗室與分析用途之需求，包含分析使用之標準品、原料用途（實驗室化學合成之試劑）、溶劑（實驗室化學合成之惰性溶劑）、毒性物質研究之標準品、需要被檢測的樣品含有 HCFCs 成分等，且過去 HCFCs 也未豁免作為實驗室與分析用途使用，故本次決議將 HCFCs 納入實驗室與分析用途之豁免項目，申請豁免至 2021 年 12 月 31 日。

五、 未來海龍與其替代品之可取得性：基於全球海龍已停產，要求 TEAP 和國際海事組織、國際民航組織合作，並進行海龍未來需求、替代品、回收純化等議題進行研究，以掌握海龍庫存與使用需求狀況。

六、 吉佳利修正案將自 2019 年 1 月 1 日正式生效；截至 2018 年 12 月 28 日，已有 65 個國家批准吉佳利修正案，先進國家除美國與紐西蘭尚未完成核准外，其他日本、加拿大、澳洲、挪威、瑞士及歐盟 28 國有 21 國完成（丹麥、義大利、西班牙、克羅埃西亞、賽普勒斯、馬爾他、波蘭、羅馬尼亞、斯洛維尼亞尚未完成），而開發中國家 HFCs 使用量大的國家如中國大陸和印度尚未核准，再查美國及臺灣鄰近國家、南韓及新加坡等亦尚未批准。

七、 吉佳利修正案確定自 2019 年 1 月 1 日起生效，依其管制時程，已開發國家（俄羅斯等部分國家除外）將於 2019 年削減 HFCs 基準量的 10%、2024 年削減 40%，我國近年（2015~2017 年）HFCs 消費量有成長趨勢（依已開發國家消費量基準公式估算），而我國已削減 CFCs 和海龍，甚至 HCFCs，但這次因為替代技術更先進，

是否能即時削減 HFCs 是目前我國面臨的挑戰。

八、我國為遵守國際環保公約「蒙特婁議定書」管制措施，自 1993 年起即陸續發佈相關管制公告、準則或命令，各部會並建立分工執掌，包括：經濟部工業局、工業技術研究院提供產業輔導及製程技術發展趨勢；經濟部國際貿易局配合我國管制規定，增修列管物質稅則號列；行政院農委會推廣木質包裝材的熱處理，輔導廠商選用溴化甲烷替代技術；財政部關務署及海洋委員會海巡署協助查緝走私列管化學品進出口，本署為管控蒙特婁議定書列管化學物質進出口於「空氣污染防制法」第 31 條納入「中央主管機關得禁止或限制國際環保公約管制之易致空氣污染物質及利用該物質製造或填充產品之製造、輸入、輸出、販賣或使用。」規定，公告「國際環保公約管制之易致空氣污染物質」(即蒙特婁議定書列管化學物質)，並發布「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」及「溴化甲烷管理辦法」等規定，以完成國際公約內國法化之建置，徹底執行國際公約之內涵。

九、保護臭氧層的工作雖已近尾聲，各國 ODS 的生產與消費量也已削減大半，但少量的管控和替代技術的挑戰也愈趨嚴峻，再加上全球暖化與臭氧層保護兩項議題間之交互作用也受到重視，未來國際管制發展趨勢將影響我國產業發展，我國政府應持續關注，並展開 HCFCs 於 2020 年之後之管制策略、我國因應 HFCs 管制策略、ODS 回收純化與銷毀策略、國內既有 ODS 流通與供需交流等研究，以減少排放與對地球環境的長期傷害。

十、我國努力成果宣傳：本署除了研擬國內相關因應管制方案外，也積極編撰相關文宣品，並透過網際網路方式宣導和提供免費諮詢服務，於國際間積極宣揚我國努力保護臭氧層的成果，本次代表團準備我國遵循蒙特婁議定書之管制方案與削減成果文宣品，包含內含英文文宣之 USB、及陶瓷杯墊置於展覽廊道供與會者索取，皆已被索取一空，如圖 9，大會並在當地時間 11 月 9 日晚上 11 點 10 分結束，2019 年 MOP-31 會議將於義大利召開。

圖 9、場外發送我國保護臭氧層文宣品

十一、 建議：

(一) 全球暖化是無可爭辯的事實，面臨全球環境治理法律趨嚴挑戰，產業亟需轉型升級，吉佳利修正案於 2019 年 1 月 1 日生效執行，全球加速 HFCs 的管制工作，已開發國家與開發中國家減量時程相差 10 年，是蒙特婁議定書一貫做法，同時這時程也是接續現有 HCFCs 管制時程，應持續掌握國內產業轉型情形。

(二) 各國善盡共同但差異的責任，與我國經濟環境相近的韓國、新加坡，目前均屬於開發中國家，過去我國冷媒汰換完全比照蒙特婁議定書已開發國家模式，並轉換使用 HFCs 冷媒(如冷凍、家用空調及車用冷媒等)，若仍比照已開發國家管制時程，將需削減 20%消費量，且在無法找到適當冷媒替代品，勢必會造成國內社會經濟衝擊。另外，不同冷媒的能源效率不同，貿然禁止或限用 HFCs，又未評估替代品之能源效率，亦恐增加我國溫室氣體排放量。

(三) 全球思維的在地行動，創造永續未來。本屆 MOP30 主辦國厄瓜多總統 Lenín Moreno 呼籲應用「新技術來扭轉對環境破壞(new technology to reverse environmental damage)」。瑞士世界經濟論壇(WEF)公布「2018 年全球競爭力報告」，臺灣的創新能力更備受肯定，德國、美國、瑞士和臺灣 4 個國家是「超級創新國」(super innovators)，我們必須進一步鼓勵這種創新行動，以解決全球永續環境威脅議題。

(四) 基於臺灣過去積極主動承擔蒙特婁議定書破壞臭氧層物質管制的成功經驗，應持續完備 HFCs 消費量基線，研擬成本有效(cost effective)及最低成本(the lowest cost) 之低 GWP 冷媒替代可行性辦法(approaches) 與科技研發，提升且確保產業國際競爭力，強化公私夥伴關係並鏈結國際，可為全球脫碳經濟轉型升級做出貢獻。

(五) 吉佳利修正案管制精神從源頭逐步削減 HFCs，限制各國的生產量、進口量及消費量（消費量=生產量+進口量-出口量），我國雖非蒙特婁議定書締約國成員，但自始即遵守蒙特婁議定書管制規定，為因應及遵守吉佳利修正案，我國已展開基線調查工作，並考量替代品自身與應用面的環境衝擊，及國內廠商替代安全性及成本，著手研擬吉佳利修正案內國法化所應增修之相關法規，訂定相關配套措施以協助廠商未來逐步停用 HFCs 物質，以符合蒙特婁議定書的管制規範。

(六) 我國非聯合國會員國，無法加入蒙特婁議定書成為締約方，然而為保護國內產業免受議定書中貿易限制條款的制裁，且避免孤立於國際舞台之外，亦積極遵守蒙特婁議定書的規定。

捌、 附錄

附錄一、會議議程

附錄二、MOP-30 會議記錄報告

附錄三、ENB 會議記錄

附錄一、會議議程

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Quito, 5–9 November 2018

Annotations to the provisional agenda

The annotations to the provisional agenda (UNEP/OzL.Pro.30/1) set out in the annex to the present note provide a reference guide to the relevant working and information documents for each agenda item to facilitate the work of the Thirtieth Meeting of the Parties.

I.Preparatory segment (5–7 November 2018)

Agenda item	*Title of the agenda item and brief description*	*Related documents*
Item 1	***Opening of the preparatory segment***	
	The preparatory segment of the meeting is scheduled to be opened at 10 a.m. on Monday, 5 November 2018, at the Quorum Convention Centre, Cumbayá, Quito.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 3–7)
(a)	*Statement(s) by representative(s) of the Government of Ecuador*	
(b)	*Statement(s) by representative(s) of the United Nations Environment Programme*	
Item 2	***Organizational matters***	
(a)	*Adoption of the agenda of the preparatory segment*	• Provisional agenda (UNEP/OzL.Pro.30/1) • Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 9)
(b)	*Organization of work* The preparatory segment will be co-chaired by the Co-Chairs of the Open-ended Working Group (Mr. Yaqoub Almatouq, Kuwait, and Ms. Cynthia Newberg, United States of America), who will present a proposal to the parties on how they may wish to organize their work.	• Provisional agenda (UNEP/OzL.Pro.30/1) • Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 4 and 10)
Item 3	***Budget of the Trust Fund for the Montreal Protocol and financial reports***	
	The preparatory segment is expected to consider information provided on the budget of the Trust Funds for the Montreal Protocol on Substances that Deplete the Ozone Layer and financial reports. In accordance with decision XXIX/24, the revised budget for 2018 and the proposed budgets for 2019 and 2020 are presented in two different formats – results-based and traditional – to enable comparison. The budgets for 2019 and 2020 are presented on the basis of two scenarios: (i) the proposed scenarios, which reflect the needs foreseen; and (ii) the zero nominal growth scenarios, pegged to the proposed revised budget for 2018.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 11–15) • Note by the Secretariat on the proposed revision to the approved budget for 2018 and proposed budgets for 2019 and 2020 of the Trust Fund for the Montreal Protocol (UNEP/OzL.Pro.30/4/Rev.1) • Addendum to the note by the Secretariat on the proposed revision to the approved budget for 2018 and proposed budgets for 2019 and 2020 of the Trust Fund for the Montreal Protocol (UNEP/OzL.Pro.30/4/Add.1/Rev.1) (results-based budget for 2019 and 2020) • Financial report for the trust funds for the Vienna Convention and the Montreal Protocol for the fiscal year 2017 (UNEP/OzL.Pro.30/5) • Draft decision on the financial reports and budgets for the Montreal

Agenda item	*Title of the agenda item and brief description*	*Related documents*
		Protocol (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[BB])
Item 4	***Kigali Amendment to the Montreal Protocol to phase down hydrofluorocarbons***	
(a)	*Data reporting under Article 7 and related issues* The parties are expected to continue the discussion held on the matter at the fortieth meeting of the Open-ended Working Group, including on the timeline for the reporting of baseline data for HFCs by parties operating under paragraph 1 of Article 5 (Article 5 parties), and the global-warming-potential (GWP) values for HCFC-141 and HCFC-142, and the proposed revised data reporting forms and associated instructions, including the reporting of HFC mixtures and blends.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 16–21) • Note by the Secretariat on data reporting under Article 7 of the Montreal Protocol, including related issues arising from the Kigali Amendment to the Montreal Protocol to phase down HFCs (UNEP/OzL.Pro.30/8/Rev.1)
(b)	*Destruction technologies for controlled substances (decision XXIX/4)* Building on the discussions at the fortieth meeting of the Open-ended Working Group, the parties are expected to consider additional information provided by the Technology and Economic Assessment Panel, including information on the carbon dioxide emissions associated with the energy consumption of the technologies under consideration.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 22–24) • Addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1, paras. 3–9 and annexes I and II) • Technology and Economic Assessment Panel April 2018 report (vol. 2): Decision XXIX/4 Task Force Report on Destruction Technologies for Controlled Substances (including an annex comprising a compilation of extracts containing substantive non-confidential information from submissions by parties in response to decision XXIX/4) • Technology and Economic Assessment Panel May 2018: Supplement to the April 2018 (vol. 2) Technology and Economic Assessment Panel decision XXIX/4 Task Force Report on Destruction Technologies for Controlled Substances and its corrigendum • Technology and Economic Assessment Panel September 2018 report (vol. 1): Decision XXIX/4 Task Force Report on Destruction Technologies for Controlled Substances (Addendum to the May 2018 supplemental report)
(c)	*Progress by the Executive Committee of the Multilateral Fund in the development of guidelines for financing the phase-down of hydrofluorocarbons (decision XXVIII/2)* The parties are expected to consider a presentation by the Chair of the Executive Committee on progress by the Committee in the development of guidelines for financing the phase-down of HFCs as requested in paragraph 10 of decision XXVIII/2.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 25–30) • Report of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol to the Thirtieth Meeting of the Parties (UNEP/OzL.Pro.30/10, paras. 5–33)
(d)	*Status of ratification of the Kigali Amendment to the Montreal Protocol*	• Note by the Secretariat on issues for discussion by and information

Agenda item	*Title of the agenda item and brief description*	*Related documents*
	The parties are expected to consider an update on the status of ratification of the Kigali Amendment and may wish to adopt a decision in that regard.	for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 31–33) • Information note on the status of ratification (UNEP/OzL.Pro.30/INF/1) • Draft decision on the status of ratification of the Kigali Amendment to the Montreal Protocol (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[AA])
Item 5	***Future availability of halons and their alternatives (decision XXIX/8)***	
	Continuing the discussions held on the matter at the fortieth meeting of the Open-ended Working Group, the parties will consider the further report by the Technology and Economic Assessment Panel pursuant to decision XXIX/8 on halons.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 34–37) • Addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1, paras. 10–12) • Technology and Economic Assessment Panel September 2018 report (vol. 2): Decision XXIX/8 on the Future Availability of Halons and their Alternatives
Item 6	***Issues related to exemptions under Articles 2A–2I of the Montreal Protocol***	
(a)	*Nominations for critical-use exemptions for methyl bromide for 2019 and 2020* The parties will consider two nominations each from two Article 5 parties (Argentina and South Africa) and one nomination each from two parties not operating under paragraph 1 of Article 5 (non-Article 5 parties) (Australia and Canada) for critical-use exemptions.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 38–40) • Addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1, paras. 13–18) • Technology and Economic Assessment Panel September 2018 report (vol. 3): Evaluation of 2018 Critical-use Nominations for Methyl Bromide (final report)
(b)	*Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol (decision XXVI/5)* The parties will consider the further report by the Technology and Economic Assessment Panel pursuant to decision XXVI/5 on the progress made in the development and availability of laboratory and analytical procedures.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 41 and 42) • Addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1, paras. 19–30 and annex III) • Technology and Economic Assessment Panel May 2018 report (vol. 3): Progress Report, sections 5 and 8

Agenda item	*Title of the agenda item and brief description*	*Related documents*
		• Technology and Economic Assessment Panel September 2018 report (vol. 4): Response to Decision XXVI/5(2) on Laboratory and Analytical Uses
(c)	*Process agents (decision XVII/6)* The parties will consider the report by the Technology and Economic Assessment Panel pursuant to decision XVII/6 on process agents and recommend a way forward.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 43 and 44) • Technology and Economic Assessment Panel May 2018 report (vol. 3): Progress Report, section 5.3.3.
Item 7	***Linkages between hydrochlorofluorocarbons and hydrofluorocarbons in transitioning to low-global-warming-potential alternatives***	
	The parties are expected to continue the discussion held on the matter at the fortieth meeting of the Open-ended Working Group and recommend a way forward.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 45–48)
Item 8	***Issues related to energy efficiency while phasing down hydrofluorocarbons (decision XXIX/10)***	
(a)	*Report by the Technology and Economic Assessment Panel on energy efficiency in the refrigeration, air-conditioning and heat-pump sectors* The parties are expected to continue the discussion held on the matter at the fortieth meeting of the Open-ended Working Group and to consider the updated final report of the Technology and Economic Assessment Panel in response to decision XXIX/10 on energy efficiency while phasing down HFCs.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 49–53) • Addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1, paras. 31–35, table 3 and annex IV) • Technology and Economic Assessment Panel May 2018 report (vol. 5): Decision XXIX/10 Task Force Report on Issues Related to Energy Efficiency while Phasing Down Hydrofluorocarbons • Technology and Economic Assessment Panel September 2018 report (vol. 5): Decision XXIX/10 Task Force Report on Issues Related to Energy Efficiency while Phasing Down Hydrofluorocarbons (updated final report)
(b)	*Access of parties operating under paragraph 1 of Article 5 of the Protocol to energy-efficient technologies in the refrigeration, air-conditioning and heat-pump sectors* The parties will continue the discussion that began at the 40th meeting of the Open-ended Working Group on this issue and will consider the draft decision on the matter put forward by Rwanda on behalf of the African Group.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 54–56) • Draft decision on access of parties operating under paragraph 1 of Article 5 of the Montreal Protocol to energy-efficient technologies in the refrigeration, air-conditioning and heat-pump sectors (UNEP/OzL.Pro.30/3/Rev.1, section II, draft decision XXX/[B])

Agenda item	*Title of the agenda item and brief description*	*Related documents*
Item 9	***Proposed adjustments to the Montreal Protocol on hydrochlorofluorocarbons for parties not operating under paragraph 1 of Article 5 of the Protocol***	
	The parties will continue their discussions on the proposed adjustments to the Montreal Protocol pursuant to paragraph 9 of article 2 (comprising the proposal submitted by the United States of America and the proposal submitted jointly by Australia and Canada ahead of the fortieth meeting of the Open-ended Working Group) and the additional needs expressed by the Russian Federation during the discussions and recorded in the report of that meeting. Parties may wish to reconvene the contact group established at the fortieth meeting of the Open-ended Working Group with a view to recommending a way forward.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 57–63) • Proposed adjustment to the Montreal Protocol submitted by the United States of America (UNEP/OzL.Pro.30/6) • Proposed adjustment to the Montreal Protocol submitted by Australia and Canada (UNEP/OzL.Pro.30/7) • Report of the Fortieth 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.1/40/7, para. 145) • Technology and Economic Assessment Panel March 2018 report (vol. 1): Decision XXIX/9 Working Group Report on HCFCs and Decision XXVII/5 • Annex to the Technology and Economic Assessment Panel March 2018 report (vol. 1): Decision XXIX/9 Working Group Report on HCFCs and Decision XXVII/5 – submissions by parties in response to Decision XXIX/9 Working Group Report on HCFCs and Decision XXVII/5 • Technology and Economic Assessment Panel March 2018 report (vol. 3): Progress Report, section 7
Item 10	***Unexpected emissions of trichlorofluoromethane (CFC-11)***	
	The parties will consider a draft decision put forward at the fortieth meeting of the Open-ended Working Group.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 64–67) • Draft decision on unexpected emissions of trichlorofluoromethane (CFC-11) (UNEP/OzL.Pro.30/3/Rev.1, section II, draft decision XXX/[A]) • Background document by the Scientific Assessment Panel entitled "Preliminary discussion of the new report on increased emissions of CFC-11" • Addendum to the note by the Secretariat on issues that the Secretariat would like to bring to the attention of the parties (UNEP/OzL.Pro.WG.1/40/INF/2/Add.1) • Background document on an overview of CFC-11 emissions, prepared by the Technology and Economic Assessment Panel for the fortieth meeting of the Open-ended Working Group
Item 11	***Issue raised by the United Arab Emirates regarding eligibility for financial and technical assistance***	

Agenda item	*Title of the agenda item and brief description*	*Related documents*
	The parties are expected to continue the discussion that began at the fortieth meeting of the Open-ended Working Group.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 68–70)
Item 12	***Review of the terms of reference, composition and balance as well as fields of expertise required of the assessment panels and their subsidiary bodies***	
	The parties are expected to continue the discussion that began at the fortieth meeting of the Open-ended Working Group and to consider the draft decision put forward at that meeting.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 71–75) • Technology and Economic Assessment Panel May 2018 report (vol. 3): Progress Report, annex 1 • Draft decision on review of the terms of reference, composition and balance as well as fields of expertise required of the assessment panels and their subsidiary bodies (UNEP/OzL.Pro.30/3/Rev.1, section II, draft decision XXX/[C])
Item 13	***Consideration of senior expert and other nominations by parties to the Technology and Economic Assessment Panel***	
	The parties are expected to consider nominations to the Technology and Economic Assessment Panel, taking into consideration the matrix of needed expertise and in the light of the information provided on the current workload of the Panel and the list of Panel members whose terms will expire at the end of 2018.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras.76–80 and annex II) • Addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1, paras. 36–38) • Note by the Secretariat on reports and updates by the Technology and Economic Assessment Panel (UNEP/OzL.Pro.30/INF/6) • Technology and Economic Assessment Panel May 2018 report (vol. 3): Progress Report, chapter 9 and annex I • List of Technology and Economic Assessment Panel expertise required: http://ozone.unenvironment.org/teap_experts_required
Item 14	***Consideration of the membership of Montreal Protocol bodies for 2019***	
(a)	*Members of the Implementation Committee* The parties are expected to consider and nominate the proposed membership of the Implementation Committee for 2019.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 81–84) • Draft decision on membership of the Implementation Committee (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[CC])
(b)	*Members of the Executive Committee of the Multilateral Fund* The parties are expected to consider and endorse the proposed membership of the Executive Committee for 2019.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 85-88)

Agenda item	*Title of the agenda item and brief description*	*Related documents*
		• Draft decision on membership of the Executive Committee of the Multilateral Fund (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[DD])
(c)	*Co-chairs of the Open-ended Working Group* The parties are expected to consider and nominate two co-chairs of the Open-ended Working Group of the parties for 2019.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 89–90) • Draft decision on co-chairs of the Open-ended Working Group of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[EE])
Item 15	***Compliance and data reporting issues: the work and recommended decisions of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol***	
	The parties will consider the report by the President of the Implementation Committee to the Thirtieth Meeting of the Parties on party compliance issues. discussed during the sixtieth and sixty-first meetings of the Implementation Committee.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 91 and 92) • Report of the Secretariat on information provided by parties in accordance with Articles 7 and 9 of the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP/OzL.Pro.30/9–UNEP/OzL.Pro/ImpCom/61/2) • Addendum to the report by the Secretariat on information provided by the parties in accordance with Articles 7 and 9 of the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP/OzL.Pro.30/9/Add.1–UNEP/OzL.Pro/ImpCom/61/2/Add.1)
Item 16	***Update on the situation of the Caribbean islands affected by hurricanes (decision XXIX/19)***	
	Pursuant to decision XXIX/19, the parties are expected to hear updates from the parties concerned regarding the exceptional situation stemming from the 2017 hurricanes.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, paras. 93 and 94)
Item 17	***Other matters***	
	The parties are expected to consider any additional substantive issues that will have been raised at the time of the adoption of the agenda.	• Provisional agenda (UNEP/OzL.Pro.30/1) • Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 95)

II.High-level segment (8 and 9 November 2018)

Agenda item	*Title of the agenda item and brief description*	*Related documents for reference*
Item 1	***Opening of the high-level segment***	
	The high-level segment of the meeting is scheduled to be opened at 10 a.m. on Thursday, 8 November 2018.	• Note by the Secretariat on issues for discussion by and information for the attention of Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 96)
(a)	*Statements(s) by representatives(s) of the Government of Ecuador*	
(b)	*Statement(s) by representatives(s) of the United Nations Environment Programme*	
(c)	*Statement by the President of the Twenty-Ninth Meeting of the Parties to the Montreal Protocol*	
Item 2	***Organizational matters***	
(a)	*Election of officers for the Thirtieth Meeting of the Parties to the Montreal Protocol* The Thirtieth Meeting of the Parties is expected to elect a president, three vice-presidents and a rapporteur on the basis of regional rotation agreed on by the parties. The parties may wish to elect the president from the Eastern European States and the rapporteur from the Asia-Pacific States. The parties may further wish to elect three vice-presidents, one from each of the following: African States, Latin American and Caribbean States, Western European and other States.	• Note by the Secretariat on issues for discussion by and information for the attention of Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 98) • Rule 21 of the rules of procedure for meetings of the parties to the Montreal Protocol: http://ozone.unenvironment.org/montreal-protocol-substances-deplete-ozone-layer/34767/2157
(b)	*Adoption of the agenda of the high-level segment of the Thirtieth Meeting of the Parties to the Montreal Protocol* The Thirtieth Meeting of the Parties to the Montreal Protocol will consider for adoption the provisional agenda of the high-level segment.	• Provisional agenda (UNEP/OzL.Pro.30/1, section II) • Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 99)
(c)	*Organization of work* The organization of work will be proposed by the President for the consideration and agreement of the parties.	• Provisional agenda (UNEP/OzL.Pro.30/1, section II) • Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 100)
(d)	*Credentials of representatives* Credentials of representatives, alternative representatives and advisers should be submitted to the Executive Secretary of the meeting if possible not later than 24 hours after the opening of the meeting. The elected officers of the meeting will examine the credentials and submit their report thereon at the meeting.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 101) • Rules 18 and 19 of the rules of procedure for meetings of the parties to the Vienna Convention and the Montreal Protocol: http://ozone.unenvironment.org/montreal-protocol-substances-deplete-ozone-layer/34767/2157

Agenda item	*Title of the agenda item and brief description*	*Related documents for reference*
Item 3	***Presentations by the assessment panels on progress in their work and any key issues having emerged from their 2018 quadrennial assessments***	
	The three assessment panels will make presentations on the status of their assessment work, to be completed by the end of 2018, including the latest developments and any emerging issues.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 102) • Addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1, paras. 2–35, table 3 and annexes)
Item 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***	
	The Chair of the Executive Committee of the Multilateral Fund will present a report on the decisions of the Executive Committee meeting and the work undertaken by the Multilateral Fund secretariat and the Fund's implementing agencies since the Twenty-Ninth Meeting of the Parties to the Montreal Protocol in November 2017.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 103) • Report of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol to the Thirtieth Meeting of the Parties (UNEP/OzL.Pro.30/10)
Item 5	***Statements by heads of delegations and discussion on key topics***	
	Heads of delegations will be invited to make statements.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 104)
Item 6	***Report by the co-chairs of the preparatory segment and consideration of the decisions recommended for adoption by the Thirtieth Meeting of the Parties***	
	The co-chairs of the preparatory segment will present the summary of discussions and recommended decisions for submission to the high-level segment.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 105)
Item 7	***Dates and venue for the Thirty-First Meeting of the Parties to the Montreal Protocol***	
	The parties will consider and decide upon the offer from the Government of Italy to host the Thirty-First Meeting of the Parties to the Montreal Protocol in Rome in 2019 (dates to be confirmed).	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 106) • Draft decision on dates and venue for the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[FF])
Item 8	***Other matters***	

Agenda item	*Title of the agenda item and brief description*	*Related documents for reference*
	The parties are expected to discuss any additional issues that will have been raised during the adoption of the agenda.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 107)
Item 9	***Adoption of decisions by the Thirtieth Meeting of the Parties to the Montreal Protocol***	
	Parties are expected to adopt decisions on the matters on the agenda.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 108).
Item 10	***Adoption of the report***	
	The parties are expected to adopt the draft report of the meeting on Friday, 9 November 2018.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 109)
Item 11	***Closure of the meeting***	
	The Thirtieth Meeting of the Parties to the Montreal Protocol is expected to close by 6 p.m. on Friday, 9 November 2018.	• Note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2, para. 110)

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**Thirtieth Meeting of the Parties to
the Montreal Protocol on Substances
that Deplete the Ozone Layer**
Quito, 5–9 November 2018

Report of the Thirtieth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer

Introduction

1.The Thirtieth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer was held at the Quorum Quito Convention Centre, Quito, from 5 to 9 November 2018.

Part one: preparatory segment (5–7 November 2018)

I. Opening of the preparatory segment

2.The preparatory segment was opened by its co-chairs, Mr. Yaqoub Almatouq (Kuwait) and Ms. Cynthia Newberg (United States of America), on Monday, 5 November 2018, at 10 a.m.

3.Opening remarks were delivered by Mr. Pablo Campana, Minister of Production, Foreign Trade and Investment of Ecuador, and Ms. Tina Birmpili, Executive Secretary of the Ozone Secretariat.

A. Statement by the representative of the Government of Ecuador

4.In his remarks, Mr. Campana welcomed the representatives of more than 170 countries to Ecuador, noting that his country was fully committed to environmental protection. Recalling the words of environmentalist John Sawhill, "A society is not only defined by what it creates, but by what it refuses to destroy", in relation to the objective of the meeting, he said that it was an honour for Ecuador and for the Ministry of Production, Foreign Trade and Investment to host the Thirtieth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer.

5. He welcomed in particular the addition of hydrofluorocarbons (HFCs) to the Montreal Protocol through the Kigali Amendment, which would not only help the recovery of the ozone layer but would also prevent the emission of approximately 19 per cent of estimated total greenhouse gas emissions by 2050, compared to business as usual. The Government of Ecuador had already ratified the Kigali Amendment and, in October 2017, had introduced an import licensing system for HFCs, which would enable his country to establish its baseline for subsequent compliance with the HFC reduction schedules. The Government also planned to complete the destruction in December 2018 of 2.5 tonnes of chlorofluorocarbons (CFCs), equivalent to approximately 27,000 tonnes of carbon dioxide (CO_2) emissions.

6. While Ecuador was a country open to the world, aiming to attract investment and diversify exports, it did so in strict compliance with national and international standards and with the utmost respect for the environment. His Government was fully aware that honouring society's social and environmental responsibility was a prerequisite for sustainable economic progress.

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

7.In her opening statement, Ms. Birmpili thanked the 59 parties that had ratified the Kigali Amendment to date, thereby guaranteeing its entry into force in 2019, and looked forward to the eventual global ratification of the Amendment. She expressed the belief that the same demonstration of strength and unity that had been seen in the worldwide ratification of the Montreal Protocol would allow the Kigali Amendment to develop its full potential in reducing global warming, an outcome which was urgently needed given the recent evidence of the scale of the climate change challenge.

8. Reviewing the items scheduled for discussion at the meeting, she observed that parties faced a heavy agenda. She thanked the members of the Technology and Economic Assessment Panel for the several reports they had produced and presentations they would be giving at the meeting. She drew attention in particular to the Panel's report on issues related to energy efficiency opportunities while phasing down HFCs in relation to the refrigeration and air-conditioning sector, a key topic given the expected 33-fold increase in global energy consumption in that sector by 2100. That was an important but challenging issue for the parties to the Montreal Protocol, and she expressed the hope that it might be possible for participants in the meeting to hold a frank and open discussion on the issue.

9. She drew attention to the unexpected increased emissions of trichlorofluoromethane (CFC-11) that had been detected, which had become a major issue for governments, industry, non-governmental organizations and the media. If those increased emissions continued unabated, they would slow the recovery of the ozone layer and pose a real threat to the credibility of the Montreal Protocol itself. As the Scientific Assessment Panel had stated in the executive summary of its quadrennial assessment for 2018, the continued success of the Protocol depended on continued compliance with the Protocol. The CFC-11 challenge raised a series of questions – whether scientific and technological efforts would be sustained over the coming decades, how the mechanisms of the Montreal Protocol could be strengthened to prevent similar situations arising in the future and whether parties were sufficiently well prepared for the future enforcement needed to implement the HFC phase-down. She looked forward to the parties taking decisive action on the illegal production and consumption of CFC-11.

10. In closing, she provided an overview of the Secretariat's planned activities for 2019, which included work on the online reporting tool, improvements to the website, and an increased focus on gender equality, with a gender action plan for the ozone treaties. She called on participants not just to work hard during the meeting but also to raise their heads from time to time to see the bigger picture: that each small action was a contribution to protecting humanity and the planet they called home.

II. Organizational matters

A. Attendance

11.The Thirtieth Meeting of the Parties to the Montreal Protocol was attended by representatives of the following parties: Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Côte d'Ivoire, Cuba, Czechia, Democratic Republic of the Congo, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Eswatini, Ethiopia, European Union, Fiji, Finland, France, Gambia, Georgia, Germany, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Holy See, Honduras, Hungary, India, Indonesia, Iran (Islamic Republic of), Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Korea (Republic of), Kuwait, Kyrgyzstan, Lao (People's Democratic Republic), Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Madagascar, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Micronesia (Federated States of), Mongolia, Morocco, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Paraguay, Peru, Poland, Romania, Russian Federation, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Slovakia, Solomon Islands, Somalia, South Africa, South Sudan, Sudan, Sweden, Switzerland, Syrian Arab Republic, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United

Republic of Tanzania, United States of America, Uruguay, Uzbekistan, Venezuela (Bolivarian Republic), Viet Nam, Yemen, Zambia and Zimbabwe.

12.Representatives of the following United Nations bodies and specialized agencies also attended: secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol, United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP) and the United Nations Industrial Development Organization (UNIDO), World Bank.

13.The following intergovernmental, non-governmental, industry, academic and other bodies were also represented: ADC3R; Alliance for Responsible Atmospheric Policy; ASHREA, Climalife; Daikin Latin America Operations; Environmental Investigation Agency (EIA); EHSSQ-SR; European Environmental Citizens Organisation for Standardisation; European Partnership for Energy and the Environment; Independent Consultant; Industrial Technology Research Institute for Governance and Sustainable Development; Intergovernmental Panel on Climate Change; Internationale Zusammenarbeit (GIZ) GmbH (GIZ Proklima); International Institute of Refrigeration; Japan Fluorocarbon Manufactures Association; Kigali Cooling Efficiency Program; Lawrence Berkeley National laboratory; MABE; Manitoba Ozone Protection Industry Association; Mebrom; Mexichem UK Ltd.; Natural Resources Defense Council; Oak Ridge National Laboratory; Refrigerants Australia; Reciplasticos S.A.; Shaffie Law and Policy; SHECCO; Trans-Mond Environment Ltd and The Energy and Resources Institute; Topten International Services; Universidad San Francisco de Quito; University of Southern California and Walton Hi Tech Industries Ltd.

B. Officers

14.The preparatory segment was co-chaired by Mr. Almatouq (Kuwait) and Ms. Newberg (United States).

C. Adoption of the agenda of the preparatory segment

15.The following agenda for the preparatory segment was adopted on the basis of the provisional agenda contained in document UNEP/OzL.Pro.30/1:

1. Opening of the preparatory segment:
   - (a) Statement(s) by representative(s) of the Government of Ecuador;
   - (b) Statement(s) by representative(s) of the United Nations Environment Programme.
2. Organizational matters:
   - (a) Adoption of the agenda of the preparatory segment;
   - (b) Organization of work.
3. Budget of the Trust Fund for the Montreal Protocol and financial reports.
4. Kigali Amendment to the Montreal Protocol to phase down hydrofluorocarbons:
   - (a) Data reporting under Article 7 and related issues;
   - (b) Destruction technologies for controlled substances (decision XXIX/4);
   - (c) Progress by the Executive Committee of the Multilateral Fund in the development of guidelines for financing the phase-down of hydrofluorocarbons (decision XXVIII/2);
   - (d) Status of ratification of the Kigali Amendment to the Montreal Protocol.
5. Future availability of halons and their alternatives (decision XXIX/8).
6. Issues related to exemptions under Articles 2A–2I of the Montreal Protocol:
   - (a) Nominations for critical-use exemptions for methyl bromide for 2019 and 2020;
   - (b) Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol (decision XXVI/5);
   - (c) Process agents (decision XVII/6).
7. Linkages between hydrochlorofluorocarbons and hydrofluorocarbons in transitioning to low-global-warming-potential alternatives.

8. Issues related to energy efficiency while phasing down hydrofluorocarbons (decision XXIX/10):

   (a) Report by the Technology and Economic Assessment Panel on energy efficiency in the refrigeration, air-conditioning and heat-pump sectors;

   (b) Access of parties operating under paragraph 1 of Article 5 of the Protocol to energy-efficient technologies in the refrigeration, air-conditioning and heat pump sectors.

9. Proposed adjustments to the Montreal Protocol on hydrochlorofluorocarbons for parties not operating under paragraph 1 of Article 5 of the Protocol.

10. Unexpected emissions of trichlorofluoromethane (CFC-11).

11. Issue raised by the United Arab Emirates regarding eligibility for financial and technical assistance.

12. Review of the terms of reference, composition and balance as well as fields of expertise required of the assessment panels and their subsidiary bodies.

13. Consideration of senior expert and other nominations by parties to the Technology and Economic Assessment Panel.

14. Consideration of the membership of Montreal Protocol bodies for 2019:

   (a) Members of the Implementation Committee;

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

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

15. Compliance and data reporting issues: the work and recommended decisions of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol.

16. Update on the situation of the Caribbean islands affected by hurricanes (decision XXIX/19).

17. Other matters.

16.Under agenda item 17, “Other matters”, the parties agreed to discuss two issues: (a) matters relating to safety standards for refrigeration, air-conditioning, and heat-pump systems and appliances, based on the information available in document UNEP/OzL.Pro.30/INF/3; and (b) matters relating to Harmonized System codes for the most commonly traded fluorinated substitutes for hydrochlorofluorocarbons (HCFCs) and CFCs, based on the information available in document UNEP/OzL.Pro.30/INF/7.

D. Organization of work

17.The parties agreed to follow their customary procedure and to establish contact groups as necessary, endeavouring to limit the number of groups operating simultaneously to ensure the effective participation of small delegations.

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

18.Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 11 to 15 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), the note by the Secretariat on the proposed revision to the approved budget for 2018 and proposed budgets for 2019 and 2020 of the Trust Fund for the Montreal Protocol (UNEP/OzL.Pro.30/4/Rev.1) and the addendum thereto (UNEP/OzL.Pro.30/4/Add.1/Rev.1), the note by the secretariat on the financial report for the trust funds for the Vienna Convention and the Montreal Protocol for the fiscal year 2017 (UNEP/OzL.Pro.30/5) as well as a draft decision on the financial reports and budgets for the Montreal Protocol (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[BB]).

19. The parties agreed to follow their standard practice and establish a budget committee to review the proposed budgets and the financial reports for the Vienna Convention and the Montreal Protocol trust funds, and to prepare a draft decision on financial matters for the Protocol. The committee was facilitated by Ms. Phillipa Guthrey (New Zealand).

20.Subsequently, the facilitator of the budget committee presented a draft decision on financial reports and budgets for the Montreal Protocol, set out in a conference room paper, which the parties approved for consideration and possible adoption during the high-level segment.

IV. Kigali Amendment to the Montreal Protocol to phase down hydrofluorocarbons

A. Data reporting under Article 7 and related issues

21.Introducing the sub-item, the Co-Chair drew attention to the background information set out in paragraphs 16 to 21 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2) and the note by the Secretariat on data reporting under Article 7 of the Montreal Protocol, including related issues arising from the Kigali Amendment to the Montreal Protocol to phase down HFCs (UNEP/OzL.Pro.30/8/Rev.1).

22.She recalled that in its discussions at the fortieth meeting of the Open-ended Working Group in July 2018, the contact group on data reporting under Article 7 and related issues had reached agreement on the issue of reporting of trade with non-parties and on the global-warming-potential (GWP) values that the Secretariat should use for HCFC-141 and HCFC-142. Those two issues had been incorporated into the revised data reporting forms and associated instructions for further consideration at the current meeting. Three issues remained to be discussed further: the timeline for the reporting of baseline data for HFCs by parties operating under paragraph 1 of Article 5 (Article 5 parties); revised data reporting forms and associated instructions; and GWP values for HCFC-123 and HCFC-124.

23.The parties agreed to establish a contact group, co-chaired by Mr. Martin Sirois (Canada) and Ms. Miruza Mohamed (Maldives), to discuss the issues further.

24. Subsequently, Mr. Sirois reported that the contact group had been able to reach agreement on all the outstanding issues. He thanked all its members for their hard work and the spirit of compromise they had displayed over the previous two years, and presented two proposals for draft decisions, one on the timeline for reporting of baseline data for HFCs by Article 5 parties, and one on data reporting forms. Agreement on those decisions would enable parties to begin to fulfil their obligations under the Kigali Amendment.

25. The parties agreed to forward both draft decisions for consideration and possible adoption during the high-level segment.

B. Destruction technologies for controlled substances (decision XXIX/4)

26.Introducing the sub-item, the Co-Chair drew attention to the background information set out in paragraphs 22 to 24 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), paragraphs 3 to 9 of, and annexes I and II to, the addendum thereto (UNEP/OzL.Pro.30/2/Add.1), volume 2 of the Technology and Economic Assessment Panel April 2018 report containing the decision XXIX/4 task force report on destruction technologies for controlled substances, volume 2 of the Panel's May 2018 report containing the supplement to the April 2018 decision XXIX/4 task force report on destruction technologies for controlled substances, and its corrigendum, volume 1 of the Panel's September 2018 revised report containing the decision XXIX/4 task force report on destruction technologies for controlled substances (addendum to the May 2018 supplemental report).

27. Ms. Helen Tope and Ms. Helen Walter-Terrinoni, co-chairs of the task force on destruction technologies of the Technology and Economic Assessment Panel, presented the key features of the addendum report published in September, and its assessment of destruction technologies for controlled substances based on additional information which had been provided subsequently. A summary of the presentation, prepared by the co-chairs of the task force, is set out in section A of annex VI to the present report.

28.Responding to questions regarding the availability of additional information on the various destruction technologies, Ms. Tope said that members of the task force would be happy to engage with parties in the margins of the meeting. She confirmed that some studies of destruction technologies had been carried out in Article 5 parties. She explained that the term "high potential" used by the task force meant either that the technology had been approved for the destruction of ozone-depleting substances but had not been demonstrated for the destruction of HFCs to the necessary performance criteria, or that the technology had been demonstrated to have destroyed a refractory chlorinated

organic compound other than an ozone-depleting substance to the technical performance criteria, on at least a pilot scale or demonstration scale, but had not been demonstrated for HFCs.

29. Responding to a question on the potential use of cement kilns for destruction, Ms. Walter-Terrinoni said that further information was available in the addendum report. The evidence available suggested that emissions from cement kilns were typically very high, but the addition of ozone-depleting substances or HFCs was unlikely to have any significant additional effect.

30. The parties agreed to establish a contact group, co-chaired by Mr. Bitul Zulhasni (Indonesia) and Mr. Mikkel Sorensen (Denmark) to discuss the issues further. The co-chairs of the task force indicated their willingness to participate in the contact group to provide advice and assistance.

31. Subsequently, the co-chair of the contact group introduced a draft decision, as set out in a conference room paper. The parties agreed to forward the draft decision for consideration and possible adoption during the high-level segment.

C. Progress by the Executive Committee of the Multilateral Fund in the development of guidelines for financing the phase-down of hydrofluorocarbons (decision XXVIII/2)

32. Introducing the sub-item, the Co-Chair drew attention to the background information set out in paragraphs 25 to 30 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2) and the report of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol to the Thirtieth Meeting of the Parties (UNEP/OzL.Pro.30/10). He recalled that, in paragraph 10 of decision XXVIII/2, the parties had requested the Executive Committee to develop, within two years of the adoption of the Kigali Amendment, guidelines for financing the phase-down of HFC consumption and production and to present those guidelines to the meeting of the parties for parties' views and input before their finalization by the Executive Committee.

33. The Chair of the Executive Committee, Mr. Mazen Hussein, and the Chief Officer of the Multilateral Fund, Mr. Eduardo Ganem, gave a presentation on the progress achieved on the funding guidelines. Mr. Ganem recalled that the Executive Committee had discussed matters arising from the Amendment that were relevant to it at its meeting immediately following the adoption of the Amendment, at a subsequent special four-day meeting and at each of its meetings since.

34. At the Twenty-Eighth Meeting of the Parties, when the Amendment had been adopted, 17 parties not operating under paragraph 1 of Article 5 (non-Article 5 parties) had announced one-off voluntary contributions to the Multilateral Fund to provide fast-start support for the implementation of the Amendment. Those contributions had all since been received and totalled $25.51 million, of which $23.11 million had been disbursed to date. That amount included $15.15 million for enabling activities in 109 countries, and $7.54 million for HFC investment projects, which would phase out 681,541 CO_2-equivalent tonnes of HFCs.

35. In 2015, the Executive Committee had decided to fund surveys of the consumption and production of HFCs and other alternatives to ozone-depleting substances. By the time of the eightieth meeting of the Executive Committee, in 2017, that data had been made available for 119 countries. Bilateral and implementing agencies had been requested to use the findings and lessons from the surveys when assisting countries in implementing enabling activities, with particular attention to strengthening HFC data collection and reporting, which would assist countries in establishing their HFC baselines.

36. In decision XXVIII/2, the parties had requested the Executive Committee to fund various enabling activities in relation to HFC phase-down. The Committee had adopted criteria for providing that funding, including a letter from the Government indicating its intention to ratify the Kigali Amendment as early as possible, if it had not already done so; a statement that the implementation of enabling activities would not delay the implementation of HCFC phase-out projects; and a deadline for completion of the activities of 18 months, which could be extended by up to 12 months, if needed. Funding for the preparation of national implementation plans to meet initial HFC reduction obligations could be provided, at the earliest, five years prior to those obligations once a country had ratified the Amendment.

37. To date, $17.2 million had been approved for enabling activities in 119 Article 5 parties (including 6 Article 5 Group 2 countries), and proposals for an additional $1.6 million for activities in 11 Article 5 parties (including 2 Article 5 Group 2 parties) had been submitted for consideration at the eighty-second meeting of the Committee, to be held in Montreal, Canada, from 3 to 7 December 2018. A further $950,000 for enabling activities in 6 Article 5 parties had been included in the 2019 business

plan. To date, 35 Article 5 Group 1 parties had ratified the Amendment; for those countries, funding requests for the preparation of national implementation plans could be received as early as 2019.

38. In decision XXVIII/2, the parties had also directed the Executive Committee to increase institutional strengthening support in the light of the new commitments related to HFCs under the Amendment. Considering the relevance of institutional strengthening for the implementation of the Montreal Protocol, and the number of decisions adopted on that issue, the Committee decided to consider increasing funding for institutional strengthening at a future meeting.

39. Many elements of decision XXVIII/2 had been included in the draft template of the guidelines for funding the phase-down of HFCs, but a number needed further discussion. Those included all aspects of the refrigeration servicing sector and the methodology for determining the starting point for sustained aggregate reductions in HFC consumption, which would be discussed at the eighty-second meeting of the Committee. In relation to the latter issue, the Committee would also consider the prioritization of technical assistance and capacity-building to address safety issues associated with low-GWP or zero-GWP alternatives. Also requiring further discussion were the levels of eligible incremental costs and cost-effectiveness thresholds in different manufacturing sectors, where the Committee had decided to approve a limited number of investment projects, under various conditions, in order to generate detailed information on the incremental capital and incremental operating costs, given the limited experience so far in phasing out HFCs. To date, $12.4 million had been approved for seven investment projects in six countries, and proposals totalling an additional $3.9 million for five projects in five parties had been submitted for consideration at the eighty-second meeting of the Committee. Another $15.6 million for five projects had been included in the 2019 business plan.

40. Elements of decision XXVIII/2 that had not yet been included in the draft template of the cost guidelines and remained under discussion included HFC-23 by-product control. HCFC-22-producing parties had been invited to provide information on the quantities of HFC-23 generated and their experience in controlling and monitoring it, and countries wishing to close HCFC-22 production swing plants had been invited to submit preliminary data on their production facilities. A report on options and costs related to the control of HFC-23 by-product emissions in Argentina, including shipping HFC-23 for destruction, and a document on cost-effective options for controlling HFC-23 by-product emissions, including the costs of closing HCFC-22 production, would both be considered by the Committee at its eighty-second meeting.

41. Another element needing further discussion was energy efficiency, which the Committee would discuss in the light of the parties' deliberations at the current meeting in relation to the relevant report of the Technology and Economic Assessment Panel. A further element was the disposal of HFCs, for which the Committee had decided to consider issues related to funding the cost-effective management of stockpiles of used or unwanted controlled substances, including through destruction, in the light of the paper on the disposal of ozone-depleting substances that would be discussed at the Committee's eighty-second meeting. Another element was capacity-building to address safety, which also remained under consideration.

42. Lastly, he said, in relation to the status of HCFC phase-out, that 27 demonstration projects for conversion from HCFCs to low- or zero-GWP technologies had been approved between November 2008 and May 2016, with total funding of $27 million. Stage I HCFC phase-out management plans had been approved for 144 parties and stage II plans had been approved for 32 parties; total funding for the plans of $1.36 billion had been approved in principle, of which $805.33 million had been disbursed. Over 19,500 ODP-tonnes of HCFCs would be phased out once those plans had been completed, representing 60.5 per cent of the starting point. Most of the foam manufacturing sector and a large portion of the air-conditioning manufacturing sector were being converted, mainly to low-GWP alternatives. All countries were addressing the refrigeration servicing sector. One phase-out plan for HCFC production had been approved, accounting for about 95 per cent of total HCFC production in Article 5 parties.

43. During the ensuing discussion, many of those who spoke expressed appreciation for the comprehensive presentation by both the Chair of the Executive Committee and the Chief Officer of the Multilateral Fund, and commended the progress achieved thus far by the Executive Committee of the Multilateral Fund in the development of guidelines for financing the phase-down of HFCs.

44. Several representatives sought clarification of how the financing modalities would actually function. One representative, referring to the decision taken at the eighty-first meeting of the Executive Committee that the regular contributions to the Multilateral Fund were to be used in the event that no more funding under the additional voluntary contributions was available to fund enabling activities, asked what impact such a use of the regular budget might have on the funding of continuing activities to phase out HCFCs. The Chief Officer responded that the issue was carefully considered in

relation to the business plan of the Multilateral Fund, and that priority was given in the disbursement of the regular budget to those activities that enabled Article 5 parties to comply with their obligations under the Montreal Protocol.

45. Referring to the timing and sequence of activities and funding under the Kigali Amendment, one representative asked whether countries that had ratified the Amendment could submit requests for funding for the implementation of phase-down projects in parallel with any enabling activities they were continuing to undertake, or whether they had to wait for the completion of the enabling activities before submitting such requests. Another representative sought clarification of the relationship between the timing of funding of national implementation plans and the date of ratification of the Kigali Amendment. Yet another drew attention to the problems faced by countries that wanted to access funding for activities under the Kigali Amendment but were encountering delays in their internal government processes for ratification. The Chair of the Executive Committee responded that those matters were on the agenda for discussion at the eighty-second meeting of the Committee. In response to a query about opportunities for parties to further review progress made and to provide inputs through their regional representatives on the Executive Committee, the Chair of the Executive Committee said that it was normal procedure for the members of the Committee to reflect the views of the regions they represented during discussions of key issues.

46. A number of representatives stressed the need for the Executive Committee to accelerate its progress in developing the guidelines. One representative highlighted the urgency of undertaking assessments of those phase-down projects that were currently under way in order to assist industry in its future planning; those assessments should take account of current HFC use and future trends, as well as the actual situation in developing countries. One representative highlighted the importance of cost-effectiveness when considering both HCFC phase-out and HFC phase-down in the servicing sector and in the commercial and domestic air-conditioning sectors. Another representative expressed concern that the guidance on energy efficiency had yet to be completed, given that investment projects were already under way in a number of countries. One representative, speaking on behalf of a group of countries, said that while the documents prepared by the Fund secretariat had been of great assistance in developing the guidelines, a number of outstanding issues remained, to be resolved at forthcoming meetings of the Executive Committee.

47. A number of representatives reflected on the current progress made in relation to the overall scale and schedule of the task envisaged, from the adoption of decision XXVIII/2 in October 2016 to the finalization of the financing guidelines within two years of the adoption of the Kigali Amendment. There was general agreement that the progress to date had been encouraging, and that the Executive Committee needed to be given the time to develop the most appropriate and effective guidelines possible, although some representatives said that firmer guidance was required on the actual time frame. Another representative said that data derived from stand-alone investment projects would be helpful in finalizing the guidance on incremental costs; the Executive Committee should therefore be afforded the time needed to work through complex material and gather the required information, taking account of the fact that for most parties the freeze in production and consumption of HFCs did not start until 2025 or later.

48. One representative said that the guidelines, once developed, would for many years provide the parameters for financing HFC phase-down activities in all Article 5 parties, and it was thus important to proceed carefully. Missing information needed to be provided, especially on the costs of adopting HFC alternative technologies in different Article 5 parties and in different regions. Once that information was available, the guidelines would be developed through a process of negotiation between the members of the Executive Committee, who represented wider geographical regions. With respect to the timing of HFC-related activities, he recalled that the finalization of the guidelines on HCFCs had not been a condition for starting to approve projects, and the evolution of HFC phase-down under the Kigali Amendment had been similar, with a number of enabling activities and stand-alone projects already being implemented. Project funding could therefore operate in parallel with the development of the guidelines, at least in the early years of control measures.

49. One representative placed high priority on an iterative dialogue between the Executive Committee and the meeting of the parties in the development of the guidelines. The input of the parties was vital in helping the Executive Committee to fill gaps and resolve the outstanding issues, and it behove the Executive Committee to report in detail to future meetings of the parties on the progress made and to seek advice on the way forward. Wide consultation was required in view of the complexity of the task and the multiple alternatives to HFCs that were under consideration. It was therefore important that the parties acted in accordance with the paragraph in decision XXVIII/2 requesting the Chair of the Executive Committee to report back to the Meeting of the Parties on the

progress made, as well making their views known through the regional constituencies of the Executive Committee members.

50. One representative said that the present process was similar to that encountered previously when parties had decided to phase out or phase down new groups of substances, and lessons could be drawn from previous experiences of implementing projects involving transitions to various technologies, especially in the case of countries with larger consumption patterns. The progress made thus far in developing the guidelines had been reassuring, and the additional contributions had enabled Article 5 parties to take early action on enabling activities and stand-alone investment projects, with further projects under consideration at the eighty-second meeting of the Executive Committee. The results of those investment projects, and the work on HFC-23 by-product production, would help the Executive Committee as it continued its discussions on the issue. It was vital to support the role of the Executive Committee in developing the guidelines, in accordance with the mandate provided by decision XXVIII/2, taking account of the expertise of its members and its complementary and enabling rules and procedures. In addition, the annual report of the Chair of the Executive Committee to the meeting of the parties provided an opportunity to ensure that the parties were fully informed of the progress made by the Committee in developing the guidelines.

51. Subsequently, the representative of India introduced a draft decision on the matter, set out in a conference room paper, which had been submitted by Argentina, Bahrain, Brazil, India, Lebanon and Saudi Arabia. The draft decision sought to ensure that, in continuing its work to develop the guidelines for financing the phase-down of HFC consumption and production, the Executive Committee of the Multilateral Fund would provide progress reports on the guidelines to the meeting of the parties and enable parties to provide input to the guidelines prior to finalizing them.

52. In the ensuing discussion, many representatives expressed support for the proposed draft decision and stressed the importance of ensuring that the process of developing the guidelines was open and transparent and enabled all parties, in particular those that were not members of the Executive Committee, to provide input into the process, with two expressing the hope that the Executive Committee would consider the suggestions and concerns of all parties and accelerate progress towards the finalization of the guidelines. Several other representatives requested additional time to review the proposed draft decision, with one seeking clarification of whether the intention was to enable all the parties, including those that were members of the Executive Committee and were involved in drafting the guidelines, to provide inputs into the drafting process.

53. Subsequently, the representative of Micronesia reported that agreement had been reached during the informal discussions on a draft decision, as set out in a revised conference room paper. The parties agreed to forward the draft decision for consideration and possible adoption during the high-level segment.

D. Status of ratification of the Kigali Amendment to the Montreal Protocol

54. Introducing the sub-item, the Co-Chair drew attention to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), the note by the Secretariat on the status of ratification, acceptance or approval of the Kigali Amendment to the Montreal Protocol (UNEP/OzL.Pro.30/INF/1), and a draft decision on the status of ratification of the Kigali Amendment (UNEP/OzL.Pro.30/3/Rev.1, section III, draft decision XXX/[AA]). He said that the proposed draft decision would record the number of ratifications of the Kigali Amendment and encourage additional ratifications of the Kigali Amendment, noting that, as at 5 November 2018, 59 parties had ratified the Amendment.

55. In the ensuing discussion, many representatives drew attention to the efforts being undertaken by their Governments to ratify the Kigali Amendment, with two representatives announcing that they expected their Governments to complete the ratification process before the end of the current meeting, and another two saying that their instruments of ratification would be deposited at the headquarters of the United Nations, in New York, in the coming days.

56. The parties agreed to forward the draft decision for consideration and possible adoption during the high-level segment, on the understanding that the number of ratifications reflected therein would correspond to the total number of instruments of ratification deposited at the time of the adoption of the decision.

V. Future availability of halons and their alternatives (decision XXIX/8)

57.Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 34 to 37 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), the addendum thereto (UNEP/OzL.Pro.30/2/Add.1) and volume 2 of the Technology and Economic Assessment Panel September 2018 report on decision XXIX/8 on the future availability of halons and their alternatives.

58.She recalled that, at its fortieth meeting the Open-ended Working Group had heard from the Halons Technical Options Committee on progress achieved regarding its collaboration with the International Civil Aviation Organization (ICAO) to implement decision XXIX/8. At the meeting, the Committee had reported that an ICAO informal working group had been established to determine the uses and emissions of halon-1301 in civil aviation fire-protection systems. The Open-ended Working Group had also discussed possible cooperation with the International Maritime Organization to facilitate work on halons on ships.

59.The co-chair of the Halons Technical Options Committee, Mr. Daniel Verdonik, gave a presentation on the report on the implementation of decision XXIX/8 on the future availability of halons and their alternatives. A summary of the presentation prepared by the presenters is set out in section B of annex VI to the present report.

60.Subsequently, the co-chairs of the Committee, Mr. Verdonik and Mr. Adam Chattaway, answered questions during a question-and-answer session on matters highlighted during the presentation or in the report.

61.In response to a question regarding the names and locations of the companies that had answered the survey prepared by the ICAO informal working group to enable a more accurate calculation of the annual amount of halon 1301 emitted from civil aviation worldwide, Mr. Verdonik said that such information was considered confidential business information, but the appropriate body would identify which key companies had not responded to the survey. With regard to data on other sources of halons, such as shipbreaking, Mr. Verdonik said that it would be very helpful if the Halons Technical Options Committee could obtain such information in order to verify its own estimates of such sources. With regard to whether the Committee had taken into account the net growth of the installed global civil aviation fleet in its calculations of the global aviation halon bank, Mr. Verdonik said that it had and stressed that the bank for 2018, estimated at 2,800 metric tonnes, was projected to reach 4,600 metric tonnes in 2026 based on growth projections from major fleet manufacturers. With regard to the high-end annual emissions rate of 15 per cent from halon 1301 aviation applications, he clarified that the purpose of that and the other emission rates estimated by the Committee in its report was to give an idea of when halon would run out under different scenarios and to show the need for additional information to make more accurate estimates. He said that the ICAO informal working group survey had prompted the civil aviation industry to consider whether there were specific sources or practices that led to excessive emissions of halon 1301.

62.Responding to other questions, Mr. Chattaway said that studies on halon alternatives in civil aviation had been conducted for at least two decades, but the problem was that halons were unique fire suppressants that were difficult to replace. Noting that there were four main areas where halons were used in an aircraft, namely, in the cargo compartment, the engine, the main cabin and the lavatory trash containers, he said that while the latter two uses had been successfully replaced, that was not the case for engines and cargo compartments, where halon alternatives were still being pursued and studied. Stressing that halon production had ceased in 2010 in Article 5 parties and in 1994 in non-Article 5 parties, Mr. Chattaway said that halons from nuclear facilities, oil and gas facilities and a number of military organizations were not expected to become available, which left the decommissioning of telecommunication facilities and data centres, and possibly shipbreaking, as potential sources of halons.

63.In response to the view expressed by a party that there should be an inventory of halon banks in specific parties to determine their condition and quantities and to encourage trade between parties, Mr. Verdonik said that, unless a halon bank was very contaminated, the Halon Technical Options Committee recommended that it be used to meet an ongoing need.

64.Following the question-and-answer session, representatives held a discussion on the way forward. One representative announced that he was working with interested parties on a draft decision for consideration by the plenary that would request the bodies of the ozone treaties to continue to engage with institutions such as the International Maritime Organization to gather data for more informed future estimates of halon availability. Several representatives expressed support for such a draft decision, noting that it was important to obtain additional information from all relevant organizations

and parties on all available halon banks and stocks in order to ensure that such halons were reclaimed, reused and moved across borders to meet future needs.

65. At the suggestion of the Co-Chairs, the parties requested the representative of the United States to consult with interested parties in the margins of the meeting in order to produce a draft decision on the future availability of halons for consideration by the plenary.

66. Thereafter, the representative of the United States, speaking also on behalf of Australia, Canada, the European Union, Nigeria and Norway, introduced a conference room paper containing a draft decision on the future availability of halons and their alternatives. The draft decision focused on recycling and information gathering, and requested the Technology and Economic Assessment Panel, through its Halons Technical Options Committee, to submit a report on halon availability to the parties in advance of the forty-second meeting of the Open-ended Working Group.

67. Following a brief discussion, it was agreed that interested parties would consult informally on the matter and report back to the plenary on the outcome of those discussions.

68. Subsequently, the representative of the United States introduced a revised version of the draft decision. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment.

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

A. Nominations for critical-use exemptions for methyl bromide for 2019 and 2020

69. Introducing the sub-item, the Co-Chair drew attention to the background information set out in paragraphs 38 to 40 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), the addendum thereto (UNEP/OzL.Pro.30/2/Add.1) and volume 3 of the Technology and Economic Assessment Panel September 2018 final report on the evaluation of 2018 critical-use nominations for methyl bromide.

70. The co-chairs of the Methyl Bromide Technical Options Committee, Ms. Marta Pizano and Mr. 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 C of annex VI to the present report.

71. During the discussion on the matter, the representative of Canada said that as had been mentioned at previous meetings, unique conditions in the province of Prince Edward Island meant that methyl bromide was the only fumigant registered in Canada that could be used for strawberry runners on Prince Edward Island. Canada had nevertheless invested considerable technical and financial resources in research on a soilless culture system, which appeared to be the only viable alternative to methyl bromide use. The project had not generated very positive results to date but there were signs of more promising results from the 2018 growing season; those results would be reported as soon as they were available. Canada remained committed to pursuing the research project in 2019 but would need to see repeated reliable positive results over several years before starting to reduce its use of methyl bromide. He also indicated that Canada was preparing a draft decision on the matter in consultation with other interested parties.

72. The representative of Australia drew attention to the Committee's conclusion that there were no technically or economically viable alternatives to methyl bromide for Australia's critical-use nomination but provided additional clarifications for the information of the parties. Referring to the wording in one of the slides, he underscored that the certification body did not delay the adoption of alternatives but rather required field trials to demonstrate that alternatives were effective and results could be replicated. Also worthy of note was the recent re-initiation of the registration process for methyl iodide. Methyl iodide had been shown to be a near drop-in replacement for methyl bromide, but a previous process to register the substance had been suspended. The process had been recommenced by the Toolangi Certified Strawberry Runner Growers' Co-op Ltd., which had access to all the data from the earlier work and would soon be meeting with the registration authority to determine next steps.

73. One representative, speaking on behalf of a group of countries, recalled that those countries had been able to end the use of methyl bromide for all applications in 2010, proof that alternatives could be found and the substance could be phased out. He congratulated China for not seeking a critical-use exemption and he urged all nominating parties to seek viable alternatives wherever possible, as

quickly as possible. He also asked for more evidence of the research being done in Australia and Canada. It was important to establish stock levels, understand research programmes and ensure that national management strategies were submitted when required, and the proposed decision should therefore include new and innovative measures for getting the issue under control. He emphasized the need to consider the issue of stocks of methyl bromide at the parties' meetings in 2019. The parties might also consider expanding the Methyl Bromide Technical Options Committee to address the broader question of methyl bromide emissions as quickly as possible.

74. Responding to his remarks, the representatives of Canada and Australia both indicated that substantial information on the research programmes in their countries had already been provided but that they would provide further clarification as needed.

75. One representative said that while her country had banned the use of methyl bromide, local farmers were aware of the parties' deliberations; she suggested that repeated requests for critical-use exemptions undermined her country's credibility in enforcing the ban. Another representative expressed the hope that the Methyl Bromide Technical Options Committee was considering the alternatives in the post-harvest sector in relation to soil fumigation. In his country, farmers had been asked to use phosphine in combination with a chiller in grain silos, but insufficient availability of chillers put grain storage at risk. A third representative noted that stocks of methyl bromide could be scattered and difficult to secure but called for heightened efforts to eliminate them.

76. Subsequently, the representative of Canada [f], speaking also on behalf of Argentina, Australia and South Africa, introduced a draft decision set out in a conference room paper. It presented the proposed critical-use exemptions for the consumption of methyl bromide for those four parties for 2019 and 2020, and reiterated the provisions of decision IX/6, that non-Article 5 parties submitting future requests for critical-use nominations for methyl bromide were to demonstrate that research programmes were in place to develop and deploy alternatives to and substitutes for methyl bromide.

77. She also observed that, in discussing the draft decision, parties had raised the issue of existing stocks of methyl bromide, but had recognized that the available information was very limited. Parties had expressed a desire for a longer discussion on the topic and recommended that the issue be tabled for discussion at the forty-first meeting of the Open-ended Working Group.

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

B. Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol (decision XXVI/5)

79. Introducing the sub-item, the Co-Chair drew attention to the background information set out in paragraphs 41 and 42 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), the addendum thereto (UNEP/OzL.Pro.30/2/Add.1), sections 5 and 8 of volume 3 of the Technology and Economic Assessment Panel May 2018 progress report, and volume 4 of the Technology and Economic Assessment Panel September 2018 report on the response to decision XXVI/5(2) on laboratory and analytical uses.

80. One of the co-chairs of the Medical and Chemicals Technical Options Committee, Ms. Helen Tope, gave a presentation on the Technology and Economic Assessment Panel's response to paragraph 2 of decision XXVI/5 on a global laboratory and analytical-use exemption. A summary of the presentation is set out in section D of annex VI to the present report.

81. In the ensuing discussion, one representative noted that at 151 tonnes, 2016 global production of ozone-depleting substances for laboratory and analytical uses was insignificant in the light of the amount phased out since 1989. Moreover, the trend in laboratory and analytical uses of such substances was decreasing. She also drew attention to the Committee's suggestion, made in both its report and its presentation, that excluding specific laboratory and analytical uses from the global exemption on a chemical-by-chemical basis could be confusing for practitioners and regulators. In the light of those considerations, she proposed that the parties not engage in detailed discussion on the recommended exclusions at the current meeting, but wait until a future meeting to take a fresh look at how to continue to reduce the use of ozone-depleting substances in laboratory and analytical procedures without sacrificing clarity or introducing excessively complicated measures to address such a small quantity of the substances. The Committee's report contained useful information on HCFCs used for laboratory and analytical purposes, however, and she proposed tabling a decision on laboratory and analytical uses of HCFCs under agenda item 9.

82. Several other representatives, including one speaking on behalf of a group of countries, spoke in support of the proposed approach.

83. The parties agreed to consider a draft decision on laboratory and analytical uses under agenda item 9, and to take up the question of laboratory and analytical uses in a more comprehensive manner at the forty-first meeting of the Open-ended Working Group.

C. Process agents (decision XVII/6)

84. Introducing the sub-item, the Co-Chair drew attention to the report on the process-agent uses of ozone-depleting substances by the Technology and Economic Assessment Panel and its Medical and Chemicals Technical Options Committee, which was contained in section 5.3.3 of volume 3 of the Panel's May 2018 progress report, recalling that the report had been presented for consideration at the fortieth meeting of the Open-ended Working Group. The report included three recommendations on table A and table B of decision X/14 for consideration by the Thirtieth Meeting of the Parties. The recommendations, which were set out in paragraphs 43 and 44 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), were that the parties consider: (a) removing from Table A the use of CFC-113 in preparation of perfluoropolyether diols; (b) updating Table A by removing the European Union under the application "recovery of chlorine by tail gas absorption from chlor-alkali production"; (c) reducing the quantities of make-up/consumption and maximum emission levels in table B to take into account the process-agent uses and emissions currently reported. She said that the parties might wish to discuss a way forward, including the possible preparation of a draft decision, to implement the three recommendations.

85. In the ensuing discussion, representatives expressed appreciation to the Medical and Chemicals Technical Options Committee for its report and the recommendations set out therein. Several representatives said that it was important to continue to eliminate process-agent uses wherever possible and that, while they were not opposed to revising tables A and B of decision X/14, as recommended by the Committee, it would be beneficial to defer consideration of the revision of the two tables to the forty-first meeting of the Open-ended Working Group in order to enable parties to hold consultations with industry and other stakeholders on the relevant process-agent uses prior to revising the tables. Another representative said that it would be better to update both table A and table B every two years at the same time. One representative stressed that the parties had made great progress in taking applications no longer using ozone-depleting substances off the list of process-agent uses, which had been reduced from 44 to 11 such uses, stressing that the current framework ensured that emissions of process-agent uses were limited and had a minimal impact on the atmosphere.

86. The parties agreed to defer further consideration of the issue to the forty-first meeting of the Open-ended Working Group.

VII. Linkages between hydrochlorofluorocarbons and hydrofluorocarbons in transitioning to low-global-warming-potential alternatives

87. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 45 to 48 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2).

88. Representatives highlighted the importance of the issue, particularly with regard to the phasing out of HCFCs such as HCFC-22 in the refrigeration and air-conditioning servicing sector, and recalled the valuable discussions that had been held at the fortieth meeting of the Open-ended Working Group in July 2018. Several representatives expressed the view that more time was needed for reflection before coming to a decision on the issue, and suggested therefore that further discussion be deferred until the forty-first meeting of the Open-ended Working Group, in July 2019, where it could be taken up on the basis of the discussions at the fortieth meeting, as summarized in the report of that meeting (UNEP/OzL.Pro.WG.1/40/7). Given the importance of the issue, one representative encouraged all parties to participate in informal discussions intersessionally, with a view to taking a decision as soon as possible.

89. The parties agreed to defer further consideration of the issue to the forty-first meeting of the Open-ended Working Group.

VIII. Issues related to energy efficiency while phasing down hydrofluorocarbons (decision XXIX/10)

A. Report by the Technology and Economic Assessment Panel on energy efficiency in the refrigeration, air-conditioning and heat-pump sectors

90. Introducing the sub-item, the Co-Chair recalled that, in accordance with decision XXIX/10, the Technology and Economic Assessment Panel and its energy efficiency task force had produced an updated final report on issues related to energy efficiency while phasing down HFCs, in September 2018. The executive summary of the report was reproduced in annex III to the addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2/Add.1), which also included a summary table of the Panel's response to each element of the additional guidance by parties on issues related to energy efficiency.

91. Ms. Bella Maranion, Mr. Fabio Polonara and Ms. Suely Carvalho, co-chairs of the decision XXIX/10 task force on issues related to energy efficiency while phasing down HFCs, gave a presentation on the main elements of the report. A summary of the presentation, prepared by the presenters, is set out in section E of annex VI to the present report.

92. The presentation was followed by a question-and-answer session on matters highlighted during the presentation of the report.

93. One representative expressed concern at the incompatibility of technologies for conversion projects, which, along with the shortfall of funding identified by the Technology and Economic Assessment Panel, meant that many Article 5 parties were facing difficulties in implementing conversion projects. Another representative, noting the growing threat of rising temperatures and rising sea levels to low-lying island communities, said that parties needed to redouble their efforts to put the Kigali Amendment into effect. Regarding the financing needed to accelerate that process, she asked what obstacles were obviating the flow of funding to the refrigeration, air-conditioning and heat-pump sectors; whether research could be undertaken to assess how funding institutions could support energy-efficient actions in the context of HFC-related projects in Article 5 parties; and what lessons could be drawn from existing examples of partnerships between the Multilateral Fund and other institutions that financed multidimensional projects. One representative stressed the urgency of setting up mechanisms to improve the flow of funds that would facilitate energy efficiency improvements in the transition to low-GWP alternatives. Another representative asked whether there was a globally acceptable threshold for defining energy efficiency, and also sought suggestions on how to overcome the safety concerns hindering the adoption of certain technologies.

94. On the matter of conversion technologies, Mr. Polonara said that the transition to energy-efficient production was addressed in many different ways around the world, and any advice on the matter would depend on the specific circumstances. On the question of establishing whether a system was energy efficient or not, he said that it would require an energy audit, for which there were well-established procedures. Standards for energy audits were also well established, though at the national, industry level rather than at the global level. Regarding the risks posed by certain refrigerants, current efforts were focused on updating standards, although different national specifications on flammable refrigerants remained a challenge to their acceptability and use. The training of personnel to handle those refrigerants was an important factor.

95. On the issue of partnerships and funding, Ms. Carvalho proffered the example of projects implemented by the Montreal Protocol in partnership with the Global Environment Facility (GEF), which had proved successful in the case of larger projects such as chiller replacement. Co-financing partnerships with the private sector was another promising means of funding large projects. On the matter of obstacles to the flow of funding, she said that funding could be difficult to coordinate in instances where funding institutions had different financing cycles, timelines, strategic focal areas, and rules and procedures, as was the case with the Montreal Protocol and GEF. It would be advantageous, therefore, to work on developing more streamlined processes to enable timely access to funding. How to ease the flow of funding deserved more intense investigation, which had been beyond the remit of the task force.

96. In a further round of queries and comments, one representative raised questions over the eligibility of energy efficiency projects for funding under the Montreal Protocol; that issue needed to be addressed before deciding on the modalities of any funding. Another representative, noting that energy efficiency was a new field for the Montreal Protocol, expressed the hope that the pace of research could be quickened so that concrete advice could be made available, while recognizing the

challenges posed by different national conditions, requirements and demands, and the current shortfalls in funding for research. Another representative highlighted the problems faced by countries with high ambient temperatures in identifying and implementing alternative technologies. While some recent projects involving smaller units had achieved positive results, there was a need for larger-scale projects addressing industrial units in countries with high ambient temperature conditions, including through public–private partnership.

97. Responding to the query on the scale of projects, Mr. Polonara said that projects for smaller units tended to be easier to implement and the relative benefits were considerable, given that they accounted for a large proportion of refrigerant consumption, while projects for larger units could be financed by companies and research centres. In addition, lessons learned from projects improving the quality and efficiency of small units could inform projects involving larger systems.

98. In the next round of queries and comments, one representative highlighted the important role played by the government in establishing regulations and standards to ensure quality in the refrigeration, air-conditioning and heat-pump sectors, and to encourage the adoption of environmentally friendly alternatives. Further funding was required to support such efforts. Another representative sought clarification on the economic benefits to the consumer of energy savings in the air-conditioning sector under the European Union Ecodesign project, and on the location of funds that could potentially be accessed to finance energy efficiency projects. One representative requested additional information on the focus of funding for energy efficiency, other than the refrigeration, air-conditioning and heat-pump sectors. Another representative said that previous energy sector funding in developing countries had often focused on increasing energy access or supply; more focus should be placed on the multiple benefits that could be derived from financing projects linking energy access with energy efficiency.

99. One representative said that innovative solutions were needed to combat the challenges posed by the huge projected increase in demand in the refrigeration and air-conditioning sector, particularly in countries with high ambient temperatures. Another representative highlighted the importance of measuring energy efficiency in different countries and projects in order to improve understanding of performance levels.

100. One representative raised queries on a number of issues arising from the report, such as the difference between “savings in energy” and “operating cost to the consumer” as benefits of higher energy efficiency; the use of the term “energy poverty” rather than “energy access”; the differentiation between energy efficiency and cooling; the environmental benefits of energy-efficient equipment, as shown in table 2.6 of the report; the ability of manufacturers to absorb the costs of the transition to energy-efficient equipment; the relative proportion of funding being allocated to the transition to energy-efficient equipment in the air-conditioning sector; and what constituted the “funding architecture” for energy-efficient equipment.

101. On the matter of the sources of funds, Ms. Carvalho said that the task force had looked at funds channelled to energy efficiency in the refrigeration, air-conditioning and heat-pump sector as a percentage of the total official development assistance available, rather than the amount of funds available in each institution. However, table 3.2 in the task force report, showing funding sources for mitigation-focused cooling projects, indicated that most funding was provided through bilateral projects, followed by foundations. While the task force had found sources of funding for energy efficiency in different institutions, including the Climate Investment Funds, it was not always possible to identify how those funds were allocated. Regarding the funding architecture, she said that two approaches could be adopted, the first looking at the present funding institutions and analysing how to address the barriers and streamline funding processes, and the second considering whether those funds might operate more efficiently within a different funding architecture. However, an in-depth analysis of the issue lay outside the mandate of the task force. On the matter of the focus of energy efficiency funding sources, she said that most funding was for large infrastructure projects, including energy access and renewable energy transmission.

102. Various members of the task force responded to the other issues raised. For the European Union Ecodesign project, the benefit to consumers over the lifetime of the project had been estimated at 340 euros per item of equipment. On the question regarding the difference between energy savings and operating costs to the consumer, the two were related, but as a function of the electricity tariffs and country policies; some countries, for example, may offer electricity subsidies to the consumer, affecting that relationship. Table 2.6 in the report showed how energy efficiency related to energy consumption, which could be converted to environment benefits in terms of CO_2 equivalent. Regarding the terms “energy poverty” and “energy access”, both were used in the literature, and they had a reciprocal relationship, in that lower energy poverty meant greater energy access. On the matter

of the degree to which the costs of conversions could be internalized, for certain options costs could be absorbed more easily, while for other options more time was needed. For small air-conditioning systems, for example, simple, cheaper options were available that allowed costs to be recouped relatively quickly, while options aiming at greater energy efficiency could prove more costly and thus constitute a greater barrier to adoption.

103. The parties took note of the information presented.

B. Access of parties operating under paragraph 1 of Article 5 of the Protocol to energy-efficient technologies in the refrigeration, air-conditioning and heat pump sectors

104. The parties agreed to widen the scope of the discussion to be held under the present sub-item to encompass general statements and proposals deriving from the report of the Technology and Economic Assessment Panel (sub-item 8 (a)) as well as the specific question of the access of parties to energy-efficient technologies (sub-item 8 (b)).

105. The Co-Chair recalled that at the fortieth meeting of the Open-ended Working Group, the representative of Rwanda, on behalf of the African Group, had introduced a draft decision on the issue, and a contact group had been established to discuss it in detail. Following the discussions in the contact group, the representative of Rwanda had produced a revised draft decision, which had been made available as a conference room paper.

106. The representative of Rwanda, speaking on behalf of the African Group, introduced a proposal for a draft decision, which had been revised after the fruitful discussions at the fortieth meeting of the Open-ended Working Group. She said that it was intended to provide the basis of a renewed discussion at the current meeting, to facilitate consideration of the crucial issue of energy efficiency and how it could be addressed under the institutions of the Montreal Protocol. She noted that the Scientific Assessment Panel had confirmed that improvements in the energy efficiency of refrigeration and air-conditioning equipment during the transition to low-GWP alternatives could double the climate benefits of the Kigali Amendment. She also drew attention to the problems caused by the dumping of obsolete and inefficient equipment in African markets, which undermined efforts by African countries to meet the climate challenge.

107. Many representatives expressed their support for the proposed draft decision, saying that it was clearly desirable to promote improvements in energy efficiency in the process of converting equipment from using HFCs to low-GWP alternatives. That was important not only for reducing greenhouse gas emissions but also in terms of other co-benefits, such as improving air quality, providing energy security and realizing economic benefits for consumers. New technology needed to be introduced which would prove attractive to consumers irrespective of the environmental benefits. The support for energy efficiency was not, however, reflected in the current system of financial assistance, and parties needed to consider carefully how technical, financial and capacity-building support could be delivered under the Montreal Protocol. One representative stressed the need to incorporate energy efficiency improvements in the process of replacing HCFCs, as well as HFCs.

108. Several representatives said that it would be helpful if the Technology and Economic Assessment Panel could provide more information on exactly how support for energy efficiency improvements could be delivered, the cost-effectiveness of such support, and what technical and financial barriers needed to be overcome.

109. Other representatives, however, while acknowledging the importance of energy efficiency improvements, and the obvious linkages with the HFC phase-down agreed in the Kigali Amendment, said that the extent to which the objective could be pursued under the Montreal Protocol was not yet clear. In particular, they noted that while some elements of the proposed draft decision were very welcome, other elements might fall outside the scope of the Protocol and the Multilateral Fund. It was important to stay within the core competencies and expertise of the Protocol and to focus on activities where the institutions of the Protocol could make a real difference.

110. The proposal needed to be viewed against the background of decision XXVIII/2, in which the parties had requested the Executive Committee to develop guidance associated with maintaining and/or enhancing the energy efficiency of low-GWP or zero-GWP replacement technologies and equipment, when phasing down HFCs, while taking note of the role of other institutions addressing energy efficiency. The Executive Committee was in the process of implementing that decision and it was important not to hamper its efforts.

111. Several representatives said that it would be important to identify how the institutions of the Montreal Protocol could work together with other entities, such as the United Nations Framework

Convention on Climate Change, the various climate funds and the multilateral development banks, in accessing and delivering financial support for energy efficiency improvements. It was clear that many of those bodies had not so far included the refrigeration and air-conditioning sector in their activities.

112. One representative expressed the view that even if the topic did not fall precisely within the mandate of the Montreal Protocol, it was covered by the broader framework of the Vienna Convention for the Protection of the Ozone Layer. He highlighted the way in which other multilateral environmental agreements, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants, had demonstrated how to work together on issues which did not quite fall under the remit of any one of them but were of importance to them all.

113. Representatives welcomed the changes that had been made to the draft decision following the discussions at the fortieth meeting of the Open-ended Working Group, and looked forward to careful consideration of its content in further discussions in a contact group.

114. The parties agreed to re-establish the contact group that had held discussions on the issue at the fortieth meeting of the Open-ended Working Group, co-chaired by Mr. Patrick McInerney (Australia) and Mr. Leslie Smith (Grenada).

115. Subsequently, the co-chair of the contact group reported that the group had reached agreement on a draft decision, as set out in a revised conference room paper. The parties agreed to forward the draft decision for consideration and possible adoption during the high-level segment.

IX. Proposed adjustments to the Montreal Protocol on hydrochlorofluorocarbons for parties not operating under paragraph 1 of Article 5 of the Protocol

116. Introducing the item, the Co-Chair drew attention to two proposals to adjust the Montreal Protocol that had been presented for consideration and possible adoption at the current meeting. The first proposal had been submitted by the United States of America and was set out in document UNEP/OzL.Pro.30/6; the second had been submitted jointly by Australia and Canada and was set out in document UNEP/OzL.Pro.30/7. Recalling that the two proposals had been discussed during the fortieth meeting of the Open-ended Working Group, including in a contact group, he said that both sought to adjust the Montreal Protocol by adding fire suppression or fire protection equipment to the existing provisions that allowed for the production and consumption of HCFCs to service existing refrigeration and air-conditioning equipment for the period 2020–2030. The joint proposal by Australia and Canada also included a mechanism for essential uses of HCFCs. He further recalled that, at its fortieth meeting, the Open-ended Working Group had agreed that the contact group on adjustments should reconvene during the current meeting to resume its work. At the request of the contact group, the Secretariat had prepared a document that consolidated the two proposals and summarized the discussion, which would be posted in the portal of the current meeting.

117. In the ensuing discussion, the representative of the Russian Federation reiterated his proposal, made at the fortieth meeting of the Open-ended Working Group, that the adjustment proposed by the United States should include aerospace industry and medical applications of HCFCs in the proposed uses. He stressed that the use of HCFC-113 was necessary to safely produce rocket engines and to protect human life in the aerospace industry and that certain medical applications required the use of HCFCs; given that they were both needed to protect human life, those proposed uses were of equal or higher priority to applications in the refrigeration and air-conditioning sector related to fire suppression.

118. The representatives of the United States of America and Australia expressed appreciation to the parties for comments provided on their proposals at the fortieth meeting of the Open-ended Working Group and said that they were ready to further discuss such comments in the contact group in order to understand and address the concerns of all parties, reiterating that neither proposal sought to modify the existing servicing tail for HCFCs for the period 2020–2030, but simply to expand the scope of permitted uses to enable the servicing of equipment for fire suppression. The representative of Australia announced that, consistent with their joint adjustment proposal, Australia and Canada were working on a draft decision that would include HCFCs in the global exemption for laboratory and analytical uses from the year 2020. She suggested that the contact group should examine the draft decision once the drafters had finalized it and introduced it in plenary.

119. Several representatives expressed concern about expanding the scope of allowed uses of HCFCs, such as medical and aerospace applications, stressing that the HCFC servicing tail was limited to the servicing of refrigeration and air-conditioning equipment produced prior to the year 2020 and that adding other uses could encourage other parties, including Article 5 parties, to seek the further expansion of HCFC allowed uses in the future. A number of the representatives questioned whether expanding the HCFC servicing tail was the best approach to address legitimate health and safety concerns related to fire suppression, with one suggesting that the essential-use nominations process could perhaps be used instead.

120. Following the discussion, the parties agreed to re-establish the contact group previously established at the fortieth meeting of the Open-ended Working Group, to be co-chaired by Mr. Alain Wilmart (Belgium) and Mr. Agustín Sánchez (Mexico), to discuss the issue further.

121. Subsequently, the representative of Australia, speaking also on behalf of Canada, introduced a conference room paper containing a draft decision on an update to the global laboratory and analytical-use exemption. The draft decision proposed the inclusion of Annex C, group I, substances in the global laboratory and analytical-use exemption under the same conditions and on the same timeline as set forth in paragraph 1 of decision XXVI/5, and set out in its preamble the rationale behind that proposal.

122. One representative, speaking on behalf of a group of countries, said that there was a recognized need to continue the general exemption for laboratory and analytical uses post 2020, and suggested that further advice be sought from the Technology and Economic Assessment Panel on the matter.

123. In response to a query about the relationship of the draft decision to the proposed adjustment to the Montreal Protocol to permit essential-use exemptions for HCFCs, the representative of Canada said that currently the use of HCFCs for laboratory and analytical uses was allowed up to 2020, but as of 1 January 2020 that would not be allowed unless an adjustment were adopted to allow for essential uses of HCFCs. If that adjustment were approved, then the draft decision would allow the new provision to be put into practice for the use of HCFCs in laboratory and essential uses after 2020, in line with the global exemption that applied to all other controlled substances.

124. The parties agreed to submit the draft decision for further discussion by the contact group on the proposed adjustment to the Montreal Protocol.

125. Subsequently, the co-chair of the contact group introduced two draft decisions on adjustments prepared by the contact group. The first was a draft decision on an update to the global laboratory and analytical-use exemption to enable the use of HCFCs for laboratory and analytical uses, which was set out in a conference room paper as presented by Australia and Canada, to which no changes had been made by the contact group. The second was a draft decision on adjustments to the Montreal Protocol that addressed other uses of HCFCs, which was set out in a conference room paper as prepared by the contact group.

126. The parties agreed to forward both draft decisions for consideration and possible adoption during the high-level segment.

127. Subsequently, one representative, speaking on behalf of a group of countries and requesting that his statement be reflected in the present report, noted that the parties had discussed laboratory and analytical uses that could be performed without using controlled substances under agenda item 6 (b) but had agreed to close that item and to address the issue of laboratory and analytical uses of HCFCs under agenda item 9, related to adjustments. When the contact group on adjustments had been formed, he had suggested that the meeting of the parties request the Technology and Economic Assessment Panel to undertake work on alternatives to controlled substances for laboratory and analytical uses through the proposed draft decision on laboratory and analytical uses. The co-chairs of both the contact group and the preparatory segment had advised him, however, that his request went beyond the mandate of the contact group and had requested that he raise the issue at the forty-first meeting of the Open-ended Working Group and the Thirty-First Meeting of the Parties.

X. Unexpected emissions of trichlorofluoromethane (CFC-11)

128. Introducing the item, the Co-Chair recalled that the issue of unexpected emissions of CFC-11 had been discussed extensively at the fortieth meeting of the Open-ended Working Group. At that meeting, the Scientific Assessment Panel had presented a summary of the recent findings on the increasing amounts of CFC-11 in the atmosphere and the Technology and Economic Assessment Panel had presented background information providing an overview of CFC-11 emissions. Those documents, along with a note by the Secretariat on issues that the Secretariat would like to bring to the

attention of the Parties (UNEP/OzL.Pro.WG.1/40/INF/2/Add.1), prepared for the fortieth meeting of the Open-ended Working Group, were available on the website for the current meeting, as background documents for the present agenda item.

129. She also recalled that, during the discussion on the item at the fortieth meeting of the Open-ended Working Group, the representative of the United States had introduced a conference room paper, containing a draft decision, that had been discussed at length in a contact group. Subsequently, the Working Group had agreed to forward a draft decision prepared by the group to the Thirtieth Meeting of the Parties for consideration. The draft decision was set out in document UNEP/OzL.Pro.30/3/Rev.1, section II, draft decision XXX/[A].

130. Noting that the Secretariat had not received further information related to CFC-11 emissions since the fortieth meeting of the Open-ended Working Group, the Co-Chair invited the Scientific Assessment Panel and the Technology and Economic Assessment Panel to provide additional information.

131. Mr. Newman, co-chair of the Scientific Assessment Panel, recalled that Mr. Stephen Montzka, the author of the scientific paper that had revealed the new CFC-11 emissions, had presented scientific information at a side event in the margins of the current meeting; his presentation was also available as a background document on the meeting portal. Information on CFC-11 was also available in the newly released executive summary of the Scientific Assessment of Ozone Depletion 2018. The executive summary reported that over the period 2014–2016, the CFC-11 atmospheric concentration had declined at only two-thirds of the rate of decline over the period 2002–2012, while Mr. Montzka's paper had shown that emissions from Eastern Asia had increased in a concurrent manner. The increase in unreported CFC-11 emissions identified in Mr. Montzka's paper was supported by independent measurements from the Advanced Global Atmospheric Gases Experiment global network. In addition, new research was being done and a CFC-11 symposium covering all the science and the technical issues related to CFC-11 would be held in Vienna in March 2019.

132. Ms. Maranion, co-chair of the Technology and Economic Assessment Panel, said that the information presented by the Panel at the fortieth meeting of the Open-ended Working Group was still relevant and that assessment reports due at the end of 2018, particularly those of the Flexible and Rigid Foams Technical Options Committee and the Medical and Chemicals Technical Options Committee, would examine the issue in more detail.

133. The representatives of the two panels then responded to technical questions from representatives.

134. Regarding a question on how the existence of new emissions was determined, Mr. Newman explained that because CFC-11 was destroyed in the upper stratosphere at very regular rate, the decrease in concentrations could be predicted. The fact that concentrations were falling at two-thirds the projected rate indicated the addition of new CFC-11 to the atmosphere.

135. Asked to give context for the 200 gigagrams of unexpected emissions, Mr. Montzka provided data on banks of CFC-11. Although he was unable to provide a figure for the CFC-11 bank in Eastern Asia, he indicated that known bank of CFC-11 was estimated at 1,420 gigagrams in 2008 and had subsequently decreased to 900 gigagrams in recent years.

136. Noting that CFC-11 and CFC-12 were normally produced together, albeit not necessarily in the same quantities, one representative asked why there was no evidence of CFC-12 in the data. Other queries followed from that, including one on the sensitivity of CFC-12 emission calculations and the possible production ratio of CFC-11 to CFC-12. Mr. Newman responded that it was difficult to say why the data did not show the presence of CFC-12, as the CFC-11 emission calculations were based on atmospheric observations, which did not allow assumptions about emission banks or processes. Mr. Montzka indicated that CFC-12 sensitivity could be expected to be similar to that of CFC-11, namely 30 per cent. Ms. Helen Tope, co-chair of the Medical and Chemicals Technical Options Committee, said that the CFC production process could easily achieve 100 per cent CFC-12 production but it was more difficult to produce only CFC-11; however, production of both substances in a range of a 70 to 30 ratio for either substance could be achieved quite comfortably.

137. Responding to a question regarding a potential correlation between CFC-11 and HCFC-22 that might be used to help locate the source of the emissions, Mr. Montzka said that the concentrations of HCFC-22 and CFC-11 measured at the Hawaiian site were highly correlated but it was not possible to say with certainty that they came from exactly the same region. Due to infrequent sampling, plumes were not characterized over their entire transition from low to high concentrations, so it was impossible to know how precisely they were correlated. On the same topic, Mr. Newman noted that

new papers were being published on locating emission sources using the technique of fingerprinting a plume by identifying its various gases.

138. Addressing a question on the method used by the Technology and Economic Assessment Panel to estimate quantities, Ms. Helen Walter-Terrinoni, co-chair of the Flexible and Rigid Foams Technical Options Committee, said that the Panel had constructed scenarios that might result in the 13,000 tonnes of unexpected CFC-11 emissions described in Mr. Montzka's paper and had thus calculated backward from those emissions. She also took the opportunity to point out that the Panel was seeking additional information from the parties and institutions of the Montreal Protocol; a list of items for which data was being sought, such as remaining produced CFC-11 and CFC-12 stockpiles or existing foam and refrigerant banks, was included in the background information providing an overview of CFC-11 emissions prepared by the Panel for the fortieth meeting of the Open-ended Working Group.

139. Ms. Walter-Terrinoni also addressed questions relating to foams in Eastern Asia, including on the scale of the foam and blowing agent domain, the possible use of CFC-11 in foam for fire safety purposes and foams in landfills as a possible source of CFC-11 emissions. She confirmed that owing to tragic fires during the last decade, the use of plastic foams had been restricted for a period and there seemed to be a residual perception that CFC-11 reduced the flammability of foams, although it was technically unfounded. She indicated that six million tonnes of foam were produced each year globally, one-third of it in Asia, but said that she did not have data on total banks, and reiterated her earlier request that parties who had access to such information provide it to the Technology and Economic Assessment Panel. With respect to the demolition of buildings that might contain foams, studies had shown that even when foam was crushed during the demolition process, it was very difficult to extract the blowing agent, which tended to remain in the foam when it went to the landfill and become a source of low emissions.

140. Two representatives asked about a recent paper by Mr. Mark Lunt that analysed unaccounted for carbon tetrachloride emissions in the atmosphere. Representatives of both panels said that they were aware of the paper, and Ms. Maranion added that the Technology and Economic Assessment Panel was taking the paper into account in the CFC-11 consideration in its assessment reports. Mr. Newman pointed out that large emissions of carbon tetrachloride had also been identified in previous assessments based on atmospheric observations, but that the source of those emissions had not been identified. He also noted that a 2016 Stratospheric Processes and their Role in Climate (SPARC) report had identified chloromethanes and perchloroethylene plants as being a major source of inadvertent carbon tetrachloride emissions. The Lunt paper used a technique that was very sensitive to regional emissions, allowing strong confidence in the possibility of locating regional emissions of CFC-11 in Asia.

141. During the ensuing discussion, the representative of China made a statement on his country's perspective on the matter and the steps it had taken since the fortieth meeting of the Open-ended Working Group. On a personal level, he said that he had been a participant in international efforts to control ozone-depleting substances for more than ten years and understood the anxiety surrounding the issue and the desire to learn what was causing the increase in CFC-11 emissions. At the country level, China had done an enormous amount of work on ozone-depleting substances over the years, being responsible for phasing out 280,000 tonnes, about half of the total for developing countries. Enforcement was an ongoing process in China, but since August 2018 the country had taken additional steps to investigate the situation, strengthening enforcement and stiffening its penalties. Two illegal CFC-11 production sites, representing 29.9 tonnes, had been identified. It had also conducted inspections of 1,172 enterprises across the country, of which a few batches of the products from 10 enterprises had been detected to contain CFC-11. Those involved in the illegal activities had been prosecuted. The Chinese Government intended to exert more pressure on illegal operators and to enforce its laws more rigorously, and was committed to locating the true source of the increase in emissions. To support exchanges on the matter, it was organizing a seminar on compliance in China that all interested parties and international organizations were invited to attend. The Chinese delegation supported the consideration of the draft decision at the current meeting and looked forward to having more scientific data to assist with compliance.

142. Many other representatives took the floor to express their views, including one speaking on behalf of a group of countries. Most, including the representative speaking on behalf of a group of countries, thanked China for the information provided and for taking action to identify the source of the CFC-11 emissions, while noting that this should be seen as a first step of an ongoing process, and several encouraged other parties to take similar steps.

143. Many of those who spoke reiterated the views they had expressed at the fortieth meeting of the Open-ended Working Group in July 2018. There continued to be widespread dismay that CFCs were once again being produced and used despite the efforts of the past 30 years, thereby threatening the reputation and success of the Montreal Protocol, until now widely hailed as the most successful global multilateral environmental agreement. Many representatives urged parties to work together to identify and rectify the underlying problems. One representative said that an adequate response was required at all levels, by individual parties, the Executive Committee of the Multilateral Fund and the meeting of the parties. The Executive Committee in particular was responsible for monitoring and would need to consider various issues emanating from the situation. At the level of the meeting of the parties, the draft decision was widely seen as a good basis for action and there was unanimous support for forwarding it to the high-level segment for consideration.

144. One representative, supported by others, underscored the gravity of the unexpected CFC-11 emissions in terms of the consequences for the ozone layer and the work under the Protocol. He stressed the fact that the problem had been identified by outside actors, not by the institutions of the Protocol; there was therefore a need to take a close look at the Protocol's institutions and rethink how they operated with respect to compliance, enforcement, implementation and financial assistance. He called for a period of reflection to allow parties to understand the situation and consider its implications. Additional information would become available from scientific work now being done to help inform the decisions, and he asked the Technology and Economic Assessment Panel, the Scientific Assessment Panel, the Ozone Secretariat and the secretariat of the Multilateral Fund to do their best to keep parties informed in the coming year. He also urged all parties to follow up on requests to support related science, share information, be transparent and ensure that their obligations to phase out CFC-11 were effectively enforced.

145. Another representative, while sharing the concerns surrounding the reported levels of CFC emissions and their potential impact, said that he believed the institutions of the Protocol were solid and that they and related institutions had been able to detect discrepancies and atmospheric observations that needed to be noted and potentially acted upon. He also informed the parties that scientific institutions in his country whose work involved the ozone layer were now concentrating on the issue of CFC emissions, and he encouraged others to do the same. He concurred that sound scientific data was crucial and said that the progress made at the fortieth meeting of the Open-ended Working Group and at the current meeting had put parties on the path to acquiring the data needed to better inform decisions for the future.

146. The representative of Japan reiterated that his Government would find it difficult to justify to its taxpayers continued full-scale funding to the Multilateral Fund for the Implementation of the Montreal Protocol if the reported increase in CFC-11 production proved to be occurring and was not addressed, thereby undermining the credibility of the Protocol. He also repeated his country's offer to share its monitoring data.

147. The representative of an observer organization that had investigated the reported increase in CFC-11 emissions said that her organization was continuing to examine the issue and had prepared a new report for the present meeting, "Tip of the iceberg: implications of illegal CFC production and use", which provided additional information and analysis of the illegal use of and trade in CFC-11. She also reported that despite limited reporting of illegal trade by parties under paragraph 7 of decision XIV/7, CFC-12 products continued to be openly advertised on the internet, and her organization was aware of sizeable seizures of CFC-12 in different regions of the world. In addition, it was currently very difficult, if not impossible, to track the international trade of ozone-depleting substances in pre-blended polyols, and her organization considered that international trade in controlled substances contained in fully formulated polyols was a grey area that needed to be addressed, as it was a large potential loophole in the implementation of the HCFC phase-out and the future HFC phase-down.

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

XI. Issue raised by the United Arab Emirates regarding eligibility for financial and technical assistance

149. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 68 to 70 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirtieth Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.30/2), recalling that, at its fortieth meeting, the Open-ended Working Group had agreed that the United Arab Emirates would hold bilateral consultations in the margins of that meeting on the issue of eligibility

for financial and technical assistance and that the issue would be taken up at the current meeting. He invited the representative of the United Arab Emirates to update the parties on the progress achieved in the consultations.

150. The representative of the United Arab Emirates said that for three decades his country had implemented its obligations under the Montreal Protocol without any assistance from the Multilateral Fund, but, following the adoption of the Kigali Amendment, the country would face considerable challenges associated with implementing the Amendment, including with regard to the linkages between HCFCs and HFCs and high-ambient temperature conditions. For that reason, at the fortieth meeting of the Open-ended Working Group, the United Arab Emirates had requested that the parties consider its eligibility to obtain financial and technical support from the Multilateral Fund to enable it to fulfil its commitments under the Amendment. Many parties had expressed support for the request, but some parties had not. The Working Group had therefore requested the United Arab Emirates to hold bilateral consultations in the margins of the meeting. Given that different views had been expressed during those consultations, the United Arab Emirates was requesting additional time to complete the consultations by the Thirty-First Meeting of the Parties, or a later date if necessary.

151. In the ensuing discussion, all the representatives who spoke commended the United Arab Emirates for its efforts to comply with its obligations under the Montreal Protocol without seeking external assistance and expressed support for giving it additional time to hold further bilateral consultations on the issue. After consultation on the issue, several representatives expressed support for allowing the United Arab Emirates to receive technical and financial assistance from the Multilateral Fund, while one queried why the United Arab Emirates was not currently eligible to receive such assistance.

152. A third representative said that, when the United Arab Emirates had been reclassified as an Article 5 party, there had been an understanding that the country would be able to avail itself of the phase-out schedule applicable to Article 5 parties but should not seek assistance from the financial mechanism of the Montreal Protocol. He emphasized that he was not inclined to revisit that understanding and would not support using the limited resources of the Multilateral Fund to give financial assistance to a country that had a relatively high gross national product and a very strong economy relative to some of the Fund donors.

153. Following the discussion, the parties agreed to give additional time to the United Arab Emirates to continue bilateral discussions on the issue of eligibility for financial and technical assistance and that, following such consultations, the issue would be included in the agenda of the Thirty-First Meeting of the Parties or a subsequent meeting of the Montreal Protocol upon the request of the United Arab Emirates.

XII. Review of the terms of reference, composition and balance as well as fields of expertise required of the assessment panels and their subsidiary bodies

154. Introducing the item, the Co-Chair recalled that the issue had been discussed, in relation to the challenges to be faced in implementing the Kigali Amendment, at the fortieth meeting of the Open-ended Working Group. There had, however, been insufficient time to conclude the matter, so it had been referred for further discussion to the present meeting. A draft decision on the issue, submitted by Bahrain, Egypt, India, Iraq, Jordan, Kuwait, Oman, Rwanda, Saudi Arabia, Tunisia and the United Arab Emirates, was contained in document UNEP/OzL.Pro.30/3/Rev.1, section II, draft decision XXX/[C].

155. Introducing the draft decision, the representative of India said the proponents had been cognizant of the terms of reference of the Technology and Economic Assessment Panel and its technical options committees and subsidiary bodies as established by decision VIII/19 and revised by decision XXIV/8, and had also recognized the invaluable contribution made by the Panel to the work of the Montreal Protocol in phasing out ozone-depleting substances. That role, however, faced a major challenge as the work of the parties moved into a different domain with the adoption of the Kigali Amendment, requiring new expertise in such fields as energy efficiency, safety standards and climate benefits. Accordingly, the draft decision requested the Ozone Secretariat to prepare, with input from the parties, a document for consideration by the Open-ended Working Group at its forty-first meeting examining several issues related to the functioning of the aforementioned bodies, including the terms of reference, composition and balance of those bodies, and the fields of expertise required for the upcoming challenges related to the implementation of the Kigali Amendment.

156. In the ensuing discussion, many representatives expressed support for the draft decision and its underlying concepts, including the need to ensure balanced geographical coverage, gender balance and appropriate representation of Article 5 parties in the bodies of the Montreal Protocol, along with the right expertise in areas of particular relevance to Article 5 parties as they sought to implement the Kigali Amendment, such as climate change, energy efficiency, HFC phase-down, and the challenge of high ambient temperatures. While there was general recognition of the important role played by the Technology and Economic Assessment Panel and its subsidiary bodies in the effective functioning of the Montreal Protocol, there was agreement on the need for new team members with a range of qualities, including expertise, neutrality, integrity and skill.

157. Several representatives sought greater clarity on a number of issues related to the proposed draft decision, including whether it was intended to address the Technology and Economic Assessment Panel alone, or included its technical options committees and subsidiary bodies; and whether the Ozone Secretariat was the appropriate body to prepare the proposed report for consideration by the Open-ended Working Group.

158. One representative said that in recent years the Panel had taken steps to address a number of the issues raised in the draft decision, including geographical and gender balance, and several new, younger members had brought fresh expertise to the Panel and other bodies. In addition, the Panel continued to adjust and augment its composition in the light of the expertise required, as reflected in the annual matrix of expertise produced by the Panel. Another representative, speaking on behalf of a group of countries, said that it was very important that the membership of the Panel and other bodies reflected the needs of the Montreal Protocol; while the matrix was very helpful in that regard, it was worth exploring further ideas to bring more clarity to the process, bearing in mind the constant rebalancing required as new issues came to the fore while the traditional work of the Protocol on phasing out ozone-depleting substances continued.

159. Responding to the points raised, the representative of India clarified that the intention had been to limit the proposal to the Technology and Economic Assessment only, given its direct impact on the implementation of projects in Article 5 parties. He said that the Ozone Secretariat was indeed well placed to develop the proposed information paper, given its skills in compiling information from a variety of sources in a cogent and coordinated manner to assist parties in their decision-making. Also, while the Panel did bring in external experts depending on the desired expertise, the introduction of permanent representatives well versed in the new areas being dealt with under the Protocol would help ensure continuity in dealing with the challenges faced by Article 5 parties.

160. Following the discussion, it was agreed that interested parties would discuss the matter further in an informal group and report back to the parties on the outcome of those discussions.

161. Subsequently, the representative of Lebanon reported that agreement had been reached on a draft decision, set out in a conference room paper. The parties agreed to forward the draft decision for consideration and possible adoption during the high-level segment.

XIII. Consideration of senior expert and other nominations by parties to the Technology and Economic Assessment Panel

162. Introducing the item, the Co-Chair recalled that at the fortieth meeting of the Open-ended Working Group the issue of senior expert nominations by the parties to the Technology and Economic Assessment Panel had been discussed. The parties had emphasized that proposed candidates should meet the expertise requirements of the Panel, taking account of the matrix of needed expertise prepared by the Panel, and that the principles of gender and regional balance should be taken into account.

163. The Open-ended Working Group had also considered the issue of Panel members whose terms would expire at the end of 2018, while the issue of individual nominations for senior expert positions and other nominations was discussed informally among interested parties. The Ozone Secretariat had thus far received five nominations for senior experts, as well as other nominations for co-chairs of the Technology and Economic Assessment Panel and the technical options committees. The terms of reference stated that the membership size of the Panel should be about 18–22 members, including two or three co-chairs, and also stated that there should be two to four senior experts for specific expertise not covered by the co-chairs, taking into account gender and geographical balance. She drew attention to the note by the Secretariat providing information on reports and updates by the Technology and Economic Assessment Panel (UNEP/OzL.Pro.30/INF/6). Lastly, she proposed that specific nominations be discussed informally by parties, and not taken up in plenary.

164. In the ensuing discussion, several representatives expressed their appreciation for the work of the Technology and Economic Assessment Panel in providing technical information to the parties in a digestible and understandable form. It was therefore important to ensure that the Panel and its technical options committees and subsidiary bodies continued to function at a high level of competence. It was acknowledged, however, that there was a need for the Panel to update its expertise. Several representatives, including one speaking on behalf of a group of countries, said that nominations for the Panel and for senior experts should be guided by the expertise required, as outlined in the matrix of expertise produced annually by the Panel. On the matter of the number of senior experts, several representatives expressed concern at the number of nominations currently before the parties, and urged adherence to the stipulation in the terms of reference that there be two to four senior experts on the Panel for specific expertise not covered by the Panel co-chairs, taking into account gender and geographical balance. Some representatives also expressed their expectation that nominating parties should consult with the Panel before they made their nominations.

165. On the issue of the workload of the Technology and Economic Assessment Panel, one representative said that the report and updates by the Panel tabulated in document UNEP/OzL.Pro.30/INF/6 indicated that there could be potential for streamlining and spacing out the requests to the Panel in order to reduce its work burden.

166. It was agreed, in accordance with a proposal by the Co-Chairs, that the matter be discussed further in the informal group set up under agenda item 12. The output of those discussions would be a proposed draft decision specifically on the matter of nominations for membership of the Technology and Economic Assessment Panel.

167. The facilitator of the informal group subsequently reported that the group had reached agreement on the nomination of the following six experts to the Technology and Economic Assessment Panel: Mr. Ashley Woodcock (United Kingdom) as Panel co-chair for an additional term of four years; Mr. Fabio Polonara (Italy) as Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee co-chair for an additional term of four years; Ms. Martha Pizano (Colombia) as co-chair of MBTOC for an additional term of four years; Ms. Zhang Shiqiu (China) as senior expert for an additional term of four years; Mr. Marco González (Costa Rica) as senior expert for an additional term of two years; and Mr. Sidi Menad Si Ahmed (Algeria) as Panel co-chair for one year. She further reported that the group had agreed to a new paragraph that urged the parties to follow the Panel's terms of reference and to refer to the matrix of needed expertise prepared by the Panel before making a nomination. She noted that the informal group had not produced a conference room paper on the nominations.

168. The parties agreed to the nominations and to the proposed new paragraph and entrusted the Secretariat with finalizing a draft decision to be forwarded for consideration and possible adoption during the high-level segment.

XIV. Consideration of the membership of Montreal Protocol bodies for 2019

169. The Co-Chair requested regional groups to submit nominations to the Secretariat for positions in various bodies under the Montreal Protocol for 2019, including the Implementation Committee, the Executive Committee of the Multilateral Fund and the co-chairs of the Open-ended Working Group.

170. The representative of Armenia, on behalf of the Eastern European and Central Asian group of parties, introduced her proposal for a draft decision, set out in a conference room paper, which aimed to increase the membership of the Executive Committee of the Multilateral Fund to eight non-Article 5 and eight Article 5 members, including one place for a representative of the Eastern European and Central Asian group. Quoting the terms of reference of the Executive Committee, she asked whether it could be regarded as equitable to deny one group of parties the right to: "develop and monitor the implementation of specific operational policies, guidelines and administrative arrangements, including the disbursement of resources, for the purpose of achieving the objectives of the Multilateral Fund under the Financial Mechanism" – yet the Eastern European and Central Asian group was deprived of that right, since it was only able to nominate a member of the Committee one year in every four. No other regional group was treated in that way. Her proposal aimed to correct that situation and establish a balanced representation of regional groups.

171. A number of representatives agreed with the proposal, highlighting in particular the importance of balanced representation in implementing the requirements of the Kigali Amendment. As alluded to in decision XVI/38, which had established the rotating seat for Article 5 parties, including the region of Eastern Europe and Central Asia, the group had not existed when the Multilateral Fund had been

created. Other multilateral environmental agreements, however, such as the Basel, Rotterdam and Stockholm conventions, had established equitable geographical representation, and the Montreal Protocol could consider doing so too.

172. Other representatives expressed their sympathy for the proposal but observed that there were other examples of imbalance in geographical representation, such as the situation of the Caribbean islands, or the Pacific islands, which should not be overlooked. They suggested that a complete overhaul of the membership structure of the Executive Committee would be needed in order to address the issue comprehensively.

173. Several representatives cautioned against upsetting the delicate balance that had been established when the Multilateral Fund had been set up, which had worked well for more than 25 years. A change in the membership risked creating unintended consequences, such as changing the allocation of funding. Also, as had been illustrated by comments from other parties, once the process of revising the structure had started, it would be difficult to know where to stop. While agreeing that new thinking was needed to address the problem of parties feeling marginalized in the decision-making processes of the Executive Committee, they wondered whether there were other potential solutions, such as changing the rules on co-options to the Committee, or making other changes within the existing structure. They requested more time to reflect on the proposal and to discuss possible ways forward with its proponents.

174. One representative stressed the need for the institutions of the Montreal Protocol to be based on the regional groups established by the United Nations and applicable to all United Nations bodies. The representative of the Secretariat clarified that the Eastern European and Central Asian group was not one of the five regions originally established by a resolution of the United Nations General Assembly. It had been created by the UNEP OzonAction Branch for operational reasons, to facilitate the delivery of financial assistance. It was also clarified that the group contained some countries, classified as countries with economies in transition, which were eligible for support from GEF and not from the Multilateral Fund. One representative suggested that the Secretariat could be asked to produce a background paper outlining the existing relevant United Nations and Montreal Protocol rules and possible creative solutions.

175. Members of the Eastern European and Central Asian group of parties clarified that the group comprised both Article 5 and non-Article parties. They stressed that they were not asking for better representation, but for equal representation. If there were other means of redressing the problem within the existing structures of the Executive Committee, they were very willing to learn about them and discuss them.

176. The Co-Chair suggested that all interested parties should discuss the issue with the proponents of the draft decision in the margins of the meeting.

177. The representative of Armenia subsequently reported that more time was needed to discuss the proposal by the Eastern European and Central Asian group of parties to review the terms of reference, composition and balance of the Executive Committee of the Multilateral Fund. At her suggestion, the parties agreed to include the issue in the agenda of the forty-first meeting of the Open-ended Working Group.

178. Subsequently, two representatives [f] of the Eastern European and Central Asian group reported that they had conducted consultations with several interested parties, including representatives of the African, Asia-Pacific and Latin American and Caribbean groups, and that there was extensive support for their proposal.

179. They clarified that the Eastern European group was an official regional group of the United Nations. In 2004, Central Asian parties had requested that they be allowed to join the group for the purposes of the Montreal Protocol, as they felt they had more in common with Eastern European parties than they did with other parties in the Asia-Pacific region. That arrangement had been recognized in decision XVI/38. At the current meeting, the group had been approached by Turkey with a similar request; Turkey was the only Article 5 party within the group of Western European and other States (for non-electoral purposes it also participated in the Asia-Pacific group). The Eastern European and Central Asian group had agreed to Turkey's request, and had nominated it for one of its positions on the Implementation Committee for 2019.

180. Other representatives, while expressing their sympathy for the proposal, expressed the view that more time was needed for discussion. It would be optimal for the consultations to continue and for the issue to be taken up again at the forty-first meeting of the Open-ended Working Group.

181. Subsequently, the representative of the Secretariat reported that, upon the receipt of the names of the nominees, the relevant draft decisions had been included in the compilation of decisions for the parties' consideration during the high-level segment.

XV. Compliance and data reporting issues: the work and recommended decisions of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol

182. The President of the Implementation Committee, Ms. Miruza Mohamed (Maldives), presented a report on the outcomes of the sixtieth and sixty-first meetings of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol, including an overview of the draft decisions that the Committee had approved for consideration by the Thirtieth Meeting of the Parties.

183. She observed that, as had been the trend in recent years, the agenda of both meetings had been light, which was a testament to the continuing high level of compliance of parties with their obligations. As could be seen in the first of the three draft decisions the Committee was asking the Thirtieth Meeting of the Parties to consider, all except two parties had reported their Article 7 data for 2017, and 97 per cent of those parties had reported their data by the deadline of 30 September. The draft decision noted that the remaining parties, Central African Republic and Yemen, were in non-compliance with their data reporting obligations under the Protocol and urged them to report their data as quickly as possible.

184. Based on the received data reports, all the reporting parties were in compliance with the control measures under the Protocol or, where applicable, with their commitments under plans of action to return to compliance.

185. The second draft decision built on the decision taken by the Twenty-Ninth Meeting of the Parties concerning blank cells in data reporting forms submitted under Article 7 of the Protocol. The submission of data forms with blank cells generated additional work by the Secretariat, in terms of requesting clarification from the parties, and caused delays in compiling information and assessing parties' compliance with the control measures.

186. In decision XXIX/18, which followed up on the earlier decision XXIV/14, the Twenty-Ninth Meeting of the Parties had urged parties to ensure that all cells on the data reporting forms were completed with a number, including zero, where appropriate, rather than leaving the cell blank; and had requested the Implementation Committee to review the status of compliance by the parties with that request at its sixty-first meeting. A total of 20 parties had submitted Article 7 data reporting forms for 2017 that had contained blank cells. At the time of the Committee's meeting, two of those parties had yet to clarify the matter, but both parties had subsequently provided the necessary information. The draft decision therefore urged all parties, when submitting their data reporting forms, to ensure that all cells were completed with a number, including zero where appropriate, and requested the Committee to review the situation at its sixty-third meeting.

187. The final draft decision related to information on the destinations of reported exports and sources of reported imports of controlled substances, provided by parties in response to decisions XVII/16 and XXIV/12, respectively. It noted with appreciation that a majority of exporting parties regularly provided information on the countries of destination for their exports, and that a number of importing parties regularly provided information on the source countries for their imports, but also noted that some parties had not provided that information. Recognizing that the information could help to identify differences in data reported on imports and exports, which could facilitate the identification of possible cases of illegal trade, the draft decision urged exporting parties to report information on the destinations of their exports and encouraged importing parties to report information on the sources of their imports.

188. During its deliberations in 2018, the Committee had considered a number of issues that did not necessarily result in draft decisions. These included monitoring the progress made by the Democratic People's Republic of Korea, Kazakhstan, Libya and Ukraine in meeting their obligations under their plans of action to return to compliance with the control measures of the Protocol.

189. In closing, she expressed her appreciation for the participation in the Committee meetings of representatives of the Multilateral Fund secretariat and the implementing agencies, and for the support of the Ozone Secretariat. She observed that the parties were on the threshold of an exciting new chapter in the story of the Montreal Protocol, with the Kigali Amendment entering into force on 1 January 2019. The outcomes of the Committee's meetings during 2018, as in previous years, had demonstrated not only the very high level of compliance by parties with their obligations but also their

commitment to achieving the goals of the Montreal Protocol. She looked forward to the opportunity of those emerging challenges to further strengthen the mechanisms of the Protocol to make them even more fit for purpose.

190. One representative observed that it was not surprising that Yemen had not yet reported data for 2017, given the ongoing political instability and conflict within the country, and asked whether language could be added to the draft decision on data reporting to reflect that situation. The meeting of the parties should not ask parties to take action that they would not be in a position to implement. The representative of Yemen said that he had discussed the matter with the Secretariat at the current meeting, and explained that his Government was preparing a letter which would describe the difficulties it was encountering.

191. The Co-Chair suggested that the text of the draft decision should remain unaltered, but that the statements on the issue would be reflected in the report of the meeting. On that understanding, the parties agreed to forward the draft decisions from the Implementation Committee for consideration and possible adoption during the high-level segment.

XVI. Update on the situation of the Caribbean islands affected by hurricanes (decision XXIX/19)

192. The Co-Chair recalled that the Twenty-Ninth Meeting of the Parties had adopted decision XXIX/19, on special considerations for the Caribbean islands affected by hurricanes, relating to the impact of the recent hurricanes on the ability of several Caribbean States to meet their obligations under the Montreal Protocol, in which it had encouraged all parties to assist Antigua and Barbuda, the Bahamas, Cuba, Dominica and the Dominican Republic by controlling the export of products, equipment and technologies that relied on ozone-depleting substances; requested the Executive Committee to take into account the exceptional situation of those countries when considering project proposals; requested the implementing agencies to consider providing appropriate assistance to those countries in various areas; and requested the Implementation Committee to take into consideration the difficulties faced by those countries in the event of cases of non-compliance by them. The relevant parties had also been requested to provide an update on the situation at the Thirtieth Meeting of the Parties.

193. The representative of Grenada said that he had been asked by three of the named parties to provide an update. Dominica had been badly affected by Hurricane Maria in 2017, but the National Ozone Unit was now operating again from new offices and was able to collect and process customs data, although an intermittent internet connection still created some challenges. It had benefited from special funding for institutional strengthening agreed by the Executive Committee, and was fully in compliance with its obligations under the Montreal Protocol.

194. Antigua and Barbuda was also grateful for the receipt of assistance following the devastating impacts of two hurricanes. Its National Ozone Unit was now functioning and the party was in compliance with its obligations. Bahamas had been seriously affected by two hurricanes, in 2015 and 2016, respectively, which had caused damage to the electricity grid and had led to delays in project implementation. It was now recovering, however, and expected to remain fully in compliance with its obligations.

195. The meeting took note of the information presented.

XVII. Other matters

A. Safety standards

196. The representative of the European Union explained that he had asked for the item to be included on the agenda in order to highlight the work of the Secretariat following the successful workshop on safety standards held just before the fortieth meeting of the Open-ended Working Group. The Secretariat had produced a tabular overview of safety standards for refrigeration, air-conditioning, and heat-pump systems and appliances (UNEP/OzL.Pro.30/INF/3), which he felt would prove extremely helpful to policymakers in pursuing the introduction of climate-friendly alternatives and helping to maximize the choices available to parties. He noted that while considerable work had been carried out on the development of safety standards for A2L refrigerants, mainly hydrofluoroolefins, there appeared to have been a bias against the development of standards for A3 refrigerants, which were mainly hydrocarbons. The development of safety standards ought to be technology-neutral.

197. Other representatives agreed that the development of safety standards was a very important matter, and should be accelerated as much as possible, with the aim of at least maintaining and preferably improving the level of safety they ensured, particularly in countries with high-ambient-temperature environments. One representative highlighted the importance of the work of the United Nations Economic Committee for Europe's Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System for Classification and Labelling of Chemicals, which was developing systems that many developing countries were beginning to implement.

198. Subsequently, one representative said that it was important that the ongoing review of International Electrotechnical Commission (IEC) standard IEC 60335-2-40 for air-conditioning equipment be concluded quickly, which was relevant to the phase-down of HFCs, and suggested that the parties further discuss the issue of safety standards at the forty-first meeting of the Open-ended Working Group, once they had had an opportunity to review the information provided in the tabular overview of safety standards for refrigeration, air-conditioning, and heat-pump systems and appliances (UNEP/OzL.Pro.30/INF/3) prepared by the Secretariat.

199. The parties agreed to include the sub-item on the agenda of the forty-first meeting of the Open-ended Working Group.

B. Harmonized System codes

200. Introducing the sub-item, the representative of the European Union drew attention to the note by the Secretariat on designated Harmonized System codes for the most commonly traded fluorinated substitutes for HCFCs and CFCs (UNEP/OzL.Pro.30/INF/7), noting that since 2015 the Secretariat had been working closely with the World Customs Organization (WCO) to expedite the establishment of Harmonized System codes for some ozone-depleting substances and their substitutes, including HFCs and HFC-containing mixtures, and that a series of Harmonized System codes of interest to the Montreal Protocol had been provisionally adopted by the WCO Harmonized System Committee in 2018. Given the interest of all parties in mitigating the growing risks of illegal trade in controlled substances, he urged all representatives to liaise with their counterparts in WCO in order to ensure that the codes were formally approved by the Harmonized System Committee in March 2019 and by the WCO Council in June 2019.

201. In the ensuing discussion, in response to a query from the floor, one representative clarified that, if approved by the WCO Council, the Harmonized System codes would enter into force on 1 January 2022.

202. The parties took note of the information provided and the request that they liaise with their counterparts in WCO to ensure that the codes were formally approved in 2019.

Part two: high-level segment (8 and 9 November 2018)

I. Opening of the high-level segment

203. The high-level segment of the Thirtieth Meeting of the Parties to the Montreal Protocol was opened at 10 a.m. on Thursday, 8 November 2018, by Mr. Yaqoub Almatouq (Kuwait), President of the Twenty-Ninth Meeting of the Parties.

204. Opening statements were delivered by Mr. Lenín Moreno, President of Ecuador; Ms. Tina Birmpili, representative of the United Nations Environment Programme and Executive Secretary of the Ozone Secretariat; and Mr. Almatouq.

A. Statement by the representative of the Government of Ecuador

205. In his opening address, Mr. Moreno warmly welcomed representatives to Ecuador, providing an overview of the country's efforts to promote sustainable development and environmental protection. Echoing the words of the conservationist Gerald Durrell, he said that pollution and environmental degradation were a strange form of slow suicide that was destroying the future of humanity. Collective action, including in the context of the ozone treaties, was urgently required to protect the Earth for present and future generations.

206. The Montreal Protocol had succeeded in controlling, and in some cases eliminating, ozone-depleting substances, but the work under the Protocol was by no means complete. It was critical that the parties continue to work together to support the development and implementation of environmentally sound products and technologies for the protection of both the ozone layer and the global climate. Also of crucial importance was the parties' continued support of developing countries

in their efforts to implement the Montreal Protocol and its amendments, including the Kigali Amendment on hydrofluorocarbons (HFCs). Noting that Ecuador had already ratified the Amendment, he urged all parties that had not yet done so to ratify the instrument as early as possible. Wishing representatives fruitful deliberations, he expressed confidence that the decisions to be adopted at the current meeting would be instrumental in the successful implementation of the Protocol and its amendments for the benefit of nature and planet Earth.

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

207. In her remarks, Ms. Birmpili expressed gratitude to the Government of Ecuador for its long-standing commitment to the Montreal Protocol and its early ratification of the Kigali Amendment. Noting that real solutions existed to the climate change challenge and that the Kigali Amendment held great potential in that regard, she commended all the parties that had ratified the Amendment and thanked all those that had reported progress towards its ratification at the current meeting. The success of the Montreal Protocol showed how powerful collective action could be, but, as the information to be presented by the Protocol's assessment panels at the meeting would show, there was no room for complacency. Safeguarding the gains made and ensuring the continued success of the Protocol would require, among other things, that the parties address recent unexpected emissions of CFC-11, which risked slowing the recovery of the ozone layer and jeopardizing the hard-won reputation of the Montreal Protocol. The parties must tackle the illegal trade in and production of controlled substances wherever they occurred. To that end, the parties might also need to assess the institutions of the Protocol with a view to strengthening their capacity to deal with such challenges. In closing, she highlighted the importance of determination and robust political leadership in addressing the multiple challenges, both old and new, facing the parties to the Protocol.

C. Statement by the President of the Twenty-Ninth Meeting of the Parties to the Montreal Protocol

208. In his remarks, Mr. Almatouq emphasized the many achievements of the Montreal Protocol since 1996 and expressed the hope that the positive spirit of cooperation at the current meeting would lend renewed momentum to the implementation of the Protocol. Stressing that the adoption of the Kigali Amendment, which would enter into force in January 2019, was an important milestone in the history of the instrument and that its implementation would greatly benefit the environment, he commended the parties that had ratified the Amendment and urged others to follow suit. In closing, he said that it had been an honour to preside over the Twenty-Ninth Meeting of the Parties and invited all the parties to the Protocol to work together to tackle the many issues on the agenda of the current meeting, including by adopting all the decisions forwarded by the preparatory segment and by sending a powerful message regarding their determination to address the unexpected emissions of CFC-11.

II. Organizational matters

A. Election of officers for the Thirtieth Meeting of the Parties to the Montreal Protocol

209. 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 Thirtieth Meeting of the Parties to the Montreal Protocol:

President: Ms. Liana Gharamanyan (Armenia) (Eastern European States)

Vice-Presidents: Mr. Samuel Pare (Burkina Faso) (African States)

Mr. Juan Sebastian Salcedo (Ecuador) (Latin American and Caribbean States)

Ms. Elisabeth Munzert (Germany) (Western European and other States)

Rapporteur: Ms. Bitul Zulhasni (Indonesia) (Asia-Pacific States)

B. Adoption of the agenda of the high-level segment of the Thirtieth Meeting of the Parties to the Montreal Protocol

210. The following agenda for the high-level segment was adopted on the basis of the provisional agenda contained in document UNEP/OzL.Pro.30/1:

1. Opening of the high-level segment:

   (a) Statement(s) by representative(s) of the Government of Ecuador;

   (b) Statement(s) by representative(s) of the United Nations Environment Programme;

   (c) Statement by the President of the Twenty-Ninth Meeting of the Parties to the Montreal Protocol.

2. Organizational matters:

   (a) Election of officers for the Thirtieth Meeting of the Parties to the Montreal Protocol;

   (b) Adoption of the agenda of the high-level segment of the Thirtieth Meeting of the Parties to the Montreal Protocol;

   (c) Organization of work;

   (d) Credentials of representatives.

3. Presentations by the assessment panels on progress in their work and any key issues having emerged from their 2018 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 Thirtieth Meeting of the Parties.

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

8. Other matters.

9. Adoption of decisions by the Thirtieth Meeting of the Parties to the Montreal Protocol.

10. Adoption of the report.

11. Closure of the meeting.

211. Prior to the adoption of the agenda, one representative informed the parties that she planned to introduce a conference room paper submitted by a group of parties on the need to study the relationship between stratospheric ozone and proposed solar radiation management strategies, and asked that it be considered under agenda item 8, on other matters.

212. Another representative, noting that it was not the usual practice to introduce conference room papers during the high-level segment, asked the Secretariat to clarify whether such a situation had occurred before and, if not, whether it was allowed under the rules of procedure. The representative of the Secretariat said that while inconsistent with usual practice, it was not against the rules of procedure.

213. Many representatives, including one speaking on behalf of a group of parties, acknowledged the importance of the topic being raised but were reluctant to consider a conference room paper on it at such a late stage in the meeting. Several, including one speaking on behalf of a group of parties, were concerned that allowing the conference room paper to be introduced during the high-level segment would set a precedent for future meetings. There was general concern that the remaining two days of the meeting left little time for fruitful discussion of a complex topic, let alone the required consultation with capitals; the normal practice of introducing conference room papers at meetings of the Open-ended Working Group or during the preparatory segment of the meeting of the parties was designed to allow ample time for due consideration. Two representatives said that they were not in a position to adopt a decision on the matter at the current meeting, although they would welcome a discussion on the topic. Other representatives, including one speaking on behalf of a group of parties, also indicated their willingness to discuss the topic.

214. The parties agreed to discuss the topic under agenda item 3 and the proponents agreed to defer the introduction of the conference room paper to a later meeting.

C. Organization of work

215.The parties agreed to follow their customary procedures.

D. Credentials of representatives

216. The Bureau of the Thirtieth Meeting of the Parties to the Montreal Protocol approved the credentials of the representatives of 91 of the 144 parties represented at the meeting. The Bureau provisionally approved the participation of 53 parties on the understanding that they would forward their 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 also 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 full participation 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 any key issues having emerged from their 2018 quadrennial assessments

217. Mr. Jon Pyle and Mr. David Fahey, two of the four co-chairs of the Scientific Assessment Panel, gave a presentation on the main findings of the World Meteorological Organization/United Nations Environment Programme *Scientific Assessment of Ozone Depletion 2018* report, which had been finalized in July 2018 and included a comprehensive assessment of the state of the ozone layer. An executive summary of the report had been made available at the current meeting, and the full version of the report would be published at the end of 2018. A summary of the presentation, prepared by the presenters, is set out in section F of annex VI to the present report.

218. Ms. Janet Bornman and Mr. Nigel Paul, two of the three co-chairs of the Environmental Effects Assessment Panel, gave a presentation on the key findings of the Panel's quadrennial assessment report for 2018, which assessed the environmental impacts of the interactive effects of ozone depletion, anticipated ozone recovery and climate change on ultraviolet radiation reaching the Earth's surface and highlighted the contributions of the Montreal Protocol to environmental sustainability, human health and well-being, as well as its alignment with many of the Sustainable Development Goals. A summary of the presentation, prepared by the presenters, is set out in section F of annex VI to the present report.

219. Mr. Woodcock, co-chair of the Technology and Economic Assessment Panel; Mr. Paulo Altoé, co-chair of the Foams Technical Options Committee; Ms. Helen Tope, co-chair of the Medical and Chemical Technical Options Committee; Mr. Chattaway, co-chair of the Halons Technical Options Committee; Mr. Ian Porter, co-chair of the Methyl Bromide Technical Options Committee; and Mr. Polonara, co-chair of the Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee, gave a presentation on the key messages emerging from the Panel's 2018 assessment reports, which would be finalized in December 2018. A summary of the presentation, prepared by the presenters, is set out in section F of annex VI to the present report.

220. Following the presentations, the members of the three panels responded to questions from the floor. Responding to a query regarding the role of the Methyl Bromide Technical Options Committee in liaising with parties whose use of methyl bromide in quarantine and pre-shipment applications had increased, in order to help them phase out such use, Mr. Porter said that, in its assessment reports, the Committee reviewed the alternatives to methyl bromide in quarantine and pre-shipment applications and encouraged the implementation of country programmes on alternatives, which benefitted the Protocol. He stressed that such uses were not prohibited, but had to be reported under the Protocol.

221. Regarding the conclusion by the Environmental Effects Assessment Panel that future concentrations of trifluoroacetic acid and its salts (TFAs), a breakdown product of hydrofluoroolefins (HFOs), would not pose a significant threat to human health or the environment, Mr. Paul explained that the basis for the conclusion was that the eco-toxicological effects of TFA were observed from exposures of milligrams per litre, whereas TFA concentrations observed in the environment were on the order of nanograms per litre. He stressed, however, that, as a recent report on HFOs commissioned by the Norwegian Environment Agency that had reached the same conclusion as the Panel had highlighted, additional research covering several knowledge gaps, for example the eco-toxicological effects of TFA on a wider number of organisms, was needed. Mr. Newman added that the increasing use of low-GWP HFOs was proof that HFCs were being replaced by short-lived compounds, which was a positive development.

222. Responding to a question on internet sale advertisements of CFC-11, Ms. Tope said that the Technology and Economic Assessment Panel had not confirmed that actual sales of CFC-11 had taken place, but continued to monitor the situation and to discuss it with relevant stakeholders in order to better understand it. The Panel would provide additional information on CFC-11 in its final 2018 assessment report.

223. With regard to a question on the benefits of energy efficiency, Mr. Newman explained that energy efficiency improvement in refrigeration and air-conditioning equipment during the transition to low-GWP alternative refrigerants could potentially double the climate benefits of the HFC phase-down provided for in the Kigali Amendment, because achieving energy efficiency would have a climate benefit additional to that of adopting low-GWP alternatives in the refrigeration and air-conditioning sector.

224.During the ensuing question-and-answer session, the representative of Norway informed the parties and the members of the assessment panels that his Government had commissioned the Norwegian Institute for Air Research at the beginning of 2018 to perform a screening survey to detect synthetic chemical substances in Arctic air samples. As a result, five volatile fluoroorganic compounds had been detected in the Arctic atmosphere for the first time. The Norwegian Government wanted to learn more about those anthropogenic substances, particularly regarding their emissions and the sectors that used them, and was seeking the guidance and help of other parties, the assessment panels, the scientific community and intergovernmental organizations in that regard. It was also interested in information on atmospheric concentrations and how they might affect the ozone layer and the climate system. The Government of Norway intended to provide the Secretariat with more details on the substances, in accordance with decision IX/24 on the control of new substances with ozone-depleting potential, before the end of the present meeting.

225.One representative said that his country was extremely concerned about the reported ongoing emissions of carbon tetrachloride. He suggested including a separate item on the agenda of the forty-first meeting of the Open-ended Working Group to allow for a more comprehensive discussion on carbon tetrachloride, which would also contribute to the development of a more holistic approach for coping more generally with deviations from the path to phasing out ozone-depleting substances.

226.Several representatives also called attention to geoengineering technologies, expressing concern that the consequences of their use were not fully understood and that the risks could outweigh the potential benefits. All had grave concerns about how such technologies would be managed. Two said that they and others were preparing a draft decision on the matter for consideration at the forty-first meeting of the Open-ended Working Group and the third said that his Government planned to submit a resolution on the matter to the United Nations Environment Assembly at its fourth session.

227.Mr. Polonara addressed a number of queries relating to the refrigeration sector. In response to a question about the availability of low-GWP alternatives for refrigeration and air-conditioning applications, he said that although the rate of penetration of the new technologies was quite high, they were not yet available everywhere and in most countries where they were available they were being used in trial applications. Regarding safety issues surrounding hydrocarbon refrigerants, he noted that the safety standards committees were in the process of updating the safety standards for the use of flammable refrigerants. The standards for flammable refrigerants used in commercial refrigeration could be available within a few months but the standards for flammable refrigerants in the air-conditioning sector were on hold, as parties had been unable to reach a consensus on the grade to assign to flammable refrigerant use. Responding to a question about the feasibility of meeting the challenge of converting 1.6 billion air conditioners to ozone-friendly, low-GWP refrigerants, he said that drop-in refrigerants to replace ozone-depleting substances were easily available.

228.Ms. Walter-Terrinoni addressed a question on the management of banks of obsolete HCFC refrigerants. They could be collected and destroyed using the technologies discussed at the current meeting and at the fortieth meeting of the Open-ended Working Group, and some parties had an extensive reclaim market for refrigerants and other substances controlled by the Montreal Protocol that allowed repeated reuse.

229.Ms. Walter-Terrinoni also addressed a question regarding technical barriers to transitioning a polyurethane foam manufacturing operation from HCFC-141b to CFC-11. She explained that CFC-11 had historically been widely used in most polyurethane foam applications because it was low-cost and very easy to use. CFC-11 foams had very good dimensional stability, strength and insulation capability, as well as very good compatibility with construction materials and equipment and the raw materials used in foam formulations, making them highly stable over long periods of time. CFC-11 was non-flammable, unlike its hydrocarbon replacements, which required additional capital

investments for safe use. For all those reasons, the conversion from CFC-11 to HCFC-141b had required significant adjustments.

230.Mr. Newman provided responses to questions addressed to the members of the Scientific Assessment Panel. He provided additional technical details, saying that the ratio of anthropogenic to natural methyl bromide was one in five, and that bromine was 60 times more efficient than chlorine, meaning that 20 parts per trillion of bromine was equivalent to 1,200 parts per trillion of chlorine. Asked whether the 2018 assessment reports took account of information from recent technical papers by Park and others and Lunt and others, he said that those papers had been published too recently for inclusion in the 2018 assessment reports, but would be reflected in future assessments.

231.Reacting to the information provided by the representative of Norway, Mr. Newman noted that the substances reported were very new and were not yet the subject of peer-reviewed literature. They were not part of the 2018 assessment but would be investigated and discussed in the next assessment. The 2018 assessment include new compounds found in significant quantities that were ozone-depleting substances, as well as a table of over 300 compounds, which he encouraged all parties to consult. The assessment also covered geoengineering, which had been the subject of several questions and comments, in chapter 6, and information on geoengineering technologies would be added in future assessments as new papers on the topic were published.

232.Asked to clarify the difference between concentrations of trifluoroacetic acid found in the environment and concentrations that would be considered toxic, Mr. Paul explained that concentrations in the environment were measured in nanograms, whereas toxic concentrations for aquatic organisms were measured in milligrams. There was a million-fold difference between nanograms and milligrams and thus a very large margin of safety between the concentrations measured in the environment and those necessary to induce toxic effects.

233. The parties took note of the information provided.

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

234. The Chair of the Executive Committee of the Multilateral Fund, Mr. Hussein Mazen (Lebanon), reported on progress in the implementation of the Committee's decisions since the Twenty-Ninth Meeting of the Parties, summarizing the information provided in document UNEP/OzL.Pro.30/10.

235. He drew attention in particular to the work of the Executive Committee covering policy matters related to the Kigali Amendment, including the status of development of the guidelines for funding the phase-down of HFCs, which had been discussed under item 4 (c) of the agenda for the preparatory segment, and where good progress had been made, although discussion on some elements remained to be completed and would be taken up again at the Committee's next meeting in December. The Committee had already approved funding for enabling activities, including data-gathering systems, in 119 Article 5 parties that intended to take early action on HFCs.

236. With regard to the eligible incremental costs for the HFCs in the consumption manufacturing sector, the Executive Committee had recognized that the cost-effectiveness thresholds for the phase-out of CFCs and HCFCs were not necessarily applicable to HFCs, so it had allowed for the preparation and submission of stand-alone HFC investment projects in order to gather detailed information on the eligible costs and relevant factors facilitating implementation of the projects. The investment projects funded had been chosen on the basis of their broad replicability within the country, region or sector.

237. On the methodology for determining the starting point for aggregate reductions under the Kigali Amendment, the Executive Committee would carefully consider the information that had been gathered on the key considerations that could assist in developing a methodology. The Committee would also be considering information on all aspects that could support HFC phase-down in the refrigeration servicing sector. The analysis of existing capacities in Article 5 parties and how those capacities could be utilized for HFC phase-down was of particular significance in the light of the fact that the implementation of HCFC phase-out management plans and national plans for the phase-down of HFCs, some of which could be submitted as early as 2019, could address the refrigeration servicing sector in parallel.

238. On matters relating to energy efficiency, the Executive Committee would consider the outcomes of the work of the parties in relation to the report of the Technology and Economic Assessment Panel on the matter, and the outcomes of the workshop on energy efficiency opportunities held in July.

239. With regard to the costs of reducing emissions of HFC-23 by-product from the production of HCFC-22, noting that the relevant control measure would come into effect on 1 January 2020, the Executive Committee had agreed to consider possible cost-effective options for compensation for HCFC-22 swing plants. The Committee would continue to review options based on the studies it had commissioned from an independent consultant and the documents it had requested from the Secretariat.

240. The Executive Committee had also continued to assist Article 5 parties to achieve the phase-out of HCFCs. It had continued to review sector plans for the consumption and production sectors, and had approved tranches of funding for HCFC phase-out management plans for 37 countries, exceptional funding for HCFC production phase-out for China, and funding for the extension of institutional strengthening projects in 25 countries.

241. He then spoke of the main achievements of the implementing agencies of the Multilateral Fund. In 2018, UNDP had continued to assist 47 countries with the implementation of HCFC phase-out management plans. UNDP had also assisted a number of Article 5 parties to undertake projects to demonstrate climate-friendly and energy-efficient alternative technologies to HCFCs, and feasibility studies on district cooling. In support of the Kigali Amendment, UNDP had assisted 16 countries with their enabling activities and had provided support to another 7 countries to develop stand-alone investment projects to phase down the use of HFCs. In addition, in order to share Article 5 parties' experience in sustainable cooling and refrigeration systems, UNDP had produced a video highlighting three projects, and had organized meetings and side events to promote the transition to technologies with low global warming potentials and higher energy efficiencies.

242. The Compliance Assistance Programme of the OzonAction Branch had continued to assist all 147 Article 5 parties to comply with their commitments through the provision of compliance assistance services; the operation of 10 regional ozone officer networks; a clearing-house function; and building the capacity of national ozone officers, refrigeration technicians and customs and enforcement officers. UNEP had reinforced its focus on capacity-building in the refrigeration servicing sector, including standards, training and certification, safety and partnership activities with refrigeration and air-conditioning organizations. It had also assisted 102 Article 5 parties with the implementation of their HCFC phase-out management plans, 104 countries with institutional strengthening and 80 countries with implementing their enabling activities in support of the Kigali Amendment.

243. UNIDO had implemented HCFC phase-out management plans in 74 countries, and HFC enabling activities in 27 countries, as a result of which a number of Article 5 parties had already ratified the Kigali Amendment and many others would do so shortly. UNIDO had also implemented four stand-alone HFC investment projects, and had included similar projects in its 2019 business plan. With the support of the Government of Italy, UNIDO had published the document "Ready, Steady, Go! Africa and the Kigali Amendment", which summarized current needs, concerns and challenges faced by African countries in making the Kigali Amendment a success.

244. World Bank partner countries had continued to make headway in the implementation of their obligations. So far they had received more than $33 million for the implementation of stage II HCFC phase-out management plans in order to achieve the HCFC consumption reduction target of 35 per cent by 2020. A further $30 million had been disbursed for the remaining commitments for activities under stage I HCFC phase-out management plans. Informed by its years of experience in sector-based approaches and in order to facilitate the swift ratification of the Kigali Amendment, the Bank had helped those countries to understand and anticipate the complexities of HFC phase-down through enabling activities and strategic investments.

245. In conclusion, he expressed thanks to those representatives who had served on the Executive Committee in 2018, the secretariat of the Multilateral Fund and the bilateral and implementing agencies for their devotion, work and commitment, including in particular the prompt efforts to address matters and initiate activities towards the implementation of the Kigali Amendment.

246.The parties took note of the information presented.

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

247. During the high-level segment, statements were made by the heads of delegation of the following parties, listed in the order in which they spoke: China, Guyana, Namibia, European Union, Mongolia, Chile, Saint Lucia, Togo, Norway, Fiji, Côte d'Ivoire, Samoa, Romania, Venezuela (Bolivarian Republic of), Kiribati, Indonesia, France, Nigeria, Belarus, Guatemala, Peru, Benin, Kyrgyzstan, Palau, Syrian Arab Republic, Senegal, Bangladesh, Trinidad and Tobago, Nepal and Ecuador. Statements were also delivered by the representatives of the Intergovernmental Panel on Climate Change (IPCC), the Environmental Investigation Agency, and the International Institute of Refrigeration.

248. Representatives of many parties who spoke expressed thanks to the Government and people of Ecuador for their hospitality in hosting the Thirtieth Meeting of the Parties and associated meetings. Many also thanked the Ozone Secretariat, the Secretariat and Executive Committee of the Multilateral Fund, the implementing agencies, donor partners, the assessment panels, international organizations and other stakeholders for their role in ensuring the success of the meeting in particular and of the Montreal Protocol in general.

249. Many representatives paid tribute to the success of the Montreal Protocol and its parties in controlling and phasing out ozone-depleting substances and assisting the recovery of the ozone layer. A number of factors contributing to that success were alluded to, including the well-functioning technical and financial support mechanisms; the strong and efficient institutions making up the ozone community; robust research and studies undertaken by the scientific bodies of the Protocol; global advocacy on the need to protect the ozone layer; and the will of the international community to take action. Several representatives expressed their confidence that those strengths would be effectively deployed in taking up the new challenge under the Montreal Protocol, namely the phase-down of HFCs, which demonstrated the continuing relevance and importance of the instrument.

250. Several representatives recalled the historical evolution of action under the Protocol, from the early efforts to phase out CFCs to the focus on HCFCs over the past decade. Many representatives described the continued actions being taken in their own countries to implement the various stages of their HCFC phase-out 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 strengthening of the legal and policy framework, for example through the introduction of quota and licensing systems; import controls and monitoring mechanisms; the implementation of national standards and guidelines for refrigerants and equipment using refrigerants; training and capacity-building for customs officers, and for service technicians in the refrigeration and air-conditioning sectors; recovery and recycling of refrigerants in the air-conditioning sector; strengthening institutional capacity; promotion of alternative substances and new technologies; public-private partnership ventures; and education and awareness-raising. Some representatives described the coordination of ozone-related activities within country programmes or national development plans that had adopted a multisectoral, multi-stakeholder approach.

251. Many representatives placed strong emphasis on the historic significance of the adoption of the Kigali Amendment to the Protocol, which would enter into force on 1 January 2019. A number stated that their countries were among the 60 parties that had thus far ratified the Amendment, or were engaged in the process of ratification. Those that had not yet ratified the Amendment were urged to do so. Several representatives highlighted the benefits to be derived from the phase-down of HFCs under the Kigali Amendment, particularly the climate and environmental co-benefits, including decreased greenhouse gas emissions and the amelioration of global warming, restoration of natural ecosystems, reduced threats to forests and wetlands, and preservation of biodiversity, as well as the stimulation of climate-friendly technologies and job creation within the green economy. One representative said that replacing HFCs with environmentally friendly substances would not only contribute to the protection of the environment and human health, but would also help to increase the profitability, efficiency and reputation of businesses in the refrigeration and air-conditioning sectors. Some representatives urged caution in ensuring that the present focus on the Kigali Amendment did not shift attention from the primary task of the Montreal Protocol to phase out ozone-depleting substances.

252. Many representatives alluded to the challenges that countries would have to overcome in the implementation of the Kigali Amendment. Energy efficiency in the refrigeration, air-conditioning and heat-pump sectors was viewed as a key issue. One representative, speaking on behalf of a group of countries, said that improving energy efficiency must be done in a way that reduced climate impacts, enabling multiple co-benefits such as savings for the user, improvements in air quality and greater energy security. Cooperation with other relevant organizations, funds and institutions would help in achieving those goals and enhance the work of the Montreal Protocol in that area.

253. Other issues facing parties included the regulation of refrigeration-related imports and combating illegal trade, identification of the most appropriate replacement technologies for different national circumstances, gathering and dissemination of knowledge on alternatives to inform policymaking and decision-making, undertaking conversions to alternatives with low GWP, market availability of alternatives, capacity-building, training and certification of human resources in the light of the new substances and technologies that would be required (including in the service sector), safety concerns (including flammability of certain substances), and awareness-raising among all stakeholders, including government, industry and the general public.

254. A number of representatives expressed concern at the uncertainty that still surrounded many aspects of the phase-down of HFCs and the best actions to be taken at the national and sector levels. Several representatives highlighted the particular challenges facing countries with certain geographical characteristics, such as small island developing States and countries with high ambient temperatures, particularly in view of the increasingly urgent threat posed by climate change and global warming. One representative [F] said that it was critical to have new policies and safety standards in place before the producing countries started to supply replacement equipment to technology-receiving countries. Another representative [F] said the absence of designated Harmonized System codes for particular controlled HFCs presented a continuing challenge to the collection of data on HFCs. Yet another said that pilot demonstration projects would be valuable in helping countries and industry to make the most appropriate technology choices.

255. Financing was viewed as a particularly critical issue. Several parties expressed their gratitude to the donors that had helped finance enabling activities and other initiatory projects, including demonstration projects, under the Kigali Amendment. Such assistance had added value to national efforts. One representative, speaking on behalf of a group of countries, said that learning from demonstration projects would help parties to design the best workable solutions for the successful implementation of the Amendment. A number of representatives highlighted the need for rapid mobilization of additional support, in terms of funding, capacity-building and technical assistance, to help parties phase down HFCs. One representative [F] said that it was critical for the implementation of the Kigali Amendment that the key elements of the financing guidelines on HFC phase-down for the Executive Committee were fair and precise. Another representative said that many technological needs remained unmet because of competing financial demands on limited funding provided through the Multilateral Fund of the Montreal Protocol.

256. Several representatives described national actions already being taken to phase down HFCs in line with the provisions of the Kigali Amendment, including promotion of energy-saving technologies in the refrigeration and air-conditioning sectors, infrastructure investment, establishment of public–private partnerships and involvement of civil society, incorporation of policies and regulations in national development plans and strategies, reform of the legal environment, assessment of national needs, holding workshops and introducing certification for service technicians, a "green passport" campaign to raise awareness among students, and public awareness initiatives. Several representatives said that such activities were part of a holistic aim to achieve sustainable development in their countries, including through attainment of the Sustainable Development Goals, compliance with multilateral environmental agreements, and promotion of the green economy and sustainable production and consumption patterns. One representative spoke of the importance of leaving a legacy of sound environmental stewardship for the benefit of future generations.

257. Some representatives described regional or other partnership activities whereby joint action was undertaken to achieve the objectives of the Montreal Protocol. For example, one representative of a small island developing State spoke of collaboration with the United Nations Environment Programme and the Secretariat of the Pacific Regional Environment Programme to manage and dispose of ozone-depleting substances under the Moana Taka Partnership, enabling disposal activities that were beyond the capacity of small States acting alone. Another representative encouraged further cooperation with other multilateral environmental agreements, including the Basel, Rotterdam and Stockholm conventions and the Minamata Convention on Mercury, in an integrated approach supporting a healthier planet for people and the environment, and welcomed the opening of negotiations on a global pact for the environment.

258. A number of representatives highlighted future challenges facing the Montreal Protocol. Several representatives expressed particular concern at the reported rise in CFC-11 emissions, suggesting continuing or new production of the substance, which had been phased out globally in 2010. One representative, speaking on behalf of a group of countries, said that a sweeping response was needed so as not to jeopardize progress made in the recovery of the ozone layer or undermine the reputation of the Montreal Protocol.

259. Several representatives stressed the importance of cooperation to enhance monitoring and research activities to keep track of developments relevant to the ozone layer, and to supply reliable and up-to-date scientific information as a prerequisite for verifying that parties were complying with the Protocol. One representative said that greater efforts should be made to support a project, in collaboration with the World Meteorological Organization, to assist monitoring activities in developing countries through the transfer of equipment for monitoring atmospheric ozone. The representative of Norway recalled his delegation's earlier intervention regarding the results of a screening survey that had detected the presence of five volatile fluoroorganic and related compounds in air samples in the vulnerable Arctic region, indicating the need for continued vigilance and strengthening of atmospheric monitoring activities. In support of such action, he announced that Norway pledged an additional contribution to the Vienna Convention Trust Fund for observation and research of 250,000 Norwegian kroner (approximately $30,000).

260. Other issues highlighted as being of crucial importance to the future success of the Montreal Protocol included the rapid implementation of activities under the Kigali Amendment, and timely resolution of the aforementioned challenges facing parties in that regard; and cooperation with other bodies in a holistic approach to protecting the environment, including ensuring that progress in repairing the ozone layer was maintained, and engaging in renewed efforts to combat the adverse effects of climate change. Several representatives drew attention to the great difficulties faced by countries in conflict situations in achieving compliance with the Montreal Protocol and other environment-related international instruments, including the targets of the Sustainable Development Goals.

261. In conclusion, many representatives reiterated their commitment to the objectives of the Protocol and its amendments, and their continued ambition to fulfil their obligations under the instrument, for the benefit of the environment and humankind.

262. In her presentation, the representative of the Intergovernmental Panel on Climate Change gave context to the urgent need to combat global warming. The recent IPCC special report entitled *Global Warming of 1.5*℃ had shown that further global, ambitious and timely climate actions were needed to reduce the risks of climate change to the environment, people and livelihoods. Limiting warming to 1.5℃ would bring clear benefits to natural and human systems compared to warming of 2℃ or higher, but would require unprecedented transitions in all aspects of society. Such action, however, could go hand in hand with achieving other world goals, particularly the Sustainable Development Goals. Achieving the aim of limiting warming to 1.5℃ would require large reductions in emissions of greenhouse gases other than CO2, including HFCs. That was of particular relevance to the Kigali Amendment, which demonstrated the feasibility of a global environmental agreement facilitating common but differentiated responsibilities, with developing countries benefiting from leap-frogging the trial-and-error stages of innovative technology development experienced by the developed countries. HFC alternatives with reduced warming effects, if combined with improved energy efficiency, could create an ideal situation where emissions of CO2 and other co-emissions were addressed simultaneously.

263. The representative of the Environmental Investigation Agency [F], in her statement, said that actions under the Montreal Protocol, in addition to placing the ozone layer on the path to recovery, had also delivered significant climate co-benefits, to which the Kigali Amendment would make a major future contribution. The Montreal Protocol was, however, at a critical juncture, with a number of challenges still to be resolved, including issues related to feedstock production and uses, increased emissions of CFC-11, and banks of ozone-depleting substances and HFCs. Lastly, she highlighted the recent IPCC special report on the urgency of limiting global warming to 1.5℃. The Montreal Protocol could contribute in that regard, not just through the phase-down of HFCs, but also by fully implementing decision XXVIII/2 and maximizing energy efficiency improvements in the refrigeration and air-conditioning sector during the transition away from HCFCs and HFCs.

264. The representative of the International Institute of Refrigeration, in his statement, said that it was important to implement the Kigali Amendment as quickly and efficiently as possible, supported by the introduction of new strategies on the consumption of refrigerants to avoid more difficult and costly conversions later. In the light of the considerable projected increase in the demand for refrigeration, especially in developing countries, urgent action was required in a number of areas, including improving the energy efficiency of facilities and entire systems, articulating and implementing regulations on the design, safety and servicing of facilities, and increasing research, development and dissemination of information on new technologies.

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

265.The Co-Chair of the preparatory segment reported that the work of the segment had concluded successfully, and draft decisions had been approved for consideration and possible adoption during the high-level segment. He recalled that it had agreed to defer discussion of a number of issues to the forty-first meeting of the Open-ended Working Group and the Thirty-First Meeting of the Parties, in 2019, including process agents, the linkages between HFCs and HCFCs, and the representation of the Eastern European and Central Asian group on the Executive Committee. Similarly, the question of the eligibility of the United Arab Emirates to assistance from the Multilateral Fund would be taken up in 2019 or subsequently. He also welcomed the steps that Caribbean nations had taken to recover from the impact of the hurricanes in recent years, and congratulated them on their efforts. In closing, he thanked all those involved for their hard work and for the spirit of cooperation that had characterized the negotiations.

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

266. The representative of Italy expressed the willingness of the Government of Italy to host the Thirty-First Meeting of the Parties at the headquarters of the Food and Agriculture Organization of the United Nations in Rome from 4 to 8 November 2019.

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

VIII. Other matters

268.The Thirtieth Meeting of the Parties took up no other matters during the high-level segment.

IX. Adoption of decisions by the Thirtieth Meeting of the Parties to the Montreal Protocol

269.The Thirtieth Meeting of the Parties adopted the decisions approved during the preparatory segment, as indicated in the following paragraphs.

270.The Thirtieth Meeting of the Parties decides:

Decision XXX/1: Status of ratification of the Kigali Amendment to the Montreal Protocol

1. To note that, as at 9 November 2018, 60 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 XXX/2: Adjustments to the Montreal Protocol

Recalling decision XIX/6 paragraph 12 which agreed to address the possibilities or need for essential use exemptions, no later than 2015 where this relates to Article 2 parties, and no later than 2020 where this relates to Article 5 parties,

Also recalling decision XIX/6 paragraph 13 which agreed to review in 2015 the need for the 0.5 per cent for servicing provided for in paragraph 3 and to review in 2025 the need for the annual average of 2.5 per cent for servicing provided for in paragraph 4 (d),

Noting the report by the Technology and Economic Assessment Panel in 2018 that highlighted the continued need of Annex C, Group I substances for laboratory

and analytical uses after 2020 as well as the continued need of Annex C, Group I substances for servicing of fire protection and fire suppression equipment and some other niche applications for parties operating under Article 2 of the Protocol,

Recognizing that parties operating under paragraph 1 of Article 5 may have needs for Annex C, Group I substances in the same applications listed in Article 2F paragraph 6 and those needs will be reviewed in accordance with paragraphs 12 and 13 of decision XIX/6,

Recognizing also the importance of parties' efforts to encourage the development and use of alternatives to Annex C, Group I substances,

Recalling paragraphs 6 to 8 of decision XXVIII/2 on the linkages between hydrofluorocarbon and hydrochlorofluorocarbon reduction schedules and the provision of flexibility if no other technically proven and economically viable alternatives are available and noting that under decision XXVIII/2 paragraphs 26 to 37 an exemption is available to high ambient temperature parties,

1. To adopt, in accordance with the procedure set out in paragraph 9 of Article 2 of the Montreal Protocol, the adjustments of production and consumption of the controlled substances listed in Annex C, Group I to the Protocol as set out in annex I to the report of the Thirtieth Meeting of the Parties;[2]

2. To encourage the development and use of alternatives to Annex C, Group I substances in the non-servicing applications set out in Article 2F, paragraphs 6 (a) (iii) and 6 (a) (iv) and 6 (b) (iii) and 6 (b) (iv) with a view to reducing and ceasing the use of Annex C, Group I substances in those applications;

3. To urge the recovery, recycling and reclamation of Annex C, Group I substances as well as the use of stocks and alternatives, where available and appropriate, in order to reduce the production and consumption of Annex C, Group I substances;

4. To request the Technology and Economic Assessment Panel to provide in its quadrennial reports to be presented to the Thirty-Fifth Meeting of the Parties in 2023 and to the Thirty-Ninth Meeting of the Parties in 2027 information on the availability of Annex C, Group I substances, including amounts available from recovery, recycling and reclamation, and best available information on country-level and total known stocks, as well as availability of alternative options for the applications described in Article 2F paragraphs 6 (a) and 6 (b);

5. To examine the flexibility of the HCFC schedule adjustment in line with the Kigali Amendment;

Decision XXX/3: Unexpected emissions of trichlorofluoromethane (CFC-11)

Noting the recent scientific findings showing that there has been an unexpected increase in global emissions of trichlorofluoromethane (CFC-11) since 2012, after the consumption and production phase-out date established under the Montreal Protocol,

Appreciating the efforts of the scientific community in providing that information,

Expressing serious concern about the substantial volume of unexpected

[2] UNEP/OzL.Pro.30/11.

emissions of CFC-11 in recent years,

1. To request the Scientific Assessment Panel to provide to the parties a summary report on the unexpected increase of CFC-11 emissions, which would supplement the information in the quadrennial assessment, including additional information regarding atmospheric monitoring and modelling, including underlying assumptions, with respect to such emissions; a preliminary summary report should be provided to the Open-ended Working Group at its forty-first meeting, a further update to the Thirty-First Meeting of the Parties and a final report to the Thirty-Second Meeting of the Parties;

2. To request the Technology and Economic Assessment Panel to provide the parties with information on potential sources of emissions of CFC-11 and related controlled substances from potential production and uses, as well as from banks, that may have resulted in emissions of CFC-11 in unexpected quantities in the relevant regions; a preliminary report should be provided to the Open-ended Working Group at its forty-first meeting and a final report to the Thirty-First Meeting of the Parties;

3. To request parties with any relevant scientific and technical information that may help inform the Scientific Assessment Panel and Technology and Economic Assessment Panel reports described in paragraphs 1 and 2 above to provide that information to the Secretariat by 1 March 2019;

4. To encourage parties, as appropriate and as feasible, to support scientific efforts, including for atmospheric measurements, to further study the unexpected emissions of CFC-11 in recent years;

5. To encourage relevant scientific and atmospheric organizations and institutions to further study and elaborate the current findings related to CFC-11 emissions as relevant and appropriate to their mandate, with a view to contributing to the assessment described in paragraph 1 above;

6. To request the Secretariat, in consultation with the secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol, to provide the parties with an overview outlining the procedures under the Protocol and the Fund with reference to controlled substances by which the parties review and ensure continuing compliance with Protocol obligations and with the terms of agreements under the Fund, including with regard to monitoring, reporting, and verification; to provide a report to the Open-ended Working Group at its forty-first meeting and a final report to the Thirty-First Meeting of the Parties;

7. To request all parties:

(a) To take appropriate measures to ensure that the phase-out of CFC-11 is effectively sustained and enforced in accordance with obligations under the Protocol;

(b) To inform the Secretariat about any potential deviations from compliance that could contribute to the unexpected increase in CFC-11 emissions;

Decision XXX/4: Progress by the Executive Committee of the Multilateral Fund in the development of guidelines for financing the phase-down of hydrofluorocarbons

Recalling decision XXVIII/2, whereby, inter alia, the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol was requested to develop, within two years of the adoption of the Kigali Amendment, guidelines for financing the phase-down of hydrofluorocarbon consumption and production, including cost-effectiveness thresholds, and to present those guidelines to the meeting of the parties for the parties' views and input before their finalization by the Executive Committee,

Noting that the Chair of the Executive Committee presented to the Thirtieth Meeting of Parties a report by the Executive Committee of the Multilateral Fund on progress in the development of guidelines for financing the phase-down of hydrofluorocarbons,

Recognizing that draft guidelines for financing the phase-down of hydrofluorocarbon consumption and production were presented to the Thirtieth Meeting of the Parties for parties' views and inputs,

1. To request the Executive Committee of the Multilateral Fund to continue its work on developing guidelines for financing the phase-down of hydrofluorocarbon consumption and production, and provide an update on progress on the elements as part of the annual report of the Executive Committee to the meeting of the parties;

2. Also to request the Executive Committee of the Multilateral Fund to present the draft guidelines developed to the meeting of the parties for the parties' views and input before their finalization by the Executive Committee;

Decision XXX/5: Access of parties operating under paragraph 1 of Article 5 of the Montreal Protocol to energy-efficient technologies in the refrigeration, air-conditioning and heat-pump sectors

Noting that the Kigali Amendment to the Montreal Protocol will enter into force on 1 January 2019,

Noting also the opportunities cited by the Technology and Economic Assessment Panel in its May 2018 report and the September 2018 revision of that report, where it is noted that several categories of enabling activities can potentially serve to promote energy efficiency,

Acknowledging the *Scientific Assessment of Ozone Depletion:2018*, 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,

Taking note of paragraphs 16 and 22 of decision XXVIII/2,

1. To request the Executive Committee of the Multilateral Fund to consider flexibility within the financial support provided through enabling activities for HFCs to enable parties operating under paragraph 1 of Article 5 of the Protocol who wish to do so, to use part of that support for energy efficiency policy and training support as it relates to the phase-down of controlled substances, such as:

(a) Developing and enforcing policies and regulations to avoid the market penetration of energy-inefficient refrigeration, air-conditioning and heat-pump equipment;

(b) Promoting access to energy-efficient technologies in those sectors;

(c) Targeted training on certification, safety and standards, awareness-raising and capacity-building aimed at maintaining and enhancing energy efficiency;

2. To request the Executive Committee of the Multilateral Fund to consider, within the context of paragraph 16 of decision XXVIII/2, increasing the funding provided to low-volume consuming countries to assist them in implementing the activities outlined in paragraph 1 of the present decision;

3. To request the Technology and Economic Assessment Panel to prepare a report on the cost and availability of low-global-warming-potential technologies and equipment that maintain or enhance energy efficiency, inter alia, covering various refrigeration, air-conditioning and heat-pump sectors, in particular domestic air-conditioning and commercial refrigeration, taking into account geographical regions, including countries with high ambient temperature conditions;

4. To continue supporting stand-alone projects in parties operating under paragraph 1 of Article 5 in accordance with Executive Committee decision 79/45;

5. To request the Executive Committee of the Multilateral Fund to build on its ongoing work of reviewing servicing projects to identify best practices, lessons

learned and additional opportunities for maintaining energy efficiency in the servicing sector, and related costs;

6. Also to request the Executive Committee of the Multilateral Fund to take into account the information provided by demonstration and stand-alone projects in order to develop cost guidance related to maintaining or enhancing the energy efficiency of replacement technologies and equipment when phasing-down hydrofluorocarbons;

7. Further to request the Executive Committee of the Multilateral Fund, in dialogue with the Ozone Secretariat, to liaise with other funds and financial institutions to explore mobilizing additional resources and, as appropriate, set up modalities for cooperation, such as co-funding arrangements, to maintain or enhance energy efficiency when phasing down HFCs, acknowledging that activities to assist parties operating under paragraph 1 of Article 5 in complying with their obligations under the Montreal Protocol will continue to be funded under the Multilateral Fund in accordance with its guidelines and decisions;

Decision XXX/6: Destruction technologies for controlled substances

Noting with appreciation the report of the task force established by the Technology and Economic Assessment Panel in response to decision XXIX/4 on destruction technologies for controlled substances,

Noting that destruction and removal efficiency is the criterion considered in approving destruction technologies,

Noting with appreciation the Panel's advice on emissions of substances other than controlled substances, and suggesting that parties consider this information in the development and implementation of their domestic regulations,

Noting that the Code of Good Housekeeping Procedures set out in annex III to the report of the Fifteenth Meeting of the Parties in accordance with paragraph 6 of decision XV/9 provides useful guidance for local management in respect of appropriate handling, transportation, monitoring and measurement in destruction facilities, where similar or stricter procedures do not exist domestically, but does not provide a framework that can be used for comprehensive verification,

1. To approve the following destruction technologies, for the purposes of paragraph 5 of Article 1 of the Montreal Protocol, and, with respect to Annex F, group II, substances, also for the purposes of paragraphs 6 and 7 of Article 2J, as additions to the technologies listed in annex VI to the report of the Fourth Meeting of the Parties and modified by decisions V/26, VII/35 and XIV/6, as reflected in annex II to the report of the Thirtieth Meeting of the Parties:[3]

(a)For Annex F, group I, substances: cement kilns; gaseous/fume oxidation; liquid injection incineration; porous thermal reactor; reactor cracking; rotary kiln incineration; argon plasma arc; nitrogen plasma arc; portable plasma arc; chemical reaction with H_2 and CO_2; gas phase catalytic dehalogenation; superheated steam reactor;

(b) For Annex F, group II, substances: gaseous/fume oxidation; liquid injection incineration; reactor cracking; rotary kiln incineration; argon plasma arc; nitrogen plasma arc; chemical reaction with H_2 and CO_2; superheated steam reactor;

(c)For Annex E substances: thermal decay of methyl bromide;

(d) For diluted sources of Annex F, group I, substances: municipal solid waste incineration; and rotary kiln incineration;

2. To request the Technology and Economic Assessment Panel to assess those destruction technologies listed in annex II to the report of the Thirtieth Meeting of the Parties as not approved or not determined, as well as any other technologies, and to report to the Open-ended Working Group prior to the Thirty-Third Meeting of the Parties, with the understanding that if further information is

[3] UNEP/OzL.Pro.30/11.

provided by parties in due time, in particular regarding the destruction of Annex F, group II, substances by cement kilns, the Panel should report to an earlier meeting of the Open-Ended Working Group;

3. To invite parties to submit to the Secretariat information relevant to paragraph 2 of the present decision;

Decision XXX/7: Future availability of halons and their alternatives

Noting with concern that, according to projections made by the Technology and Economic Assessment Panel in consultation with the International Civil Aviation Organization, there could be a lack of available halons for the civil aviation industry in the upcoming decades to service aircraft being manufactured today,

Recognizing that ships currently being decommissioned contain halons that can be recovered for potential reuse in civil aviation,

Recalling paragraph 3 of decision XXVI/7, which encourages parties to consider reassessing their situation with a view to removing barriers to the import and export of recovered, recycled or reclaimed halons,

1. To request that the Ozone Secretariat liaise with the secretariat of the International Maritime Organization in order to facilitate the exchange of information between relevant technical experts regarding halon availability;

2. To request that the Technology and Economic Assessment Panel, through its Halons Technical Options Committee:

(a) Continue engaging with the International Maritime Organization and the International Civil Aviation Organization, consistent with paragraph 4 of decision XXVI/7 and paragraph 1 of decision XXIX/8, to better assess future amounts of halons available to support civil aviation and to identify relevant alternatives already available or in development;

(b) Identify ways to enhance the recovery of halons from the breaking of ships;

(c) Identify specific needs for halon, other sources of recoverable halon, and opportunities for recycling halon in parties operating under paragraph 1 of Article 5 of the Protocol and parties not so operating; and

(d) Submit a report on halon availability, based on the above-mentioned assessment and identification activities, to the parties in advance of the forty-second meeting of the Open-Ended Working Group of the Parties to the Montreal Protocol;

Decision XXX/8: Update to the global laboratory and analytical-use exemption

Recalling decision XXVI/5, which extended the global laboratory and analytical-use exemption until 31 December 2021, under the conditions set out in annex II to the report of the Sixth Meeting of the Parties,

Noting that Annex C, group I, substances (hydrochlorofluorocarbons) are currently not included in the global laboratory and analytical-use exemption,

Noting the 2018 report by the Technology and Economic Assessment Panel, which notes that hydrochlorofluorocarbons will be required for laboratory and analytical uses after 2020,

Taking into account the adjustment agreed on by parties in 2018 to permit essential-use exemptions for hydrochlorofluorocarbons,

To include Annex C, group I, substances in the global laboratory and analytical-use exemption under the same conditions and on the same timeline as set

forth in paragraph 1 of decision XXVI/5;

Decision XXX/9: Critical-use exemptions for methyl bromide for 2019 and 2020

Noting with appreciation the work of the Technology and Economic Assessment Panel and its Methyl Bromide Technical Options Committee,

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

Recalling paragraph 10 of decision XVII/9,

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

Recognizing that the production and consumption of methyl bromide for critical uses should be permitted only if methyl bromide is not available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide,

Recognizing also that parties operating under critical-use exemptions should 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 in licensing, permitting or authorizing the production and consumption of methyl bromide for critical uses,

Recalling decision Ex.I/4, by which parties with critical-use exemptions were requested to
submit annual accounting frameworks and national management strategies,

Noting the progress made under the research programme of the Australian strawberry runner industry and that Australia is planning to move to alternatives if trials in 2018 and 2019 are successful and the registration of the alternatives is completed,

Noting also the progress made under the Canadian research programme and that Canada is committed to continuing its research programme in 2019,

Noting further that the research programme of Argentina is continuing to pursue its aim of developing alternatives for methyl bromide,

Recognizing that some parties have recently ceased critical-use exemption requests and that the applicants' efforts to develop alternatives and substitutes are designed to achieve the same outcome,

1. To permit, for the agreed critical-use categories for 2019 and 2020 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 2019 and 2020 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 license, 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 in paragraph 1 of decision IX/6, in particular the criterion laid down 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 call upon parties operating under paragraph 1 of Article 5 of the Protocol requesting critical-use exemptions to submit their national management strategy in accordance with paragraph 3 of decision Ex.I/4;

Annex to decision XXX/9

Table A
Agreed critical-use categories
(tonnes)[a]

2020	
Australia	Strawberry runners 28.98
2019	
Argentina	Strawberry fruit 15.710 Tomato 25.600
Canada	Strawberry runners (Prince Edward Island) 5.261
South Africa	Mills 1.000 Houses 40.000

[a] Tonnes = metric tons.

Table B
Permitted levels of production and consumption[a]
(tonnes)[b]

2020	
Australia	28.98
2019	
Argentina	41.310
Canada	5.261
South Africa	41.000

[a] Minus available stocks.
[b] Tonnes = metric tons.

Decision XXX/10: Revised data reporting forms and global-warming-potential values for HCFC-123, HCFC-124, HCFC-141 and HCFC-142

Noting with appreciation the support provided by the Ozone Secretariat to the parties in developing revisions to the reporting forms and their instructions,

Noting the parties' intent that the global-warming-potential values listed for the group of isomers for HCFC-123 and for HCFC-124 listed in Annex C should apply to the most commercially viable isomers, listed as HCFC-123** and HCFC-124**,

Noting also that there are no global-warming-potential values assigned to HCFC-141 and
HCFC-142 in Annex C of the Kigali Amendment and that HCFC-141b and HCFC-142b represent the most commercially viable isomers of those substances,

1. To approve the revised forms and instructions for reporting data in accordance with the reporting obligations under the Protocol, as set out in annex III to the report of the Thirtieth Meeting of the Parties[4];

2. To clarify that decision XXIV/14, by which parties are requested to enter a number in each cell in the data reporting forms that they submit, including zero,

[4] UNEP/OzL.Pro.30/11.

where appropriate, rather than leaving the cell blank, does not apply to cells where the information is to be provided on a voluntary basis;

3. To instruct the Ozone Secretariat to use the global-warming-potential values listed for HCFC-123 and HCFC-124 in Annex C for HCFC-123** and HCFC-124**, respectively, when calculating the hydrofluorocarbon baselines of parties with consumption or production of HCFC-123** and HCFC-124** in their respective baseline years;

4. Also to instruct the Ozone Secretariat to use the global-warming-potential values of HCFC-141b and HCFC-142b for HCFC-141 and HCFC-142, respectively, when calculating the hydrofluorocarbon baselines of parties with past consumption or production of HCFC-141 and HCFC-142 in their respective baseline years;

Decision XXX/11: Timeline for reporting of baseline data for hydrofluorocarbons by parties operating under paragraph 1 of Article 5 of the Montreal Protocol

Noting that it is preferable for parties operating under paragraph 1 of Article 5 of the Montreal Protocol that ratify the Kigali Amendment before the end of their respective applicable baseline years to provide actual baseline data for the controlled substances in Annex F (hydrofluorocarbons) when those data become available,

Recognizing that hydrofluorocarbons data will be reported annually, pursuant to paragraph 3 of Article 7 of the Montreal Protocol as amended by the Kigali Amendment, not later than nine months after the end of each year,

Recognizing also that by decision XV/15 parties were encouraged to forward data on production and consumption to the Secretariat as soon as the data are available, and preferably by 30 June of each year,

In order to allow parties operating under paragraph 1 of Article 5 to report actual baseline data for hydrofluorocarbons, to request the Implementation Committee and the meeting of the parties to defer, for each year of the applicable baseline period, consideration of the status of the reporting of hydrofluorocarbon baseline data under paragraph 2 of Article 7 until nine months after the end of each baseline year as applicable to the group of parties operating under paragraph 1 of Article 5 in question;

Decision XXX/12: Reporting information on destination countries for exports and source countries for imports of ozone-depleting substances

Recalling decisions XVII/16 and XXIV/12, which refer to the submission of data on destinations of exports and sources of imports of controlled substances by importing parties and exporting parties, respectively, to the Ozone Secretariat in their annual reports in accordance with Article 7,

Noting with appreciation that a majority of parties exporting controlled substances regularly provide information on the countries of destination for their exports, in response to decision XVII/16,

Noting also with appreciation that a number of parties importing controlled substances regularly provide information on the source countries of their imports, in response to decision XXIV/12,

Recognizing that such information facilitates the exchange of information and the identification of differences between data reported on imports and data reported on exports, which in turn may facilitate the identification of possible cases of illegal

trade,

Noting, however, that a large number of importing parties and a small number of exporting parties do not provide that information,

1. To urge parties exporting controlled substances to report to the Secretariat information on the destinations of their exports, as called for in decision XVII/16;

2. To encourage parties importing controlled substances to report to the Secretariat information on the sources of their imports, as set out in decision XXIV/12;

Decision XXX/13: Data and information provided by the parties in accordance with Article 7 of the Montreal Protocol

1. To note that 195 parties of the 197 parties that should have reported data for 2017 have done so, and that 190 of those parties had reported their data by 30 September 2018 as required under paragraph 3 of Article 7 of the Montreal Protocol;

2. To note with appreciation that 133 of those parties had reported their data by 30 June 2018, 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 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;

4. To note with concern that two parties, namely the Central African Republic and Yemen, have not reported their 2017 data as required under 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;

5. To urge the Central African Republic and Yemen to report the required data to the Secretariat as quickly as possible;

6. To request the Implementation Committee to review the situation of those parties at its sixty-second meeting;

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

Decision XXX/14: Reporting of zero in Article 7 data reporting forms

Recalling paragraph 3 of decision XXIX/18, whereby the parties were urged, when submitting forms for reporting data in accordance with Article 7, to ensure that all cells in the forms are completed with a number, including zero where appropriate, rather than being left blank,

Recalling also that, by decision XXIX/18, the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol was requested to review the status of compliance by the parties with paragraph 3 of that decision at its sixty-first meeting,

Noting with appreciation that the majority of parties are continuing to report data in accordance with the request made in decision XXIV/14, and reiterated in

decision XXIX/18, by recording a number in each cell in the data reporting forms that they submit, including zero where appropriate, rather than leaving the cell blank,

Noting with concern, however, that there are still a number of parties that leave blank cells in their Article 7 reports, which requires additional work by the Secretariat,

1. To note that 20 parties submitted forms for reporting data in accordance with Article 7 for 2017 containing blank cells, contrary to decisions XXIV/14 and XXIX/18, and that all of those parties provided clarification in response to the request of the Secretariat;

2. To urge all parties, when submitting forms for reporting data in accordance with Article 7, to ensure that in the future all cells in the data reporting forms are completed with a number, including zero where appropriate, rather than being left blank, in accordance with decision XXIV/14;

3. To request the Implementation Committee to review the status of adherence to paragraph 2 of the present decision at its sixty-third meeting;

Decision XXX/15: Review of the terms of reference, composition, balance, fields of expertise and workload of the Technology and Economic Assessment Panel

Noting that the Technology and Economic Assessment Panel and the technical options committees, through the provision of independent technical and scientific assessments and information, have helped the parties reach informed decisions,

Recalling paragraph 5 (e) of decision VII/34, on the organization and functioning of the Technology and Economic Assessment Panel and specifically on efforts to increase the participation of experts from parties operating under paragraph 1 of Article 5 in order to improve geographical expertise and balance,

Recalling also decision XXVIII/1, by which the parties adopted the amendment to the Montreal Protocol, on the phase-down of hydrofluorocarbons,

Recalling further decision XXVIII/3, in which the parties recognized that a phase-down of hydrofluorocarbons under the Montreal Protocol would present additional opportunities to catalyse and secure improvements in the energy efficiency of appliances and equipment,

Recalling the Technology and Economic Assessment Panel report of May 2013 in response to decision XXIV/8 and volume 5 of the Technology and Economic Assessment Panel report of May 2014, in response to decision XXV/6, which provides useful details on the Technology and Economic Assessment Panel and its subsidiary bodies, and their terms of reference, composition, balance, fields of expertise,

Noting with appreciation the analysis provided by the Ozone Secretariat of the many types of reports produced by the Panel for the parties and the timing of the many requests for these reports,

1. To request the Ozone Secretariat to prepare a document in consultation with the Technology and Economic Assessment Panel, for the Open-ended Working Group at its forty-first meeting, taking into account the ongoing efforts by the Technology and Economic Assessment Panel to respond to changing circumstances, including the Kigali Amendment, in relation to the following:

(a)Terms of reference, composition, and balance with regard to geography, representation of parties operating under paragraph 1 of Article 5 and parties not so operating, and gender;

(b) The fields of expertise required for the upcoming challenges related to the implementation of the Kigali Amendment, such as energy efficiency, climate benefits and safety;

2. To note that paragraphs 3, 4, 5 and 6 of the present decision supersede prior direction regarding periodicity to the Technology and Economic Assessment Panel regarding assessments of process agents, laboratory and analytical applications, destruction technologies, n-propyl bromide and possible new substances;

3. To request the Technology and Economic Assessment Panel to provide their review of process-agent uses of controlled substances no earlier than 2021, and every four years thereafter, if new compelling information becomes available;

4. Also to request the Technology and Economic Assessment Panel to provide a review of the laboratory and analytical uses of controlled substances if new compelling information becomes available indicating an opportunity for significant reductions in production and consumption

5. Further to request the Technology and Economic Assessment Panel, following the submission of the report called for in decision XXX/6, to provide a review of destruction technologies, if new compelling information becomes available;

6. To request the Technology and Economic Assessment Panel to provide information to the parties on n-propyl bromide (nPB) if new compelling information is available, and on possible new substances if any previously unreported substances are identified, that may have a likelihood of substantial production;

Decision XXX/16: Membership of the Technology and Economic Assessment Panel

Recalling that the terms of reference for the Technology and Economic Assessment Panel established in decision XXIV/8 provide for a limited number of senior experts for specific expertise not covered by the Panel's co-chairs or technical options committee co-chairs,

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

2. To endorse the appointment of 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 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 Fabio Polonara (Italy) as Co-Chair of the Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee for an additional term of four years;

5. To endorse the appointment of Shiqiu Zhang (China) as senior expert of the Panel for an additional term of four years;

6. To endorse the appointment of Marco González (Costa Rica) as senior expert of the Panel for an additional term of two years;

7. To endorse the appointment of Sidi Menad Si Ahmed (Algeria) as senior expert of the Technology and Economic Assessment Panel for an additional term of one year;

8. To urge the parties to follow the Panel's terms of reference and consult the Panel Co-Chairs and refer to the matrix of needed expertise prior to making nominations for appointments to the Panel;

Decision XXX/17: 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 2018;

2. To confirm the positions of Australia, Chile, Maldives, Poland and South Africa as members of the Committee for one further year and to select the European Union, Guinea Bissau, Paraguay, Saudi Arabia and Turkey as members of the Committee for a two-year period beginning on 1 January 2019;

3 To note the selection of Lesley Dowling (Australia) to serve as President and Obed Baloyi (South Africa) to serve as Vice-President and Rapporteur of the Committee for one year beginning on 1 January 2019;

Decision XXX/18: 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 2018;

2. To endorse the selection of Argentina, Benin, China, Grenada, Kuwait, Niger and Rwanda as members of the Executive Committee representing parties operating under paragraph 1 of Article 5 of the Protocol and the selection of Belgium, Canada, France, Hungary, Japan, Norway and the United States of America as members representing parties not so operating, for one year beginning 1 January 2019;

3. To note the selection of Philippe Chemouny (Canada) to serve as Chair and Juliet Kabera (Rwanda) to serve as Vice-Chair of the Executive Committee for one year beginning 1 January 2019;

Decision XXX/19: Co-Chairs of the Open-ended Working Group of the Parties to the Montreal Protocol

To endorse the selection of Mr. Alain Wilmart (Belgium) and Ms. Laura-Juliana Arciniegas (Colombia) as Co-Chairs of the Open-ended Working Group of the Parties to the Montreal Protocol in 2019;

Decision XXX/20: Financial reports and budgets for the Montreal Protocol

Recalling decision XXIX/24 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 2017,[5]

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

Welcoming the Secretariat's continued efforts to improve the management of the finances of the Trust Fund for the Montreal Protocol,

Noting with appreciation the commitment by the host Government to contribute towards the Thirty-First Meeting of the Parties, which enabled, inter alia, stability in the 2019 budget,

1. To approve the revised budget for 2018 in the amount of $5,326,722 and the 2019 budget in the amount of $5,326,722, and to take note of the indicative budget for 2020, as set out in annex IV to the report of the Thirtieth Meeting of the Parties to the Montreal Protocol[6], to be considered further by the Thirty-First Meeting of the Parties;

2. To authorize the Executive Secretary, on an exceptional basis, to draw upon the available cash balance for 2019 for specified activities, listed in annex IV to the report of the Thirtieth Meeting

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of the Parties, in an amount up to $616,058, provided that the cash balance is not reduced below the working capital reserve;

3. To approve the contributions to be paid by the parties of $5,326,722 for 2019 and to take note of the contributions of $5,326,722 for 2020, as set out in annex IV to the report of the Thirtieth Meeting of the Parties;

4. That the contributions of individual parties for 2019 and the indicative contributions for 2020 shall be as listed in annex V to the report of the Thirtieth Meeting of the Parties;

5. To reaffirm that a working capital reserve shall be maintained at a level of 15 per cent of the annual budget in order to meet the final expenditures under the Trust Fund, with the understanding 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 for the fact that a number of parties have paid their contributions for 2018 and prior years, and to urge those parties that have not done so to pay both their outstanding contributions and their future contributions promptly and in full;

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

9. Also to request the Executive Secretary to continue working on the format for the presentation of future budgets, taking into consideration the benefits of enhanced transparency of existing budget formats, considering other examples, including multilateral environmental agreements, to provide additional information such as fact sheets or annotated budget tables on budget lines and activities;

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

11. To request the Secretariat to ensure the full utilization of programme support cost budget allocation available to it in 2019 and later years and, where possible, to offset those allocations against the administrative components of the approved budget;

12. Also to request the Secretariat to indicate in future financial reports of the Trust Fund the amount of the cash balance and the status of contributions to the Trust Fund;

13. To request the Executive Secretary to prepare budgets and work programmes for the years 2020 and 2021, presenting two budget scenarios and work programmes based on the projected needs:

(a)A zero-nominal-growth scenario;

(b) A scenario based on further recommended adjustments to the above-mentioned scenario and the added costs or savings related thereto;

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

Decision XXX/21: Thirty-First Meeting of the Parties to the Montreal Protocol

To convene the Thirty-First Meeting of the Parties to the Montreal Protocol in Rome from 4 to 8 November 2019.

X. Adoption of the report

271.The parties adopted the present report on Friday, 9 November 2018, on the basis of the draft report set out in documents UNEP/OzL.Pro.30/L.1 and UNEP/OzL.Pro.30/L.1/Add.1.

XII. Closure of the meeting

272.Following the customary exchange of courtesies, the meeting was declared closed at 11.10 p.m. on Friday, 9 November 2018.

Annex I

Adjustments to the Montreal Protocol on Substances that Deplete the Ozone Layer relating to the controlled substances in Annex C, Group I, for parties not operating under paragraph 1 of Article 5

Article 2F, paragraph 6

The following sentence shall be added in paragraph 6 of Article 2F of the Protocol after the words "does not exceed zero." and before the word "However:":

"This paragraph will apply save to the extent that the Parties decide to permit the level of production or consumption that is necessary to satisfy uses agreed by them to be essential."

Article 2F, paragraph 6 (a)

In paragraph 6 (a) of Article 2F of the Protocol,

There shall be inserted a colon after the words "restricted to"

The words "the servicing of refrigeration and air-conditioning equipment existing on 1 January 2020;" shall be moved to a new subparagraph 6 (a) (i)

The following subparagraphs shall be inserted after the new subparagraph 6 (a) (i)

"(ii) The servicing of fire suppression and fire protection equipment existing on 1 January 2020;

(iii) Solvent applications in rocket engine manufacturing; and

(iv) Topical medical aerosol applications for the specialised treatment of burns."

Article 2F, paragraph 6(b)

In paragraph 6 (b) of Article 2F of the Protocol,

There shall be inserted a colon after the words "restricted to"

The words "The servicing of refrigeration and air-conditioning equipment existing on 1 January 2020." shall be moved to a new subparagraph 6 (b) (i)

For the period following "2020" there shall be substituted a semicolon

The following subparagraphs shall be inserted after the new subparagraph 6 (b) (i)

"(ii) The servicing of fire suppression and fire protection equipment existing on 1 January 2020;

(iii) Solvent applications in rocket engine manufacturing; and

(iv) Topical medical aerosol applications for the specialised treatment of burns."

Article 5, paragraph 8 ter (e)

The following sentence shall be added in paragraph 8 *ter* (e) of Article 5 of the Protocol after the words "does not exceed zero." and before the word "However:":

"This paragraph will apply save to the extent that the Parties decide to permit the level of production or consumption that is necessary to satisfy uses agreed by them to be essential."

Article 5, paragraph 8 ter (e) (i)

In paragraph 8 *ter* (e) (i) of Article 5 of the Protocol,

There shall be inserted a colon after the words "restricted to"

The words "The servicing of refrigeration and air-conditioning equipment existing on 1 January 2030;" shall be moved to a new subparagraph 8 *ter* (e) (i) a.

The following subparagraphs shall be inserted after the new subparagraph 8 *ter* (e) (i) a.

"b. The servicing of fire suppression and fire protection equipment existing on 1 January 2030;

c. Solvent applications in rocket engine manufacturing; and

d. Topical medical aerosol applications for the specialized treatment of burns."

Article 5, paragraph 8 ter (e) (ii)

In paragraph 8 *ter* (e) (ii) of Article 5 of the Protocol,

There shall be inserted a colon after the words "restricted to"

The words "the servicing of refrigeration and air-conditioning equipment existing on 1 January 2030." shall be moved to a new subparagraph 8 *ter* (e) (ii) a.

For the period following "2030" there shall be substituted a semicolon

The following subparagraphs shall be inserted after the new subparagraph 8 *ter* (e) (ii) a.

"b. The servicing of fire suppression and fire protection equipment existing on 1 January 2030;

c. Solvent applications in rocket engine manufacturing; and

d. Topical medical aerosol applications for the specialized treatment of burns."

Annex II Destruction technologies and status of their approval

Technology	Applicability										
	Concentrated Sources									Dilute Sources	
	Annex A		Annex B			Annex C	Annex E	Annex F			Annex F
	Group 1	Group 2	Group 1	Group 2	Group 3	Group 1	Group 1	Group 1	Group 2		Group 1
	Primary CFCs	Halons	Other CFCs	Carbon Tetrachloride	Methyl Chloroform	HCFCs	Methyl Bromide	HFCs	HFC-23	ODS	HFCs
DRE*	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	95%	95%
Cement Kilns	Approved	Not Approved	Approved	Approved	Approved	Approved	Not Determined	Approved	Not determined		
Gaseous/Fume Oxidation	Approved	Not Determined	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved		
Liquid Injection Incineration	Approved	Approved	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved		
Municipal Solid Waste Incineration										Approved	Approved
Porous Thermal Reactor	Approved	Not Determined	Approved	Approved	Approved	Approved	Not Determined	Approved	Not determined		
Reactor Cracking	Approved	Not Approved	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved		
Rotary Kiln Incineration	Approved	Approved	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved	Approved	Approved
Argon Plasma Arc	Approved	Approved	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved		
Inductively coupled radio frequency plasma	Approved	Approved	Approved	Approved	Approved	Approved	Not Determined	Not Determined	Not Determined		
Microwave Plasma	Approved	Not Determined	Approved	Approved	Approved	Approved	Not Determined	Not Determined	Not Determined		
Nitrogen Plasma Arc	Approved	Not Determined	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved		
Portable Plasma Arc	Approved	Not Determined	Approved	Approved	Approved	Approved	Not Determined	Approved	Not Determined		
Chemical Reaction with H2 and CO2	Approved	Approved	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved		
Gas Phase Catalytic De-halogenation	Approved	Not Determined	Approved	Approved	Approved	Approved	Not Determined	Approved	Not determined		
Superheated steam reactor	Approved	Not Determined	Approved	Approved	Approved	Approved	Not Determined	Approved	Approved		
Thermal Reaction with Methane	Approved	Approved	Approved	Approved	Approved	Approved	Not Determined	Not Determined	Not Determined		
Thermal Decay of Methyl Bromide	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Approved	Not Determined	Not Determined		

Annex III

Article 7 data reporting forms and associated instructions and guidelines

Questionnaire

Party:_____Reporting year:_____

Before beginning the questionnaire, respondents are requested to read the following sections of the data reporting instructions and guidelines document carefully: (a) Section 1: Introduction; (b) Section 3: General instructions; and (c) Section 4: Definitions. Respondents are encouraged to refer to the data reporting instructions and guidelines as necessary when completing the data forms.

Questionnaire

1.1. Did your country **import** CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane, methyl bromide or HFCs in the reporting year?

Yes [ ] No [ ]

If No, ignore data form 1 and go to question 1.2. If Yes, please complete data form 1. Please read **instruction I** (on data on imports of controlled substances) of the data reporting instructions and guidelines document carefully before filling in the form.

1.2. Did your country **export or re-export** CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane, methyl bromide or HFCs in the reporting year?

Yes [ ] No [ ]

If No, ignore data form 2 and go to question 1.3. If Yes, please complete data form 2. Please read **instruction II** (on data on exports of controlled substances) of the data reporting instructions and guidelines document carefully before filling in the form.

1.3. Did your country **produce** CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane, methyl bromide or HFCs in the reporting year?

Yes [ ] No [ ]

If No, ignore data form 3 and go to question 1.4. If Yes, please complete data form 3. Please read **instruction III** (on data on production of controlled substances) of the data reporting instructions and guidelines document carefully before filling in the form.

1.4. Did your country **destroy** any ozone-depleting substances or HFCs in the reporting year?

Yes [ ] No [ ]

If No, ignore data form 4 and go to question 1.5. If Yes, please complete data form 4. Please read **instruction IV** (on data on destruction of controlled substances) of the data reporting instructions and guidelines document carefully before filling in the form.

1.5. Did your country **import from** or **export or re-export to non-parties** in the reporting year?

Yes [ ] No [ ]

If No, ignore data form 5 and go to question 1.6. If Yes, please complete data form 5. Please read **instruction V** (on data on imports from and exports to non-parties) of the data reporting instructions and guidelines document carefully, particularly the definition of non-parties, before filling in the form.

1.6. Did your country **generate** the substance HFC-23 in the reporting year from any facility that produces (manufactures) Annex C Group I or Annex F substances?

Yes [ ] No [ ]

If No, ignore data form 6. If Yes, please complete data form 6. Please read **instruction VI** (on data on emissions of Annex F Group II substance – HFC-23) of the data reporting instructions and guidelines document carefully before filling in the form.

Name of reporting officer:.....

Signature:.....

Designation:.....

Organization:.....

Postal address:.....

Country:.....

Phone:.....

Email:.....

Date:.....

Data form 1 on imports

1. Fill in this form only if your country imported CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane, methyl bromide or HFCs

2. Please read instruction I carefully before filling in this form.

DATA FORM 1

DATA ON IMPORTS

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

Annex A, B, C, E and F substances

A7_Dataform/2018

Party: _____

Period: January – December 20____

(1) Annex/group	*(2) Substance*	*Total quantity imported for all uses*		*(5) Quantity of new substance imported for feedstock uses*	*Quantity of new substance imported for exempted essential, critical, high-ambient-temperature or other uses**	
		(3) New	*(4) Recovered and reclaimed*		*(6) Quantity*	*(7) Decision / type of use* or remarks*
A-Group I	CFC-11 ($CFCl_3$)					
	CFC-12 (CF_2Cl_2)					
	CFC-113 ($C_2F_3Cl_3$)					
	CFC-114 ($C_2F_4Cl_2$)					
	CFC-115 (C_2F_5Cl)					
A-Group II	Halon-1211 (CF_2BrCl)					
	Halon-1301 (CF_3Br)					
	Halon-2402 ($C_2F_4Br_2$)					
B-Group I	CFC-13 (CF_3Cl)					
B-Group II	Carbon tetrachloride (CCl_4)					
B-Group III	Methyl chloroform, i.e., 1,1,1-trichloroethane ($C_2H_3Cl_3$)					
Comments:						

[1] Tonne = Metric ton.

* Against each substance imported for exempted essential, critical or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

(1) *Annex/group*	*(2)* *Substance*	*Total quantity imported for all uses* *(3)* *New*	 *(4)* *Recovered and reclaimed*	*(5)* *Quantity of new substance imported for feedstock uses*	*Quantity of new substance imported for exempted essential, critical, high-ambient-temperature or other uses** *(6)* *Quantity*	 *(7)* *Decision / type of use* or remarks*
C-Group I	HCFC-21** ($CHFCl_2$)					
	HCFC-22** (CHF_2Cl)					
	HCFC-31 (CH_2FCl)					
	HCFC-123** ($CHCl_2CF_3$)					
	HCFC-124** ($CHFClCF_3$)					
	HCFC-133 ($C_2H_2F_3Cl$)					
	HCFC-141b** (CH_3CFCl_2)					
	HCFC-142b** (CH_3CF_2Cl)					
	HCFC-225 ($C_3HF_5Cl_2$)					
	HCFC-225ca ($CF_3CF_2CHCl_2$)					
	HCFC-225cb (CF_2ClCF_2CHClF)					
C-Group II	HBFCs					
C-Group III	Bromochloromethane (CH_2BrCl)					
E-Group I	Methyl bromide (CH_3Br)					
					Quantity of new methyl bromide imported to be used for quarantine and pre-shipment applications within your country	
Comments:						

Note: As per paragraph 5 bis of Article 2 of the Protocol, any transfer of HCFC consumption by parties not operating under paragraph 1 of Article 5 shall be notified to the Secretariat, no later than the time of the transfer, by each of the parties concerned, stating the terms of such transfer and the period for which it is to apply.

* Against each substance imported for exempted essential, critical or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

** Identifies the most commercially viable substances with ozone-depleting-potential (ODP) values listed against them to be used for the purposes of the Protocol.

(1) *Annex/group*	*(2)* *Substance*	*Total quantity imported for all uses* *(3)* *New*	 *(4)* *Recovered and reclaimed*	*(5)* *Quantity of new substance imported for feedstock uses*	*Quantity of new substance imported for exempted essential, critical, high-ambient-temperature or other uses** *(6)* *Quantity*	 *(7)* *Decision / type of use* or remarks*
F-Group I	HFC-32 (CH_2F_2)					
	HFC-41 (CH_3F)					
	HFC-125 (CHF_2CF_3)					
	HFC-134 (CHF_2CHF_2)					
	HFC-134a (CH_2FCF_3)					
	HFC-143 (CH_2FCHF_2)					
	HFC-143a (CH_3CF_3)					
	HFC-152 (CH_2FCH_2F)					
	HFC-152a (CH_3CHF_2)					
	HFC-227ea (CF_3CHFCF_3)					
	HFC-236cb ($CH_2FCF_2CF_3$)					
	HFC-236ea (CHF_2CHFCF_3)					
	HFC-236fa ($CF_3CH_2CF_3$)					
	HFC-245ca ($CH_2FCF_2CHF_2$)					
	HFC-245fa ($CHF_2CH_2CF_3$)					
	HFC-365mfc ($CF_3CH_2CF_2CH_3$)					
	HFC-43-10mee ($CF_3CHFCHFCF_2CF_3$)					
F-Group II	HFC-23 (CHF3)					
Mixtures containing controlled substance(s) – applicable to all substances, not just HFCs (add additional rows or pages as required for mixtures not listed below)						
R-404A (HFC-125 = 44%, HFC-134a = 4%, HFC-143a = 52%)						
R-407A (HFC-32 = 20%, HFC-125 = 40%, HFC-134a = 40%)						
R-407C (HFC-32 = 23%, HFC-125 = 25%, HFC-134a = 52%)						
R-410A (HFC-32 = 50%, HFC-125 = 50%)						
R-507A (HFC-125 = 50%, HFC-143a = 50%)						
R-508B (HFC-23 = 46%, PFC-116 = 54%)						
Comments:						

Note: When reporting mixtures, reporting of controlled substances should not be duplicated. Parties may choose to report imports of individual controlled substances, total quantities of mixtures imported, or a combination of both, provided that the amounts of imported controlled substances are not reported more than once. If a non-standard mixture not listed in section 11 of the data reporting instructions and guidelines is to be reported, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported in the "remark" column or in the "comments" box above.

* Against each substance imported for exempted essential, critical, high-ambient-temperature or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above. In case of multiple exemptions per substance for some of the controlled substances, multiple entries may be used for those substances to report on those exemptions.

Annex to DATA FORM 1 - Exporting parties for quantities reported as imports **A7_Dataform/2018**

Note: This annex is excluded from the reporting requirements under Article 7 of the Protocol, and the information in the annex is to be provided on a voluntary basis (decision XXIV/12)

(1) *Substance or Mixture*	*(2)* *Exporting party for quantities reported as imports*	*Total quantity imported for all uses*		*(5)* *Quantity of new substance imported for feedstock uses*	*Quantity of new substance imported for exempted essential, critical, high-ambient-temperature or other uses**	
		(3) *New*	*(4)* *Recovered and reclaimed*		*(6)* *Quantity*	*(7)* *Decision / type of use* or remarks*
Methyl bromide (CH_3Br)						
					Quantity of new methyl bromide imported to be used for quarantine and pre-shipment applications within your country	

Comments:

* Against each substance imported for exempted essential, critical, high-ambient-temperature or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

Data form 2 on exports

1. Fill in this form only if your country exported or re-exported CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane, methyl bromide or HFCs

2. Please read instruction II carefully before filling in this form.

DATA FORM 2 **A7_Dataform/2018**

DATA ON EXPORTS*

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

Annex A, B, C, E and F substances

Party: _____ Period: January – December 20____

(1) Substance or Mixture	*(2) Country of destination of exports***	*Total quantity exported for all uses*		*(5) Quantity of new substance exported for feedstock uses****	*Quantity of new substance exported for exempted essential, critical, high-ambient-temperature or other uses*****	
		(3) New	*(4) Recovered and reclaimed*		*(6) Quantity*	*(7) Decision / type of use***** or remarks*
Methyl bromide (CH_3Br)						
					Quantity of new methyl bromide exported to be used for quarantine and pre-shipment applications	

Comments:

[1] Tonne = Metric ton.

Note: If a non-standard mixture not listed in section 11 of the data reporting instructions and guidelines is to be reported, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported in the "remark" column or in the "comments" box above.

* Includes re-exports. Ref. decisions IV/14 and XVII/16, paragraph 4.

** Reporting of countries of destination is not a requirement under Article 7. In paragraph 4 of decision VII/9, it was decided that parties should report on the destination of Annex A and Annex B substances (new, recovered or reclaimed) that are exported. Paragraph 4 of decision XVII/16 requested a revision of the reporting formats to cover the export of all controlled substances contained in the annexes of the Protocol, and urged the Parties to implement the revised reporting format expeditiously.

*** Do not deduct from total production in column 3 of data form 3 (data on production).

**** Against each substance exported for exempted essential, critical, high-ambient-temperature or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

Data form 3 on production and HFC-23 generation

1. Fill in this form only if your country produced CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane, methyl bromide or HFCs or generated HFC-23

2. Please read instruction III carefully before filling in this form

DATA FORM 3 **A7_Dataform/2018**

DATA ON PRODUCTION AND HFC-23 GENERATION

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

Annex A, B, C, E and F substances

Party: _____ Period: January – December 20____

(1) Annex/group	*(2) Substance*	*(3) Total production for all uses*	*(4) Production for feedstock uses within your country*	*Production for exempted essential, critical, high-ambient-temperature or other uses within your country**		*(7) Production for supply to Article 5 countries in accordance with Articles 2A-2H and 5*
				(5) Quantity	*(6) Decision / type of use* or remarks*	
A-Group I	CFC-11 ($CFCl_3$)					This column is no longer applicable to Annex A and B substances (CFCs, halons, CCl_4 and methyl chloroform)
	CFC-12 (CF_2Cl_2)					
	CFC-113 ($C_2F_3Cl_3$)					
	CFC-114 ($C_2F_4Cl_2$)					
	CFC-115 (C_2F_5Cl)					
A-Group II	Halon-1211 (CF_2BrCl)					
	Halon-1301 (CF_3Br)					
	Halon-2402 ($C_2F_4Br_2$)					
B-Group I	CFC-13 (CF_3Cl)					
B-Group II	Carbon tetrachloride (CCl_4)					
B-Group III	Methyl chloroform, i.e., 1,1,1-trichloroethane ($C_2H_3Cl_3$)					

Comments:

[1] Tonne = Metric ton.

Note: As per paragraph 5 of Article 2 of the Protocol, any transfer of production shall be notified to the Secretariat, no later than the time of the transfer, by each of the parties concerned, stating the terms of such transfer and the period for which it is to apply.

* Against each substance produced for exempted essential, critical or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

(1) *Annex/group*	*(2)* *Substance*	*(3)* *Total production for all uses*	*(4)* *Production for feedstock uses within your country*	*Production for exempted essential, critical, high-ambient-temperature or other uses within your country**		*(7)* *Production for supply to Article 5 countries in accordance with Articles 2A-2H and 5*
				(5) *Quantity*	*(6)* *Decision / type of use* or remarks*	
C-Group I	HCFC-21** ($CHFCl_2$)					
	HCFC-22** (CHF_2Cl)					
	HCFC-31 (CH_2FCl)					
	HCFC-123** ($CHCl_2CF_3$)					
	HCFC-124** ($CHFClCF_3$)					
	HCFC-133 ($C_2H_2F_3Cl$)					
	HCFC-141b** (CH_3CFCl_2)					
	HCFC-142b** (CH_3CF_2Cl)					
	HCFC-225 ($C_3HF_5Cl_2$)					
	HCFC-225ca ($CF_3CF_2CHCl_2$)					
	HCFC-225cb (CF_2ClCF_2CHClF)					
C-Group II	HBFCs					This column is no longer applicable to Annex/group C/II, C/III and E/I substances (HBFCs, BCM and methyl bromide)
C-Group III	Bromochloromethane (CH_2BrCl)					
E-Group I	Methyl bromide (CH_3Br)			*Total quantity of new methyl bromide produced for quarantine and pre-shipment applications within your country and for export*		

Comments:

Note: As per paragraph 5 of Article 2 of the Protocol, any transfer of production shall be notified to the Secretariat, no later than the time of the transfer, by each of the parties concerned, stating the terms of such transfer and the period for which it is to apply.

* Against each substance produced for exempted essential, critical or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

** Identifies the most commercially viable substances with ozone-depleting-potential (ODP) values listed against them to be used for the purposes of the Protocol.

(1) *Annex/group*	*(2)* *Substance*	*(3)* *Total production for all uses*	*(4)* *Production for feedstock uses within your country*	*Production for exempted essential, critical, high-ambient-temperature or other uses within your country**		*(7)* *Production for supply to Article 5 countries in accordance with Articles 2A-2H and 5*
				(5) *Quantity*	*(6)* *Decision / type of use* or remarks*	
F-Group I	HFC-32 (CH_2F_2)					This column is not applicable to Annex F substances (HFCs)
	HFC-41 (CH_3F)					
	HFC-125 (CHF_2CF_3)					
	HFC-134 (CHF_2CHF_2)					
	HFC-134a (CH_2FCF_3)					
	HFC-143 (CH_2FCHF_2)					
	HFC-143a (CH_3CF_3)					
	HFC-152 (CH_2FCH_2F)					
	HFC-152a (CH_3CHF_2)					
	HFC-227ea (CF_3CHFCF_3)					
	HFC-236cb ($CH_2FCF_2CF_3$)					
	HFC-236ea (CHF_2CHFCF_3)					
	HFC-236fa ($CF_3CH_2CF_3$)					
	HFC-245ca ($CH_2FCF_2CHF_2$)					
	HFC-245fa ($CHF_2CH_2CF_3$)					
	HFC-365mfc ($CF_3CH_2CF_2CH_3$)					
	HFC-43-10mee ($CF_3CHFCHFCF_2CF_3$)					

		(3) *Captured for all uses***	*(4a)* *Captured for feedstock uses within your country****	*(4b)* *Captured for destruction****			
F-Group II	HFC-23 (CHF_3)**						

Comments:

Note: As per paragraph 5 of Article 2 of the Protocol, any transfer of production shall be notified to the Secretariat, no later than the time of the transfer, by each of the parties concerned, stating the terms of such transfer and the period for which it is to apply.

* Against each substance produced for exempted essential, critical, high-ambient-temperature or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

** HFC-23 generation that is captured, whether for destruction, feedstock or any other use, shall be reported in this form.

***Amounts of HFC-23 captured for destruction or feedstock use will not be counted as production as per Article 1.

Data form 4 on destruction of controlled substances

1. Fill in this form only if your country destroyed CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane, methyl bromide or HFCs

2. Please read instruction IV carefully before filling in this form

DATA FORM 4 **A7_Dataform/2018**

DATA ON QUANTITY OF SUBSTANCES DESTROYED

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

Annex A, B, C, E and F substances

Party: _____

Period: January – December 20____

(1) *Substance or Mixture*	*(2)* *Quantity destroyed*	*(3)* *Remarks*

Comments:

[1] Tonne = Metric ton.

Note: If the composition of a destroyed mixture is known, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported in the remarks or comments section of the form or indicate a standard mixture as listed in section 11 of the data reporting instructions and guidelines.

Data form 5 on trade with non-parties

1. Fill in this form only if your country imported or exported CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs, HBFCs, bromochloromethane or methyl bromide from or to non-parties

2. Please read instruction V carefully before filling in this form.

DATA FORM 5 **A7_Dataform/2018**

DATA ON IMPORTS FROM AND/OR EXPORTS TO NON-PARTIES*

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

Annex A, B, C and E substances

Party: _____ Period: January – December 20____

(1) *Substance or Mixture*	*(2)* *Exporting party for quantities reported as imports OR Country of destination of exports***	*Quantity of imports from non-parties**		*Quantity of exports to non-parties**		*(7)* *Remarks*
		(3) *New imports*	*(4)* *Recovered and reclaimed imports*	*(5)* *New exports*	*(6)* *Recovered and reclaimed exports*	
Comments:						

[1] Tonne = Metric ton.

Note: If a non-standard mixture not listed in section 11 of the data reporting instructions and guidelines is to be reported, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported in the "remark" column or in the "comments" box above.

* See definition of "non-parties" in Instruction V.

** Reporting of information on "exporting parties for quantities reported as imports" and "countries of destination of exports" is not a requirement under Article 7 of the Protocol, and the information is to be provided on a voluntary basis.

Data form 6 on HFC-23 emissions

1. Fill in this form only if your country generated HFC-23 from any facility that produced (manufactured) Annex C Group I or Annex F substances	**DATA FORM 6** **DATA ON QUANTITY OF EMISSIONS OF HFC 23 FROM FACILITIES MANUFACTURING ANNEX C GROUP I OR ANNEX F SUBSTANCES**	**A7_Dataform/2018**
2. Please read instruction VI carefully before filling in this form	**in tonnes[1] (not ODP or CO2-equivalent tonnes)**	
Party: _____	**Period: January – December 20____**	

Note: Information in columns 2 to 5 is excluded from the reporting requirements under Article 7 of the Protocol and is provided on a voluntary basis.

(1) *Facility name or identifier*	*(2)* *Total amount generated* (tonnes)*	*(3)* *Amount generated and captured** (tonnes)*			*(4)* *Amount used for feedstock without prior capture*** (tonnes)*	*(5)* *Amount destroyed without prior capture **** (tonnes)*	*(6)* *Amount of generated emissions (tonnes)*	*(7)* *Remarks*
		(3a) *For all uses*	*(3b)* *For feedstock use in your country*	*(3c)* *For destruction*				

Comments:

[1] Tonne = Metric ton.
* "Total amount generated" refers to the total amount whether captured or not. The sum of these amounts is not to be reported under data form 3.
** The sums of these amounts are to be reported under data form 3.
*** Amount converted to other substances in the facility. The sum of these amounts is not to be reported under data form 3.
**** Amount destroyed in the facility.

Appendix I

Data reporting instructions and guidelines

Section 1: Introduction

1.1 The attached data forms have been designed to make reporting easier for the parties. The reporting is prescribed by Article 7 of the Montreal Protocol and further described in various decisions of the meeting of the parties. Some decisions introduce additional items that parties may report voluntarily.

1.2 The data reported in accordance with the data forms will be used to determine the calculated levels of production and consumption, upon which the control measures are based.

1.3 The major features of the forms are as follows:

(a) Six separate data forms are provided for imports, exports, production, destruction, trade with non-parties and emissions of controlled substances. Please use only those data forms applicable to your country and ignore the other forms, after ticking off the respective "No" box in the questionnaire. For example, many parties only import and do not export, produce, destroy or trade with non-parties in any of the substances. If this is the case, please use only data form 1 on imports and ignore the other forms, after ticking off the "No" boxes for questions 1.2 – 1.6 on the questionnaire.

(b) A row has been provided in data forms 1 (imports) and 3 (production) for each of the substances in Annex A, Annex B Groups II and III, Annex E and Annex F. However, for categories of "Other CFCs" (Annex B Group I) and HCFCs (Annex C Group I), the form is made shorter by providing rows only for substances commonly reported by parties in the past. A few blank rows are provided for more substances, if needed. HBFCs and BCM (Annex C Groups II and III) were phased out by all parties immediately upon inclusion in the list of controlled substance; hence, one row has been provided for them as a formality only. You may use the computerized forms supplied by the Secretariat or paper forms. Parties who use the computerized forms can easily add more rows as needed; parties using paper forms are free to add pages as required.

(c) The following are some of the different categories of uses of controlled substances that need to be reported:

- Feedstock uses for all substances
- Essential uses, including laboratory and analytical uses, for substances as approved by the meeting of the parties from time to time
- Quarantine and pre-shipment applications for methyl bromide
- Process agent uses for specific applications as approved in table A of decision X/14 and updated periodically by the meeting of the parties
- Critical or emergency uses of methyl bromide as approved from time to time
- Exemption for high-ambient-temperature parties

It is necessary for each party to specify how much of its production, export or import is used for these categories. Where applicable, the Secretariat will deduct these quantities from the total figures. Provision is made in the data forms for these categories. For exempted essential, critical, high-ambient-temperature or other uses, provision has also been made for parties to specify the decision of the meeting of the parties that approved the use.

(d) The same forms can be used for reporting for baseline years and other years. It should be noted that paragraphs 1 and 2 of Article 7 of the Montreal Protocol both provide that the parties may submit the best possible estimates of data for the base years if actual data are not available.

(e) The basis for reporting requirements and definitions are given in sections 2 and 4 below respectively.

(f) A "remarks" column has been provided at the end of each row, and a "comments" box has been provided at the end of each form, for parties to include any additional information that they believe would assist the Secretariat in processing their data report.

Section 2: Reporting of data and clarifications associated with Article 7 of the Montreal Protocol

Reporting set out under Article 7 of the Montreal Protocol, and related requests pursuant to decisions by the meeting of the parties

Basis for reporting under Article 7	*Information to be provided*
Annual data reporting under Article 7	**(reported annually)**
(a) Article 7 paragraphs 3, 3 bis and 3 ter	Statistical data on production of each of the controlled substances
	Amounts used for feedstock
	Amounts destroyed by technologies approved by the parties
	Imports from and exports to parties and non-parties respectively
	Statistical data on the amount of methyl bromide used for quarantine and pre-shipment applications
	Statistical data on imports and exports of recycled halons and HCFCs
	Statistical data on emissions of HFC-23 per facility in accordance with paragraph 1 (d) of Article 3 of the Protocol
(b) To verify implementation of Articles 2A to 2F and 2H	Excess production above the control limit in order to satisfy the basic domestic needs of parties operating under paragraph 1 of Article 5 (Article 5 parties)
(c) Decision IV/11, paragraph 3	Actual quantities of controlled substances destroyed
(d) Decision VII/30, paragraph 1	Volumes of controlled substances imported for feedstock uses by importing countries
(e) Decision XI/13, paragraph 3	Amount of methyl bromide used for quarantine and pre-shipment applications
(f) Decision XVII/16, paragraph 4, and decision VII/9, paragraph 4	Types, quantities and destinations of exports of all controlled substances
(g) Decision XXIV/12, paragraph 1	Types, quantities and exporting party for quantities reported as imports
Baseline data reporting under Article 7	**(reported once)**
Article 7, paragraphs 1 and 2	Statistical data on production, imports and exports of each of the controlled substances in: – Annex A, for the year 1986 – Annex B and groups I and II of Annex C, for the year 1989 – Annex E, for the year 1991 – Annex F: by parties not operating under paragraph 1 of Article 5, for the years 2011 to 2013; by Article 5, group 1, parties, for the years 2020 to 2022; and by Article 5, group 2, parties, for the years 2024 to 2026 or the best possible estimates of such data where actual data are not available, within three months of entry into force

Definitions and clarifications on calculating production and consumption using the reported data

Basis for clarification	*Guidance provided*
a) Article 1, paragraph 5	Subtract the amount destroyed by technologies approved by the parties and the amount entirely used as feedstock in the manufacture of other chemicals from production. The amount recycled and reused is not to be considered as production.
b) Article 1, paragraph 6	"Consumption" means production plus imports minus exports of controlled substances.
c) Article 2H, paragraph 6	Calculated levels of consumption and production for methyl bromide shall not include the amounts used for quarantine and pre-shipment applications.
d) Article 3, paragraph 1 (c)	Beginning on 1 January 1993, any export of controlled substances to non-parties shall not be subtracted in calculating the consumption level of the exporting party. Note that HFCs are excluded from the requirement to report on trade with non-parties. This provision therefore does not apply to HFCs.
e) Decision IV/24, paragraph 2	The import and export of recycled and used controlled substances should not be taken into account for calculating consumption (except when calculating the base year consumption under paragraph 1 of Article 5 of the Protocol).
f) Decisions X/14, paragraph 3	Quantities of controlled substances produced or imported for the purpose of being used as process agents in plants and installations in operation before 1 January 1999 should not be taken into account in the calculation of production and consumption from 1 January 2002 onwards.
g) Decision VII/30, paragraph 1	The amount of controlled substances produced and exported for the purpose of being entirely used as feedstock in the manufacture of other chemicals in importing countries should not be the subject of the calculation of production or consumption in exporting countries.
h) Decision VII/30, paragraph 2	The amount of controlled substances entirely used as feedstock in the manufacture of other chemicals should not be the subject of calculation of consumption in importing countries.
i) Paragraphs 145–147 of the report of the Eighteenth Meeting of the Parties	**Calculated production and consumption figures should be reported and reviewed at one decimal place only.**
j) Decision XXIII/30	**Use two decimal places when presenting and analysing for compliance hydrochlorofluorocarbon baselines established after the Twenty-Third Meeting of the Parties and annual hydrochlorofluorocarbon data reported under Article 7 for 2011 and later years.**
k) Decision XXX/10, paragraphs 3 and 4	**Use the GWP values of HCFC-141b and HCFC-142b for HCFC-141 and HCFC-142, respectively, and GWP values listed for HCFC-123 and HCFC-124 for HCFC-123** and HCFC-124**, respectively when calculating the HFC baselines of affected parties.**
l) Paragraph 7.4 of the data reporting instructions and guidelines, and data form 3 on production	**Amounts of HFC-23 captured for destruction or feedstock use will not be counted as production as per Article 1.**

Section 3: General instructions

3.1 Parties are requested to report the production and consumption of bulk controlled substances in tonnes, **without** multiplying by the relevant ozone-depleting-potential or global-warming-potential values.

3.2 In order to avoid duplication, quantities contained in manufactured products should not be included in a country's consumption, regardless of whether the

end-products are imported or exported.

3.3 It is crucial that data be provided separately for each individual controlled substance listed in the forms. Further, as requested in decisions XXIV/14 and XXIX/18, parties should enter a number in each cell in the data reporting forms that they submit, including zero, where appropriate, rather than leaving any cells blank. This provision does not apply to optional or voluntary data in the reporting forms.

3.4 When calculating production, the Montreal Protocol allows countries to deduct amounts of controlled substances destroyed and amounts used for feedstock and for quarantine and pre-shipment applications. However, when reporting production data, parties **should not deduct** these figures from their data. The Secretariat will make the necessary deductions.

3.5 Parties with approved essential-use exemptions should report to the Secretariat on the amounts of controlled substances produced or consumed for those uses using the accounting form approved by decision VIII/9, paragraph 9.

3.6 Parties with approved critical-use exemptions should report to the Secretariat on the amounts of methyl bromide produced or consumed for those uses using the form approved by decision Ex.I/4, paragraph 9 (f) and decision Ex.II/1, paragraph 3.

3.7 Parties might import or export mixtures containing controlled substances, in particular Annex F substances, rather than its constituent controlled substances. If this is the case, the parties may choose to report the quantity of the mixture in the designated section on the form. If you choose to report mixtures, please take care to ensure that the quantities reported are those of the mixtures, not their individual constituents. The Secretariat will calculate the quantity of each pure substance from the mixtures and will include the appropriate quantities of those pure substances in the reported data. An illustrative list of mixtures containing controlled substances with their compositions is given in section 11 of these data reporting instructions and guidelines. If the mixture being reported is not included in section 11, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported. For further information about the composition and commercial trade names of chemical products containing controlled substances, visit the "Trade names of chemicals containing ozone-depleting substances and their alternatives" page of the OzonAction website.[1] This worldwide database service is designed to help customs officials and national ozone units control imports and exports of controlled substances and prevent their illegal trade.

3.8 Parties listed in Appendix II to decision XXVIII/2 that produce or consume controlled substances under the high-ambient-temperature exemption should also report separately production and consumption data to the Secretariat for the subsectors to which the exemption applies (decision XXVIII/2, paragraph 30). Subsector-specific information should be provided by the country using the exemption, not by the producer country. Production under the high-ambient-temperature exemption should only be reported if the production is for use internally by the producing country, not for export.

Section 4: Definitions

[1] http://www.unep.fr/ozonaction/library/tradenames/main.asp.

4.1 "Consumption" means production plus imports minus exports of controlled substances (Montreal Protocol, Article 1).

4.2 "Controlled substance" means a substance in Annex A, Annex B, Annex C, Annex E or Annex F to the Protocol, whether existing alone or in a mixture. It includes the isomers of any such substance except as specified in the relevant annex, but excludes any controlled substance or mixture that is in a manufactured product other than a container used for the transportation or storage of that substance (Montreal Protocol, Article 1).

4.3 "Destruction process" is one that, when applied to controlled substances, results in the permanent transformation or decomposition of all or a significant portion of such substances (decisions I/12F, IV/11, V/26 and VII/35).

4.4 "Production" means the amount of controlled substances produced, minus the amount destroyed by technologies approved by the parties and minus the amount entirely used as feedstock in the manufacture of other chemicals. The data forms prescribe reporting of feedstock use and of quantities destroyed separately, and reporting of total production **without** deduction. The Secretariat will make the necessary deduction.

4.5 Amounts recovered, reclaimed or recycled (or reused) are not to be considered as "production" (Montreal Protocol, Article 1), even though they are to be reported (Article 7 of the Protocol).

"Recovery, recycling and reclamation" have been defined by the parties (decision IV/24) as follows:

(a) Recovery: The collection and storage of controlled substances from machinery, equipment, containment vessels, etc., during servicing or prior to disposal;

(b) Recycling: The reuse of a recovered controlled substance following a basic cleaning process such as filtering and drying. For refrigerants, recycling normally involves recharge back into equipment. It often occurs "on-site";

(c) Reclamation: The re-processing and upgrading of a recovered controlled substance through such mechanisms as filtering, drying, distillation and chemical treatment in order to restore the substance to a specified standard of performance. It often involves processing "off-site" at a central facility.

4.6 "Quarantine and pre-shipment applications" have been defined by the parties (decision VII/5) as follows:

(a) "Quarantine applications", with respect to methyl bromide, are treatments to prevent the introduction, establishment and/or spread of quarantine pests (including diseases), or to ensure their official control, where:

(i) Official control is that performed by, or authorized by, a national plant, animal or environmental protection or health authority;

(ii) Quarantine pests are pests of potential importance to the areas endangered thereby and not yet present there, or present but not widely distributed and being officially controlled.

(b) "Pre-shipment applications" are those treatments applied directly preceding and in relation to export, to meet the phytosanitary or sanitary

requirements of the importing country or existing phytosanitary or sanitary requirements of the exporting country.

4.7 The Eleventh Meeting of the Parties decided in decision XI/12 that pre-shipment applications are those non-quarantine applications applied within 21 days prior to export to meet the official requirements of the importing country or existing official requirements of the exporting country. Official requirements are those that are performed by, or authorized by, a national plant, animal, environmental, health or stored product authority.

4.8 On transhipment and re-export of substances, the Fourth Meeting of the Parties decided (decision IV/14):

"To clarify Article 7 of the amended Protocol so that it is understood to mean that, in cases of tran(s)shipment of controlled substances through a third country (as opposed to imports and subsequent re-exports), the country of origin of the controlled substances shall be regarded as the exporter and the country of final destination shall be regarded as the importer. In such cases, the responsibility for reporting data shall lie with the country of origin as the exporter and the country of final destination as the importer. Cases of import and re-export should be treated as two separate transactions; the country of origin would report shipment to the country of intermediate destination, which would subsequently report the import from the country of origin and export to the country of final destination, while the country of final destination would report the import."

4.9 With respect to trade in bulk methyl bromide, the Eighth Meeting of the Parties decided (decision VIII/14):

"To clarify decision I/12A of the First Meeting of the Parties as follows: trade and supply of methyl bromide in cylinders or any other container will be regarded as trade in bulk in methyl bromide."

4.10 "Regional economic integration organization" means an organization constituted by sovereign States of a given region that has competence in respect of matters governed by the Vienna Convention for the Protection of the Ozone Layer or its protocols and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned. The only such organization for the purpose of the Montreal Protocol is the European Union.

4.11 The Montreal Protocol stipulates, under paragraph 8 (a) of Article 2, that any parties which are member States of a regional economic integration organization as defined above may agree that they shall jointly fulfil their obligations respecting consumption provided that their total combined calculated level of consumption under Articles 2A to 2J of the Protocol does not exceed the levels required by those articles.

Section 5: Instruction I on data on imports of controlled substances (data form 1)

5.1 Please use data form 1 to report data on imports of substances listed in Annex A (CFCs and halons), Annex B (other fully halogenated CFCs, methyl chloroform and carbon tetrachloride), Annex C (HCFCs, HBFCs and BCM), Annex E (methyl bromide) and Annex F (HFCs).

5.2 All the substances in Annex A, Annex B (Groups II and III) and Annex F are listed in column 2 of data form 1. For Annex B Group I (other fully halogenated CFCs) and Annex C Group I (HCFCs), only substances that have been reported

by parties in the past are listed. HBFCs and BCM were phased out by all parties immediately upon inclusion in the list of controlled substance, and hence for HBFCs and BCM one row has been provided as a formality only. If you are importing controlled substances other than those listed, please use the blank space to report data on those substances, and use additional pages, if necessary.

5.3 If your country imported mixtures of controlled substances, e.g., R-410A (50% HFC-32; 50% HFC-125), you may choose to report either the quantity of the mixture or the individual constituents of the mixture. If you choose to report mixtures rather than their individual constituents, please take care to ensure that the quantities reported are those of the mixtures, not their individual constituents. The Secretariat will calculate the quantity of the individual pure controlled substances contained in the mixture and enter the appropriate data under each controlled substance. An illustrative list of mixtures with their compositions is given in section 11 of these data reporting instructions and guidelines. If the mixture being reported is not included in section 11, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported. For further information about the composition and commercial trade names of chemical products containing controlled substances, visit the "Trade names of chemicals containing ozone-depleting substances and their alternatives" page on the OzonAction website.[2] This worldwide database service is designed to help customs officials and national ozone units control imports and exports of controlled substances and prevent their illegal trade.

5.4 Please enter the number of tonnes imported in column 3 of data form 1 for each substance imported. If you did not import any of the substances listed, or if you have imported only recovered or reclaimed substances, please enter a zero in column 3, "New", for each substance. If you imported any recovered or reclaimed substances, please enter the data in column 4.

5.5 When calculating a party's consumption, substances used as feedstock for the production of other chemicals are exempted, as such substances are completely transformed in the manufacturing process of the new chemical. In reporting total quantities of new substances imported in column 3, **do not deduct** the quantities imported for feedstock reported in column 5. Similarly, **do not deduct** the quantities imported for exempted essential, critical, high-ambient-temperature or other uses reported in column 6. The Secretariat will make the necessary deductions. In column 7, please indicate, for each type of controlled substance imported for exempted essential, critical, high-ambient-temperature or other uses, the decision of the meeting of the parties that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box at the bottom of the form.

5.6 When calculating a party's consumption of methyl bromide, the quantities used for quarantine and pre-shipment applications are excluded. In data form 1, please enter the quantities of methyl bromide imported for quarantine and pre-shipment applications separately at the bottom of the form, and **do not deduct them** from the total quantity imported. The Secretariat will make the necessary deductions.

5.7 Decision XXIV/12, paragraph 1, requested the Secretariat to revise the reporting forms resulting from decision XVII/16 to include an annex indicating the

[2] http://www.unep.fr/ozonaction/library/tradenames/main.asp.

exporting party for the quantities reported as imports, noting that the annex is excluded from the reporting requirements under Article 7 of the Protocol, and that the information in the annex would be provided on a voluntary basis. If a particular controlled substance is imported from more than one country, please indicate the quantity imported from each country separately. Please see the example below.

Annex to data form 1 - Exporting parties for quantities reported as imports **A7_Dataform/2018**

Note: This annex is excluded from the reporting requirements under Article 7 of the Protocol, and the information in the annex is to be provided on a voluntary basis (decision XXIV/12)

(1) Substance or mixture	*(2) Exporting party for quantities reported as imports*	*Total quantity imported for all uses*		*(5) Quantity of new substance imported for feedstock uses*	*Quantity of new substance imported for exempted essential, critical, high-ambient-temperature or other uses**	
		(3) New	*(4) Recovered and reclaimed*		*(6) Quantity*	*(7) Decision / type of use* or remark*
HCFC-22	**Country AAA**	**50**				
HCFC-22	**Country BBB**	**75**				
HFC-134a	**Country AAA**	**80**				
HFC-134a	**Country CCC**	**60**				
HFC-134a	**Country DDD**	**30**				
Methyl bromide (CH_3Br)						
					Quantity of new methyl bromide imported to be used for quarantine and pre-shipment applications within your country	

Comments:

* Against each substance imported for exempted essential, critical, high-ambient-temperature or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

Section 6: Instruction II on data on exports of controlled substances (data form 2)

6.1 Please use data form 2 to report data on exports, including re-exports, of substances listed in Annex A (CFCs and halons), Annex B (other fully halogenated CFCs, methyl chloroform and carbon tetrachloride), Annex C (HCFCs, HBFCs and BCM), Annex E (methyl bromide) and Annex F (HFCs).

6.2 Data on re-exports of the substances listed above should also be included in this form. Decision IV/14 clarified that cases of import and re-export should be treated as two separate transactions, so that the country of intermediate destination would report both the import from the country of origin and re-export to the country of final destination.

6.3 The first column ("Substance") has been left blank because each party may export different substances. Please add the names and relevant information of only those substances being exported by your country.

6.4 If your country exported mixtures of controlled substances, e.g., R-410A (50% HFC-32; 50% HFC-125), you may choose to report either the quantity of the mixture, or the individual constituents of the mixture. If you choose to report mixtures rather than their individual constituents, please take care to ensure that

quantities reported are those of the mixtures, not their individual constituents. The Secretariat will calculate the quantity of the individual pure controlled substances contained in the mixture and enter the appropriate data under each controlled substance. An illustrative list of mixtures with their compositions is given in section 11 of these data reporting instructions and guidelines. If the mixture being reported is not included in section 11, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported. For further information about the composition and commercial trade names of chemical products containing controlled substances, visit the "Trade names of chemicals containing ozone-depleting substances and their alternatives" on the OzonAction website.[3] This worldwide database service is designed to help customs officials and national ozone units control imports and exports of controlled substances and prevent illegal trade.

6.5 Reporting of countries of destination is not a requirement under Article 7. In paragraph 4 of decision VII/9, it is stated that parties should report on the destination of Annex A and Annex B substances (new, recovered or reclaimed) that are exported. Paragraph 4 of decision XVII/16 requested a revision of the reporting formats to cover the export of all controlled substances contained in the annexes of the Protocol and urged parties to implement the revised reporting format expeditiously. Please fill in column 2 on the destination of exports, ensuring that if a particular controlled substance is exported to more than one country, the quantity exported to each country is indicated separately. Please see the example below.

1. Fill in this form only if your country exported or re-exported
CFCs, halons, carbon tetrachloride, methyl chloroform, HCFCs,
HBFCs, bromochloromethane, methyl bromide or HFCs

2. Please read instruction II carefully before filling in this form.

DATA FORM 2 **A7_Dataform/2018**

DATA ON EXPORTS*

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

Annex A, B, C, E and F substances

Period: January – December 20____

Party: _____

*(1) Substance **or** **Mixture***	*(2) Country of destination of exports***	*Total quantity exported for all uses*		*(5) Quantity of new substance exported for feedstock uses****	*Quantity of new substances exported for exempted essential, critical, high-ambient-temperature or other uses*****	
		(3) New	*(4) Recovered and reclaimed*		*(6) Quantity*	*(7) Decision / type of use***** or remarks*
HCFC-22	**Destination AAA**	**50**				
HCFC-22	**Destination BBB**	**75**				
HFC-134a	**Destination AAA**	**80**				
HFC-134a	**Destination CCC**	**60**				
HFC-134a	**Destination DDD**	**30**				
Methyl bromide						
					Quantity of new methyl	

[3] http://www.unep.fr/ozonaction/library/tradenames/main.asp.

(CH_3Br)					*bromide exported to be used for quarantine and pre-shipment applications*	
Comments:						

[1] Tonne = metric ton.

Note: If a non-standard mixture not listed in section 11 of the data reporting instructions and guidelines is to be reported, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported in the "remarks" column or in the "comments" box above.

* Includes re-exports. Ref. decisions IV/14 and XVII/16, paragraph 4.

** Reporting of countries of destination is not a requirement under Article 7. In paragraph 4 of decision VII/9, it was decided that parties should report on the destination of Annex A and Annex B substances (new, recovered or reclaimed) that are exported. Paragraph 4 of decision XVII/16 requested a revision of the reporting formats to cover the export of all controlled substances contained in the annexes of the Protocol, and urged the Parties to implement the revised reporting format expeditiously.

*** Do not deduct from total production in column 3 of data form 3 (data on production).

**** Against each substance exported for exempted essential, critical, high-ambient-temperature or other uses, please specify the meeting of the parties decision that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box above.

6.6 If your country is exporting new controlled substances, please provide the quantity in tonnes for the chemical(s) you exported in column 3. If you exported any recovered or reclaimed substances, please enter the data in column 4.

6.7 Under the Montreal Protocol, controlled substances used as feedstock for the production of other chemicals are not included in the calculation of a party's consumption, as such controlled substances are completely transformed in the manufacturing process of new chemicals. When reporting the total quantities of new substances exported in column 3, **do not deduct** the quantities exported to be used as feedstock reported in column 5. Similarly, **do not deduct** the quantities exported for exempted essential, critical, high-ambient-temperature or other uses, reported in column 6. In column 7, please indicate, for each type of controlled substance exported for exempted essential, critical, high-ambient-temperature or other uses, the decision of the meeting of the parties that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box at the end of the form.

6.8 When calculating a party's consumption of methyl bromide, quantities used for quarantine and pre-shipment applications are exempted. In data form 2, please enter quantities of methyl bromide exported for quarantine and pre-shipment applications separately, and **do not deduct them** from the quantity exported. The Secretariat will make the necessary deductions.

Section 7: Instruction III on data on production of controlled substances (data form 3)

7.1 Please use data form 3 to report data on production of substances listed in Annex A (CFCs and halons), Annex B (other fully halogenated CFCs, methyl chloroform and carbon tetrachloride), Annex C (HCFCs, HBFCs and BCM), Annex E (methyl bromide) and Annex F (HFCs). Generation of HFC-23 that is captured, whether for destruction, feedstock or any other use, shall be reported in data form 3.

7.2 All the substances in Annex A, Annex B Groups II and III, and Annex F are listed in column 2 of data form 3. For Annex B Group I (other fully halogenated CFCs) and Annex C Group I (HCFCs), only substances that have been reported by parties in the past are listed. HBFCs and BCM have already been phased out by all parties and hence one row has been provided as a formality only. If you are producing controlled substances other than those listed, please use the blank space to report data on those substances, or use additional pages, if necessary.

7.3 In column 3 of data form 3, please give the **total** production or "generation of HFC-23" of your country **without** making any deductions for feedstock, destruction, export for feedstock uses, or any other use. **Do not deduct** from your total production or "generation of HFC-23 that is captured" the quantity of production used for feedstock **within** your country reported in column 4, or the production for exempted essential, critical, high-ambient-temperature or other uses within your country reported in column 5. Similarly, **do not deduct** from your total production the quantity of production for supply to Article 5 parties reported in column 7. Please report exports of controlled substances to be used for feedstock by the importing country in column 5 of data form 2 (data on exports), not in data form 3 (this form). The Secretariat will make the necessary deductions. With regard to production for exempted essential, critical, high-ambient-temperature or other uses, please indicate in column 6, for each type of controlled substance produced for exempted essential, critical, high-ambient-temperature or other uses, the decision of the meeting of the parties that approved the use. Should the column space be insufficient, further information can be provided in the "comments" box at the end of the form.

7.4 When calculating a party's consumption, the Montreal Protocol does not include controlled substances used as feedstock for the production of other chemicals, as such controlled substances are completely transformed in the manufacturing process of the new chemical. If your country produced or generated controlled substances for feedstock use within the reporting period, please provide data on the quantity of each controlled substance produced for feedstock purposes in column 4. The Secretariat will make the necessary deductions. Generated HFC-23 that is captured, whether for destruction, feedstock or any other use, shall be reported on data form 3. Amounts converted to other substances shall be reported under the column for feedstock uses. Amounts of HFC-23 captured for destruction or feedstock use will not be counted as production as per Article 1.

7.5 Producers are allowed to produce additional amounts to meet the basic domestic needs of Article 5 parties. If your country produced controlled substances for this purpose, please enter the amount so produced in column 7 of data form 3.

7.6 When calculating a party's consumption of methyl bromide, quantities produced for quarantine and pre-shipment applications are exempted. Please enter the total quantities of methyl bromide produced for quarantine and pre-shipment applications separately at the bottom of data form 3 and **do not deduct them** from the total quantity produced. The Secretariat will make the necessary deductions.

Section 8: Instruction IV on data on destruction of controlled substances (data form 4)

8.1 Very few countries have the capacity to destroy controlled substances using approved destruction technologies. If your country has destroyed any of the substances listed in Annex A (CFCs and halons), Annex B (other fully halogenated CFCs, methyl chloroform and carbon tetrachloride), Annex C (HCFCs, HBFCs and BCM), Annex E (methyl bromide) and Annex F (HFCs) in the reporting period, please use data form 4.

8.2 The first column ("Substance") has been left blank because each party may destroy different substances ***or mixtures***. Please list only the names of those substances ***or mixtures*** destroyed in the reporting year.

8.3 Under the Montreal Protocol, the amount of substances destroyed is not included

in the calculation of a party's production and consumption if destruction occurred through the use of an approved technology (listed in decision XXIII/12 and any subsequent relevant decisions). If you have destroyed any substance in the reporting year, **do not deduct** the quantity destroyed reported in column 2 of data form 4 from the total production reported in column 3 of data form 3. The Secretariat will make the necessary deductions. HFC-23 amounts destroyed without prior capture will not be counted in the calculation of production.

Section 9: Instruction V on data on imports from and exports to non-parties (data form 5)

9.1 Please use data form 5 to report data on imports from and exports to non-parties of substances of Annex A (CFCs and halons), Annex B (other fully halogenated CFCs, methyl chloroform and carbon tetrachloride), Annex C (HCFCs, HBFCs and BCM) and Annex E (methyl bromide).

9.2 The first column ("Substance") has been left blank because each party may import different substances or mixtures from and/or export different substances or mixtures to non-parties. Please fill in only the names of those substances that were imported from and/or exported to non-parties.

9.3 For purposes of these data forms, "non-party" means:

- With respect to Annex A substances, all countries that have not ratified the 1987 Montreal Protocol;
- With respect to Annex B substances, all countries that have not ratified the London Amendment;
- With respect to Annex C substances, all countries that have not ratified the Copenhagen Amendment;
- With respect to Annex E substances, all countries that have not ratified the Copenhagen Amendment;

except where the parties have otherwise specified by means of a decision.

9.4 Exports of HFCs should not be reported under data form 5 but should be reported under data form 2. Any export of HFCs that is nonetheless reported on data form 5 shall not be treated as export to non-parties for the purpose of calculating the consumption levels as specified in paragraph 1 (c) of Article 3 of the Montreal Protocol.

9.5 Reporting of information on "exporting parties for quantities reported as imports" and "countries of destination of exports" is not a requirement under Article 7 of the Protocol, and the information is to be provided on a voluntary basis. Please fill in column 2 on the exporting countries for imports or destination of exports, ensuring that if a particular controlled substance is exported to or imported from more than one country, the quantity exported to or imported from each country is indicated separately.

9.6 The status of ratification of the Montreal Protocol and its amendments can be found in a document published by the Secretariat and updated twice a year. That information is also available on the website of the Ozone Secretariat, at: http://ozone.unep.org/.

Section 10: Instruction VI on data on emissions of Annex F, Group II substance – HFC-23 (data form 6)

10.1 Very few countries will have manufacturing facilities for Annex C Group I or

Annex F substances that generate HFC-23. If your country has such facilities that were operational in the reporting period, please use data form 6 to report emissions of HFC-23 from each facility. If there were no emissions from a manufacturing facility, please include the facility in the data form and enter a zero in the emissions column.

10.2 The amounts of production or generated HFC-23 that is captured for use, feedstock, destruction or storage shall be reported in data form 3 on production. The amounts converted to other substances shall be reported as feedstock uses in data form 3. The amounts destroyed shall be reported in data form 4, except the amounts of HFC-23 that are destroyed without prior capture.

10.3 The information in columns 2 to 5 of data form 6 is excluded from the reporting requirements under Article 7 the Protocol and is provided on a voluntary basis. The amount of generated HFC-23 refers to the total amount whether captured or not. The sum of the amounts of total generated HFC-23 is not to be reported under data form 3. However, the sums of the amounts of generated HFC-23 that are captured are to be reported under data form 3 under the corresponding columns. Column 4 in data form 6 refers to the amounts converted to other substances in the specified facilities, and the sum of those amounts is not to be reported under data form 3. Column 5 in data form 6 refers to amounts destroyed in the specified facilities.

Section 11: Illustrative list of mixtures containing controlled substances[4]

11.1 Zeotropic mixtures

No.	*Refrigerant*	*Composition*											
		Component 1		*Component 2*		*Component 3*		*Component 4*		*Component 5*		*Component 6*	
24.	R-401A	HCFC-124	34%	HCFC-22	53%	HFC-152a	13%						
25.	R-401B	HCFC-124	28%	HCFC-22	61%	HFC-152a	11%						
26.	R-401C	HCFC-124	52%	HCFC-22	33%	HFC-152a	15%						
27.	R-402A	HC-290	2%	HCFC-22	38%	HFC-125	60%						
28.	R-402B	HC-290	2%	HCFC-22	60%	HFC-125	38%						
29.	R-403A	HC-290	5%	HCFC-22	75%	PFC-218	20%						
30.	R-403B	HC-290	5%	HCFC-22	56%	PFC-218	39%						
31.	R-404A	HFC-125	44%	HFC-134a	4%	HFC-143a	52%						
32.	R-405A	HCFC-142b	6%	HCFC-22	45%	HFC-152a	7%	PFC-C318	43%				
33.	R-406A	HC-600a	4%	HCFC-142b	41%	HCFC-22	55%						
34.	R-407A	HFC-125	40%	HFC-134a	40%	HFC-32	20%						
35.	R-407B	HFC-125	70%	HFC-134a	20%	HFC-32	10%						
36.	R-407C	HFC-125	25%	HFC-134a	52%	HFC-32	23%						
37.	R-407D	HFC-125	15%	HFC-134a	70%	HFC-32	15%						
38.	R-407E	HFC-125	15%	HFC-134a	60%	HFC-32	25%						
39.	R-407F	HFC-125	30%	HFC-134a	40%	HFC-32	30%						
40.	R-407G	HFC-125	2.5%	HFC-134a	95%	HFC-32	2.5%						
41.	R-408A	HCFC-22	47%	HFC-125	7%	HFC-143a	46%						
42.	R-409A	HCFC-124	25%	HCFC-142b	15%	HCFC-22	60%						
43.	R-409B	HCFC-124	25%	HCFC-142b	10%	HCFC-22	65%						
44.	R-410A	HFC-125	50%	HFC-32	50%								
45.	R-410B	HFC-125	55%	HFC-32	45%								
46.	R-411A	HO-1270	1.5%	HCFC-22	87.5%	HFC-152a	11%						
47.	R-411B	HO-1270	3%	HCFC-22	94%	HFC-152a	3%						
48.	R-412A	HCFC-142b	25%	HCFC-22	70%	PFC-218	5%						
49.	R-413A	HC-600a	3%	HFC-134a	88%	PFC-218	9%						
50.	R-414A	HC-600a	4%	HCFC-124	28.5%	HCFC-142b	16.5%	HCFC-22	51%				
51.	R-414B	HC-600a	1.5%	HCFC-124	39%	HCFC-142b	9.5%	HCFC-22	50%				
52.	R-415A	HCFC-22	82%	HFC-152a	18%								
53.	R-415B	HCFC-22	25%	HFC-152a	75%								
54.	R-416A	HC-600	1.5%	HCFC-124	39.5%	HFC-134a	59%						
55.	R-417A	HC-600	3.4%	HFC-125	46.6%	HFC-134a	50%						
56.	R-417B	HC-600	2.7%	HFC-125	79%	HFC-134a	18.3%						

[4] For more information about trade names for mixtures and pure substances, visit the "Trade names of chemicals containing ozone-depleting substances and their alternatives" page on the UNEP Division of Technology, Industry and Economics (DTIE) OzonAction website, at http://www.unep.fr/ozonaction/library/tradenames/main.asp. This worldwide database service is designed to help customs officials and national ozone units control imports and exports of controlled substances and prevent their illegal trade.

No.	*Refrigerant*	*Composition*											
		Component 1		*Component 2*		*Component 3*		*Component 4*		*Component 5*		*Component 6*	
57.	R-417C	HC-600	1.7%	HFC-125	19.5%	HFC-134a	78.8%						
58.	R-418A	HC-290	1.5%	HCFC-22	96%	HFC-152a	2.5%						
59.	R-419A	HCE-170	4%	HFC-125	77%	HFC-134a	19%						
60.	R-419B	HCE-170	3.5%	HFC-125	48.5%	HFC-134a	48%						
61.	R-420A	HCFC-142b	12%	HFC-134a	88%								
62.	R-421A	HFC-125	58%	HFC-134a	42%								
63.	R-421B	HFC-125	85%	HFC-134a	15%								
64.	R-422A	HC-600a	3.4%	HFC-125	85.1%	HFC-134a	11.5%						
65.	R-422B	HC-600a	3%	HFC-125	55%	HFC-134a	42%						
66.	R-422C	HC-600a	3%	HFC-125	82%	HFC-134a	15%						
67.	R-422D	HC-600a	3.4%	HFC-125	65.1%	HFC-134a	31.5%						
68.	R-422E	HC-600a	2.7%	HFC-125	58%	HFC-134a	39.3%						
69.	R-423A	HFC-134a	52.5%	HFC-227ea	47.5%								
70.	R-424A	HC-600	1%	HC-600a	0.9%	HC-601a	0.6%	HFC-125	50.5%	HFC-134a	47%		
71.	R-425A	HFC-134a	69.5%	HFC-227ea	12%	HFC-32	18.5%						
72.	R-426A	HC-600	1.3%	HC-601a	0.6%	HFC-125	5.1%	HFC-134a	93%				
73.	R-427A	HFC-125	25%	HFC-134a	50%	HFC-143a	10%	HFC-32	15%				
74.	R-428A	HC-290	0.6%	HC-600a	1.9%	HFC-125	77.5%	HFC-143a	20%				
75.	R-429A	HC-600a	30%	HCE-170	60%	HFC-152a	10%						
76.	R-430A	HC-600a	24%	HFC-152a	76%								
77.	R-431A	HC-290	71%	HFC-152a	29%								
78.	R-434A	HC-600a	2.8%	HFC-125	63.2%	HFC-134a	16%	HFC-143a	18%				
79.	R-435A	HCE-170	80%	HFC-152a	20%								
80.	R-437A	HC-600	1.4%	HC-601	0.6%	HFC-125	19.5%	HFC-134a	78.5%				
81.	R-438A	HC-600	1.7%	HC-601a	0.6%	HFC-125	45%	HFC-134a	44.2%	HFC-32	8.5%		
82.	R-439A	HC-600a	3%	HFC-125	47%	HFC-32	50%						
83.	R-440A	HC-290	0.6%	HFC-134a	1.6%	HFC-152a	97.8%						
84.	R-442A	HFC-125	31%	HFC-134a	30%	HFC-152a	3%	HFC-227ea	5%	HFC-32	31%		
85.	R-444A	HFC-152a	5%	HFC-32	12%	HFO-1234ze (E)	83%						
86.	R-444B	HFC-152a	10%	HFC-32	41.5%	HFO-1234ze (E)	48.5%						
87.	R-445A	HFC-134a	9%	R-744	6%	HFO-1234ze (E)	85%						
88.	R-446A	HC-600	3%	HFC-32	68%	HFO-1234ze (E)	29%						
89.	R-447A	HFC-125	3.5%	HFC-32	68%	HFO-1234ze (E)	28.5%						
90.	R-447B	HFC-125	8%	HFC-32	68%	HFO-1234ze (E)	24%						
91.	R-448A	HFC-125	26%	HFC-134a	21%	HFO-1234ze (E)	7%	HFO-1234yf	20%	HFC-32	26%		
92.	R-449A	HFC-125	24.7%	HFC-134a	25.7%	HFC-32	24.3%	HFO-1234yf	25.3%				
93.	R-449B	HFC-125	24.3%	HFC-134a	27.3%	HFC-32	25.2%	HFO-1234yf	23.2%				
94.	R-449C	HFC-125	20%	HFC-134a	29%	HFC-32	20%	HFO-1234yf	31%				
95.	R-450A	HFC-134a	42%	HFO-1234ze (E)	58%								
96.	R-451A	HFC-134a	10.2%	HFO-1234yf	89.8%								

No.	*Refrigerant*	*Composition*											
		Component 1		*Component 2*		*Component 3*		*Component 4*		*Component 5*		*Component 6*	
97.	R-451B	HFC-134a	11.2%	HFO-1234yf	88.8%								
98.	R-452A	HFC-125	59%	HFC-32	11%	HFO-1234yf	30%						
99.	R-452B	HFC-125	7%	HFC-32	67%	HFO-1234yf	26%						
100.	R-452C	HFC-125	61%	HFC-32	12.5%	HFO-1234yf	26.5%						
101.	R-453A	HC-600	0.6%	HC-601a	0.6%	HFC-125	20%	HFC-134a	53.8%	HFC-227ea	5%	HFC-32	20%
102.	R-454A	HFC-32	35%	HFO-1234yf	65%								
103.	R-454B	HFC-32	68.9%	HFO-1234yf	31.1%								
104.	R-454C	HFC-32	21.5%	HFO-1234yf	78.5%								
105.	R-455A	HFC-32	21.5%	HFO-1234yf	75.5%	R-744	3%						
106.	R-456A	HFC-134a	45%	HFC-32	6%	HFO-1234ze (E)	49%						
107.	R-457A	HFC-152a	12%	HFC-32	18%	HFO-1234yf	70%						
108.	R-458A	HFC-125	4%	HFC-134a	61.4%	HFC-227ea	13.5%	HFC-236fa	0.6%	HFC-32	20.5%		
109.	R-459A	HFC-32	68%	HFO-1234yf	26%	HFO-1234ze (E)	6%						
110.	R-459B	HFC-32	21%	HFO-1234yf	69%	HFO-1234ze (E)	10%						
111.	R-460A	HFC-125	52%	HFC-134a	14%	HFO-1234ze (E)	22%	HFC-32	12%				
112.	R-460B	HFC-125	25%	HFC-134a	20%	HFO-1234ze (E)	27%	HFC-32	28%				

11.2 Azeotropic mixtures

No.	*Refrigerant number (trade name) of mixture*	*Composition*			
		Component 1		*Component 2*	
1.	R-500	CFC-12	73.8%	HFC-152a	26.2%
2.	R-501	CFC-12	25%	HCFC-22	75%
3.	R-502	CFC-115	51.2%	HCFC-22	48.8%
4.	R-503	CFC-13	59.9%	HFC-23	40.1%
5.	R-504	CFC-115	51.8%	HFC-32	48.2%
6.	R-505	CFC-12	78%	HCFC-31	22%
7.	R-506	CFC-114	45%	HCFC-31	55%
8.	R-507A (AZ-50)	HFC-125	50%	HFC-143a	50%
9.	R-508A	HFC-23	39%	PFC-116	61%
10.	R-508B	HFC-23	46%	PFC-116	54%
11.	R-509 (TP5R2)	HCFC-22	46%	PFC-218	54%
12.	R-509A	HCFC-22	44%	PFC-218	56%
13.	R-512A	HFC-134a	5%	HFC-152a	95%
14.	R-513A (XP10/DR-11)	HFC-134a	44%	HFO-1234yf	56%
15.	R-513B	HFC-134a	41.5%	HFO-1234yf	58.5%
16.	R-515A	HFC-227ea	12%	HFO-1234ze (E)	88%

11.3 Other mixtures

No.	*Trade name of mixture*	*Composition*							
		Component 1		*Component 2*		*Component 3*		*Component 4*	
1.	FX 20	HFC-125	45%	HCFC-22	55%				
2.	FX 55	HCF-C22	60%	HCFC-142b	40%				
3.	D 136	HCFC-22	50%	HCFC-124	47%	HC-600a	3%		
4.	Daikin Blend	HFC-23	2%	HFC-32	28%	HCFC-124	70%		
5.	FRIGC	HCFC-124	39%	HCFC-134a	59%	HC-600a	2%		
6.	Free Zone	HCFC-142b	19%	HFC-134a	79%	Lubricant	2%		
7.	GHG-HP	HCFC-22	65%	HCFC-142b	31%	HC-600a	4%		
8.	GHG-X5	HCFC-22	41%	HCFC-142b	15%	HFC-227ea	40%	HC-600a	4%
9.	NARM-502	HCFC-22	90%	HFC-152a	5%	HFC-23	5%		
10.	NASF-S-III[5]	HCFC-22	82%	HCFC-123	4.75%	HCFC-124	9.5%	HC-600a	3.75%

11.4 Methyl bromide mixtures

No.	*Trade name of mixture*	*Composition*			
		Component 1		*Component 2*	
1.	Methyl bromide with chloropicrin	Methyl bromide	67%	Chloropicrin	33%
2.	Methyl bromide with chloropicrin	Methyl bromide	98%	Chloropicrin	2%

[5] A halon alternative.

Appendix II

Reporting provisions and clarifications associated with reporting of information other than Article 7 reporting

Reporting provisions and related decisions for reporting of information other than Article 7 reporting

Basis for reporting	*Information to be provided*
Transfer or addition of production or consumption	***(reported as and when it occurs)***
Article 2, paragraphs 5, 5 bis, 6, 7	Transfer or addition of production or consumption
Trade with non-parties (Article 4)	
Decision IV/17 A, paragraph 1	Information on the implementation of Article 4 of the Protocol, control of trade with non-parties
Licensing information	***(reporting periodicity specified below)***
(a) Article 4B – Licensing	The establishment and operation of its licensing system *(reported once)*
(b) Decision IX/8, paragraph 2	Focal points for licensing systems for trade in controlled substances *(reported once, updated as required)*
(c) Decision XIV/7, paragraph 7	Information reported by the parties on illegal trade in controlled substances *(reported when cases occur)*
(d) Decision XXVII/8	Parties wishing to avoid the unwanted import of products and equipment containing or relying on hydrochlorofluorocarbons *(notification sent once)*
Research, development, public awareness and exchange of information	***(reported every two years)***
Article 9	Summary of activities
Essential-use exemptions other than laboratory and analytical uses[6]	***(reported the year following an exemption)***
Decision VIII/9, paragraph 9	Report on quantities and uses of controlled substances produced and consumed for essential uses (reporting accounting framework)
Essential-use exemptions: laboratory and analytical uses	***(reported annually)***
Decision VI/9, paragraph 4, of annex II to the report of the Sixth Meeting of the Parties	Each controlled substance produced for laboratory and analytical uses
Exemption for high-ambient-temperature parties	***(reported the year following an exemption)***
Decision XXVIII/2, paragraph 30	Report separately production and consumption data for the subsectors to which the exemption applies
Critical-use exemptions for methyl bromide information	***(reported once)***

[6] Decisions relating to essential-use exemptions for CFCs for metered-dose inhalers for the treatment of asthma and chronic obstructive pulmonary diseases are no longer included here, since such exemptions have been phased out.

Basis for reporting	*Information to be provided*
(a) Decision Ex.I/3, paragraph 5	Parties that have a methyl bromide critical-use exemption to report on the implementation of the requirement to ensure that the criteria in paragraph 1 of decision IX/6 are applied when licensing, permitting or authorizing the use of methyl bromide and that such procedures take into account available stocks
(b) Decision Ex.I/4, paragraph 2	Parties seeking methyl bromide critical-use exemptions and parties that have ceased methyl bromide consumption to submit information on the alternatives available, listed according to their pre-harvest or post-harvest uses and the possible date of registration, if required, for each alternative; and on the alternatives that the parties can disclose to be under development, listed according to their pre-harvest or post-harvest uses and the likely date of registration, if required and known, for those alternatives
(c) Decision Ex.I/4, paragraphs 3 and 6	Parties seeking methyl bromide critical-use exemptions to submit national methyl bromide phase-out strategy and describe methodology used to determine economic feasibility in the event that economic feasibility is used as a criterion to justify the critical use
(d) Decision Ex.I/4, paragraph 9 (f), and decision Ex.II/1, paragraph 3	Report on quantities and uses of methyl bromide produced, imported and exported for critical uses in accounting framework
Process agent uses	***(reported annually)***
Decisions X/14, XV/7, XVII/6 and XXI/3	Use of controlled substances as process agents, make-up amounts, resulting emissions, emission containment technologies employed and opportunities for emission reduction. Report on quantities of controlled substances produced or imported for process agent applications
Requests for changes in reported baseline data	***(reported once)***
(a) Decision XIII/15, paragraph 5	Requests for changes in reported baseline data for the base years to be presented to the Implementation Committee, which will in turn work with the Ozone Secretariat and the Executive Committee to confirm the justification for the changes and present them to the meeting of the parties for approval
(b) Decision XV/19, paragraph 2	Methodology for submission of requests for revision of baseline data: the information and documentation to be submitted
Other information	***(reporting periodicity specified below)***
(a) Decision V/15	Information relevant to international halon bank management *(reported once)*
(b) Decision V/25 and VI/14A	Parties supplying controlled substances to parties operating under paragraph 1 of Article 5 (Article 5 party) to provide annually summary of requests from importing parties *(reported annually)*
(c) Decision VI/19, paragraph 4	List of reclamation facilities and their capacities *(reported annually)*
(d) Decisions X/8 and IX/24	New ozone-depleting substances reported by the parties *(reported when new substances emerge)*
(e) Decision XX/7, paragraph 5	Strategies on environmentally sound management of banks of ozone-depleting substances *(reported once, updated as required)*

1. The control measures under Articles 2A-2E, 2G and 2I include a provision for parties to decide to permit levels of production or consumption that are necessary to satisfy uses agreed by them to be essential. Decision IV/25 on essential uses states that a use of a controlled substance should qualify as “essential” only if:

(a) It is necessary for the health, safety or is critical for the functioning of society (encompassing cultural and intellectual aspects); and

(b) There are no available technically and economically feasible alternatives or substitutes that are acceptable from the standpoint of environment and health.

2. The conditions applied to exemption for laboratory and analytical uses, which fall under essential uses, are provided in annex II to the report of the Sixth Meeting of the Parties.

3. The control measures under Article 2H include a provision for parties to decide to permit levels of production or consumption that are necessary to satisfy uses agreed by them to be critical uses. In decision IX/6 on critical uses, the parties agreed to apply the following criteria and procedure in assessing a critical methyl bromide use for the purposes of control measures in Article 2 of the Protocol:

(a) That a use of methyl bromide should qualify as "critical" only if the nominating party determines that:

(i) The specific use is critical because the lack of availability of methyl bromide for that use would result in a significant market disruption; and

(ii) There are no technically and economically feasible alternatives or substitutes available to the user that are acceptable from the standpoint of environment and health and are suitable to the crops and circumstances of the nomination;

(b) That production and consumption, if any, of methyl bromide for critical uses should be permitted only if:

(i) All technically and economically feasible steps have been taken to minimize the critical use and any associated emission of methyl bromide;

(ii) Methyl bromide is not available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide, also bearing in mind the developing countries' need for methyl bromide;

(iii) It is demonstrated that an appropriate effort is being made to evaluate, commercialize and secure national regulatory approval of alternatives and substitutes, taking into consideration the circumstances of the particular nomination and the special needs of Article 5 parties, including lack of financial and expert resources, institutional capacity, and information. Parties not operating under paragraph 1 of Article 5 (non-Article 5 parties) must demonstrate that research programmes are in place to develop and deploy alternatives and substitutes. Article 5 parties must demonstrate that feasible alternatives shall be adopted as soon as they are confirmed as suitable to the party's specific conditions and/or that they have applied to the Multilateral Fund or other sources for assistance in identifying, evaluating, adapting and demonstrating such options;

4. "Process agents" should be understood to mean the use of controlled substances for the applications listed in table A of decision X/14, as amended by various decisions. Amounts produced or imported for use as process agents in plants and installations in

operation before 1 January 1999 should not be taken into account in the calculation of production and consumption from 1 January 2002 onwards, provided that:

(a)In the case of non-Article 5 parties, the emissions of controlled substances from these processes have been reduced to insignificant levels as defined in table B of decision X/14, as amended by various decisions;

(b) In the case of Article 5 parties, the emissions of controlled substances from process-agent use have been reduced to levels agreed by the Executive Committee to be reasonably achievable in a cost-effective manner without undue abandonment of infrastructure.

Appendix III

Reporting on consumption and production under the exemption for high-ambient-temperature parties

Section 1: Instruction VII on data on consumption (imports) under the exemption for high-ambient-temperature parties (data form 7)

1.1 If your country formally notified the Secretariat, as specified under paragraph 29 of decision XXVIII/2, of its intention to use the exemption for high-ambient-temperature parties and is listed in appendix II of decision XXVIII/2, please use data form 7 to report quantities of new HFCs imported for use in approved subsectors as listed in appendix I to the decision. Those imports must be for use within your country and not for export. In case other subsectors are approved after the assessments under paragraphs 32 and 33 of decision XXVIII/2, please use the additional columns in the data form to specify the approved subsectors and the amounts imported for use in those subsectors. Only bulk gases for servicing of equipment in the exempted subsectors should be reported here, not gases imported inside pre-charged equipment.

Section 2: Instruction VIII on data on production under the exemption for high-ambient-temperature parties (data form 8)

2.1 Very few countries listed in Appendix II of decision XXVIII/2 have production facilities for Annex F substances (HFCs). If your country formally notified the Secretariat, as specified under paragraph 29 of decision XXVIII/2, of its intention to use the exemption for high-ambient-temperature parties and is listed in Appendix II of decision XXVIII/2, please use data form 8 to report quantities of HFC produced for use in approved subsectors as listed in appendix I to the decision. That production must be for use within your country and not for export. In case other subsectors are approved after the assessments under paragraphs 32 and 33 of decision XXVIII/2, please use the additional columns in the data form to specify the approved subsectors and the amounts produced for use in those subsectors.

Data form 7 on consumption (imports) under the exemption for high-ambient-temperature parties

1. Fill in this form only if your country is listed in Appendix II to decision XXVIII/2, has formally notified the Secretariat of its intention to use the high-ambient-temperature exemption, and imported HFCs for its own use in the subsectors contained in Appendix I to decision XXVIII/2.

DATA FORM 7 **HAT_Dataform/2018**

DATA ON IMPORTS OF ANNEX F SUBSTANCES FOR EXEMPTED SUBSECTORS

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

2. Please read instruction VII carefully before filling in this form.

Party: _____ Period: January - December 20____

(1) *Annex/group*	*(2)* *Substance*	*Quantity of new substances imported for approved subsectors to which the high-ambient-temperature exemption applies (columns to be added as required for other subsectors that may be approved after the assessments under paragraphs 32 and 33 of decision XXVIII/2)**				
		(3) *New imports for use in multi-split air conditioners*	*(4)* *New imports for use in split ducted air conditioners*	*(5)* *New imports for use in ducted commercial packaged (self-contained) air conditioners*	*(6)* *New imports for use in subsector***	*(7)* *New imports for use in subsector***
F-Group I	HFC-32 (CH_2F_2)					
	HFC-41 (CH_3F)					
	HFC-125 (CHF_2CF_3)					
	HFC-134 (CHF_2CHF_2)					
	HFC-134a (CH_2FCF_3)					
	HFC-143 (CH_2FCHF_2)					
	HFC-143a (CH_3CF_3)					
	HFC-152 (CH_2FCH_2F)					
	HFC-152a (CH_3CHF_2)					
	HFC-227ea (CF_3CHFCF_3)					
	HFC-236cb ($CH_2FCF_2CF_3$)					
	HFC-236ea (CHF_2CHFCF_3)					
	HFC-236fa ($CF_3CH_2CF_3$)					
	HFC-245ca ($CH_2FCF_2CHF_2$)					
	HFC-245fa ($CHF_2CH_2CF_3$)					
	HFC-365mfc ($CF_3CH_2CF_2CH_3$)					
	HFC-43-10mee ($CF_3CHFCHFCF_2CF_3$)					
F-Group II	HFC-23 (CHF_3)					
Mixtures containing controlled substance(s) – applicable to all substances, not just HFCs (add additional rows or pages as required for mixtures not listed below)						
R-404A (HFC-125 = 44%, HFC-134a = 4%, HFC-143a = 52%)						
R-407A (HFC-32 = 20%, HFC-125 = 40%, HFC-134a = 40%)						
R-407C (HFC-32 = 23%, HFC-125 = 25%, HFC-134a = 52%)						

(1) *Annex/group*	*(2)* *Substance*	*Quantity of new substances imported for approved subsectors to which the high-ambient-temperature exemption applies (columns to be added as required for other subsectors that may be approved after the assessments under paragraphs 32 and 33 of decision XXVIII/2)**				
		(3) *New imports for use in multi-split air conditioners*	*(4)* *New imports for use in split ducted air conditioners*	*(5)* *New imports for use in ducted commercial packaged (self-contained) air conditioners*	*(6)* *New imports for use in subsector***	*(7)* *New imports for use in subsector***
R-410A (HFC-32 = 50%, HFC-125 = 50%)						
R-507A (HFC-125 = 50%, HFC-143a = 50%)						
R-508B (HFC-23 = 46%, PFC-116 = 54%)						
Comments:						

[1] Tonne = Metric ton.

Note: If a non-standard mixture not listed in section 11 of the data reporting instructions and guidelines is to be reported, please indicate the percentage by weight of each constituent controlled substance of the mixture being reported in the "comments" box above.

* Only bulk gases for servicing of exempted equipment should be reported here, not gases imported inside pre-charged equipment.

** For each substance imported for use in subsectors that may be approved after the assessments under paragraphs 32 and 33 of decision XXVIII/2, please specify the approved subsector. Should the column space be insufficient, further information can be provided in the "comments" box above.

Data form 8 on production under the exemption for high-ambient-temperature parties

1. Fill in this form only if your country is listed in appendix II to decision XXVIII/2, has formally notified the Secretariat of its intention to use the high-ambient-temperature exemption, and produced HFCs for its own use in the subsectors contained in appendix I to decision XXVIII/2.

DATA FORM 8 **HAT_Dataform/2018**

DATA ON PRODUCTION OF ANNEX F SUBSTANCES FOR EXEMPTED SUBSECTORS

in tonnes[1] (not ODP or CO_2-equivalent tonnes)

2. Please read instruction VIII carefully before filling in this form.

Party: _____ Period: January - December 20____

(1) *Annex/group*	*(2)* *Substance*	Quantity of new substances *produced for approved subsectors to which the high-ambient-temperature exemption applies (production should be for use within the producing country) (columns to be added as required for other subsectors that may be approved after the assessments under paragraphs 32 and 33 of decision XXVIII/2)** *(3)* *New production for use in multi-split air conditioners*	*(4)* *New production for use in split ducted air conditioners*	*(5)* *New production for use in ducted commercial packaged (self-contained) air conditioners*	*(6)* *New production for use in subsector**	*(7)* *New production for use in subsector**
F-Group I	HFC-32 (CH_2F_2)					
	HFC-41 (CH_3F)					
	HFC-125 (CHF_2CF_3)					
	HFC-134 (CHF_2CHF_2)					
	HFC-134a (CH_2FCF_3)					
	HFC-143 (CH_2FCHF_2)					
	HFC-143a (CH_3CF_3)					
	HFC-152 (CH_2FCH_2F)					
	HFC-152a (CH_3CHF_2)					
	HFC-227ea (CF_3CHFCF_3)					
	HFC-236cb ($CH_2FCF_2CF_3$)					
	HFC-236ea (CHF_2CHFCF_3)					
	HFC-236fa ($CF_3CH_2CF_3$)					
	HFC-245ca ($CH_2FCF_2CHF_2$)					
	HFC-245fa ($CHF_2CH_2CF_3$)					
	HFC-365mfc ($CF_3CH_2CF_2CH_3$)					
	HFC-43-10mee ($CF_3CHFCHFCF_2CF_3$)					
F-Group II	HFC-23 (CHF_3)					
Comments:						

[1] Tonne = Metric ton.

* For each substance produced for use in subsectors that may be approved after the assessments under paragraphs 32 and 33 of decision XXVIII/2, please specify the approved subsector. Should the column space be insufficient, further information can be provided in the "comments" box above.

Annex IV

Trust Fund for the Montreal Protocol on Substances that Deplete the Ozone Layer

Approved revised 2018, approved 2019 and proposed 2020 budgets

(United States dollars)

	Cost category	*2018*	*2019*	*2020*
1000	Employee salaries, allowances and benefits	1 395 479	1 492 918	1 523 777
1200	Consultants	85 000	85 000	85 000
1300	**Meeting costs**			
1321	Conference services costs: Open-ended Working Group meetings	514 920	597 500	597 500
1322	Conference services costs: preparatory meetings and meetings of the parties	505 310	505 310	505 310
1323	Communication costs of Article 5 assessment panel members and organizational costs of panel meetings	70 000	55 000	55 000
1324	Conference services costs: Bureau meetings	25 000	25 000	25 000
1325	Conference services costs: Implementation Committee meetings	125 000	125 000	125 000
1326	Hospitality	25 000	25 000	25 000
Subtotal, meeting costs		**1 265 230**	**1 332 810**	**1 332 810**
3300	**Travel of Article 5 parties and experts**			
3301	Travel of Article 5 parties: assessment panel meetings	400 000	400 000	400 000
3302	Travel of Article 5 parties: preparatory meetings and meetings of the parties	375 000	375 000	375 000
3303	Travel of Article 5 parties: Open-ended Working Group meetings	325 000	325 000	325 000
3304	Travel of Article 5 parties: Bureau meetings	20 000	20 000	20 000
3305	Travel of Article 5 parties: Implementation Committee meetings	125 000	125 000	125 000
Subtotal, travel of Article 5 parties and experts		**1 245 000**	**1 245 000**	**1 245 000**
1600	**Travel on official business**			
1601	Staff travel on official business	210 000	195 000	195 000
1602	Conference Services staff travel on official business	15 000	15 000	15 000
Subtotal, travel on official business		**225 000**	**210 000**	**210 000**
4100-5300	**Other operating costs**			
4100	Expendable equipment	18 000	18 000	8 000
4200	Non-expendable equipment	25 000	25 000	14 141
4300	Rental of premises	27 370	27 370	27 370
5100	Operational and maintenance of equipment	20 000	20 000	20 000
5200	Reporting costs	367 835	70 000	70 000
5300	Sundry	40 000	30 000	20 000
Subtotal, Other operating costs		**498 205**	**190 370**	**159 511**
5401	Public awareness and communication		157 816	157 816
Total direct costs		**4 713 914**	**4 713 914**	**4 713 914**
Programme support costs (13 per cent)		612 808	612 808	612 808
Grand total – to be financed by contributions		**5 326 722**	**5 326 722**	**5 326 722**

Additional activities to be drawn down from the existing cash balance		**2018**	**2019**	**2020**
1327	Contribution to the SAP/SPARC workshop on CFC-11		100 000	–
5402	Online tool for safety standards		30 000	–
5403	Printing of Handbooks		18 000	–

5404	Communication campaign		70 000	70 000
Enhancement of the digital presence				
5407	Temporary P-3 post		150 000	150 000
5405	Contract for services of digital presence		145 000	–
5406	Software for enhancement of website and meeting portal		32 184	32 184
	Subtotal		**545 184**	**252 184**
	Programme support costs (13%)		70 874	32 784
Total additional activities			**616 058**	**284 968**
GRAND TOTAL		**5.326 722**	**5 942 780**	**5 611 690**

Explanatory notes for the 2019 and 2020 budgets of the Trust Fund for the Montreal Protocol on Substances that Deplete the Ozone Layer

Cost category	*Budget line*	*Comment*
Employee salaries, allowances and benefits	1000	The 2019 and 2020 costs have been increased by the United Nations mandatory 2 per cent over the revised 2018 costs to allow for inflation. The 2019 and 2020 costs also include the costs of a United Nations Volunteer to support the work of the Secretariat at an estimated cost of $70,000 per year.
Consultants	1200	The 2019 and 2020 costs for consultants remain constant at the level of the 2018 revised budget.
Meeting costs	1300 1321	Open-ended Working Group meetings The figure for 2019 represents the estimated meeting cost for the meeting to be held in Bangkok. The 2020 cost are kept steady at the 2019 level. The meeting is tentatively scheduled to be held in Montreal, Canada, however the costs are yet to be determined, therefore, kept at the same level as for 2019.
	1322	Preparatory meetings and Meetings of the Parties: The full cost of the Thirty-First Meeting of the Parties in the proposed budget for 2019 will be supplemented by an additional voluntary contribution by the host country, the Government of Italy, of 200,000 euros. For 2020, for the joint meeting of the Conference of the Parties and the meeting of the parties, the amount is based on the assumption that the meeting will be hosted by a Government. In addition, the contribution of $252,000 from the Vienna Convention Trust Fund, will be deducted from the cost of the meeting. This amount may be allocated for other activities in 2020.
	1324	One Bureau meeting is scheduled for each of the years, 2019 and 2020, with provision for interpretation and document translation into appropriate languages, depending on the membership of the Bureau. The budget amounts remain at the same level as the revised 2018 amount due to the uncertainty in the interpretation requirements. Moreover, contribution of $20,000 from the Vienna Convention Trust Fund will be deducted from the cost of the meeting in 2020. This amount may be allocated for other activities in 2020.
	1325	The proposed budgets for Implementation Committee meetings in 2019 and 2020 includes the cost of two meetings, one held back to back with the Open-ended Working Group Meeting and one held back to back with the meeting of the parties. The budget amounts are kept at the same level as the revised 2018 level due to the uncertainty in the interpretation requirements.
	1326	The hospitality costs cover receptions at the meetings of the Open-ended Working Group and the meetings of the parties. The costs for 2019 and 2020 remain constant at the 2018 revised level.

Cost category	*Budget line*	*Comment*
Travel of Article 5 participants	3300	The participation of representatives of parties operating under paragraph 1 of Article 5 in various Montreal Protocol meetings is budgeted at $5,000 per representative per meeting which is an average cost used for budgeting purposes. The standard cost of $5,000 is calculated using the most appropriate and advantageous economy-class fare and United Nations daily subsistence allowances.
	3301	The costs of travel of experts of Article 5 parties to the assessment panel meetings for 2019 and 2020 remain constant at the revised 2018 level.
	3302	The costs of travel of participants from Article 5 parties for the meetings of the parties in 2019 and 2020 remain constant at the revised 2018 level.
	3303	The costs of travel of participants from Article 5 parties for the Open-ended Working Group meetings for 2019 and 2020 remain constant at the revised 2018 level.
	3304	Includes the cost of travel of Article 5 Bureau members to the Bureau meeting and to the meeting of the parties
	3305	Includes the cost of travel of Article 5 Implementation Committee members to the Implementation Committee meeting and the Open-ended Working Group meeting in mid-year; and to the Implementation Committee meeting and the meeting of the parties near-end of the year.
Travel on official business	1600	The budgets include travel of Secretariat officers in connection with the 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, meetings of importance to the ongoing work of the Secretariat to implement the decisions and requests of the parties.
	1601	Travel of staff on official business for 2019 and 2020 are decreased by $15,000 from the revised 2018 level.
	1602	The costs of travel of conference services staff for 2019 and 2020 remain constant at the revised 2018 level.
Other operating costs:	4100-5400	The section includes expendable equipment, non-expendable equipment, rental of office premises, operation and maintenance of equipment, reporting costs, sundry, public awareness and communication.
	4100	The expendable equipment costs include the costs of office computer software licences, stationary, office supplies and consumables. The costs for 2019 remains constant at the revised 2018 level and reduced by $10,000.
	4200	The non-expendable equipment costs include the costs of computers, peripheral equipment and furniture. The costs for 2019 remains constant at the revised 2018 level, and for 2020 the amount has been reduced by $10,859.
	4300	The rental cost for the Secretariat's offices in Nairobi was corrected in 2018 after the reallocation and a reassessment of the office space in 2018. The cost for 2019 and 2020 remain constant at the revised 2018 level.
	5100	For the operation and maintenance of equipment, the costs include the service level agreements for copy machines, IT support provided by the United Nations Office at Nairobi. The cost for 2019 and 2020 remain constant at the revised 2018 level.
	5300	In 2019 and 2020 the sundry costs include: (1) telecommunication costs ($10,000); (2) freight costs ($10,000); and (3) training costs ($10,000). The costs for the International Ozone Day celebrations of $10,000 which has usually been included under sundries in the past have been reallocated to the new budget line 5401 "Public awareness and communications". The costs for 2019 have been kept at the level of the revised 2018 budget and the costs for 2020 have been reduced by $10,000.
	5401	A new budget line 5401 is established from 2019. The costs for 2019 include the following activities: International Ozone Day celebrations ($10,000); visual materials ($20,000); enhancement of registration system and

Cost category	*Budget line*	*Comment*
		maintenance, website fixes in the back-end of the website and enhancement of the site ($90,000); software for website and associated costs ($27,816); and hosting of website ($10,000). The enhancement of the registration system involves taking ownership of the current registration system that belongs to the secretariat of the Convention on Biological Diversity and enhancing the system to suit the needs of the Ozone Secretariat.

Explanatory notes for the additional activities

Cost category	*Budget line*	*Comment*
	1327	The CFC-11 workshop will be organized by the Science Assessment Panel co-chairs in collaboration with Stratospheric Processes and their Role in Climate, to provide a forum for scientists and technologists to explore and present information on the potential causes of the unexpected increases in CFC-11 emissions in the recent years. This information will provide a firmer scientific basis for discussions amongst the Parties of the Montreal Protocol in the coming years. The symposium is open to discussions on all aspects of CFC-11 and related compounds, from production to atmospheric loss, along with environmental impact of the molecule. Attendance is subject to approved by the Scientific Steering Committee. The budget will supplement the costs of the workshop. The workshop is scheduled for March 2019.
	5402	By decision XXIX/11, the Secretariat was requested to hold regular consultations with relevant standards bodies with a view to providing, with regard to standards for flammable low-GWP refrigerants, a tabular overview of relevant safety standards, drawing on the 2017 report of the Technology and Economic Assessment Panel task force on decision XXVIII/4 and the outcome of the consultations. The Secretariat would like to develop an online tool for the overview of safety standards relevant to refrigeration and air-conditioning, to enable instant updating and easy access of information.
	5403	The new, special edition of the Montreal Protocol Handbook was printed in 2017 in conjunction with the thirtieth anniversary of the Montreal Protocol. Only 250 copies were printed due to funding constraints. Additional funds enable additional copies to be printed plus other publications relevant to the Montreal Protocol as well.
	5404	Following the successful communication campaign of 2017, Ozone Heroes, a new campaign is being planned for 2019, to collaborate once again with partners to create an innovative campaign. The budget of $70,000 is the seed money for leveraging additional funding from partners to organize the campaign.
Enhancement of the digital presence		The website of the Secretariat and the meeting portal will be modernized, enhanced, improved and maintained; mobile applications e.g., for the Montreal Protocol and its decisions, and data, will be developed.
	5407	A temporary programme officer at P-3 level will be employed to undertake the work of digital enhancement and maintenance.
	5405	The amount will be allocated for services of a company in developing and servicing the digital presence. In the event that the provision of $130,000 in the 2018 revised budget is utilized, the $145,000 available for 2019 will be reduced by the same amount. The total cost for the company is estimated to be $235,000 consisting of $90,000 in budget line 5401 and $145,000 under this budget line.
	5406	The amount is required for new software and maintenance of the enhanced digital presence.

Annex V

Contribution by the parties to the Trust Fund for the Montreal Protocol on Substances that Deplete the Ozone Layer

(General Assembly resolution 70/245 of 23 December 2015 with a maximum assessment rate of 22 per cent)

	Party	*Adjusted United Nations scale with 22 per cent maximum assessment rate considered*	*2019 and 2020 contributions by parties*
1	Afghanistan	**0.000**	–
2	Albania	**0.000**	–
3	Algeria	**0.160**	8 539
4	Andorra	**0.000**	–
5	Angola	**0.000**	–
6	Antigua and Barbuda	**0.000**	–
7	Argentina	**0.888**	47 311
8	Armenia	**0.000**	–
9	Australia	**2.327**	123 952
10	Austria	**0.717**	38 188
11	Azerbaijan	**0.000**	–
12	Bahamas	**0.000**	–
13	Bahrain	**0.000**	–
14	Bangladesh	**0.000**	–
15	Barbados	**0.000**	–
16	Belarus	**0.000**	–
17	Belgium	**0.881**	46 940
18	Belize	**0.000**	–
19	Benin	**0.000**	–
20	Bhutan	**0.000**	–
21	Bolivia (Plurinational State of)	**0.000**	–
22	Bosnia and Herzegovina	**0.000**	–
23	Botswana	**0.000**	–
24	Brazil	**3.807**	202 769
25	Brunei Darussalam	**0.000**	–
26	Bulgaria	**0.000**	–
27	Burkina Faso	**0.000**	–
28	Burundi	**0.000**	–
29	Cabo Verde	**0.000**	–
30	Cambodia	**0.000**	–
31	Cameroon	**0.000**	–
32	Canada	**2.908**	154 927
33	Central African Republic	**0.000**	–
34	Chad	**0.000**	–
35	Chile	**0.397**	21 163
36	China	**7.887**	420 123

	Party	*Adjusted United Nations scale with 22 per cent maximum assessment rate considered*	*2019 and 2020 contributions by parties*
37	Colombia	**0.321**	17 079
38	Comoros	**0.000**	–
39	Congo	**0.000**	–
40	Cook Islands	**0.000**	–
41	Costa Rica	**0.000**	–
42	Cote d' Ivoire	**0.000**	–
43	Croatia	**0.000**	–
44	Cuba	**0.000**	–
45	Cyprus	**0.000**	–
46	Czechia	**0.343**	18 245
47	Democratic People's Republic of Korea	**0.000**	–
48	Democratic Republic of the Congo	**0.000**	–
49	Denmark	**0.581**	30 975
50	Djibouti	**0.000**	–
51	Dominica	**0.000**	–
52	Dominican Republic	**0.000**	–
53	Ecuador	**0.000**	–
54	Egypt	**0.151**	8 062
55	El Salvador	**0.000**	–
56	Equatorial Guinea	**0.000**	–
57	Eritrea	**0.000**	–
58	Estonia	**0.000**	–
59	Eswatini	**0.000**	–
60	Ethiopia	**0.000**	–
61	European Union	**2.489**	132 598
62	Fiji	**0.000**	–
63	Finland	**0.454**	24 186
64	France	**4.838**	257 717
65	Gabon	**0.000**	–
66	Gambia	**0.000**	–
67	Georgia	**0.000**	–
68	Germany	**6.362**	338 867
69	Ghana	**0.000**	–
70	Greece	**0.469**	24 981
71	Grenada	**0.000**	–
72	Guatemala	**0.000**	–
73	Guinea	**0.000**	–
74	Guinea-Bissau	**0.000**	–
75	Guyana	**0.000**	–
76	Haiti	**0.000**	–
77	Holy See	**0.000**	–
78	Honduras	**0.000**	–
79	Hungary	**0.160**	8 539

	Party	*Adjusted United Nations scale with 22 per cent maximum assessment rate considered*	*2019 and 2020 contributions by parties*
80	Iceland	**0.000**	–
81	India	**0.734**	39 090
82	Indonesia	**0.502**	26 732
83	Iran (Islamic Republic of)	**0.469**	24 981
84	Iraq	**0.128**	6 842
85	Ireland	**0.334**	17 768
86	Israel	**0.428**	22 807
87	Italy	**3.732**	198 791
88	Jamaica	**0.000**	–
89	Japan	**9.639**	513 419
90	Jordan	**0.000**	–
91	Kazakhstan	**0.190**	10 130
92	Kenya	**0.000**	–
93	Kiribati	**0.000**	–
94	Kuwait	**0.284**	15 116
95	Kyrgyzstan	**0.000**	–
96	Lao People’s Democratic Republic	**0.000**	–
97	Latvia	**0.000**	–
98	Lebanon	**0.000**	–
99	Lesotho	**0.000**	–
100	Liberia	**0.000**	–
101	Libya	**0.124**	6 630
102	Liechtenstein	**0.000**	–
103	Lithuania	**0.000**	–
104	Luxembourg	**0.000**	–
105	Madagascar	**0.000**	–
106	Malawi	**0.000**	–
107	Malaysia	**0.321**	17 079
108	Maldives	**0.000**	–
109	Mali	**0.000**	–
110	Malta	**0.000**	–
111	Marshall Islands	**0.000**	–
112	Mauritania	**0.000**	–
113	Mauritius	**0.000**	–
114	Mexico	**1.429**	76 111
115	Micronesia (Federated States of)	**0.000**	–
116	Monaco	**0.000**	–
117	Mongolia	**0.000**	–
118	Montenegro	**0.000**	–
119	Morocco	**0.000**	–
120	Mozambique	**0.000**	–
121	Myanmar	**0.000**	–
122	Namibia	**0.000**	–

	Party	*Adjusted United Nations scale with 22 per cent maximum assessment rate considered*	*2019 and 2020 contributions by parties*
123	Nauru	**0.000**	–
124	Nepal	**0.000**	–
125	Netherlands	**1.476**	78 604
126	New Zealand	**0.267**	14 214
127	Nicaragua	**0.000**	–
128	Niger	**0.000**	–
129	Nigeria	**0.208**	11 085
130	Niue	**0.000**	–
131	Norway	**0.845**	45 030
132	Oman	**0.113**	5 993
133	Pakistan	**0.000**	–
134	Palau	**0.000**	–
135	Panama	**0.000**	–
136	Papua New Guinea	**0.000**	–
137	Paraguay	**0.000**	–
138	Peru	**0.135**	7 213
139	Philippines	**0.164**	8 751
140	Poland	**0.837**	44 606
141	Portugal	**0.390**	20 791
142	Qatar	**0.268**	14 268
143	Republic of Korea	**2.030**	108 147
144	Republic of Moldova	**0.000**	–
145	Romania	**0.183**	9 759
146	Russian Federation	**3.075**	163 785
147	Rwanda	**0.000**	–
148	Saint Kitts and Nevis	**0.000**	–
149	Saint Lucia	**0.000**	–
150	Saint Vincent and the Grenadines	**0.000**	–
151	Samoa	**0.000**	–
152	San Marino	**0.000**	–
153	Sao Tome and Principe	**0.000**	–
154	Saudi Arabia	**1.141**	60 783
155	Senegal	**0.000**	–
156	Serbia	**0.000**	–
157	Seychelles	**0.000**	–
158	Sierra Leone	**0.000**	–
159	Singapore	**0.445**	23 709
160	Slovakia	**0.159**	8 486
161	Slovenia	**0.000**	–
162	Solomon Islands	**0.000**	–
163	Somalia	**0.000**	–
164	South Africa	**0.362**	19 306
165	South Sudan	**0.000**	–

	Party	*Adjusted United Nations scale with 22 per cent maximum assessment rate considered*	*2019 and 2020 contributions by parties*
166	Spain	**2.433**	129 575
167	Sri Lanka	**0.000**	–
168	Sudan	**0.000**	–
169	Suriname	**0.000**	–
171	Sweden	**0.952**	50 705
172	Switzerland	**1.135**	60 465
173	Syrian Arab Republic	**0.000**	–
174	Tajikistan	**0.000**	–
175	Thailand	**0.290**	15 434
176	The former Yugoslav Republic of Macedonia	**0.000**	–
177	Timor-Leste	**0.000**	–
178	Togo	**0.000**	–
179	Tonga	**0.000**	–
180	Trinidad and Tobago	**0.000**	–
181	Tunisia	**0.000**	–
182	Turkey	**1.014**	53 994
183	Turkmenistan	**0.000**	–
184	Tuvalu	**0.000**	–
185	Uganda	**0.000**	–
186	Ukraine	**0.103**	5 463
187	United Arab Emirates	**0.601**	32 036
188	United Kingdom	**4.444**	236 714
189	United Republic of Tanzania	**0.000**	–
190	United States of America	**21.906**	1 166 864
191	Uruguay	**0.000**	–
192	Uzbekistan	**0.000**	–
193	Vanuatu	**0.000**	–
194	Venezuela (Bolivarian Republic of)	**0.569**	30 285
195	Vietnam	**0.000**	–
196	Yemen	**0.000**	–
197	Zambia	**0.000**	–
198	Zimbabwe	**0.000**	–
	Total	**100.000**	**5 326 722**

Annex VI

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

A. Destruction technologies for controlled substances (decision XXIX/4)

1.Ms. Helen Tope, co-chair of the Technology and Economic Assessment Panel task force on destruction technologies, introduced the Panel's response to decision XXIX/4 on destruction technologies for controlled substances. She summarized the relevant decision, noting that it had requested the Panel to undertake an assessment of destruction technologies approved under decision XXIII/12 to confirm their applicability to HFCs, and any other technology for possible inclusion in the list of approved destruction technologies. She recalled that the Panel had established a task force of experts to address the decision. She summarized a timeline and the task force reports issued during 2018, including an initial report in April, a supplemental report in May, a request to the Panel to provide additional information at the fortieth meeting of the Open-ended Working Group, an addendum report in September, and additional information provided after the report was published, which was included in the findings of the presentation. She provided an overview of the addendum report, which presented the task force's assessment of additional information provided by a number of parties, and information on energy consumption for a destruction technology with high energy intensity. She summarized the findings of the assessment of new information on a technology for possible inclusion in the list of approved destruction technologies, namely the thermal decay of methyl bromide. Since the release of the supplemental report, modifications had been made to the technology developed. New analytical measurements were provided for carbon monoxide emissions only, which now met the performance criteria. The operating temperature remained in the range where dioxins/furans could still be formed. Thermal decay of methyl bromide remained recommended as high potential by the task force for the destruction of methyl bromide but not recommended for approval because of the absence of brominated dioxin/furan measurements. She then summarized the additional new information provided for technologies for their applicability to HFCs destruction. Ms. Tope then noted that the task force had taken an objective approach to its assessment to ensure internal consistency with previous assessments. Although the task force had carried out a comprehensive data compilation, in some cases data, providing examples including the destruction of mixed waste streams, had not been available for assessment ; cases when surrogate chemicals or criteria were required by some parties, technologies that are no longer in operation and circumstances where emissions testing has not been feasible. Lastly, Ms. Tope noted that parties might wish to consider those factors when deciding whether to approve technologies or not, based on the balance of available information.

2.Ms. Helen Walter-Terrinoni, co-chair of the Panel's task force on destruction technologies, provided additional considerations regarding particulate and carbon monoxide emissions when contaminant oils were absent. She noted that for conversion technologies and reactor cracking, if oil contaminants were removed, particulate emissions might meet particulate performance criterion for HFC destruction. For cement kilns, particulate and some other emissions were higher than performance criteria. The 2002 task force on destruction technologies had noted typically high emissions, but had also noted that the addition of ozone-depleting substances or HFCs was unlikely to have any or little additional effects. Carbon monoxide was formed in the thermal destruction of halocarbons through incomplete combustion of carbon-based fuels and oils in the presence of oxygen. Without oxygen, carbon monoxide could not be formed, and analysis was unnecessary.

3.As requested by the Open-ended Working Group at its fortieth meeting, Ms. Walter-Terrinoni described the holistic greenhouse gas impacts and benefits of destroying HFCs, noting that there was significant greenhouse gas benefit because of the high GWP of HFCs and the negligible impact of the operation of destruction facilities. She provided an example of the most energy intensive group of technologies (plasma arc) and explained that the benefit was greater for less energy-intensive processes. She noted that the task force evaluated more carbon intensity energy production and the impact had been found to be negligible. In summary she said that the impact from energy consumption associated with operating any destruction technology was negligible compared with the reduction in greenhouse gas emissions due to HFC destruction. Lastly, Ms. Walter-Terrinoni presented the available data and the task force's recommendations to the parties, highlighting the changes made in the addendum to the supplementary report.

B. Future availability of halons and their alternatives

4.Mr. Daniel Verdonik, co-chair of the Halons Technical Options Committee, gave a presentation on the Panel's response to decision XXIX/8 on the future availability of halons and their alternatives. The decision requested the Panel, through its Halons Technical Options Committee, to continue to liaise with the International Civil Aviation Organization (ICAO) on the development and implementation of alternatives to halons, to explore the possibility of forming a joint working group with ICAO to develop and thereafter carry out a study to determine the current and projected future quantities of halons installed in civil aviation fire protection systems, the associated uses and releases of halons from those systems and any potential courses of action that civil aviation could take to reduce those uses and releases, and to submit a report on the work of the joint working group before the Thirtieth Meeting of the Parties and, importantly, the fortieth session of the ICAO Assembly in September 2019 for consideration and potential further action

5.Mr. Verdonik said that ICAO, in coordination with the HTOC co-chairs, had hosted a meeting with interested parties in March 2018. At that meeting, ICAO had decided to establish an informal working group to provide the information requested in the decision. He explained that the informal working group currently consisted of representatives from several of the airframe manufacturers, both of the civil aviation fire protection cylinder manufacturers in the United States, two important civil aviation non-governmental organizations, the ICAO secretariat and several members of the Technology and Economic Assessment Panel, who were also the authors of the report on the Panel's response to decision XXIX/8. The working group had decided that ICAO would send out a survey it had developed as an ICAO State letter. The purpose of that survey was to provide a more accurate estimate of annual halon 1301 emissions from civil aviation.

6.The questionnaire or survey had been designed to be short and simple in order to maximize the number of respondents. It included contact information and confirmation that the respondents performed halon 1301 servicing of civil aviation bottles. There were two questions to determine the amount of halon needed to be replaced in the bottles they received for servicing (i.e., the amount that was discharged or emitted from the bottles during aircraft operations) and four additional questions to get a sense of the halon 1301 market and availability. The informal working group members from servicing companies thought it likely that most, if not all, companies would track or log both the amount of halon recovered from the bottles they received as the recycling or reclaiming would incur a cost to the company, and the amount of recycled or reclaimed halon put back into the same bottles as that would be charged to the customer. He also explained that the ICAO State letter was provided to national civil aviation authorities, who would then send the letters to the companies in their country that were identified by ICAO as providing servicing of civil aviation halon 1301 bottles.

7.A total of 53 surveys had been returned, of which 33 confirmed servicing aviation halon bottles but only 21 provided data and only 10 provided data on the questions intended to determine emissions. The 10 responses with data on the difference between the amount recovered versus the amount filled i.e., the amount emitted, ranged from 4 per cent to 50 per cent with an average of 14 per cent. While the data set was too limited to determine a more accurate emission rate, it did provide additional anecdotal information that civil aviation emissions could be substantially higher than the 2–3 per cent annual average overall emission rate used by the Halons Technical Options Committee to estimate global emissions. That result also supported other anecdotal information available to the Committee. The informal working group also recognized that a number of major service companies had not responded to the survey and that ICAO was following up with those companies to try to get additional data.

8.Mr. Verdonik reported on the update to the amount of halon 1301 that could be available to support civil aviation and other long-term uses such as oil and gas, military and nuclear power plants. He explained that the Halons Technical Options Committee estimated the global bank or inventory of halon 1301 to be 37,500 metric tonnes at the end of 2018, but that not all of that amount would be available to civil aviation and other long-term users. The Committee estimated that of the 37,500 metric tonnes, about 12,500 could become available to support all of the long-term uses. To estimate the run-out date, eight scenarios had been developed to look at two assumed amounts of available halon (12,500 +/- 10 per cent) and four emissions scenarios, which had changed civil aviation emissions from a low of 2 –3 per cent to a high of 15 per cent to bound the potential aviation emissions. The most reasonable worst case scenario of the lowest halon amount available and the highest emission rates predicted that halon 1301 would run out for civil aviation and other long-term uses in 2032, while the best case scenario predicted a run-out date of 2054.

9.The next steps for the Committee would be to continue to work with ICAO to refine emission estimates as much as possible from any additional survey data that came in and to work with ICAO to

develop a working paper for the upcoming fortieth session of the ICAO General Assembly. The working paper would address potential actions for ICAO and/or civil aviation industry to take to obtain additional data for estimating emissions and would recommend initiatives that civil aviation could take to reduce emissions.

10.In summary, Mr. Verdonik cautioned that while the global amount of halon 1301 used in the analysis was based on the Halons Technical Options Committee model, emissions derived from atmospheric measurements (while within the uncertainty range) were higher than the Committee's estimates. It was therefore possible that the global bank of halon 1301 could be much smaller than the amount used in the analysis, by as much as 9,000 metric tonnes. He noted that the civil aviation emission rate was still uncertain but was a major driving force in overall emissions and hence the remaining bank. In all eight scenarios, a 15 per cent civil aviation emission rate would deplete the available bank in the early 2030s, which further supported the need to have better estimates of the civil aviation actual emission rate.

11.In closing, he said that based on run-out dates between 2032 and 2054 and aircraft lifetimes of up to 40 years, it was almost certain that civil aviation was producing aircraft now that could not be sustained with the available supplies of halon 1301.

C. Critical-use nominations for methyl bromide

12.On behalf of the Technology and Economic Assessment Panel, the co-chairs of the Methyl Bromide Technical Options Committee, Ms. Marta Pizano and Mr. Ian Porter, presented an overview of the trends and outcomes for the critical-use nominations submitted in 2018 for use in 2019 and 2020.

13.Ms. Pizano described the outcomes of the assessment of critical-use nominations submitted in 2018, noting that four countries (Argentina, Australia, Canada and South Africa) had applied for 147.241 tonnes of methyl bromide under critical use in six sectors. After the interim assessment presented at the thirty-ninth meeting of the Open-ended Working Group, three parties had requested re-assessment of their critical-use nominations (4 in total).

14.She provided an overview of the two non-Article 5 final recommendations for preplant use of methyl bromide. The Australian and Canadian strawberry runner nominations had found difficulties in implementing alternatives, mainly due to regulatory issues and high phytosanitary requirements for the runners.

15.For the Australian strawberry runners the full amount nominated by the party of 28.98 tonnes was recommended, as the party had provided further information showing progress with chemical and non-chemical alternatives, but had explained that those would not be available before 2020 as results needed acceptance by the certification body (Victorian Strawberry Industry Certification Authority - VSICA). The Methyl Bromide Technical Options Committee recognized that the party had provided a transition plan for phasing out methyl bromide, based on methyl iodide, which showed that if registration and availability was achieved by 2021, then that year the nomination amount would be reduced by 50 per cent and critical-use nomination requests would cease entirely in 2022.

16.For methyl bromide use on Canadian strawberry runners in 2019, the Methyl Bromide Technical Options Committee recommended the full amount of 5.261 tonnes. Further information from the party after the meeting of the Open-ended Working Group had justified that regulations unique to Prince Edward Island prohibited the use of all feasible chemical fumigant options, and that soilless culture was the only option presently suitable for a proportion of the nomination. The Methyl Bromide Technical Options Committee accepted that soilless culture could not be adopted further under the present circumstances.

17.Mr. Porter then showed the trends in amounts of methyl bromide requested in nominations from five Article 5 parties since 2015 and that they had generally declined. He indicated that South Africa had reduced its nomination since the fortieth meeting of the Open-ended Working Group by 5.5 tonnes. Mexico and China were no longer requesting critical-use nominations, but the Methyl Bromide Technical Options Committee was unable to determine if those parties had phased out methyl bromide or were using stocks, since there was no requirement for parties to report stocks gathered before 2015.

18.Recommendations for critical-use nominations requested by Argentina for tomatoes and strawberries in 2019 remained unchanged as they were accepted by the party. For strawberries, the nomination was reduced based on the uptake of barrier films for the third year of a three-year adoption period, which allowed for reduced use of methyl bromide. For tomatoes, the Methyl Bromide Technical Options Committee accepted that alternatives for controlling *Nacobbus* (e.g., resistant rootstock for grafting) were not yet available. Both nominations from Argentina for 2019 (strawberry

fruit – 27.1 tonnes, tomatoes - 44.4 tonnes) were reduced by 10 per cent to meet the standard presumptions for methyl bromide dosage rates used with barrier films over a three-year adoption period.

19.Mr. Porter then provided the outcome of the two interim recommendations for pests in commodities and structures for 2019 from South Africa. He explained that both nominations had been reduced by the party since the fortieth meeting of the Open-ended Working Group, and that further information had been provided. For mills, the Methyl Bromide Technical Options Committee recommended 1.0 t, a 50 per cent reduction of the 1.5 tonnes nominated. The reduction was based on two fumigations per year for pests in the remaining three mills at 20 g/m^3 (the standard presumption) as a transitional measure to allow time for the adoption of alternatives in an integrated pest management system, with possible phase-in of sulfuryl fluoride. For houses, the Committee recommended the full revised amount of 40 tonnes as the party had justified that heat and sulfuryl fluoride could not be adopted for the remaining amount until after 2019. Also, there had been an increase in population and the number of houses in dry wood termite infested areas, leading to increased pressure to use methyl bromide.

20.The co-chair then showed the total final recommendation for parties in the 2018 round, amounting to 116.551 tonnes of the 147.241 tonnes nominated by all parties for either 2019 or 2020.

21.Mr. Porter reported that 24.285 tonnes of stocks were held by parties that were required to report under decision XVI/6 at the end of 2017. The Methyl Bromide Technical Options Committee critical-use exemption recommendations had not been adjusted to account for stocks, and although reported stocks were small, unknown quantities of pre-2015 stocks appeared to exist.

22.The timelines for submission of critical-use nominations in 2019 were shown, as required under decision Dec XVI/6, subparagraph 1 (b) (ii).

23.In closing, Mr. Porter highlighted that pre-2015 stocks were being used by some Article 5 parties, and that the Methyl Bromide Technical Options Committee was unclear as to whether parties had effective alternatives for those sectors and, if not, whether diminishing stocks might lead to further requests for critical-use nominations in the future. The Methyl Bromide Technical Options Committee was unable to gather accurate reliable information on the pre-2015 stocks held by Article 5 parties as they were not required to be reported.

D. Response to paragraph 2 of decision XXVI/5 on a global laboratory and analytical use exemption

24.Ms. Helen Tope, co-chair of the Medical and Chemicals Technical Options Committee, introduced the Technology and Economic Assessment Panel's response to paragraph 2 of decision XXVI/5 on laboratory and analytical uses. She thanked Mr. Jianjun Zhang, co-chair of the Medical and Chemicals Technical Options Committee, who had been instrumental in the development of the Panel's response but had been unable to attend the meeting. She began by recalling some typical examples of laboratory and analytical uses of controlled substances, and noted that carbon tetrachloride, CFC-113 and 1,1,1-trichloroethane had been the main controlled substances used for that purpose. She summarized the relevant decision, noting that it recalled some of the many previous decisions of parties, eliminating specific uses from the global exemption, and extended the exemption until 31 December 2021, under the conditions set out in an earlier decision, for all controlled substances at that time, except HCFCs. She outlined the paragraph relevant to the Panel's response, which requested the Technology and Economic Assessment Panel to report in 2018 on the development and availability of laboratory and analytical procedures that could be performed without using controlled substances under the Montreal Protocol. She noted that the Panel's response had been published in September, building on responses to previous decisions developed by the former Chemicals Technical Options Committee. She noted that the response considered available alternatives and potential barriers to their adoption in Article 5 and non-Article 5 parties, and reviewed standards for analytical procedures, within certain constraints such as limited resources. She said that the response was limited to controlled substances already included in the global exemption, although included information on known laboratory and analytical uses of HCFCs. It did not include Annex F substances. As background to its response, she presented production data reported under Article 7 for laboratory and analytical uses, which was about 150 tonnes globally in 2016, and that carbon tetrachloride was the main controlled substance produced for those uses, more than 99.9 per cent. She said that reported production in 2016 in non-Article 5 parties had decreased to 21 tonnes, and in Article 5 parties had decreased to 130 tonnes. For its assessment of the development and availability of alternatives to laboratory solvent and reagent uses that could be performed without using controlled substances, she noted that many laboratory uses of controlled substances could be phased out, such as solvent and

cleaning uses. She summarized that a review of the use of carbon tetrachloride as a solvent in reactions involving N-bromosuccinimide had identified alternatives, and that alternatives were available for methyl bromide used as a methylating agent. As a result, the Panel was recommending that these be excluded from the global essential-use exemption. She summarized the review of standards using controlled substances for laboratory and analytical uses, noting that international standards bodies were continuing to work on the development of new standards methods to replace controlled substances, and that alternatives had replaced controlled substances in a number of standards. She noted some barriers to the adoption of alternatives, with some challenges common to both non-Article 5 and Article 5 parties, where some standards still allowed or required the use of controlled substances despite the availability of alternatives. She indicated that some challenges remained for Article 5 parties only, such as adherence to standards using controlled substances, and the cost and time associated with the development and adoption of alternative analytical procedures and standards. She noted that some standards where the controlled substance was used as a reference chemical would likely remain for as long as the controlled substance was needed in applications, for enforcement, or for measurements. She presented a table of recommendations to remove specific laboratory and analytical uses from the global exemption for parties' consideration, at a date to be determined by parties, recalling that any decision taken to remove a use from the global exemption would not prevent a party from nominating a specific use for an essential-use exemption under decision IV/25. She summarized other recommendations relating to parties considering establishing cooperation with standards organizations to facilitate and accelerate the development or revision of standards for the replacement of controlled substances in analytical uses, and parties considering providing more comprehensive data, sharing information on alternatives and the revision of standards, and possible support for the development or revision of standards, and training where needed. She concluded by summarizing other considerations, namely that many standards still required the use of small quantities of controlled substances, and that removal of specific uses on a case-by-case basis from the global exemption created confusion on what was allowable under the exemption, and that monitoring of, and adherence to, specific authorized laboratory and analytical uses of controlled substances might become increasingly challenging as the exclusion list expands, while providing diminishing environmental benefits for about 150 tonnes of controlled substances.

E. Decision XXIX/10 task force on issues related to energy efficiency while phasing down HFCs

25. Ms. Suely Carvalho, Ms. Bella Maranion, and Mr. Fabio Polonara, co-chairs of the energy efficiency task force, gave a presentation on the updated final report of the task force.

26. Ms. Maranion began by elaborating on the request to the Technology and Economic Assessment Panel, set out in paragraph 3 of decision XXIX/10, that it prepare a final report for consideration by the Open-ended Working Group at its fortieth meeting, and thereafter an updated final report to be submitted to the Thirtieth Meeting of the Parties taking into consideration the outcome of the workshop organized by the Secretariat in accordance with paragraph 4 of the decision. When the co-chairs had presented the May 2018 report of the task force to the Open-ended Working Group parties at its fortieth meeting, parties had noted that energy efficiency was a broad topic of major importance for the environment, health and economics, with an enormous amount of published literature available. She said that parties had requested the Technology and Economic Assessment Panel and its task force to provide information focusing on the specific intersection between the refrigeration, air-conditioning and heat-pumps sector and the phasedown of HFCs. She also noted, as reported by the Executive Secretary of the Multilateral Fund at the present meeting, that the Executive Committee of the Multilateral Fund was continuing to work on the development of cost guidelines for HFCs. The task force had had less than five months to complete its May 2018 report, relying on previous Panel reports for reference, updated and available research and studies, available methodologies and practical examples. Immediately after the fortieth meeting of the Open-ended Working Group, the task force had met to begin its work, facing an extremely challenging timeline of four weeks to complete its draft, allowing for subsequent review by the task force and the Panel, and submission to the Thirtieth Meeting of the Parties. Ms. Maranion provided the list of the 21 members of the task force and expressed appreciation for their outstanding efforts in producing the updated final report.

27. She noted that the updated report followed the same outline as the May 2018 report, with updated information highlighted in grey throughout. The updated final report included as much as possible the additional guidance provided by parties to the Panel (UNEP/OzL.Pro.WG.1/40/7, annex III) and interventions made by parties at the fortieth meeting of the Open-ended Working Group. Ms. Maranion said that the Technology and Economic Assessment Panel looked forward to future opportunities for engaging more fully in specific regions and countries on the topics covered. She also

highlighted that Annex A to the report presented further information on additional sectors and technologies; Annex C was new and contained a summary of the workshop on energy efficiency; while Annex D contained the guidance to the Technology and Economic Assessment Panel from the relevant contact group at the fortieth meeting of the Open-ended Working Group. The table in Annex D also indicated report sections where comments were addressed. Given the limited time allotted for the presentation, Ms. Maranion indicated that the co-chairs would not cover all the updates but would highlight some of the significant new information contained in the updated report.

28. One of the requests to the task force, set out in the additional guidance provided by parties to the Panel (UNEP/OzL.Pro.WG.1/40/7, annex III), had been to discuss energy efficiency in the context of the refrigerant transition. Specifically, parties had requested the Panel to reformulate its response to decision XXIX/10 to put it in the context of refrigerant transition and to elaborate in a comprehensive way and provide clear comparison between HCFCs, HFCs and HFC alternatives with respect to performance, safety and costs. Ms. Maranion said that the Kigali Amendment focused primarily on developing a timeline to phase down high-GWP HFCs to avoid their direct contribution of up to 0.5°C of total global warming by 2100. However, the direct benefits of the reduction of high-GWP refrigerants during the phase-down might be offset by the use of less energy-efficient equipment. If more energy-efficient equipment was used, the total reduction of greenhouse gas emissions, both from direct and indirect sources, could as much as double the climate benefits of the phase-down. She also noted that low-GWP refrigerants themselves were only expected to have a minor impact on the system efficiency, likely within ±5% of the energy performance of baseline refrigerant(s). Refrigerant blends could enable system optimization balancing between coefficient of performance, volumetric capacity, flammability and GWP. The large majority of any improvement in energy efficiency of refrigeration, air-conditioning and heat-pump systems could be achieved through the optimization and use of new and advanced components, particularly compressors, heat exchangers and controls.

29. Another request from parties had been to consider the lessons learned from previous refrigerant transitions. The Montreal Protocol had considered energy efficiency alongside the phase-out of ozone-depleting substances. Specifically, in domestic refrigeration, CFC-12 had been phased out to either hydrocarbon HC-600a or HFC-134a. HC-600a had become dominant, but HFC-134a, even with a higher GWP, had been favoured in regions where concern about flammability was a significant market barrier for hydrocarbons. When transitioning from CFC-12 in domestic refrigeration, industry had made great efforts to improve energy efficiency, mainly through better compressor and system designs. Lessons had also been learned in the transition in room air conditioners. Non-Article 5 markets had initially adapted to the phase-out of HCFC-22 with R-407C, and then R-410A with better energy performance. Currently, global markets were adapting to medium-GWP and low-GWP options to replace HCFCs and high-GWP HFCs in air conditioners, including HFC-32, HC-290 and others under development. The performance of room air conditioners could be optimized with improved compressor, refrigerant charge and size of the heat exchanger. She noted that in the absence of enabling energy efficiency policy, energy efficiency values for air-conditioning were generally lower in Article 5 compared to non-Article 5 parties.

30. Mr. Polonara then presented the answers on the challenges for energy efficiency equipment under high ambient temperature (HAT) conditions and design of refrigeration, air-conditioning and heat-pump units.

31. In response to the parties' request that the Panel look at measures taken in other regions in recent years and address the particular challenges faced by HAT countries, he said that, according to the literature, worldwide demand for cooling energy in 2100 was predicted to increase dramatically due to climate change and income growth, with most demand occurring in the tropical regions. For example, the need for increased space cooling due to climate change in HAT conditions was projected to be 10–30 per cent higher in 2100.

32. Looking at measures taken in other regions, he suggested that minimum energy performance standards and labels had proved to be cost-effective policy tools, reducing energy consumption without reducing consumer choice or triggering sustained price increases. As an example, air-conditioning equipment designed in accord with the European Union Ecodesign regulation were expected to save 11 TWh and nearly 5 million tonnes of CO_2 emissions annually by 2020.

33. As far as the request to report on what research and development was occurring, and its progress and outcomes, to address HAT challenges, he said that since 2012, four collective research projects had been launched working with various refrigerant alternatives to test units for performance and energy efficiency in HAT condition projects, carried out by main research establishments in the Middle East and in the United States. He added that the details of the four projects were available in the updated report presented by the energy efficiency task force.

34. He then presented a table summarizing some of the results of the four projects in order to give an idea of how the design of refrigeration, air-conditioning and heat-pump units could be affected by HAT conditions.

35. As an example of the results in terms of cooling capacity and energy efficiency from studies on alternative refrigerants he presented the results of the tests done within the PRAHA project on ducted split air conditioners whose baseline refrigerant was HCFC-22. The performances obtained with some fluorinated blends proposed as low-GWP alternatives gave a decrease in refrigerating capacity ranging from 5 to 8 per cent with respect to the baseline and a decrease in efficiency ranging from 10 to 12 per cent.

36. With regard to the request to provide information on additional gains from improved servicing, Mr. Polonara listed the several benefits of high quality service and maintenance as follows: reduced energy costs; reduced refrigerant leaks; improved safety by eliminating risks; better temperature control and thermal comfort for occupants; improved occupant productivity by maintaining a high quality indoor environment; deferred capital expenditure for replacement and repair cost by extending the useful life of equipment.

37. Regarding the request for more information on specific economic benefits in terms of savings to consumers, power plants, payback periods he said that given that the economic benefits of energy efficiency varied by equipment type, application, weather, time and by local factors such as discount rates, hours of use, electricity prices and transmission losses, it was possible to cite some examples of worldwide achievements.

38. Energy efficiency measures for Mexico housing offered payback periods of 4–6 years, while energy efficiency improvement of India room air conditioners had payback periods of 1–3 years. As far as the power plants were involved, it had been estimated that the global reduction of peak load by an improvement in energy efficiency of 30 per cent for room air conditioners alone would abolish the need for around 1400 peak load power plants of 500MW capacity by 2030 and around 2200 peak load power plants by 2050

39. Regarding the request that a matrix of technical interventions to energy efficiency and associated costs be provided, Mr. Polonara said that in the report some tables showed the requested data and, as an example, showed the case of improved controls which could lead to an increase in energy efficiency ranging from 10 per cent to 50 per cent with a low to medium cost for implementation.

40. In terms of the request on the exploration of the possibility of district cooling, green buildings code and hydrocarbons in commercial applications to be options for energy efficiency, he referred the audience to the energy efficiency task force updated report for details, noting that in the case of district cooling in the United Arab Emirates, which had been able to reduce power demand by 55–62 per cent in comparison to conventional air-conditioning systems and consume 40–50 per cent less energy. Those results could be enhanced if some not-in-kind technologies, such as absorption refrigeration, were used.

41. Subsequently, Ms. Carvalho, co-chair of the task force, provided an overview of the responses to the requests concerning funding and financing energy efficiency.

42. Regarding the request to elaborate on the criteria and methodologies of relevant funding institutions, she said that the public information available for eight other funding institutions had been added to the report; it was not as comprehensive as desired due to difficulties in obtaining specific information focusing on energy efficiency in the refrigeration, air-conditioning and heat-pump sectors. Regarding the request for the task force to prepare a tabular presentation of funding sources, due to the lack of specific information on the internet, the task force had performed a search (supported by K-CEP) of the Creditor Reporting System Funding Database covering official development assistance (ODA) and published by the Organization for Economic Cooperation and Development. Key words linked to the refrigeration, air-conditioning and heat-pump sectors had been used and tagged to climate change. As result, a snapshot of funded projects in 2014 and 2015 was presented to illustrate types and scale of funding. The result of the search showed that refrigeration and air-conditioning only represented 0.1 per cent of total development aid, indicating that there was extremely low international focus on the refrigeration, air-conditioning and heat-pump sectors relative to other development topics. A tabular presentation of ODA funding sources was presented adding known philanthropic organizations and institutions with projects starting after 2015. Regarding the request to provide further information on the takeaway messages from the energy efficiency workshop on availability of funds that were not easily flowing, the energy efficiency task force considered that while providing a compilation of funding sources, that compilation exercise was insufficient alone and that a majority of

large multilateral climate funds operated in projects in sectors other than refrigeration, air-conditioning and heat pumps, such as infrastructure, energy access and renewable energy transmissions. Ms. Carvalho said that in spite of the low level of official development assistance funding focusing on the refrigeration, air-conditioning and heat-pump sectors, there were numerous financial resources for project implementation in the field of energy efficiency in general, but barriers to access those funds needed to be addressed. She suggested that parties consider liaising with the main funding institutions with shared objectives to increase funding flow to refrigeration, air-conditioning and heat pumps and develop or streamline processes to enable timely access to funding. In addition, the energy efficiency task force suggested that parties consider investigating novel funding architectures with clear rules, regulations and governance structures for optimal bridging to other financial resources.

F. Presentations during the high-level segment by members of the assessment panels on progress in the work of the panels

1. Scientific Assessment Panel

43.Mr. John Pyle, Mr. Paul A. Newman, Mr. David W. Fahey, and Mr. Bonfils Safari, co-chairs of the Scientific Assessment Panel, gave a presentation and answered questions on progress and key issues in the 2018 assessment, prepared in accordance with the requirement under the Montreal Protocol that the Panel provide the latest information on the state of the ozone layer, the stratosphere, and ozone depleting substances, such as chlorofluorocarbons (CFCs), at least every four years. The presentation provided an overview of the 2018 assessment and highlighted key issues.

44.The 2018 assessment comprised six chapters on: ozone-depleting substances; HFCs; global stratospheric ozone - past, present and future; polar stratospheric ozone - past, present and future; stratospheric ozone changes and climate; scenarios and information for policymakers. It had been completed at a meeting in Les Diablerets in Switzerland in July 2018 and would be available in December 2018. The Executive Summary had been released on 5 November and was available at https://www.esrl.noaa.gov/csd/assessments/ozone/2018/executivesummary.pdf.

45.Specific highlights of the report included:

(a)Actions taken under the Montreal Protocol had led to decreases in the atmospheric abundance of controlled ozone-depleting substances. Current levels of chlorine and bromine gases entering the stratosphere were both approximately10 per cent below the peak values occurring in the 1990s. The decline in the abundance of atmospheric chlorine since 2014 was in line with projections in the last assessment, but the decline in CFCs was slower that projected while the increase in HCFCs was also slower than expected.

(b)There had been an unexpected increase in total global emissions of trichlorofluoromethane (CFC-11). Global CFC-11 emissions, derived from measurements by two independent networks, had increased after 2012 contrary to projections from previous assessments, which showed decreasing emissions. Global CFC-11 emissions for 2014–2016 were approximately 10 Gg yr^{-1} (about 15 per cent) higher than the fairly constant emissions derived for 2002–2012. The increase in global emissions above the 2002–2012 average resulted in a global concentration decline in CFC-11 over the 2014–2016 period that was only two-thirds as fast as that over the 2002–2012. The CFC-11 emissions increase suggested new production not reported to UNEP.

46.Sources of significant carbon tetrachloride (CCl4) emissions, some previously unrecognized, had been quantified. At least 25 Gg yr^{-1} of emissions had been estimated, mainly originating from the industrial production of chloro-methanes, perchloroethylene and chlorine. The global CCl4 budget was now much better understood and the previously identified gap between observation-based and industry-based emission estimates had been substantially reduced compared to the 2014 assessment.

47.The weight of evidence suggested that the decline in ozone-depleting substances had made a substantial contribution to the following observed ozone trends: the Antarctic ozone hole was recovering, while continuing to occur every year; as a result of the Montreal Protocol much more severe ozone depletion in the polar regions had been avoided; outside the polar regions, upper stratospheric ozone had increased by 1–3 per cent per decade since 2000; no significant trend had been detected in global (60°S–60°N) total column ozone over the 1997–2016 period with average values in the years since the last assessment remaining roughly 2 per cent below the 1964–1980 average.

48.Ozone layer changes in the latter half of the present century would be complex, with projected increases and decreases in different regions. Northern Hemisphere mid-latitude total column ozone was expected to return to 1980 abundances in the 2030s, and Southern Hemisphere mid-latitude ozone to return around mid-century. The Antarctic ozone hole was expected to gradually close, with springtime total column ozone returning to 1980 values in the 2060s.

49.HFC emissions estimated from the combination of inventory reporting and atmospheric observations indicated that the HFC emissions originated from both developed and developing countries. Radiative forcing from measured HFCs continued to increase, but the HFC phase-down schedule of the 2016 Kigali Amendment to the Montreal Protocol would substantially reduce future projected global HFC emissions and, assuming global compliance, was projected to reduce future radiative forcing due to HFCs by about 50 per cent by 2050 compared to a scenario without any HFC controls. Accordingly, the Kigali Amendment was projected to reduce future global average warming in 2100 due to HFCs from a baseline of 0.3–0.5^{o}C to less than 0.1^{o}C

50.The Scientific Assessment Panel had concluded that the continued success of the Montreal Protocol in protecting stratospheric ozone depended on continued compliance with the Protocol.

2. Environmental Effects Assessment Panel

51.The co-chairs of the Environmental Effects Assessment Panel, Ms. Janet Bornman and Mr. Nigel Paul, presented the quadrennial assessment for 2018 on the environmental effects of ozone depletion, ultraviolet (UV) radiation, and interactions with climate change. The assessment highlighted the important role played by the Montreal Protocol in terms of its contribution to the Sustainable Development Goals as well as the alignment of the Environmental Effects Assessment Panel report with many of those goals.

52.Ms. Bornman drew attention to the significant role of the Montreal Protocol in preventing extensive negative effects on human health and the environment. With regard to human health in the "world avoided" scenario (a world without an effective Montreal Protocol), the wide-range of interactive effects of UV radiation, ozone depletion and climate change were addressed, taking into account the adverse effects as well as the benefits of exposure to UV radiation.

53.Although the Montreal Protocol had prevented large increases in skin cancers and cataract, incidences of UV-related cancers and cataract continued to pose major health problems. Cases of skin cancers remained high, mainly in light-skinned populations, with a considerable cost to society and human well-being. Cataract continued to be the leading cause of blindness globally, and UV radiation was the major risk factor in its development. UV radiation was also implicated in a debilitating eye condition, age-related macular degeneration, which caused loss of colour and central vision. Changes in lifestyle towards increased sun exposure played a large part in determining the severity of skin cancers, eye diseases and other health issues. Climate change was becoming a key factor in influencing sun exposure behaviour.

54.The body's immune defence mechanism against infections and certain cancers could be modified by UV radiation. In some cases, UV radiation suppressed the immune system, contributing to higher incidences of some skin cancers, and reduced the efficacy of vaccines against several infectious diseases. In other cases, UV radiation could have a beneficial effect against some autoimmune diseases, such as multiple sclerosis. Other key beneficial effects of UV radiation were the generation of vitamin D in the skin, which was required for healthy bones, as well as lowering the risk of colorectal cancer, short-sightedness, allergies and skin inflammation.

55.Expected decreases in air pollution in heavily polluted areas were likely to cause local increases in UV radiation. Concurrent changes in stratospheric ozone and cloud cover would determine future UV radiation at the Earth's surface. In currently polluted areas, however, direct links had been shown between poor air quality and declining human health, leading in many instances to millions of deaths from respiratory problems from aerosols and ozone, as well as cardiovascular disease and some cancers.

56.Mr. Paul highlighted the way in which tropospheric air quality was determined by emissions, weather, and by photochemical transformations driven by UV radiation. Changes in UV radiation, due to the future recovery of stratospheric ozone and the effects of climate change, were expected to affect ground-level ozone concentrations. The magnitude and direction of change would vary substantially between different geographical locations (e.g., urban *vs* rural). Emissions of some replacements for ozone-depleting substances (e.g., ammonia, hydrocarbons) might have direct or indirect effects on tropospheric air quality. These effects were currently assessed to be small relative to other sources, but there was a lack of published information. Future increases in tropospheric air quality posed a threat to crop production as well as human health, one mechanism of several by which future changes in stratospheric ozone might influence food security.

57.Trifluoroacetic acid (TFA) was a degradation product of several HCFCs, HFCs and HFOs, as well as some other man-made fluorocarbon compounds. TFA was highly persistent and could accumulate in water bodies. The Environmental Effects Assessment Panel's previous assessment, that future

concentrations of TFA due to the expected use of replacements for ozone-depleting substances did not pose a significant threat to human health or the environment, remained unchanged.

58.UV radiation affected water quality as it played a major a major role in breaking down plastics and chemical contaminants in the environment, and in determining the survival of microbes that caused water-borne diseases. The priority for current research was to use improved modelling approaches to quantify how those processes would be affected by future changes in stratospheric ozone and other factors that influenced UV radiation in water bodies.

59.UV radiation in water bodies was strongly attenuated by natural organic materials dissolved in the water. Extreme weather events and permafrost thawing were increasing inputs of dissolved organic matter, reducing the penetration of UV radiation into waters. Reductions in ice or snow cover in polar regions were increasing the penetration of UV radiation into waters that were previously below the snow or ice. Those climate-driven effects would act alongside future changes in stratospheric ozone to modify the UV exposure of aquatic organisms and ecosystems, including fisheries.

60.Antarctic stratospheric ozone depletion was contributing to regional climate change in the southern hemisphere. The resulting changes in patterns of precipitation, temperature, UV-B radiation and wild fires were having measurable impacts in southern hemisphere ecosystems. How long those currently observed effects on ecosystems would persist depended on the timescale of the recovery of Antarctic ozone. It was likely that any environmental effects of delayed recovery of stratospheric ozone, for example due to recently reported unexpected CFC-11 emissions, would be most evident through those climate-driven mechanisms.

61.Globally, the implementation of the Montreal Protocol had protected crop production from the damaging effects of both elevated UV radiation and climate change. To date, however, there were no "world avoided" models of those effects. By protecting climate, the Kigali Amendment would also protect crops from the damaging effects of increased temperature and extremes of water availability (drought, floods).

62.Crop responses to climate change could be modified by UV radiation and *vice versa*. Effects were expected to vary between species and growing conditions. Therefore, understanding current and evolving drivers of change in food security, for example due to changes in climate, ozone and air quality, as well as UV radiation, demanded holistic, interdisciplinary assessment.

63.Solar UV radiation damaged the functional integrity and shortened service lifetimes of plastics and wood used in construction, and might constrain the service life of new polymer-based photovoltaics. UV stabilizers, surface treatments or coatings were being developed to mitigate the adverse effects of UV radiation and climate. The emerging trend for "greener" materials was driving efforts to reduce the environmental effects of those UV stabilisers.

64.In closing, Mr. Paul noted that the 2018 assessment of environmental effects, including on health, reinforced the benefits of the Montreal Protocol relevant to multiple Sustainable Development Goals. Another benefit was the new scientific knowledge that now underpinned the understanding of many environmental challenges.

3. Key messages emerging from the Panel's 2018 assessment reports

65.A presentation on the key messages emerging from the Panel's 2018 assessment reports was given by Mr. Ashley Woodcock, co-chair of the Technology and Economic Assessment Panel; Mr. Paulo Altoé, co-chair of the Foams Technical Options Committee; Ms. Helen Tope, co-chair of the Medical and Chemical Technical Options Committee; Mr. Adam Chattaway, co-chair of the Halons Technical Options Committee; Mr. Ian Porter, co-chair of the Methyl Bromide Technical Options Committee; and Mr. Polonara, co-chair of the Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee.

(a) Technology and Economic Assessment Panel

66.Mr. Woodcock, co-chair of the Technology and Economic Assessment Panel, also on behalf of Panel co-chairs Ms. Marta Pizano and Ms. Maranion, introduced the presentation on the progress of work and key issues emerging from the Panel's 2018 assessment reports. He presented a full list of the 20 current members of the Panel, of which 10 were from Article 5 parties and 10 were from non-Article 5 parties. The 2018 assessment reports responded to decision XXVII/6, which had requested the Technology and Economic Assessment Panel reports to consider:

(a)The impact of the phase-out of ozone-depleting substances on sustainable development;

(b) Technical progress in the production and consumption sectors in the transition to alternatives and practices that eliminated or minimized emissions of ozone-depleting substances in consideration of factors stipulated in the Vienna Convention.

(c)Technically and economically feasible choices for the reduction and elimination of ozone-depleting substances in all relevant sectors.

(d) The status of banks containing ozone-depleting substances and their alternatives, including those maintained for essential and critical uses, and options for handling them.

(e)Accounting for the production and consumption for various applications and relevant sources of ozone-depleting substances and their alternatives.

67.Mr. Woodcock described the timelines for the assessment reports, noting that reports of the technical options committees were due on 31 December 2018, the Technology and Economic Assessment Panel report by the forty-first meeting of the Open-ended Working Group, and the synthesis report by the Thirty-First Meeting of the Parties. He then introduced the individual co-chairs of the technical options committees, who described the key messages emerging from their sectors.

(b) Foams Technical Options Committee

68.Mr. Altoé, co-chair of the Foams Technical Options Committee, also on behalf of co-chair, Ms. Helen Walter-Terrinoni, presented the key messages from the Committee's 2018 assessment report. Mr. Altoé discussed the availability of zero-ozone depletion potential and low-global warming potential (GWP) blowing agents, noting that there had been significant improvements in the development and availability of foam additives enabling the successful commercialization of foams containing zero-ODP and low-GWP blowing agents. He also noted that blowing agent conversions were under way in Europe and other non-Article 5 parties and that F-gas regulations had accelerated conversions. The Committee had been unable to gather details on specific product availability because companies kept certain information confidential.

69.With regard to CFC-11, the Committee was aware of the marketing of CFC-11 for use in foams on the internet and by other means. The Committee's 2018 assessment report would provide a summary of the technical feasibility of reverting to CFC-11 in foam blowing. Mr. Altoé noted that the initial CFC-11 conversion to HCFC-141b required significant adjustments to the formulation because of the solvent properties of HCFC-141b, while, in contrast, switching back to CFC-11 from HCFC141b would require minimal adjustment of the formulation. Lastly, he noted that the substitution of CFC-11 into hydrocarbon or HFC formulations was more difficult.

(c)Halons Technical Options Committee

70.Mr. Chattaway, co-chair of the Halons Technical Options Committee, also on behalf of co-chairs Mr. Verdonik and Mr. Sergey Kopylov, presented the key messages from the Committee's 2018 assessment report. For several years the Committee had reported little or no significant progress in new replacement fire extinguishing agents, but this had changed recently. In October 2018, a new low-GWP blend had been announced for total flooding; this was a blend of two existing low-GWP agents: FK-5-1-12 and HCFO-1233zd(E). Because of the time taken for new agents to be adopted by the relevant standards organizations it would be several years before market impact could be assessed. Regarding military systems, there were virtually no applications where a halon needed to be used for new designs although there were many applications where there were no low-GWP alternatives. In legacy (existing) designs, there were applications where neither a suitable halon nor a high-GWP HFC alternative existed for retrofit. In oil and gas operations, halon 1301 was only required to support long-term legacy facilities, whereas all new facilities were halon-free, but depending on the climate (i.e., low temperature), might require HFC-23, a very high-GWP HFC (12,400).

71.Mr Chattaway presented information on halon and HFC fire extinguishant banks. The estimated size of the global halon banks from the Committee's model at the end of 2018 were (in metric tonnes): halon 1301: 37,750; halon 1211: 24,000 and halon 2402: 6,750. It was noted that the Committee's model used expert opinion on emission rates of various end uses, by region. Regarding estimated emissions derived from atmospheric measurements: for halon 1301, while within uncertainty, they were higher than the Halons Technical Options Committee model, providing a significantly smaller bank; for halon 1211 they were consistently higher than the Committee's model since 2002, providing a significantly smaller bank; and for halon 2402, while within uncertainty, they were less than the

Committee's model, providing a somewhat larger bank. Estimated annual emissions of HFC-227ea (the main high-GWP alternative to halon 1301) from fire protection applications in 2018 were 3,400 metric tonnes. Assuming a global average annual emission rate of 2.5 per cent, the global bank was therefore estimated to be 130,000 metric tonnes at the end of 2018, but he noted that higher emission rates would provide a resulting smaller bank. Owing to the continued global demand from long-term applications, the Halons Technical Options Committee continued to recommend that the destruction of fire extinguishants should be considered only as a last resort, i.e., only if they were too contaminated to be recycled/reclaimed to an acceptable purity.

72.Mr. Chattaway presented an update on civil aviation, noting that halon 1211 alternative (2-BTP) in portable extinguishers was being used on aircraft coming off the production line. Very recently (the week before the Thirtieth Meeting of the Parties), new progress had been announced in the testing of a proprietary blend to replace halon 1301 in cargo bays. In addition, re-testing of a halon 1301 replacement in engine nacelles is ongoing. Nevertheless, as reported under decision XXIX/8, the Halons Technical Options Committee had serious concerns regarding the long-term availability of halon 1301 for civil aviation and other long-term uses beyond the early 2030s, given that the annual rate of halon 1301 emissions in civil aviation might be substantially greater than previous estimates, and the majority of the halon 1301 bank was unlikely to be available for civil aviation use. The consequences of those factors meant that the available amount of halon 1301 would not be sufficient for all long-term applications (e.g., civil aviation, oil and gas, and military use). In closing, Mr. Chattaway said that given that the lifetime of an aircraft was approximately 40 years, there would not be sufficient halon 1301 for the lifetimes of aircraft currently being built.

(d) Methyl Bromide Technical Options Committee

73.Mr. Ian Porter, co-chair of the Methyl Bromide Technical Options Committee, also on behalf of co-chair Ms. Marta Pizano, presented an overview of the issues related to methyl bromide. He explained that the methyl bromide phase-out for controlled uses had been achieved in nearly all countries, but that an unknown level of stocks was still being used. The Committee was aware of marketing of methyl bromide on the internet without apparent restriction for controlled uses and that made it difficult to determine how many countries were still using methyl bromide outside of the critical-use exemption procedures. Less than 290 tonnes (0.5 per cent of the global baseline) had reportedly been used in four countries in 2017 under the critical-use exemptions of the Protocol. Alternatives for virtually all controlled uses were now available and had been adopted.

74.In 2017, approximately 10,000 tonnes of methyl bromide had been used for quarantine and pre-shipment and that figure was increasing. In 2017, six non-Article 5 parties (34 per cent of total quarantine and pre-shipment use) and 41 Article 5 parties (66 per cent of total quarantine and pre-shipment use) had reported methyl bromide consumption for quarantine and pre-shipment uses. Aggregated use showed that Asia accounted for 55 per cent of the consumption; Australia, Israel, New Zealand and the United States of America for 30 per cent; Latin America and the Caribbean for 10 per cent; and Africa for 5 per cent, with no consumption in Europe. In the past 10 years, quarantine and pre-shipment consumption had more than doubled in some parties, which could be due to increased trade, threats from quarantine pests, and/or incorrect classification of quarantine and pre-shipment uses. The key factor impacting global emissions was the use of methyl bromide for quarantine and pre-shipment, being approximately 7,500 tonnes per year. Methyl bromide used for quarantine and pre-shipment were highly emissive (up to 95 per cent of the methyl bromide could be vented directly to the atmosphere after fumigation), advances in recapture and destruction technologies could, however, substantially reduce emissions. In closing, he explained that some parties were enforcing the mandatory recapture of quarantine and pre-shipment methyl bromide under their own national policies to minimize emissions and over concerns for human health.

(e)Medical and Chemicals Technical Options Committee

75.Ms Helen Tope, co-chair of the Medical and Chemicals Technical Options Committee, also on behalf of co-chairs Mr. Keiichi Ohnishi and Mr. Jianjun Zhang, said that CFC-containing metered-dose inhalers had been phased out, with affordable alternatives available worldwide. Some 800 million inhalers were used annually, with a global average 50:50 proportion of HFC metered-dose inhalers versus dry powder inhalers, within which there was large regional variability. She noted that HFC-134a was the major metered-dose inhaler propellant, and that new propellants with lower GWP were in the early stages of development. She suggested that a reduction in the carbon footprint for inhaler use could be achieved by switching to dry powder inhalers, by avoiding inhalers using HFC-227ea, and using only metered-dose inhalers with low volumes of HFC-134a propellant. For aerosols and sterilants, the global use of HCFCs in those applications was relatively very small, with a range of alternatives available. Many aerosol propellants had migrated to flammable hydrocarbons and

dimethyl ether, especially for consumer aerosols. She noted that non-flammable, non-toxic HFCs were used in aerosols when flammability or toxicity was a consideration, and also where emissions of volatile organic compounds were controlled. For solvents, a range of alternatives were available for HCFCs, with solvent cleaning ceased in non-Article 5 parties, with the exception of aerospace and military applications, and reduced in Article 5 parties. Quantities of controlled substances used for process agents had decreased. Reported global production of controlled substances for laboratory and analytical uses was relatively small at around 150 tonnes. Production of controlled substances for feedstock uses had grown significantly between 1990 and 2011, and since then had fluctuated around a mean total of 116,000 tonnes per year. For other chemicals, emissions of CFC-11, carbon tetrachloride, very short-lived substances, dichloromethane and dichloroethane, were presented in the assessment report. In closing, she highlighted that since 1996, over 300,000 tonnes of controlled substances had been destroyed, and many non-Article 5 parties had already mandated the destruction of waste HFCs.

(f) Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee

76. Mr. Polonara, co-chair of the Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee, also on behalf of his co-chair, Mr. Roberto Peixoto, said that in non-Article 5 parties, the HCFC phase-out was almost complete and was progressing in Article 5 parties. More specifically, in Article 5 parties, HCFC-22 consumption in the refrigeration, air-conditioning and heat pumps sector was decreasing and HCFCs would soon be used only in servicing for that sector, with low-GWP solutions becoming increasingly available for many applications in the sector. He noted the current concerns in some Article 5 parties in terms of the availability and cost of HFO refrigerants, and said that the development of safety standards for the use of flammable refrigerants was progressing. He also noted that refrigeration, air-conditioning and heat pump technology, such as CO_2 ejectors, microchannel heat exchangers, was rapidly evolving.

77. Energy (electricity) consumption for the sector had been increasing globally due to the substantial growth in equipment numbers, especially in Article 5 parties. The 2016 annual sales of air conditioners was estimated at 135 million units with 1.6 billion air conditioners in use. There was growing concern over the efficiency of refrigeration, air-conditioning and heat pump systems aimed at reducing energy consumption and at delivering cooling and heating in a more sustainable way. In closing, Mr. Polonara said that an integrated approach was needed for low-GWP solutions, including energy efficiency, flammability, toxicity and servicing.

(g) Concluding remarks

78. In rounding up the presentations, Mr. Woodcock said that the Technology and Economic Assessment Panel Report would include the executive summaries of the assessment reports of the technical options committees, and cross-cutting issues such as energy efficiency, sustainability, CFC-11 and organizational planning. The executive summary of the Technology and Economic Assessment Panel's assessment report would then be integrated with the executive summaries of the assessment reports of the Scientific Assessment Panel and the Environmental Effects Assessment Panel into the 2019 synthesis report.

MOP 30 FINAL

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Summary of the Thirtieth Meeting of the Parties to the Montreal Protocol: 5-9 November 2018

The thirtieth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (MOP 30) convened from 5-9 November 2018 in Quito, Ecuador. MOP 30 was attended by over 500 delegates, including representatives of 144 parties to the Protocol, the members of the Protocol's technical advisory bodies, as well as representatives of UN agencies and programmes, regional organizations, industry and non-governmental organizations (NGOs).

MOP 30 adopted 21 decisions on, *inter alia*: issues important to the January 2019 entry into force of the Kigali Amendment on Hydrofluorocarbons (HFCs), including:

- data reporting issues, including timeline and revised reporting forms, ways to report mixtures and blends, and setting global warming potential (GWP) values for HCFC-123, HCFC-124, HCFC-141, and HCFC-142;
- approved destruction technologies to be used for HFCs;
- Multilateral Fund (MLF) Executive Committee's (ExCom) progress in developing guidelines for the financing of the HFC phase-down; and
- access of Article 5 parties to energy-efficient technologies in the refrigeration, air conditioning and heat pump (RACHP) Sectors.

Other decisions addressed:

- future availability of halons and their alternatives, especially in sectors such as civil aviation;
- nominations for critical-use exemptions for methyl bromide for 2019 and 2020;
- development and availability of laboratory and analytical procedures that can be performed without using substances controlled under the Protocol;
- a proposal to permit essential use exemptions for hydrochlorofluorocarbons (HCFCs) for specific uses by certain parties;
- unexpected emissions of CFC-11 recently detected;
- a review of the work and recommended decisions of the Implementation Committee (ImpCom); and
- a review of the terms of reference, composition, and balance of the scientific and technical advisory bodies.

Through decisions on data reporting, destruction technologies and access to energy-efficient technologies, MOP 30 took key steps to pave the way for implementation of the Kigali Amendment, while its decision on the ExCom cost guidelines for the HFC phase-down ensures the input of all parties to that instrument before the guidelines are finalized. MOP 30 also took action to address the issues raised by the recent discovery of CFC-11 emissions. In addition, the MOP heard the technical panels' key messages from their upcoming Quadrennial Assessments and pondered their implications for the functioning and future implementation of the Protocol.

Several other key issues were aired at MOP 30 but decisions were not adopted at this stage because the subjects require further consultation and deliberation during 2019, including:

- the relationship between stratospheric ozone and proposed solar radiation management strategies;
- linkages between HCFCs and HFCs in transitioning to low-GWP alternatives;
- new terms of reference for the TEAP;
- a possible change in the composition of the MLF ExCom; and
- safety standards.

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 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.

IN THIS ISSUE

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Key Turning Points

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 called for cooperation on monitoring, research, and data exchange, but it did not impose obligations to reduce ozone depleting substances (ODS) usage. The Convention now has 197 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 and all amendments except its newest, the Kigali Amendment, have been ratified by 197 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.

London Amendment and Adjustments: At MOP 2, held in London, UK, in 1990, delegates tightened control schedules and added ten more CFCs to the list of ODS, as well as carbon tetrachloride (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 HCFCs. MOP 4 also agreed to enact non-compliance procedures. It established an 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 CFCs and thus a result of ODS phase-out. HFCs are not a threat to the ozone layer but have a high GWP. To date, 60 parties to the Montreal Protocol have ratified the Kigali Amendment, which will enter into force on 1 January 2019.

MOP 30 Report

Preparatory Segment

Montreal Protocol Open-ended Working Group (OEWG) 40 Co-Chair Yaqoub Almatouq (Kuwait) opened the Preparatory Segment on Monday, 5 November 2018.

Pablo Campana Sáenz, Minister for Industry and Productivity, Ecuador, noted his country was an early ratifier of the Kigali Amendment and has already set up a HFCs licensing system and detailed databank.

Tina Birmpili, Executive Secretary, Ozone Secretariat, stressed the importance of strong action at MOP 30 on enforcement and compliance, to uphold the credibility of the Protocol, and announced that the Secretariat will present a draft gender action plan at OEWG 41.

Organizational Matters: Adoption of the Agenda of the Preparatory Segment: Co-Chair Almatouq introduced the provisional agenda (UNEP/OzL.Pro.30/1 and UNEP/OzL.Pro.30/1/Add.1). The European Union (EU) requested discussing safety standards for RACHP systems and appliances, and Harmonized System customs codes for HCFC and CFC substitutes under "other matters." The agenda was adopted with this amendment.

Organization of Work: OEWG 40 Co-Chair Cynthia Newberg (US) suggested, and delegates agreed, to address the topics in order of the agenda.

High-Level Segment

On Thursday, 8 November, MOP 29 President Yaqoub Almatouq opened the High-Level Segment (HLS).

Lenín Moreno, President, Ecuador, welcomed delegates. He stressed the importance of seeking inclusive sustainable development to "protect the house in which our children and grandchildren must live." He called for seeking alternative technologies that do not deplete the ozone layer and continued financial assistance to support developing countries in implementing the Protocol and its amendment. He urged all countries to swiftly ratify the Kigali Amendment.

Tina Birmpili said the overarching message that the assessment panels' reports would present is that there is no room for complacency, which together with the unexpected detection of CFC-11 emissions, potentially jeopardizes the reputation the Montreal Protocol has built over 30 years. She suggested that to tackle the challenges facing the body, Protocol institutions may need to be reassessed.

Almatouq noted the progress made by Protocol parties since the last time a meeting was held in the region in 1996; highlighted that decisions taken by this meeting will have a positive impact in the protection of the environment; and stressed the need to send a strong political message to halt the production and use of CFC-11.

Organizational Matters: ***Elections of MOP 30 Officers:*** MOP 30 elected by acclamation: Liana Ghahramanyan (Armenia), as President; Samuel Pare (Burkina Faso), Juan Sebastian Salcedo (Ecuador), and Elisabeth Munzert (Germany), as Vice Presidents; and Bitul Zulhasni (Indonesia) as Rapporteur.

Adoption of the Agenda and Organization of Work: MOP 30 President Ghahramanyan introduced the agenda (UNEP/OzL.Pro.30/1, section II). The Federated States of Micronesia (FSM) suggested a new proposal, by FSM, Mali, Morocco and Nigeria, on the need to study the relationship between stratospheric ozone and proposed solar radiation management strategies (UNEP/OzL.Pro.30/CRP.7) be included under "other matters," noting that it is related to the report of the Scientific Assessment Panel (SAP). Australia called for clarity on whether there was a legal precedent for introducing conference room papers (CRPs) during the HLS. Ozone Secretariat Legal Advisor Gilbert Bankobeza noted that nothing in the rules of procedure precludes this. The US, Canada, and the EU cautioned that this would set a bad precedent and, with China, noted that there was insufficient time to discuss this important issue. Burkina Faso, Niger, and Switzerland suggested

that the proponents introduce the CRP, and take it up at OEWG 41. President Ghahramanyan proposed, and FSM agreed, to initiate discussions after presentations by the assessment panels and resubmit the CRP at OEWG 41. Delegates adopted the agenda.

Presentations by the Assessment Panels on Progress in their Work and Any Key Issues Having Emerged from their 2018 Quadrennial Assessments: SAP Co-Chairs John Pyle and David Fahey shared several key SAP findings from the forthcoming Assessment, including:

- the continued decline in the total emissions of ODS;
- a slower decline in CFCs and slower increase in HCFCs since 2014;
- an unexpected increase in global total emissions of CFC-11;
- the Kigali Amendment is projected to reduce future global average warming in 2100 due to HFCs from a baseline of 0.3–0.5˚C to less than 0.1˚C; and
- new options available to hasten recovery of the ozone layer are limited, hence compliance is key.

Environmental Effects Assessment Panel (EEAP) Co-Chairs Nigel Paul and Janet Bornman presented on the environmental effects of ozone depletion, UV radiation, and interactions with climate change. The panel stated that 43 scientists from 18 countries contributed to this 2018 Quadrennial Assessment. EEAP underscored that decreasing ODS controlled by the Protocol has helped avoid large increases in solar UV-B radiation. Further, they added that modelling studies have shown how the implementation of the Protocol has avoided catastrophic effects on human health. They discussed possible impacts on tropospheric air quality of Protocol actions. They noted some ODS replacements (e.g. ammonia, hydrocarbons) may have direct or indirect effects on air quality.

Technology and Economic Assessment Panel (TEAP) Co-Chairs Ashley Woodcock and Paulo Altoe presented its key TEAP messages for the Assessment, including that:

- the Foam Technical Options Committee (FTOC) is aware of the marketing of CFC-11 for use in foams on the internet and through other means;
- a new low GWP halon blend for total flooding fire extinguishing systems (blending two existing low-GWP agents) was announced in October 2018;
- CFC metered-dose inhalers have been phased out, with affordable alternatives available worldwide; and
- the Methyl Bromide TOC (MBTOC) is aware of marketing of methyl bromide on the internet without apparent restriction for controlled uses.

In discussions, delegates raised, *inter alia*:

- the need for cooperation between the MBTOC and governments to regulate the use of methyl bromide;
- the state-of-play in the development of low-GWP technologies;
- the need for more information on the sale of CFC-11;
- the need to take action on the information available on CTC emissions;
- the importance of addressing governance issues related to atmospheric geoengineering; and
- the recent detection of five volatile fluorinated gases in the Arctic.

FSM noted their intention to present their CRP on the relationship between stratospheric ozone and proposed solar radiation management strategies at OEWG 41.

Presentation by the Chair of the MLF ExCom: Hussein Mazen, Chair, ExCom, presented the achievements of the work of the ExCom, MLF Secretariat and implementing agencies (UNEP/OzL.Pro.30/10). He underlined the complexities faced by the ExCom in the elaboration of the guidelines for financing the phase-down of HFCs. He also presented initiatives and partnerships established to support institutional strengthening and to promote knowledge for the implementation of the Kigali Amendment.

Statements by Heads of Delegation: Alexander Teabo, Minister of Environment, Lands and Agriculture Development, Kiribati, outlined challenges his country faces in meeting Protocol obligations, including lack of national capacity to store properly and destroy in an environmentally-sound manner unwanted controlled substances, and limited local expertise for refrigeration and air conditioning (RAC) technicians.

Samoa encouraged all parties to refrain from illegal activities resulting in ODS emissions into the atmosphere, and requested help in adopting standards that ensure replacement cooling and refrigeration technologies that are both low-GWP and energy efficient.

Romania said it expects to ratify the Kigali Amendment during the first half of 2019 while it serves as President of the EU Council of Ministers, and highlighted enhancing energy efficiency in the RACHP sectors while switching to low- or zero-GWP refrigerants as a key national challenge.

Venezuela outlined his country's efforts to meet its obligations under the Protocol, including greater use of hydrocarbons as refrigerants, and stressed that, to implement the Kigali Amendment, Venezuela would require financial assistance and technology transfer.

Indonesia noted her country is collecting HFCs data as it prepares to ratify the Kigali Amendment, and underscored the importance of Harmonized System codes in this regard. She also expressed concerns about shortages of halon 1211 for fire suppression in aviation.

France noted that since 1991, it has contributed USD 290 million to the Protocol and together with 16 other donor parties, allocated an additional USD 2.5 million to accelerate the phase-down of HFCs.

Nigeria said his country would soon ratify the Kigali Amendment. He expressed concern, however, on the recent findings of CFC-11 emissions and asked parties to take a decision clearly addressing this issue.

Belarus expressed to parties its longstanding dedication to the Montreal Protocol having been one of the first Eastern European countries to sign the Vienna Convention.

Guatemala communicated the country's commitment to strengthening the existing legislation on imports of HCFCs and HFCs, but stressed that to do so it is necessary to, *inter alia*, strengthen the system of import licenses and internal controls.

Benin underscored the importance of meeting their Montreal Protocol commitments.

Kyrgyzstan raised concern about lack of progress with its 2013 request for help from the Ozone Secretariat in transferring unused stratospheric ozone monitoring equipment to developing countries as a means of improving global operating networks of stations monitoring the ozone layer and UV radiation.

Palau said most challenges it will face in Kigali Amendment implementation "have straightforward solutions that can be addressed with additional financial and human resources and training."

Syria emphasized that despite disruptions caused by internal war, it stands by its Protocol commitments and intends to ratify and implement the Kigali Amendment.

Senegal said the phasing out of HCFCs presents an unprecedented opportunity to both switch to natural low-GWP refrigerants and utilize equipment with higher energy efficiency.

He expressed support for the African Group's proposal on energy-efficient technologies in the RACHP sectors.

Bangladesh noted his country's HCFCs Phase-out Management Plan (HPMP) Stage II has been approved by ExCom and it hopes, by the end of 2019, to be able to advance in phasing down HFCs.

Trinidad and Tobago supported and encouraged further investigation into control of illegal ODS trade, as well as further research on destruction technologies and its applicability to low volume consuming countries.

Nepal said it has committed to phasing out HCFCs by 2030 and to ratifying the Kigali Amendment. He called for a financial support mechanism for Article 5 countries wishing to convert from HCFC- or HFC- to low-GWP refrigerant based systems.

The Intergovernmental Panel on Climate Change (IPCC) recounted key messages from its recent report to show the importance of the Kigali Amendment in helping developing countries to leapfrog "the trial-and error stages of innovative technology development" others have endured to adopt low or no-GWP alternatives combined with energy efficiency.

The Environmental Investigation Agency (EIA) commended the sense of urgency and action that parties have taken to address the recent confirmation of CFC-11 emissions.

The International Institute of Refrigeration (IIR) urged phasing out HCFCs now and replacing them with low-GWP alternatives, which may require changes to the phase-out schedule to focus first on sectors where low-GWP refrigerants can be quickly implemented.

Ecuador urged those parties who have not ratified the Kigali Amendment to do so.

An in-depth summary of Thursday's statements is available at: http://enb.iisd.org/vol19/enb19144e.html

Closing Session: ***Report of the Preparatory Segment Co-Chairs and Consideration of the Decisions Recommended for Adoption by MOP 30:*** On Friday evening, Co-Chair Almatouq reported on the progress of the Preparatory Segment to the HLS. He highlighted that delegates faced tough issues, specifically related to energy efficiency, adjustments, and CFC-11, but that many agenda items had reached agreement and been forwarded for decision at the HLS..

Adoption of MOP 30 Decisions and the Meeting Report: On Friday night, MOP 30 Rapporteur Zulhasni reviewed the report of the meeting (UNEP/OzL.Pro.30/L.1, and Add.1) paragraph-by-paragraph. Delegates adopted the report with minor textual amendments. Delegates adopted all 21 decisions without amendment.

MOP 30 President Ghahramanyan thanked all participants for the spirit of cooperation displayed, noting that 2019 will be an exciting year for the parties. She gaveled the meeting to a close at 11:10 pm.

MOP 30 Outcomes

All decisions were adopted without amendment on Friday by the HLS. Twenty decisions are contained in a compilation of draft decisions for adoption (UNEP/OzL.Pro.30/L.2, Add.1 and Add.2) and one decision on senior expert nominations to the TEAP was adopted orally.

Budget of the Trust Fund for the Montreal Protocol and Financial Reports: On Monday, Co-Chair Almatouq introduced this item (UNEP/OzL.Pro.30/4/Rev.1, UNEP/OzL.Pro.30/4/Add.1/Rev.1 and UNEP/OzL.Pro.30/5). Delegates established a Budget Committee chaired by Phillipa Guthrey (New Zealand) to discuss the relevant documents and prepare draft decisions. The committee held closed-door meetings throughout the week, submitting the results of their work on Friday (UNEP/Ozl.Pro.30/CRP.12).

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2/Add.1), the MOP decides to, *inter alia*:

- approve the revised budget for 2018 in the amount of USD 5,326,722 and the 2019 budget in the amount of USD 5,326,722;
- authorize the Executive Secretary, on an exceptional basis, to draw upon the available cash balance for 2019 for specified activities, such as a workshop on CFC-11 and an online tool for safety standards, in an amount up to USD 616,058;
- request the Executive Secretary to prepare budgets and work programmes for the years 2020 and 2021, presenting two budget scenarios, specifically a zero-nominal-growth scenario, and a scenario based on further recommended adjustments to the zero-nominal growth; and
- stress the need to ensure that the budget proposals are realistic and represent the agreed priorities of all parties to help ensure a sustainable and stable fund and cash balance, including contributions.

Kigali Amendment to the Montreal Protocol to Phase Down HFCs: ***Data Reporting Under Article 7 and Related Issues*:** On Monday, Co-Chair Newberg opened this agenda item (UNEP/OzL.Pro.30/8/Rev.1), noting the need for further work on the timeline for the reporting of baseline data for HFCs by Article 5 parties; the GWP values for HCFC-141 and HCFC-142; and the proposed revised data reporting forms and associated instructions.

The contact group established at OEWG 40 was reconvened, with Miruza Mohamed (Maldives) and Martin Sirois (Canada) as Co-Chairs, and met throughout the week. The group started by working on formalizing the GWP values of HCFC-141, HCFC-142, HCFC-123, and HCFC-124, and approving a draft decision on the timeline for reporting baseline data for HFCs by Article 5 parties. Subsequent meetings focused on the HFC-23 emissions reporting requirement; the content of the information to be provided in each data form; and what should be considered compulsory or voluntary reporting. The resulting two draft decisions and their detailed annexes (UNEP/OzL.Pro.30/CRP.9, Add.1 and UNEP/OzL.Pro.30/CRP.10) were presented to the Preparatory Segment on Friday and forwarded to the HLS, which adopted them without amendment.

Final Outcome: In its decision on the timeline for reporting of baseline data for HFCs for Article 5 parties (UNEP/OzL.Pro.30/L.2), the MOP decides to request the ImpCom and the MOP to defer consideration of the status of the reporting of HFC baseline data until nine months after the end of each baseline year as applicable to the group of Article 5 parties in question, in order to allow Article 5 parties to report actual baseline data for HFCs.

In its decision on revised data reporting forms and GWP values for HCFC-123, HCFC-124, HCFC-141 and HCFC-142, (UNEP/OzL.Pro.30/L.2/Add.1), the MOP:

- approves the revised forms and instructions for reporting data in accordance with the reporting obligations under the Protocol;
- clarifies that decision XXIV/14, by which parties are requested to enter a number in each cell in the data reporting forms that they submit, including zero, where appropriate, rather than leaving the cell blank, does not apply to cells where the information is to be provided on a voluntary basis;
- instructs the Ozone Secretariat to use the GWP values listed for HCFC-123 and HCFC-124 in Annex C for their most commercially viable isomers, listed as HCFC-123**

and HCFC 124**, respectively, when calculating the HFC baselines of parties with consumption or production of HCFC-123** and HCFC-124** in their respective baseline years; and
- instructs the Ozone Secretariat to use the GWP values of HCFC-141b and HCFC 142b for HCFC-141 and HCFC-142, respectively, when calculating the HFC baselines of parties with past consumption or production of HCFC-141 and HCFC-142 in their respective baseline years.

An annex contains revised forms and instructions for reporting data.

Destruction Technologies for Controlled Substances: On Monday, Co-Chair Newberg highlighted the September 2018 TEAP Task Force report on destruction technologies for controlled substances. TEAP Task Force on Destruction Technologies Co-Chairs Helen Tope and Helen Walter-Terrinoni presented an addendum to the report, highlighting the assessment of approved destruction technologies, such as liquid injection and rotary kiln incineration.

A contact group was established to further consider this issue co-chaired by Bitul Zulhasni (Indonesia) and Mikkel Sørensen (Denmark). On Wednesday, Zulhasni reported to plenary that the group had finalized its work and submitted UNEP/OzL.Pro.30/CRP.6, which approves specific destruction technologies and requests the TEAP to assess those technologies that have not yet been approved. Delegates agreed to forward the CRP to the HLS.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2), the MOP approves the following destruction technologies, as additions to the technologies listed in Annex VI to the report of MOP 4 and modified by decisions V/26, VII/35 and XIV/6:
- for Annex F, Group I substances (HFCs except HFC-23): cement kilns, gaseous/fume oxidation, liquid injection incineration, porous thermal reactor, reactor cracking, rotary kiln incineration, argon plasma arc, nitrogen plasma arc, portable plasma arc, chemical reaction with hydrogen gas (H2) and carbon dioxide (CO2), gas phase catalytic dehalogenation, and superheated steam reactor;
- for Annex F, Group II substances (HFC-23): gaseous/fume oxidation, liquid injection incineration, reactor cracking, rotary kiln incineration, argon plasma arc, nitrogen plasma arc, chemical reaction with H2 and CO2, and superheated steam reactor;
- for Annex E substances (methyl bromide): thermal decay of methyl bromide; and
- for diluted sources of Annex F, Group I substances (HFCs except HFC-23): municipal solid waste incineration and rotary kiln incineration.

The decision also requests TEAP to assess destruction technologies listed in an annex to the decision as not approved or not determined, as well as any other technologies, and to report to the OEWG prior to MOP 33, with the understanding that if further information is provided by parties in due time, in particular regarding the destruction of HFC-23 by cement kilns, TEAP should report to an earlier meeting of the OEWG.

Progress by the MLF ExCom in the Development of Guidelines for Financing the Phase-down of HFCs (Decision XXVIII/2): On Monday, Eduardo Ganem, Chief Officer, MLF, presented ExCom's report to MOP 30 (UNEP/OzL.Pro.30/10*). He underlined that the ExCom has been discussing the establishment of guidelines since 2016. He highlighted key issues for Kigali Amendment implementation, including: additional contributions to the MLF; information on HFCs consumption and production; principles for funding enabling activities and institutional strengthening; and draft cost-effectiveness guidelines for funding the phase-down of HFCs and key aspects related to HFC-23 technologies.

China suggested that the MLF Secretariat accelerate its funding programmes and outstanding guidelines taking into account future trends so that funding for Article 5 parties is aligned to the actual situation of phase-down activities. The MLF Secretariat responded that the business plan is revised annually and adapts to the changing situation of Article 5 parties' compliance status.

India proposed establishing a contact group to define ways forward for the cost guidelines. Jordan, with Lebanon, suggested terms of reference (ToR) be developed for this contact group to ensure there is no conflict with the mandate of the ExCom.

Syria, FSM, and Switzerland supported allowing the ExCom to finalize the guidelines. Barbados, with Australia, called on parties to review the documentation in order to better advise their ExCom representatives. Australia, the US, and FSM stressed the need to give the ExCom enough time to "get it right." Nigeria asked whether the ExCom has a timeframe for concluding the guidelines.

India stressed that under decision XXVIII/2, the ExCom was mandated to present the guidelines to the MOP for input before they are finalized. Stating that his delegation trusts the ExCom to finalize the guidelines, the US suggested that the meeting report reflect the "flavor" of the discussion, and forward the meeting report to the MLF, suggesting that this would fulfil the provision in decision XXVIII/2.

Co-Chair Almatouq suggested that the discussions be reflected in the meeting report in detail and called on the ExCom members to take note of all the discussions, which would then be used as a basis to finalize the guidelines. India opposed, calling for the issue to remain open until a decision is reached on the way forward. Almatouq suspended discussions on the guidelines, noting that the MOP will return to them later in the week.

On Wednesday, India reported on a CRP it submitted together with Argentina, Bahrain, Brazil, Lebanon, and Saudi Arabia (UNEP/OzL.Pro.30/CRP.8). China, Burkina Faso, FSM, Rwanda, Peru, and South Africa supported the draft decision. Parties urged the ExCom to develop these guidelines in a transparent way and China and FSM asked the ExCom to expedite these guidelines.

The EU, the US and Canada asked for more time to reflect on the CRP. An informal group to discuss this issue was facilitated by Ana Maria Kleymeyer (FSM). After Thursday and Friday informal group sessions, a revised CRP was submitted by the sponsors (UNEP/OzL.Pro.30/CRP.8/Rev.1) and delegates agreed to forward it to the HLS.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2/Add.1), the MOP:
- requests the ExCom to continue its work on developing guidelines for financing the phase-down of HFC consumption and production, and provide an update on progress on the elements as part of the annual report of the ExCom to the MOP; and
- requests the ExCom to present the draft guidelines developed to the MOP for the parties' views and input before their finalization by the ExCom.

Status of Ratification of the Kigali Amendment: Co-Chair Almatouq opened this agenda item (UNEP/OzL.Pro.30/INF/1) on Monday, indicating that 59 countries have ratified the Amendment and encouraged all countries to do the same. Several delegates presented the status of ratification of the Kigali Amendment in their countries and the expected conclusion date.

On Friday, during the adoption of the decision, the Secretariat announced that it had received the 60th instrument of ratification during the week.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2), the MOP notes that, as of 9 November 2018, 60 parties had ratified, approved or accepted the Kigali Amendment, and urges all parties that have not yet done so to consider ratifying, approving or accepting the Amendment in order to ensure broad participation and to achieve the goals of the Amendment

Future Availability of Halons and Their Alternatives (decision XXIX/8): On Monday, Dan Verdonik, Co-Chair, Halons Technical Options Committee (HTOC), reported on progress made with the International Civil Aviation Organization (ICAO) since forming an informal working group to better understand the current uses and releases of halons and any potential courses of action that civil aviation could take to reduce those uses and releases.

Verdonik informed parties that a questionnaire was developed and sent out to national servicing companies to provide a more accurate estimate of annual halon 1301 emissions from civil aviation. Fifty-three surveys were returned but only 10 provided data on the questions intended to determine emissions. HTOC does not know the total number of surveys that were distributed; however, its estimate of halon 1301 available at the end of 2018 is 37,750 metric tonnes.

Following questions from parties, HTOC agreed to have offline discussions with parties on their more detailed and technical questions.

The US, supported by the EU, Canada, and Australia, noted that they would present a CRP later in the week, requesting the Secretariat to engage with the International Maritime Organization (IMO) and other organizations. Nigeria suggested encouraging countries still using halons in the oil and gas sector to decommission them. Co-Chair Newberg suspended discussions until parties could consider the CRP submitted by the US and others.

During Wednesday morning's plenary, the US reported on a proposal with Australia, Canada, the EU, Nigeria, and Norway on future availability of halons and their alternatives (UNEP/OzL.Pro.30/CRP.3). Colombia requested consultations with the proponents for a possible amendment regarding Article 5 party interests in halon recovery. During the evening plenary, the US reported the proposal had been revised (UNEP/OzL.Pro.30/CRP.3/Rev.1) to request the TEAP to identify specific needs for halons, and other sources of recoverable halons, and opportunities for recycling halons in Article 5 and non-Article 5 parties. Delegates forwarded the revised CRP to the HLS.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2), the MOP requests the Ozone Secretariat to liaise with the IMO Secretariat to facilitate the exchange of information between relevant technical experts regarding halon availability; and the TEAP, through its HTOC, to:

- continue engaging with the IMO and ICAO to better assess future amounts of halons available to support civil aviation and to identify relevant alternatives already available or in development;
- identify ways to enhance the recovery of halons from the breaking of ships;
- identify specific needs for halon, other sources of recoverable halon, and opportunities for recycling halon in all parties; and
- submit a report on halon availability, based on the above-mentioned assessment and identification activities, before OEWG 42.

Issues Related to Exemptions under Articles 2A–2I of the Montreal Protocol: Co-Chair Almatouq introduced these items (UNEP/OzL.Pro.30/2/Add.1) on Monday.

Critical Use Nominations (CUNs) for 2019 and 2020: On Monday, MBTOC Co-Chairs Ian Porter and Marta Pizano discussed the critical use exemptions (CUEs) requested by Argentina, Australia, Canada, China, Mexico, and South Africa.

Jordan called for parties to share information in order to phase out methyl bromide. The US noted that the workload of the MBTOC is significantly diminished and proposed that the MBTOC process be further streamlined. Canada reported that they were working with Australia, Argentina, and South Africa on drafting a CRP.

In the discussion, Argentina agreed to eliminate methyl bromide in the short term. The EU recalled its experience in phasing out methyl bromide and urged the use of alternatives for tomatoes and strawberries. Costa Rica expressed concern on the expansion of exemptions for methyl bromide. Mexico highlighted that it may be complicated to secure some countries' inventories, since they may be fragmented. Co-Chair Newberg suspended decision on this item until Canada submitted its CRP.

Informal consultations were held during the week and a CRP (UNEP/OzL.Pro.30/CRP.11) was submitted to the Preparatory Segment on Thursday, which forwarded it to the HLS.

Final Outcome: The MOP decision on CUEs for 2019 and 2020 (UNEP/OzL.Pro.30/L.2) contains an annex with two tables: agreed critical-use categories (Table A), for 2019, for Argentina (strawberry fruit and tomatoes), Canada (strawberry runners) and South Africa (mills and houses), and for 2020 for Australia (strawberry runners); and corresponding permitted levels of production and consumption (Table B).

The MOP decides, *inter alia*:

- to permit, for the agreed critical-use categories for 2019 and 2020 in Table A for each party, the levels of production and consumption for 2019 and 2020 in Table B, 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; and
- that parties shall endeavor to license, permit, authorize or allocate quantities of methyl bromide for critical uses as listed in Table A.

Development and Availability of Laboratory and Analytical Procedures that can be performed without Using Controlled Substances under the Protocol (Decision XXVI/5): On Monday, Helen Tope, Co-Chair, Medical and Chemicals TOC (MCTOC) presented MCTOC's report. She gave examples of laboratory and analytical uses (LAU) of controlled substances including: calibration, and extraction of solvents, diluents, and carriers for specific chemical analyses. She highlighted the main ODS have been CTC, CFC-113 and 1,1,1-trichloroethane. She emphasized the report considers standards relating to LAU, as well as available alternatives, potential barriers, and challenges for parties, that it focuses on controlled substances already granted under the global exemption, and it includes information on known LAU using HCFCs. She highlighted that in 2016 the global production of all reported controlled substances for LAU was relatively small and listed some recommendations, including establishing cooperation with standards organizations and parties providing more comprehensive data.

Australia, supported by the US, suggested it may be time to take a pause and revisit this issue in order to formulate a new way of dealing with it. The Co-Chairs noted a draft decision by Australia, supported by the EU and Canada, to be addressed

under the agenda item on adjustments, proposing that OEWG 41 consider a revised list of laboratory and analytical procedures that can be performed without using controlled substances.

On Wednesday, Australia introduced its proposal with Canada (UNEP/OzL.Pro.30/CRP.5) to add HCFCs to the existing global LAU exemption under the Protocol.

The CRP was referred to the Adjustments Contact Group. During the week the contact group considered several proposals to modify CRP.5, but ultimately elected to leave it unchanged.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2/Add.1), the MOP decides to include HCFCs in the global LAU exemption under the same conditions and on the same timeline as set forth in paragraph 1 of decision XXVI/5.

Process Agents: On Monday, Co-Chair Newberg introduced this agenda item. Mexico and Venezuela requested parties using process agents to provide an update and timeline for the elimination of these substances. Reflecting suggestions by the EU and Canada, the Co-Chairs recommended, and delegates accepted, that this discussion be reflected in the meeting report and this item be addressed at OEWG 41.

Linkages between HCFCs and HFCs in Transitioning to Low GWP Alternatives: On Tuesday, Co-Chair Almatouq summarized prior work on this issue and invited input. Saudi Arabia, supported by Bahrain, Oman, and the EU, proposed postponing discussion until OEWG 41 to allow for further consultations. Parties agreed to the proposal.

Issues Related to Energy Efficiency While Phasing Down HFCs (Decision XXIX/10): ***TEAP Report on Energy Efficiency in the RACHP Sectors:*** On Tuesday, TEAP Energy Efficiency Task Force Co-Chairs Bella Maranion, Fabio Polonara, and Suely Carvalho presented the executive summary of the Task Force's supplemental report reflecting guidance and requests made by OEWG 40. Among the messages they highlighted were:

- low-GWP refrigerants themselves are only expected to have a minor impact on system efficiency;
- most improvement in energy efficiency of systems can be achieved through optimization and use of new and advanced components;
- in the absence of enabling energy efficiency policy, energy efficiency values for air conditioning are generally lower in Article 5 parties compared to non-Article 5 parties;
- minimum energy performance standards and labels have proved to be cost-effective policy tools;
- district cooling systems may reduce power demand by 55-62% in comparison to conventional air conditioning systems and may consume 40-50% less energy; and
- there needs to be consideration of potential options for a new financial architecture, by which resources for energy efficiency could flow more certainly and effectively.

In the ensuing discussion, the Gambia noted that the funding agencies do not usually fund transition projects. FSM, with Burkina Faso, called for more information on the obstacles preventing available finances to flow to energy efficiency in the RACHP sectors, and requested the TEAP to suggest approaches to ensure the MLF can partner with other financial organizations to improve financing for energy efficiency. The TEAP noted that the MLF partners with the Global Environment Facility (GEF) to provide co-financing for large projects. Nigeria highlighted the need for a globally acceptable threshold to determine energy efficiency in industrial equipment. Argentina stressed that parties need to decide whether they will fund energy efficiency. The United Arab Emirates (UAE) called for more information on funding energy efficiency on an industrial scale. China stressed the need for adequate funding to promote research in energy efficiency.

The US asked for more information on consumers' benefits. India and South Africa asked for further discussion on funding sources and architecture for energy efficiency. Uganda called for a complementary treatment of energy access and energy efficiency.

Responding to questions and comments, TEAP said:

- the benefits of energy efficiency for consumers would be experienced over the lifetime of the project;
- the research focused on multilateral funds, which tend to be allocated to large projects;
- energy saving and operating costs for consumers are interrelated; and
- the report's annex highlights different energy efficiency options so parties can chose the most cost-effective one.

Colombia suggested developing a roadmap to understand funding gaps for energy efficiency in the RACHP sectors.

Access of Article 5 Parties to Energy-Efficient Technologies in the RACHP Sectors: On Tuesday, Rwanda presented the African Group's CRP on this issue (UNEP/OzL.Pro.30/CRP.2), saying it now reflects comments provided at OEWG 40. Brazil and FSM supported the CRP. Canada, the EU and US expressed concern that the requests contained in the CRP may go beyond the mandate of the Montreal Protocol and the MLF. Lesotho called for clarity on the scope of the Protocol in relation to energy efficiency.

Zambia said lessons on synergies could be drawn from the Rotterdam and Stockholm Conventions.

Switzerland, Barbados, Nigeria, the EU, and Bahrain welcomed further discussions on the African Group proposal in a contact group.

Mexico stressed that to transition to low-GWP alternatives, we need to improve the energy efficiency of equipment, making it more sustainable in the long run. India and Nigeria called for a stronger focus on energy efficiency in refrigeration and air conditioning. Nigeria also expressed concern about the dumping of obsolete, high-GWP refrigeration technology in Africa. Kenya called for specific indications on which areas of the African Group proposal were beyond the Protocol's scope.

Co-Chair Newberg reconvened the OEWG contact group on this issue with Leslie Smith (Grenada) and Patrick McInerney (Australia) as Co-Chairs. During its work throughout the week revising the African Group proposal, delegates discussed, *inter alia*: what ExCom should take into account when developing cost guidance related to maintaining or enhancing energy efficiency of replacement technologies; modalities for co-funding improvements in energy efficiency; and the development by OEWG 41 and MOP 31 of an energy efficiency "roadmap" to guide governance, regulatory frameworks, and funding and co-funding opportunities.

The group also discussed the new wording related to the allocation of specific funds for demonstration projects on energy efficiency in Article 5 parties. They considered a request to the ExCom to liaise with other funds and financial institutions to support improvements in energy efficiency, with some suggesting that the ExCom seek modalities for cooperation, and others suggesting that the ExCom also seek co-funding.

They also considered issues related to: the difference between cooperation and co-funding; the possibility of limiting the financial support just to "low-volume consuming countries"; and the importance of the bulk procurement processes for energy efficiency.

Delegates reviewed the revised CRP (UNEP/OzL.Pro.30/CRP.2/Rev.1) in the Preparatory Segment on Friday, which forwarded it to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2/Add.1), the MOP requests the ExCom to consider flexibility within the financial support provided through enabling activities for HFCs to enable Article 5 parties to use part of this support for energy efficiency policy and training support as it relates to the phase-down of controlled substances, such as:

- developing and enforcing policies and regulations to avoid the market penetration of energy-inefficient RACHP equipment,
- promoting access to energy-efficient technologies in these sectors; and
- targeted training on certification, safety and standards, awareness-raising, and capacity-building aimed at maintaining and enhancing the energy efficiency.

In addition, the MOP requests:

- the ExCom to consider increasing the funding provided to low-volume consuming countries;
- the TEAP to prepare a report on the cost and availability of low-GWP technologies/equipment that maintain/enhance energy efficiency, *inter alia*, covering various RACHP sectors, in particular, domestic air-conditioning and commercial refrigeration taking into account geographical regions, including countries with high ambient temperature (HAT) conditions; and
- continued support of stand-alone projects in Article 5 parties.

The MOP further calls on the ExCom to:

- build on its ongoing work of reviewing servicing projects to identify best practices, lessons learned, and additional opportunities for maintaining energy efficiency in the servicing sector, and related costs;
- consider the information provided by demonstration and stand-alone projects in order to develop cost guidance related to maintaining or enhancing energy efficiency of replacement technologies and equipment when phasing-down HFCs; and
- in dialogue with the Ozone Secretariat, to liaise with other funds and financial institutions to explore mobilizing additional resources and, as appropriate, set up modalities for cooperation such as co-funding arrangements to maintain or enhance energy efficiency when phasing down HFCs, acknowledging that activities to assist Article 5 parties comply with their obligations under the Montreal Protocol will continue to be funded under the MLF in accordance with its guidelines and decisions.

Proposed Adjustments to the Montreal Protocol on HCFCs for Non-Article 5 Parties: On Tuesday, Co-Chair Almatouq introduced the two proposals for adjustments to the Montreal Protocol on HCFCs submitted by the US (UNEP/OzL.Pro.30/6) and Australia with Canada (UNEP/OzL.Pro.30/7). The Russian Federation asked for the expansion of the scope of the adjustment to include certain medical aerosols and solvents used for rocket engines. The US highlighted that fire suppression is a safety and public health issue, so should be considered during the 2020-2030 period.

Australia informed parties that a draft decision will be available for consideration.

The EU said parties should be addressing exemptions for use in the RAC sectors. Switzerland questioned whether a "servicing tail" (an amount of HCFCs allowed to be used to service existing equipment) is the best way forward for this approach. Nigeria cautioned that exemptions allowed in this instance might open a floodgate of requests for exemptions from other parties.

The issue was referred to a contact group co-chaired by Alain Wilmart (Belgium) and Agustin Sanchez Guevara (Mexico) for further discussion. During the week the group considered a consolidated proposal submitted by the US, Canada, and Australia, discussing HCFC consumption beyond 1 January 2020, agreeing that consumption should be restricted to the servicing of fire suppression and protection equipment, solvent applications in rocket manufacturing, and topical medical aerosol applications in specialized burn treatments. The group also discussed two new texts tabled by several Article 5 parties, related to:

- extending HCFC use for the RAC sector to beyond 2025 in HAT countries; and
- equalizing the HCFC consumption threshold permitted for certain uses in both Article 5 and non-Article 5 parties.

On the first text, the Article 5 parties concerned explained the need to ensure that HAT countries are not found to be in non-compliance between 2025 and 2028, when the compliance deferral (which allows certain parties to go above the use of HCFCs for certain uses) under the Kigali Amendment comes into effect. Some countries were concerned that this suggestion is a "blank check" to HAT countries on the continued use of HCFCs, calling instead for this use to be reviewed in 2025. After several rounds of informal consultations, delegates agreed to examine the flexibility of the HCFC schedule adjustment in line with the Kigali Amendment.

On the second text, one country suggested that, as the HCFC use threshold is already in the Protocol in relation to non-Article 5 parties, the adjustment would apply *mutatis mutandis* to Article 5 parties. On this understanding, the proponents withdrew the proposed text.

The draft decision was forwarded to the HLS on Friday, which adopted it without amendment.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2/Add.1), the MOP adopts, in accordance with the procedure set out in paragraph 9 of Article 2 of the Montreal Protocol, an amendment of Article 2F of the Protocol to provide for the adjustments of production and consumption of controlled substances listed in Protocol Annex C Group 1 (HCFCs), to allow exceeding consumption and production limits by 0.5% for:

- the servicing of refrigeration and air-conditioning equipment existing on 1 January 2020;
- the servicing of fire suppression and fire protection equipment existing on 1 January 2020;
- solvent applications in rocket engine manufacturing; and
- topical medical aerosol applications for the specialized treatment of burns.

The MOP further:

- encourages the development and use of alternatives to HCFCs in the non-servicing applications set out in Article 2F;
- urges the recovery, recycling, and reclamation of HCFCs as well as the use of stocks and alternatives, where available and appropriate, in order to reduce the production and consumption of HCFC substances;
- requests the TEAP to provide in its quadrennial reports to be presented to MOP 35 in 2023 and to MOP 39 in 2027 information on the availability of HCFCs, including amounts available from recovery, recycling, and reclamation, and best available information on country level and total known stocks, as well as availability of alternative options for the applications described in Article 2F; and
- examines the flexibility of the HCFCs schedule adjustment in line with the Kigali Amendment.

The annex contains the specific adjustments to the relevant articles of the Montreal Protocol.

Unexpected Emissions of Trichlorofluoromethane (CFC-11): On Tuesday, Co-Chair Newberg introduced this issue (UNEP/OzL.Pro.30/2, UNEP/OzL.Pro.30/3/Rev.1, and UNEP/OzL.Pro.WG.1/40/INF/2/Add.1). SAP and TEAP highlighted the information on CFC-11 emissions presented at a side-event on Monday.

Jordan requested clarification on the measurement of new emissions given the lifecycle of CFC-11. The US asked for clarification on the correlation between sources of CFC-11 and CFC-22. China called for clarity on: the methodology used to estimate CFC-11 quantities in the atmosphere; the gap between TEAP figures related to foams and national data; and the factors taken into consideration in the measurement of CFC-11, including factors due to foam agents.

SAP said it recognized the correlation between CFC-11 and CFC-22, but that the extent of this correlation is not yet known. The EU asked why there was no further evidence on CFC-12 and CTC. SAP explained that the global atmospheric concentration of CFC-11 was expected to go down by 2% per year, but is currently decreasing by 0.08%, indicating that there is an increase in emissions.

China assured delegates that the recent findings have been taken very seriously, adding that 1,172 inspections were conducted countrywide and a number of enterprises have been brought to justice for their production and use of CFC-11. China proposed holding a seminar on compliance and invited parties to participate.

The EU, Barbados, China, Nigeria, Burkina Faso, Zambia, Canada, and Bahrain supported forwarding the decision drafted by OEWG 40 (UNEP/OzL.Pro.30/3) to the HLS. Canada also highlighted other actions that could be taken, including action by the ImpCom. Zambia noted that the Protocol needs to address the drivers of the CFC-11 emissions.

The US underlined the need for the Protocol to pause and reassess its role, lamenting that the increase in CFC-11 in the atmosphere was detected by entities outside the competencies of the Montreal Protocol even though the Protocol is charged with monitoring emissions' levels; and requested leaving the item open to give countries time to hold bilateral meetings to discuss the next steps.

Venezuela asked for further scientific data. FSM called on all parties to pay more attention to production and consumption of CFC-11 within their borders and to make sure it is controlled. Japan, with others, emphasized that this issue can damage efforts made throughout the years as well as the credibility of the Montreal Protocol. The EIA called for a review on compliance and enforcement procedures.

Delegates agreed to forward the draft decision to the HLS while keeping the agenda item open for further discussion.

On Wednesday, Co-Chair Newberg reopened this agenda item for further comments. The US said it looked forward to more studies on this issue in 2019 and emphasized transparency is key, calling on all parties to share information on CFC-11 to build confidence in the Protocol's institutions. Australia highlighted that decisions need to be based on additional data.

The HLS adopted the decision on Friday without amendment.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2), the MOP:

- requests SAP to provide to the parties a summary report on the unexpected increase of CFC-11 emissions, which would supplement the information in the Quadrennial Assessment, with a preliminary summary to be provided to OEWG 41 and an update to MOP 31;
- requests TEAP to provide the parties with information on potential sources of emissions of CFC-11 and related controlled substances from potential production and uses, as well as from banks, that may have resulted in emissions of CFC-11 in unexpected quantities in the relevant regions, with a preliminary summary to be provided to OEWG 41 and an update to MOP 31;
- requests parties with any relevant scientific and technical information that may help inform the SAP and TEAP reports to provide that information to the Secretariat by 1 March 2019;
- encourages parties, as appropriate and as feasible, to support scientific efforts, including for atmospheric measurements, to further study the unexpected emissions of CFC-11 in recent years;
- encourages relevant scientific and atmospheric organizations and institutions to further study and elaborate the current findings related to CFC-11 emissions; and
- requests the Ozone Secretariat, in consultation with the MLF Secretariat, to provide parties, via a report to OEWG 41 and a final report to MOP 31, an overview outlining the procedures under the Protocol and the Fund regarding controlled substances by which the parties review and ensure continuing compliance with Protocol obligations and with the terms of agreements under the Fund, including with regard to monitoring, reporting, and verification.

The MOP further requests all parties to:

- take appropriate measures to ensure that the phase-out of CFC-11 is effectively sustained and enforced in accordance with obligations under the Protocol; and
- inform the Secretariat about any potential deviations from compliance that could contribute to the unexpected increase in CFC-11 emissions.

Issue Raised by the UAE on Eligibility for Financial and Technical Assistance: On Tuesday, Co-Chair Almatouq introduced this agenda item. The UAE reiterated its need for financial and technical support under the obligations of the Kigali Amendment. He stressed the UAE's historical support and compliance to the Montreal Protocol, noting it had never made a prior request to the MLF. Calling for more bilateral consultations on this matter, the UAE asked for this issue to be deferred to MOP 31 or beyond. Saudi Arabia, Bahrain, Jordan, Egypt, Syria, Morocco, Bangladesh, Lebanon, and Oman supported the UAE request.

Iran asked parties for more elaboration on the categorization of Article 5 parties in relation to the request put forward by the UAE, as an Article 5 party.

The US said it was open to allowing the UAE more time for bilateral consultations, but raised questions about UAE's categorization as an Article 5 party.

Delegates agreed to defer discussions on this issue as requested.

Review of the Terms of Reference, Composition and Balance as well as Fields of Expertise Required of the Assessment Panels and their Subsidiary Bodies: On Wednesday, Co-Chair Newberg introduced this item, noting a draft decision based on a CRP was developed during OEWG 40 (UNEP/OzL.Pro.30/3). India noted that the CRP was produced in response to the new challenges that Article 5 parties face as a result of the Kigali Amendment, including, *inter alia*, more focus on energy efficiency and liaising with other bodies and funding institutions. He stated that given the guidance that the TEAP and its Technical Options Committees (TOCs) provide to parties, there is need to re-consider the TEAP ToR; he asked the Ozone

Secretariat to develop an information document summarizing the expertise needed for the TEAP for OEWG 41 with input from parties.

Bahrain, Lebanon, Jordan, Nigeria, Morocco, and FSM supported the CRP.

Australia, with Canada, the US, and the EU, noted that the CRP specified revising the ToR of the TEAP, but noted that parties presenting this CRP in plenary mentioned revisions needed for the ToR of other assessment panels. They also questioned the request for the Ozone Secretariat to produce an information document on this item given that the TEAP provides regular updates through its expertise matrix on the TEAP's needs.

Burkina Faso called on the Secretariat to provide a summary of the information needed for parties to discuss this issue. Supporting the proposal, Syria and Yemen stressed the need for regional balance. Saudi Arabia said the review should address expertise required for the implementation of the Kigali Amendment.

Co-Chair Newberg proposed, and parties supported, the establishment of an informal group to further discuss this issue. The group met several times during the week, and on Friday reported reaching consensus on a draft decision (UNEP/OzL.Pro.30/CRP.13) supported by Bahrain Egypt, India, Iraq, Jordan, Kuwait, Oman, Rwanda, Saudi Arabia, Tunisia, and the UAE. The Preparatory Segment forwarded the draft decision to the HLS, which adopted it without amendment.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2/Add.1), the MOP requests the Ozone Secretariat to prepare a document in consultation with the TEAP, for OEWG 41, taking into account the ongoing efforts by the TEAP to respond to changing circumstances, including the Kigali Amendment, in relation to:

- ToR, composition, and balance with regard to geography, representation of Article 5 and non-Article 5 parties, and gender; and
- the fields of expertise required for the upcoming challenges related to implementation of the Kigali Amendment, such as energy efficiency, climate benefits, and safety.

The MOP further notes that the following paragraphs of this decision supersede prior direction regarding periodicity to the TEAP regarding assessments of process agents, laboratory and analytical applications, destruction technologies, n-propyl bromide and possible new substances, and requests the TEAP to:

- provide their review of process agent uses of controlled substances no earlier than 2021, and every four years thereafter, if new compelling information becomes available;
- provide a review of LAU of controlled substances if new compelling information becomes available indicating an opportunity for significant reductions in production and consumption;
- to provide a review of destruction technologies after submitting the report called for in the MOP 30 decision on destruction technologies, if new compelling information becomes available; and
- requests the TEAP to provide information to the parties on n-propyl bromide (nPB) if there is new compelling information, and on possible new substances if any previously unreported substances are identified that may have a likelihood of substantial production.

Consideration of Senior Expert and Other Nominations by Parties to the TEAP: On Wednesday, Co-Chair Newberg introduced this issue (UNEP/OzL.Pro.30/2/Add.1, and UNEP/OzL.Pro.30/INF/6), noting prior discussions at OEWG 40 including the ToR for membership to the TEAP, and highlighted the number of senior experts on the TEAP as between two and four. The US noted that the number of senior expert nominations exceed four, calling for further discussions. Australia, supported by Canada, stressed that nominations should be guided by the expertise needed on the TEAP, and noted that the workload presented is an opportunity to streamline the TEAP's annual update report. The EU reiterated the need to adhere to the ToR.

Delegates agreed to forward this matter to the informal group on ToR review. Closed door discussions on this issue were held on Friday evening. On Friday during the last session of the Preparatory Segment plenary, Lebanon presented the results. She thanked the TEAP for its work, and the individual members for their service, and then announced the endorsement of the following members: Marta Pizano (Colombia) as TEAP Co-Chair for an additional term of four years; Ashley Woodcock (UK) as TEAP Co-Chair for an additional term of four years; Fabio Polonara (Italy) as Refrigeration, Air Conditioning and Heat Pumps TOC Co-Chair for a four-year term; Shiqui Zhang (China) as a senior expert for an additional four-year term; Marco González (Colombia) as a senior expert for an additional four-year term; Sidi Menad Di Ahmed (Algeria) as a senior expert for an additional year; and Mohamed Besri (Morocco) as a senior expert for an additional year.

Final Outcome: In its decision (UNEP/Ozl.Pro.30/CRP.13), the MOP decides to endorse the three Co-Chairs and four senior experts as outlined orally by Lebanon during the HLS.

Consideration of the Membership of Montreal Protocol Bodies for 2019: On Wednesday, the Secretariat highlighted that not all regions had submitted their nominations and asked them to do so. Co-Chair Almatouq drew attention to the proposal by Armenia and Bosnia and Herzegovina on behalf of the Eastern Europe and Central Asia region (UNEP/OzL.Pro.30/CRP.4) to address geographical representation under the ExCom to include eight Article 5 parties and eight non-Article 5 parties. Bosnia and Herzegovina explained one of ExCom seats for Article 5 parties would be rotated among Article 5 parties from Eastern Europe and Central Asia. The Russian Federation asked for clarification on the difference between this proposal and the UN regional group and sub-regional classifications. The US highlighted that there are other ways to ensure equal representation.

Grenada, Samoa, and Barbados noted the regional imbalance on the ExCom also affects them so they would be keen to participate in discussions to find a solution.

Canada acknowledged that this is an important but delicate issue, noting it is worth exploring other ways to achieve regional balance without changing the membership of the ExCom. Armenia responded it is interested to learn how this can be achieved.

Jordan, Mexico, and Georgia supported the CRP. The Co-Chairs proposed that the presenters of this CRP continue consultations on this matter. The proponents of the CRP held informal bilateral discussions throughout the week, and reported to plenary on Friday that they had received support from many Article 5 parties, but that more time was needed for all parties to consider the proposal, so they requested that the issue be included on the agenda of OEWG 41. OEWG 40 Co-Chair Almatouq said the request would be noted in the MOP report.

In Thursday's plenary, the Secretariat noted the nominations for Protocol bodies and said the Secretariat would be entrusted to insert them into proper MOP decision texts to be forwarded to the HLS. On Friday evening, the decisions were adopted without amendment.

ImpCom Membership: In its decision (UNEP/OzL.Pro.30/L.2), the MOP confirms the positions of Australia, Chile, Maldives, Poland, and South Africa as members of the Committee for one further year and selects the EU, Guinea-Bissau, Paraguay, Saudi Arabia, and Turkey as members of the Committee for a two-year period beginning on 1 January 2019.

It also notes the selection of Lesley Dowling (Australia) to serve as President and Obed Baloyi (South Africa) to serve as Vice-President and Rapporteur of the Committee for one year beginning on 1 January 2019.

MLF ExCom Membership: In its decision (UNEP/OzL.Pro.30/L.2), the MOP: endorses the selection of Argentina, Benin, China, Grenada, Kuwait, Niger, and Rwanda as members of the ExCom representing Article 5 parties; and the selection of Belgium, Canada, France, Hungary, Japan, Norway, and the US as members representing non-Article 5 parties for one year beginning 1 January 2019.

The MOP also notes the selection of Philippe Chemouny (Canada) to serve as Chair and Juliet Kabera (Rwanda) as Vice-Chair of the ExCom for one year beginning 1 January 2019.

OEWG Co-Chairs: In its decision (UNEP/OzL.Pro.30/L.2), the MOP endorses the selection of Alain Wilmart (Belgium) and Laura-Juliana Arciniegas (Colombia) as Co-Chairs of OEWG 41.

Compliance and Data Reporting Issues Considered by the Implementation Committee: On Wednesday, Miruza Mohamed, President, ImpCom, presented a summary of the 60th and 61st meetings of the ImpCom, noting that the agendas of both meetings were light due to the high level of compliance, and highlighting that with the Kigali Amendment coming into force in January 2019, the Committee will have more to consider. Co-Chair Almatouq noted that the CRPs from the ImpCom will be forwarded to the HLS as a package.

Jordan proposed changing the language related to Yemen's non-compliance to reflect the difficulties in reporting due to the ongoing conflict in the country. Ozone Secretariat Legal Advisor Gilbert Bankobeza noted that Yemen would need to report their difficulties to the Secretariat. Yemen reported that the country had been in touch with the Secretariat on this issue, and was in the process of submitting a letter to the Secretariat. Co-Chair Almatouq noted that three draft decisions (UNEP/OzL.Pro.30/CRP.1) would be forwarded to the HLS, and that the discussion in plenary would be recorded in the meeting report. On Friday evening, the HLS adopted the decisions without amendment.

Final Outcome: On data and information provided by the parties in accordance with Article 7 of the Montreal Protocol, the MOP, in its decision (UNEP/OzL.Pro.30/L.2):

- notes that all but two parties that should have reported data for 2017 have done so;
- notes with concern that two parties, namely the Central African Republic and Yemen, have not reported their 2017 data as required under Article 7, and that this places them in non-compliance with their data reporting obligations under the Protocol;
- urges the Central African Republic and Yemen to report the required data to the Secretariat as quickly as possible; and
- requests ImpCom to review the situation at its next meeting.

In its decision on the reporting of zero in Article 7 data reporting forms (UNEP/OzL.Pro.30/L.2), the MOP:

- notes that 20 parties submitted forms for reporting data in accordance with Article 7 for 2017 containing blank cells, contrary to decisions XXIV/14 and XXIX/18, and that all of those parties provided clarification in response to the request of the Secretariat;
- urges all parties, when submitting forms for reporting data in accordance with Article 7, to ensure that in the future all cells in the data reporting forms are completed with a number, including zero, where appropriate, rather than being left blank, in accordance with decision XXIV/14; and
- requests ImpCom to review the status of adherence to paragraph 2 of the present decision at its sixty-third meeting.

In its decision on reporting information on destination countries for exports and source countries for ODS imports (UNEP/OzL.Pro.30/L.2/Add.2), the MOP:

- urges parties exporting controlled substances to report to the Secretariat information on the destinations of their exports, as called for in decision XVII/16; and
- encourages parties importing controlled substances to report to the Secretariat information on the sources of their imports, as set out in decision XXIV/12.

Update on the Situation of the Caribbean Islands Affected by Hurricanes (Decision XXIX/19): On Wednesday, Co-Chair Newberg called for a report on this issue (UNEP/OzL.Pro.30/2). Grenada presented reports from Dominica, Antigua and Barbuda, and the Bahamas, noting that Dominica is still experiencing data-reporting challenges, but that the latter two will be able to meet their obligations under the Protocol, as their national ozone units are functional. Co-Chair Newberg noted that this will be recorded in the meeting report.

Other Matters: ***Safety Standards for RACHP Systems and Appliances:*** On Wednesday, the EU said that the purpose of this item (UNEP/OzL.Pro.30/INF/2, Add.1 and UNEP/OzL.Pro.30/INF/3) was to highlight the work of the Secretariat in outlining safety standards to ensure parties could meet their obligations under the Kigali Amendment in the most cost-effective manner, noting the need for the Protocol to be technologically neutral in its consideration of effective refrigeration technologies. China pointed out that Article 5 parties need to be selective when considering alternative technologies. Zambia suggested that the Secretariat work with the UN Committee of Experts on the Transport of Dangerous Goods on safety standards. Saudi Arabia supported maintaining or raising the safety standards. Delegates agreed to discuss this issue at OEWG 41.

Harmonized System Customs Codes for HCFC and CFC Substitutes: On Wednesday, the EU welcomed the Ozone Secretariat's work with the World Customs Organization (WCO) on standardized customs codes for substances and blends that should help combat illegal trade in substances controlled under the Montreal Protocol (UNEP/OzL.Pro.30/INF/5 and INF/7). He noted that the codes would be up for adoption by WCO in June 2019 and asked all parties to liaise with their customs authorities to urge support for adoption. The US added that if adopted in June 2019, the new codes would enter into effect for WCO parties on 1 January 2022. This discussion was recorded in the MOP meeting report.

Dates and Venue of MOP 31: On Friday, President Ghahramanyan asked the Ozone Secretariat to present upcoming meeting dates. The Secretariat informed parties that OEWG 41 will be hosted in Bangkok, Thailand from 1-5 July 2019, and MOP 31 is confirmed to take place in Rome, Italy from 4-8 November 2019. Italy informed parties that they have reached an agreement to host MOP 31 at the UN Food and Agriculture Organization headquarters in Rome.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2), the MOP decides to convene the Thirty-First Meeting of the Parties to the Montreal Protocol in Rome from 4-8 November 2019.

A Brief Analysis of MOP 30

Delegates arrived in Quito with their eyes on the imminent entry into force of the Kigali Amendment and the multiple opportunities and challenges that it brings. The Montreal Protocol has been famously heralded as the "most successful international environmental treaty"; this status was celebrated at MOP 30, but as one delegate observed, "success is not a static state – it takes effort to maintain it." With the recent confirmation that, long after its phase-out, emissions of CFC-11 are on the rise, delegates' minds were preoccupied with the possible implications for the Protocol, and how to overcome this new, unexpected hurdle. Coming into MOP 30, the unspoken question was how parties would respond to ensure that the considerable reputation the Montreal Protocol has built over 30 years prevails.

Also on the minds of delegates arriving in Quito were issues related to the Kigali Amendment and its implementation. Carried forward from MOP 29 and OEWG 40 were discussions related to energy efficiency, representation, and financing. Acknowledging that some of these issues represented new territory for the Protocol, the outgoing MOP President defined this as a time of growth and transition. "It is important to reflect on the roots of the success of the Protocol: one where parties respond with unwavering commitment and cooperation."

This brief analysis looks at how MOP 30 began to address issues related to that transition and what processes have been set in motion to adapt the Protocol to new realities and challenges as well as deal more effectively with old ones, and safeguard its credibility and reputation for effectiveness.

Addressing CFC-11: Accountability and Action

With the recent confirmation of CFC-11 emissions, parties to the Montreal Protocol found themselves oscillating between old and new challenges: the old being having to address the recent emissions of CFC-11, a substance that has been banned since 1996; and the new being whether there is a need to reassess the Protocol's institutions to address compliance and enforcement. The CFC-11 emissions problem "is a threat to the Protocol, as much as it is a threat to ozone-hole recovery," said the US in plenary, calling to "take a pause and reassess how we got here."

While questions had arisen at OEWG 40 regarding the delay in reporting these emissions, parties arrived in Quito expecting more scientific evidence confirming the emissions and their sources. The Scientific Assessment Panel (SAP) accordingly provided an explanation at MOP 30 as to how it has arrived at the conclusion that indeed this banned substance is in use once more. SAP supported its conclusions that CFC-11 was being emitted by explaining that CFC-11 global concentration is expected to decrease by 2% a year; however, the fact that the concentration is now decreasing by 0.08% a year is indicative of an increase in use.

With new evidence pointing to China as the source of these emissions, nervousness permeated the halls on the first day of MOP 30 as many wondered how China and other parties would tackle this. Following the buoyant optimism and drive experienced at the 2016 adoption of the Kigali Amendment, parties noted again and again that this unexpected discovery threatened to drive the steady course of the Montreal Protocol off its linear success path.

In a statement that many delegates appreciated as "transparent and mature" China made no excuses for the use of CFC-11 by enterprises in the country. The head of delegation furthermore described the swift and extensive inspections that had been conducted across the country since August 2018 and informed the MOP that several perpetrators had been brought to justice. "This was a refreshingly unexpected show of humility," said one observer, given the reaction from China at OEWG 40, when the country had questioned the credibility of the data presented at that time. With a view to ensure a sustainable solution to this violation, China repeatedly noted that it continues to investigate why this has happened and is committed to address this, suggesting for instance a seminar on compliance and education. In a gesture of cooperation, China reached out to parties inviting their input into the seminar organization and participation.

In what might have been a contentious and eclipsing issue at MOP 30, China's prompt admittance and ownership over the CFC-11 emissions allowed parties to focus on ways forward. But herein lies the new challenge: some parties rightly questioned whether it is enough to just address this recent violation or whether this case raises broader questions about compliance and monitoring of phased-out ODS for all parties to the Montreal Protocol. As the Federated States of Micronesia reflected, "it may be time to look to improving our enforcement and implementation systems for the future." Indeed, this process has defined itself as one where parties have built a relationship founded on trust, but has the time come to "trust, but verify" by reassessing the Protocol's institutional capacity to address challenges?

A Time of Transition and Reflection: Are Protocol Institutions, Mechanisms and Approaches Ready for What's to Come?

In this process, trust has been established over years of unabated effort, focus, and collaboration, but the Kigali Amendment—as a delegate from India aptly described it—has brought with it new challenges for Article 5 parties. One such challenge regards financing the cost of the HFCs phase-down.

At this meeting, parties expected a comprehensive progress report from the Executive Committee (ExCom) of the Multilateral Fund (MLF), including cost guidelines for the HFC phase-down. Many applauded the ExCom's work, trusting their representatives on the Committee to ensure the final guidelines were balanced and needs-responsive. Others, however, were not so keen to leave the finalization of the guidelines to the ExCom. In a terse exchange during the plenary discussion, a suggestion by the US to entrust the guidelines to the ExCom was met by a definite "no" from India, who expressed concern that their specific needs may not be well understood by the ExCom. The delegate from India noted that his reading of decision XXVIII/2 instructed the ExCom to check back with the MOP before finalizing the guidelines, and it is this understanding that eventually prevailed. Commenting on this, some Article 5 parties opined that this discussion was "reminiscent of the discussions on HCFC phase-down," where a number of them had felt their issues had not been fully understood. "These guidelines represent one of the most sensitive aspects of the Kigali Amendment. We need to learn from history on this," one of the sponsors of the proposal confided, alluding to the aforementioned HCFC-guideline discussions.

Several issues arose on the question of representation. First, as a carry-over from OEWG 40 (and perhaps Kigali in 2016), countries with high ambient temperatures (HAT countries) clamored to be recognized as separate from other Article 5 parties, even as they postponed the discussion of a proposal for special funding for their energy-efficient-technology transition needs. The question of whether some HAT countries still qualify to be listed as Article 5 parties was raised by the US in plenary, and may become an issue to watch in the future.

Second, the issue of geographic representation also came up in discussions over expert nominees to the TEAP. Traditionally, the TEAP's membership has reflected geographical balance, as well as a balance of expertise, but at OEWG 40, the TEAP Co-Chairs presented their updated "Matrix of Needed Expertise," and called for nominees that fit those areas of expertise, regardless of where they came from. At MOP 30, there was some push back on this suggestion, but behind closed doors, parties seemed to agree that, with respect to the senior experts, expertise outweighs geographic representation. The MOP chose to extend the terms of two senior experts by four years, but only granted one more year to two other long-standing experts, as their expertise "is already represented on the Panel." However, the issue of representation still remains an unresolved issue for HAT countries. "Air conditioning is not a luxury to us. It is crucial for HAT countries to have representation on the science panels to reflect our unique circumstances," said one HAT country representative.

The debate over regional representation also raged where the ExCom was concerned. At the prompting of Armenia and Bosnia and Herzegovina, parties were asked to consider designating a permanent seat for Eastern Europe and Central Asia on the ExCom. "The Soviet Union split up two decades ago, and yet the ExCom has never recognized us as full parties, only allowing us to participate once every four years," said one delegate. This issue was deferred to OEWG 41, in July 2019, where this may continue to prove to be a complex matter to address, due to the differences between the UN's designation of regions and the Montreal Protocol's description of Article 5 and non-Article 5 parties.

Financing the Transition

Energy efficiency, another recurring point of discussion since Kigali, remained a prominent agenda item at MOP 30. The African Group, in what was welcomed as a proactive step, presented a proposal related to market regulation to ensure effective energy efficiency transitions. However, many saw the proposal as going far beyond the mandate of the Protocol. Throughout the discussions on this proposal from OEWG 40, it was clear that the requirement of the Kigali Amendment action on a high-GWP substance like HFCs requires taking into account energy efficiency aspects in a way that was not an issue when the Montreal Protocol was only dealing with ODS. Moving into this new realm proved to be difficult at this meeting. In the contact group discussions at MOP 30, parties reformulated the African Group proposal to instead address demonstration projects for HFC phase-down, calling for broader discussions around how best Article 5 parties can access co-financing, including through various modalities for cooperation.

The Montreal Protocol is known for supporting implementation, and the MLF is tasked with providing funding to Article 5 parties to enable them to meet their obligations under the Protocol. At MOP 30, the ExCom highlighted a USD 2.5 million surplus in funds due to additional voluntary contributions made by 17 donor parties, which would be made available for the changing needs of parties. With an agreement to fund and support, *inter alia*, policies and regulations, capacity building, best practices, and other activities to achieve energy efficient technology adoption, the MLF is entering new terrain. The contact group on energy efficiency held extensive discussions on how to assist parties to implement their Kigali-related obligations, including calling on the MLF to work with the Ozone Secretariat to secure additional funding for Kigali implementation. The provision of funding has not been within the domain of the Ozone Secretariat, therefore this new arrangement will pose a unique challenge.

Moving Forward

Throughout the week it was difficult to escape the feeling that the Montreal Protocol is entering a transitional phase where its tried-and-true institutions and procedures might need to be reassessed and adapted to protect its hard-won reputation as one of the most successful multilateral environment agreements.

MOP 30 deferred several complex issues to OEWG 41 and MOP 31, making 2019, as MOP President Ghahramanyan put it, "an exciting year." These include: the relationship between stratospheric ozone and proposed solar radiation management strategies; linkages between HCFCs and HFCs in transitioning to low global warming potential alternatives; a new Scientific Assessment Panel report on CFC-11 emissions; new terms of reference for the TEAP; the composition of the MLF ExCom; and safety standards.

In discussing the challenges that have presented themselves, one party maintained that, as long as the Montreal Protocol was supported by strong scientific expertise and evidence, it would prevail. Commenting on this, however, another observer pointed to the "the strong political will" of the parties to drive implementation, which he noted, "builds the bridge between science and action."

Upcoming Meetings

2018 CVF Virtual Climate Summit: The Climate Vulnerable Forum (CVF) will convene a global political leaders' summit to build increased support to safeguard those that are most vulnerable to the growing climate change impacts. The Virtual Climate Summit is the first Heads of Government-level conference to be held entirely online, eliminating greenhouse gas (GHG) emissions and promoting inclusive dialogue. **date**: 22 November 2018 **location:** virtual **www:** https://thecvf.org/virtual-leaders-summit-to-raise-climate-ambition-and-accelerate-action/

Fourth Meeting of the Global Commission on the Geopolitics of Energy Transformation: At its fourth meeting, the Global Commission on the Geopolitics of Energy Transformation will review its draft report on the geopolitical implications of the expected energy transformation and the large-scale deployment of renewable energies. The Commission is expected to publish its final report in January 2019 during the International Renewable Energy Agency (IRENA) Assembly. **dates:** 27-29 November 2018 **location:** Abu Dhabi, UAE **contact:** Global Commission on the Geopolitics of Energy Transformation **email:** geopolitics@irena.org **www:** http://geopoliticsofrenewables.org/

Global Science, Technology and Innovation Conference (G-STIC) 2018: The Conference aims to accelerate the development, dissemination, and deployment of technology innovations that enable the achievement of the Sustainable Development Goals (SDGs). G-STIC 2018 will build on the results of G-STIC 2017 and further discuss the policy changes needed for the technological transition to sustainable societies. In addition, the different thematic sessions will dive deeper into integrated technological solutions with significant impact on the SDGs, and further strengthen the multi-stakeholder communities around the different thematic clusters of G-STIC. **dates:** 28-30 November 2018 **location:** Brussels, Belgium **contact:** VITO NV **phone:** +323-286-7458 **www:** https://www.gstic.org

Katowice Climate Change Conference: The Katowice Climate Change Conference will include the 24th session of the Conference of the Parties (COP 24) to the UN Framework Convention on Climate Change (UNFCCC), along with meetings

of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol, the Subsidiary Body for Scientific and Technological Advice, the Subsidiary Body for Implementation, and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. COP 24 is expected to finalize the rules for implementation of the Paris Agreement on climate change under the Paris Agreement work programme. A High-Level Ministerial Dialogue on Climate Finance is expected to be held in conjunction with COP 24. **dates:** 2-14 December 2018 **location:** Katowice, Poland **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** cop24@mos.gov.pl; secretariat@unfccc.int **www:** http://cop24.gov.pl/en/; http://unfccc.int

55th Meeting of the GEF Council: The GEF Council will approve projects to realize global environmental benefits in the GEF's focal areas, provide guidance to the GEF Secretariat and implementing agencies, and discuss its relations with the conventions for which it serves as the financial mechanism. **dates:** 17-20 December 2018 **location:** Washington DC, US **contact:** GEF Secretariat **phone:** +1-202-473-0508 **fax:** +1-202-522- 3240/3245 **email:** secretariat@thegef.org **www:** https://www.thegef.org/council-meetings/gef-55th-council-meeting

Fourth Session of the UN Environment Assembly (UNEA): The theme of the fourth session of the UN Environment Assembly is "Innovative solutions for environmental challenges and sustainable consumption and production." It will be preceded by a meeting of the Open-Ended Committee of Permanent Representatives (OECPR) from 4-8 March 2019. **dates:** 11-15 March 2019 **location:** Nairobi, Kenya **contact:** UNEP **email:** beatpollution@unenvironment.org **www:** http://web.unep.org/environmentassembly/

International Symposium on the Unexpected Increase in Emissions of Ozone-Depleting CFC-11: Organized by World Climate Research Programme's Stratosphere-troposphere Processes and their Role in Climate (SPARC) project, the purpose of the Symposium is to provide a forum for scientists and technologists to explore and present information on the potential causes of the increased CFC-11 emissions to provide a firmer scientific basis for future Montreal Protocol discussions on this issue. **dates:** 25-27 March 2019 **location:** Vienna, Austria **contact:** Susan McFadden, NASA **email:** susan.k.mcfadden@nasa.gov **www:** https://www.sparc-climate.org/meetings/meetingscfc-11-workshop-march-2019-in-vienna/

49th Session of the IPCC: This meeting will approve the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. **dates:** 8-12 May 2018 **location:** Kyoto, Japan **contact:** IPCC Secretariat **phone:** +41-22-730-8208/54/84 **fax:** +41-22-730-8025/13 **email:** IPCC-Sec@wmo.int **www:** http://www.ipcc.ch

Montreal Protocol OEWG 41: Montreal Protocol OEWG 41 will meet to prepare for MOP 31. **dates:** 1-5 July 2019 **location:** Bangkok, Thailand **contact**: Ozone Secretariat **phone**: +254-20-762-3851 **fax**: +254-20-762-0335 **email**: ozoneinfo@unep.org **www:** http://ozone.unep.org/meetings

High-level Political Forum on Sustainable Development (HLPF) 2019: HLPF 2019 will address the theme, "Empowering people and ensuring inclusiveness and equality." It will conduct an in-depth review of SDG 4 (quality education), SDG 8 (decent work and economic growth), SDG 10 (reduced inequalities), SDG 13 (climate action), and SDG 16 (peace, justice and strong institutions), in addition to SDG 17 (partnerships for the Goals), which is reviewed each year. Among other items, the Forum will consider the Global Sustainable Development Report, which is issued every four years. **dates:** 9-18 July 2019 **location:** UN Headquarters, New York **contact:** UN Division for Sustainable Development Goals **fax:** +1-212-963-4260 **www:** https://sustainabledevelopment.un.org/hlpf/2019

Montreal Protocol MOP 31: MOP 31 will address, *inter alia*, implementation of the Kigali Amendment, linkages between HCFCs and HFCs in transitioning to low global warming potential alternatives, issues related to energy efficiency while phasing down HFCs, and critical and essential use exemptions. **dates:** 4-8 November 2019 **location:** Rome, Italy **contact**: Ozone Secretariat **phone**: +254-20-762-3851 **fax**: +254-20-762-0335 **email**: ozoneinfo@unep.org **www:** http://ozone.unep.org/meetings

For additional meetings, see http://sdg.iisd.org

Glossary

CFCs	Chlorofluorocarbons
CFC-11	Trichlorofluoromethane
CRP	Conference room paper
CTC	Carbon tetrachloride
EIA	Environmental Investigation Agency
ExCom	Executive Committee (MLF)
FSM	Federated States of Micronesia
GWP	Global Warming Potential
HAT	High ambient temperature
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
HLS	High-level Segment
HTOC	Halons Technical Options Committee
ImpCom	Implementation Committee
IPCC	Intergovernmental Panel on Climate Change
LAU	Laboratory and analytical uses
MBTOC	Methyl Bromide Technical Options Committee
MLF	Multilateral Fund
MOP	Meeting of the Parties
ODS	Ozone depleting substances
OEWG	Open-ended Working Group
RAC	Refrigeration and air conditioning
RACHP	Refrigeration, air-conditioning and heat-pump
SAP	Scientific Assessment Panel
TEAP	Technology and Economic Assessment Panel
TOC	Technical Options Committee
ToR	Terms of reference
UAE	United Arab Emirates
UNEP	United Nations Environment Programme
UV	Ultraviolet