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「蒙特婁議定書第三十一次締約國會議」報告

出國人服務機關、職稱及姓名：

外交部秘書　王妍潔

行政院環境保護署副處長　謝炳輝

環境技術師　謝議輝

出國地點：義大利羅馬

出國期間：108 年 11 月 2 日至 11 月 11 日

報告日期：108 年 12 月 28 日

摘要

蒙特婁議定書第 31 次締約方會議（MOP-31）於西元（下同）2019 年 11 月 4 至 8 日假義大利羅馬聯合國糧食與農業組織（FAO）舉行，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。

保護臭氧層維也納公約於 1985 年在各國協議下通過，並於 1987 年通過具有實質管制規定及約束力的蒙特婁議定書，且公約於 1988 年及議定書於 1989 年正式生效。歷年來，各國合作協商下已再次通過 4 個蒙特婁議定書修正案與 13 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。蒙特婁議定書是全球公認最成功的國際環保協議，不僅是第一個在 2009 年讓當時 196 個聯合國會員 1 全數批准與承諾遵循管制規範的議定書，更成功於 2010 年起讓全球禁止生產氟氯碳化物（CFCs）與海龍且消費量降為零，且大幅展開削減氟氯烴（HCFCs）。

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，我國由工業技術研究院（UNEP 認可之 NGOs，以下簡稱工研院）以觀察員身分參加蒙特婁議定書第 31 次締約方大會（MOP-31），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，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，以供國內相關管制參考。會議期間，有不少國家發言表示有關吉佳利修正案批准進度，已經陸續與各部會、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。我國代表團也與鄰近國家如新加坡、越南、印尼及韓國代表詢問該國對吉佳利修正案的立場，並與相關空調熱泵、冷凍冷藏及歐盟能源與環境合作組織、義大利國家環境保護研究機構交流。

本次會議於 11 月 9 日凌晨 33 分結束，會議共產出約 17 項 MOP 決議，包括有效實施和執行而強化體制程序、2020-2021 溴化甲烷關鍵用途豁免、各評估小組 2022 年 4 年期報告、多邊基金資金研究、CFC-11 非預期排放、實驗室和分析用途、製程助劑、消費量提報事宜、許可證制度等議題，另蒙特利爾議定書締約方第 32 次會議訂於明(2020)年 11 月 23 日至 27 日假烏茲別克首都塔什干召開。

目　　錄

壹、前言

一、臭氧層（距地球表面 15 至 50 公里）能夠吸收太陽光中大部分的紫外線為天然屏障，保護生態環境與人類健康免受到傷害。但人類及工業活動，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，釋放至大氣中的氟氯碳化物（Chlorofluorocarbons，CFCs）等物質破壞了臭氧層被證實後，聯合國環境規劃署（United Nations Environment Programme，UNEP）即於 1985 年 9 月 16 日邀集各國共同攜手，通過了蒙特婁議定書，管制削減臭氧層破壞物質（Ozone Depleting Substances，ODSs），並訂每年的 9 月 16 日為「國際保護臭氧層日」。

二、1985 年在各國協議下通過保護臭氧層維也納公約，1987 年制定「蒙特婁議定書」，展開削減破壞臭氧層物質的管制行動。我國為避免國內產業受到貿易阻礙，於蒙特婁議定書正式生效後也同時展開國內管制規範，遵循蒙特婁議定書管制規範，將 CFCs、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)及溴化甲烷...等管制物質消費量削減為零，也已削減 90%的氟氯烴(Hydrochlorofluorocarbons，HCFCs)消費量，且已不再生產任何破壞臭氧層物質。

三、1989 年 1 月 1 日起蒙特婁議定書正式生效後，聯合國環境規劃署臭氧秘書處（Ozone Secretariat，UNEP）每年召開 1 次締約方會議（Meeting of the Parties，MOP），檢討議定書執行的現況、並協商其他 ODSs 的管制方案及討論衍生的管制議題。一旦有增加新的管制方案與物質，則締約方會議會產出修正案（Amendments），且該修正案需要一定數目的締約國批准才具有效力；倘加嚴現有管制方案，未新增管制物質，締約方會議以調整案（Adjustments）方式執行，僅需締約方會議決議，無需任何締約國批准即生效。故截至目前，議定書共計產出 5 個修正案（MOP-2、MOP-4、MOP-9、MOP-11 及 MOP-28）與 14 個調整案（MOP-2、MOP-4、MOP-7、MOP-9、MOP-11、MOP-19、MOP-30），批准情形如表 1，說明如下：

（一）倫敦修正案（London Amendment）：MOP-2 新增 10 種 CFCs、四氯

化碳（CCl_4）與三氯乙烷（methyl chloroform）於管制清單中。也奠立一多邊基金（Multilateral Fund），資助開發中國家執行議定書減量方案時可能需承擔的部份成本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，於 1992 年 10 月 8 日生效，有 197 個締約國批准。

（二）哥本哈根修正案（Copenhagen Amendment）：MOP-4 增加管制物質種類，納入溴化甲烷、氟溴烴（HBFC）以及氟氯烴（HCFCs）。同時締約方會議也啟動未遵約程序（non-compliance procedure），成立執行委員會（Implementation Committee）來審查締約方未遵守約定之案例與相關後續處置，於 1994 年 6 月 14 日生效，有 197 個締約國批准。

（三）蒙特婁修正案（Montreal Amendment）：MOP-9 與會代表除了加嚴管制方案，也同意增加建置 ODSs 進口與出口的許可制度之要求條文（Article 4B），及對未批准哥本哈根修正案的締約方進行溴化甲烷貿易禁止，於 1999 年 11 月 10 日生效，有 197 個締約國批准。

（四）北京修正案（Beijing Amendment）：MOP-11 與會代表同意納入管制 HCFCs 與 BCM（Bromochloromethane）生產量的條文，並且要求締約方提報使用於檢疫與裝運前處理的溴化甲烷使用量，於 2002 年 2 月 25 日生效，有 197 個締約國批准。

（五）吉佳利修正案（Kigali Amendment）：MOP-28 將 17 種溫室氣體氫氟碳化物（Hydrofluorocarbons，HFCs）增列入蒙特婁議定書的管制物質，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，於 2019 年 1 月 1 日生效，截至 2019 年 11 月 8 日止，有 88 個締約國批准。

表 1、蒙特婁議定書及其修正案批准情形

公約/修正案	通過年	生效年	締約國總數
維也納公約	1985	1988	198
蒙特婁議定書	1987	1989	198
倫敦修正案	1990	1992	197
哥本哈根修正案	1992	1994	197
蒙特婁修正案	1997	1999	197
北京修正案	1999	2002	197
吉佳利修正案	2016	2019	88

資料來源：https://ozone.unep.org/all-ratifications

四、 我國雖非聯合國會員國，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。

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（Non-governmental organization，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；外交部王秘書 妍潔；工業技術研究院胡副組長 文正、楊經理斐喬，劉副研究員 恩廷，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	發展資訊蒐集/會議紀錄
外交部	秘書	王妍潔	法律/對外交流
工業技術研究院	副組長	胡文正	掌握會議進展/研議因應策略

能源與環境研究所	經理	楊斐喬	介紹國際友人/訪談人員洽詢
	副研究員	劉恩廷	資訊蒐集/庶務行政

參、會議議程

蒙特婁議定書第三十一次締約國會議於 2019 年 11 月 4 日至 11 月 8 日假義大利羅馬市之聯合國糧食與農業組織（Food and Agriculture Organization of the United Nations，FAO）召開，圖 1，共計有超過 500 位代表與專家與會，分為 2019 年 11 月 4-6 日 3 天的預備會議及 11 月 7-8 日 2 天的高層會議。會議議程，如表 3：

表 3、蒙特婁議定書第三十一次締約國會議議程

日期	議程
11/4	1. 義大利政府代表、UNEP 代表致歡迎詞。 2. 會議架構：確認預備會議討論議題項目、會議工作程序與架構。 3. 多邊基金預算與財務報告，及審查 2020 年執委會、多邊基金及不限成員工作小組共同主席等資格多邊基金 2021~2023 年預算討論。 4. 各部門評估小組 2022 年四年期報告之潛在重點領域。 5. CFC-11 排放議題其他事項。
11/5	6. 四氯化碳排放議題。 7. 蒙特婁議定書第二條豁免相關議題，包含 2020 年與 2021 年溴化甲。 8. 關鍵用途豁免提名、溴化甲烷庫存、實驗室與分析用途、製程助劑等。 9. A5 國家冷凍冷藏、空調、熱泵之能源效率議題討論。 10. TEAP 職權範圍、組成、專業領域與工作量議題討論。
11/6	11. 多邊基金成員資格議題討論。 12. 安全標準議題討論。 13. 科學評估小組與技術評估小組針對北極地區發現 5 種揮發性有

	機化合物及其成分討論。 14. 遵約與資料提報事項：執行委員會說明各國執行情形。 15. 吉佳利修正案批准現況。
11/7	1. 開幕典禮：義大利政府代表、UNEP 代表、前次 MOP-30 主席與教皇致詞。 2. 會議架構：MOP-31 主席選舉、確認高階會議議程、會議工作程序與架構、代表之到任文件（Credentials of representatives）。 3. 評估小組 2018 年四年期綜合報告。 4. 多邊基金執行委員會主席報告基金執行內容與進展。 5. 各國代表致詞與關鍵議題討論。
11/8	6. MOP-31 預備會議決議結果說明。 7. MOP-32 會議地點與時間。 8. 其他事項。 9. MOP-31 會議決議。 10. MOP-31 會議決議確認通過。 11. 會議閉幕。

圖 1、會議地點：義大利羅馬聯合國糧食與農業組織（FAO）

肆、會議過程及重要決議

自 2014 年起網路填單報名方式，本次由臭氧秘書處提供專屬報名網址，提供非政府組織（NGOs）的選項完成報名並取得 Priority Pass；現場以 Pass 順利領取會議名牌順利入場參與會議，如圖 2。

圖 2、我國出席人員參與情形

一、會議重點內容

本次會議共計產出 17 個決議文，共有 10 個與議定書進展、豁免審核、要求研究主題相關的決議，以及 7 個與議定書運作與行政程序相關的包括 2 個多邊基金財務議題及 3 個委員會委員提名議題，1 個 OEWG41（Open-ended Working Group）會議共同主席提名及 1 個 MOP-32 會議地點時間等，以下僅針對我國關注的重點說明如下：

（一）吉佳利修正案批准情況（Decision XXXI/11）

截至 2019 年 11 月 8 日已有 88 個國家批准吉佳利修正案，超過修正案生效的門檻(20 個會員國提交批准或接受文件)，並自 2019 年 1 月 1 日生效，包括：

1.歐洲：波蘭、丹麥、瑞士、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。

2.北美洲：加拿大。

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。

4.南美洲：智利、哥斯大黎加、厄瓜多、烏拉圭。

5.中東：約旦。

6.亞洲：越南、日本、朝鮮人民共和國（北韓）、寮國、馬爾地夫。

7.非洲：南非、馬利、盧安達、葛摩、馬拉威、象牙海岸、貝南共和國、加彭、多哥、烏干達、布吉納法索、尼日、塞內加爾。

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

（二）科學評估報告、環境影響評估報告、技術與經濟評估報告等之 2022 年 4 年期報告之潛在重點領域（Decision XXX/2）

1.肯定各評估委員會委員的努力，收集全球資料完成 2018 年精確且易懂形式的報告供政策決策者較易理解與使用。期待科學評估委員會(Scientific Assessment Panel，SAP)、環境影響評估委員會、技術暨經濟評估委員會（Technology and Economic Assessment Panel， TEAP）於 2022 年 12 月 31 日以前完成 2022 年之四年期評估報告，並於 2023 年 4 月 30 日以前完成一份綜合報告，供 2023 年 OEWG 討論。報告執行期間，委員會可與各國交換資料與溝通，以避免資料重複，並提供可被理解的資訊。

2.請各評估小組根據第 IV/13 號決議，將值得通報的任何重大情況發展通知締約方，與來自第 5 條締約方的相關科學家密切溝通，在編寫報告時促進區域平衡。

3.請環境影響評估小組在撰寫 2022 年評估報告時，掌握最新的科學資訊及未來模擬情境，並針對管制物質及替代物質在大氣中分解，進一步評估臭氧層和紫外線造成的影響與氣候變遷之關係：

(1)生物圈、生物多樣性和生態系統健康，包括生物地球化學過程和全球循環。

(2)人體健康。

(3)生態系統、農產業，包括建築、運輸、太陽能材料和塑膠微粒。

4.科學評估小組 2022 年報告應包括：

(1)評估臭氧層狀況及其未變化。

(2)評估全球及極區上空臭氧層，包括南極和北極冬、春季節臭氧濃度變化情形。

(3)評估大氣中稀有氣體和雜質組成的混合物氣體，尤其是管制物質及其他對臭氧層有重要意義的物質，在大氣中自上而下衍生的排放量及最終歸宿趨勢，並對不明排放源及排放量觀測大氣濃度間之差異。

(4)依據維也納公約及蒙特婁議定書目標，對臭氧層和氣候變化具有重要性的任何問題，進行探討。

(5)評估紫外線及其對平流層臭氧層潛在影響有關的資訊及研究。

(6)蒙特婁議定書列管化學物質相關檢測物質的相關資訊。

5.技術和經濟評估小組應在其 2022 年報告中對以下專題作出評估和評價：

(1)生產及消費部門在向技術和經濟上可行和可持續的替代品和做法過渡的過程中取得的技術進步，以儘量減少或消除所有部門對受控物質的使用。

(2)受控物質儲存和庫存的狀況，以及可用於管理這些物質以避免向大氣排放的備選方案。

(3)所有 蒙特婁議定書締約方在履行蒙特婁議定書義務和維持已經實現的淘汰方面面臨的挑戰，特別是在替代品和替代技術方面的挑

戰，包括締約方為防止排放而面臨的與原料使用及副產品有關的挑戰，因應挑戰的技術及經濟上可行的方案。

(4)逐步淘汰受控破壞臭氧層物質和逐步少用氫氟碳化物對可持續發展的影響。

(5)在開發適合高環境溫度國家使用的 HCFs 替代品方面取得的技術進展，特別是在效能及安全。

（三）CFC-11 非預期排放（Decision XXXI/3）

1.去年 MOP-30 即針對此事件通過第 XXX/3 號決議，要求 SAP 提交 CFC-11 的非預期排放報告，內容包含大氣監測及模式模擬資料，並於 MOP-32 提交最終報告。

2.管制物質的違法生產與走私為《蒙特婁議定書》不遵約行為，為了更進一步瞭解實際排放情況，2019 年 3 月由臭氧秘書處舉行 CFC-11 非預期排放的國際專題討論報告，查證締約方違法生產與走私的可能性。 同時檢討現行制度，由多邊基金執行委員會轉交各締約方審議文件，評 估目前的監測、報告、核查以及許可證制度與配額制度。

3.為加強 CFC-11 排放管制，避免違法生產與走私再發生，本次會議決議如下：

(1)若締約方有任何超過允許量的 CFC-11 生產或消費量資料，請立即提交報 告說明具體情形。

(2)提醒締約方若為新數據,則應依據議定書第 7 條更新申報報告數據。

(3)提醒各締約方按照第 XXII/20 號決定第 1 段的規定，匯報所有管制物質的生產，以便根據議定書第 3 條計算生產量和消費量。

(4)鼓勵各締約方採取行動，確保為原料生產目的所允許使用的管制物質，不直接用於非原料目的或非法生產 CFC-11。

(5)鼓勵各方採取以下行動，以發現和防止管制物質的非法生產、進口、出口及消費：

i.以有效發現和防止非法生產管制物質的方式履行蒙特婁議定書義務。

ii.酌情考慮各國在其淘汰之前或之後禁止使用管制物質的禁令。

iii.向臭氧秘書處報告經充分證實的管制物質非法貿易案件，以促進訊息交流。

iv.向臭氧秘書處報告如何處理重大的非法生產、進口、出口或消費案件，並說明原因以促進訊息交流。

(6)提醒各締約方，確保將用於原料和豁免用途的管制物質的任何進出口納 入許可證制度。

(7)請 TEAP 向各締約方提供根據第 XXX/3 號決定第 2 段訊息的最新情況，並就此向第 32 屆締約方會議提供報告，包括任何新的強制性要求以及以下訊息：

i.分析 CFC-11 貯存庫的地理位置和市場部門。

ii.無水氟化氫和四氯化碳的生產與 CFC-11 的非預期排放之間的關聯性。

iii.CFC-11 產品的類型，以及任何此類產品的處置、檢測與可能的回收 機會和方法。

iv.調查非法生產 CFC-11 的可能驅動原因，例如是否有在技術和經濟上可行的 CFC-11 和 HCFC-141b 替代品及可行性。

(8)請 SAP 與臭氧管理研究人員在 2020 年的會議上合作，釐清對全球範圍的管制物質進行大氣監測的差距，並提供加強監測的方法選擇。同時向締約方報告管制物質非預期排放的初步訊息，以供 2020 年第 32 屆締約方會議暨第 12 屆公約締約方會議審議。

(9)邀請各締約方盡快向秘書處提供與 CFC-11 非預期排放有關的任何大氣監測數據，並請臭氧秘書處將數據提供給各締約方。

（四）2020 年和 2021 年關鍵用途豁免提名（Decision XXXI/4）

1.TEAP 及溴化甲烷技術選擇委員會的報告顯示，已確認幾乎所有檢疫及裝運前處理（Quarantine and Preshipment，QPS） 用途的溴化甲烷有在技術和經濟上可行的替代品，許多締約方也大幅減少溴化甲烷關鍵用途提名，且繼續申請豁免用途的締約方也積極為開發替代品努力。

2.澳洲草莓種植業的研究計劃取得進展，計劃在 2018 年、2019 年和 2020 年進行的試驗成功並且完成替代品註冊後即轉用替代品，澳洲政府承諾僅在 2021 年有替代品可供註冊使用時才批准所需的溴化甲烷量。

3.加拿大的關鍵用途溴化甲烷的研究計劃下取得進展，且將在 2020 年繼續其研究計劃，阿根廷也持續進行替代品的研究開發，而南非政府也積極淘汰溴化甲烷。

（五）實驗室與分析用途豁免（Decision XXXI/5）

1.締約方會議在第 XXVI/5 號決議中將全球實驗室和分析用途豁免延長至 2021 年 12 月 31 日。

2.根據 TEAP2018 年 9 月的報告針對實驗室和分析用途的第 XXVI(5)(2) 號決議答覆，以及醫學和化學技術選擇委員會的 2018 年評估報告及其建議，顯示過去四年實驗室及分析用途 ODSs 消費量少於 160 公噸，若從現行的用途豁免清單刪除部分用途可能造成混亂，且所需的行政工作與可帶來的環境效益比例不相稱，本次會議決議如下：

(1)將全球實驗室和分析用途豁免無限期延長至 2021 年以後，但不影響締約方在以後會議上的豁免審查。

(2)請秘書處在提交締約方的第 7 條年度報告資料，包括用於實驗室和分析用途的 ODSs 生產和消費趨勢等訊息。

(3)為了進一步請秘書處透過網站向各締約方提供全球的 ODSs 實驗室和分析用途豁免清單，而各締約方所同意的用途清單將不再接受豁免。

(4)邀請各締約方將醫學和化學技術選擇委員會在 TEAP2018 年評估報告中，所提供的不使用 ODSs 的方法納入考慮。

(5)提醒各締約方，用於實驗室和分析用途的 ODSs 的生產和消費，僅限於未被排除的實驗室和分析基本用途豁免。

(6)鼓勵各締約方更進一步減少用於實驗室和分析用途的 ODSs 生產和消費，並促進不需要此類物質的實驗室標準方法。

(7)請 TEAP 在其四年期報告中，報告各締約方在減少用於實驗室和分析用途的 ODSs 生產和消費方面取得的任何進展。任何新替代品以及無需使用的情況，以及任何可大幅減少生產和消費的可能，應在年度進度報告中報告該訊息。

(8)本決議第 7 段取代了對 TEAP 在 XXX/15 號決議第 4 段中有關實驗室和分析用途的報告的要求。

（六）製程助劑（Decision XXXI/6）

1.TEAP 的 2018 年和 2019 年進度報告，大多數締約方報告的製程助劑消費和排放量皆大幅低於第 XXIII/7 決議所列。

2.本次會議決議如下：

(1)更新第 X/14 號決議的用途清單表 4 及 5。

(2)提醒各締約方注意第 X/14 號決議所要求的報告重要性。

(3)請 TEAP 在四年期報告中，報告各締約方減少製程助劑用途的 ODSs 使用和排放所取得的任何進展，以及任何新替代品或新的生產技術、減少排技術，並且在其年度進度報告中報告可信的新訊息。

表 4、列管物質製程助劑用途清單

製程助劑用途	列管物質	許可的締約方
生產氯鹼過程去除三氯化氮	四氯化碳	歐盟、以色列、美國
生產氯化橡膠	四氯化碳	美國
生產氯磺化聚乙烯	四氯化碳	歐盟
生產高性能纖維聚合物	四氯化碳	中國

生產合成纖維板	四氯化碳	歐盟
生產合成纖維板	三氯氟甲烷	美國
全氟聚醚聚過氧化物光化學合成	二氯二氟甲烷	歐盟
生產環戊二烯	四氯化碳	歐盟
苯乙烯聚合物溴化處理	溴氯甲烷	美國
超高分子量聚乙烯纖維	三氟三氯乙烷	美國

表 5、加工劑用途限制

國家	補給或消費量(公噸/年)	最大排放量(公噸/年)
中國	1 103.0	313
歐盟	921.0	15
以色列	3.5	0
美國	2 300.0	181
共計	4 327.5	509

（七）能源效率與低溫暖化潛勢值（Global Warming Potential，GWP）值技術之資訊規範（Decision XXXI/7）

持續依據第 28~30 次締約方會議決議，要求 TEAP 繼續進行與更新為因應吉佳利修正案管制，冷凍冷藏空調及熱泵之替代品的能源效率與低 GWP 值技術之成本、可行性、市場取得性及最佳施行方法等，並於 MOP32 提出供各國討論。

（八）TEAP 等評估小組委員會提名的程序（Decision XXXI/8）

締約方要求審查評估小組的職權範圍、組成、平衡、專業領域和工作，其中敦促締約方遵循評估小組職權範圍，在提名任命評估小組成員之前，與評估小組共同主席進行磋商：

1.技術和經濟評估小組的職權範圍的重要性，特別是蒙特婁議定書第 24 次締約國會議第 8 號決議附件中關於提名準則的第 2.9 節，該附件界定應列入所需專門知識的要求及訊息。

2.請評估小組在年度進展報告中提供一份摘要，概述評估小組及其各技術選擇委員會採取了哪些步驟，以通過公開及透明程序，確保遵守評估小組的職權範圍，包括根據職權範圍及協調進行充分磋商，內容涉

及：

(1)提名過程，需考慮專業領域和工作。

(2)擬訂提名和任用規定。

(3)終止任用及替換。

3.請締約方在向評估小組及其各技術選擇委員會或其臨時附屬機構提名專家時，使用評估小組的提名表和相關準則，以便於提交適當的提名，同時考慮到所需專門知識匯總表、地域和性別平衡，以及解決能效、安全標準和氣候效益等與吉加利修正有關的新問題所需的專門知識。

4.請臭氧秘書處在秘書處網站上提供評估小組成員提名表格，並在會議門戶網站上公佈締約方向評估小組提交的成員提名表格，以便於締約方審查和討論擬議提名。

5.敦促締約方依照第蒙特婁議定書第 30 次締約國會議第 16 號決議遵循評估小組的職權範圍，在提名任命評估小組成員之前，與評估小組共同主席進行磋商，並參考所需專業。

（九）依循蒙特婁議定書第七章之消費量提報事宜（Decision XXXI/9）

今年度完成申報 2018 年列管化學物質消費量資料的國家計有 169 個，其中有 103 個國家依據第 15 次締約方會議決議 XV/15 於 6 月 30 日以前提報，秘書處期望各國未來能依循規範持續儘早完成提報作業，以利執委會進行遵約審查作業。

（十）許可證制度（Decision XXXI/10）

1.蒙特婁議定書第 4B 條第 3 款要求各締約方，在列表中原生、已使用的、回收以及再精製的進出口貨品，其許可之日起三個月內應向秘書處提出報告。

2.已批准或接受吉佳利修正案，並確定無法在 2019 年 1 月 1 日之前建立和實施許可證制度，可推遲到 2021 年 1 月 1 日實施。目前已有 41

個吉佳利修正案締約方表示已經完成系統的建置作業，另有 5 個尚未批准吉佳利修正案的國家也表示已經完成系統建置作業。

3.許可證制度可監測管制藥物進出口、防止非法貿易並能收集數據，本次會議決議如下：

(1)已批准、批准中或接受吉佳利修正案並已根據議定書附件 F 實施管制物質許可證制度的所有締約方，應確保這些許可證制度包括進出口新的、已使用的管制物質，以及根據議定書第 4B 條第 2 之二款回收和回收的管制物質，並確保許可證制度有效實施和執行。

(2)提醒所有已批准、批准或接受吉佳利修正案的締約方，尚未批准並建立和實施附件中所列管制物質的進出口許可證制度。

(3)按第 4B 條的要求，定期審查已批准、批准或接受吉佳利修正案的議定書所有締約方，應根據議定書附件 F 建立和實施管制物質進出口許可證制度。

（十一）敦聘環境影響評估及 TEAP 共同主席（Decision XXXI/12）

感謝卸任環境影響評估小組及評估小組各共同主席和委員傑出工作及服務，敦聘印度 Mr.Krishna K. Pandey 及美國 Mr.Paul Barnes 擔任環境影響評估小組新共同主席；敦聘中國張建軍先生擔任醫療及化學品技術選擇委員會共同主席；敦聘埃及 Mr.Omar Abdelaziz 擔任冷凍冷、空調和熱泵技術選擇委員會新共同主席；敦聘日本 Mr.Keiichi Ohnishi 擔任醫療及化學技術選擇委員會共同主席;敦聘巴西 Ms.Suely Carvalho 為技術和經濟評估小組高級專家，以上任期為 4 年；敦聘阿爾及利亞 Mr.Sidi Menad Si Ahmed 為技術和經濟評估小組高級專家，任期 1 年，並請針對各小組委員提名進行研商。

（十二）多邊基金委員會成員（Decision XXXI/14）

1.敦聘巴林、孟加拉、智利、吉布地、印度、盧安達及蘇利南擔任執行委員會成員,依據蒙特婁議定書第 5 條第 1 款履行締約方(即開發中國家)，並推選澳洲、比利時、捷克、日本、瑞士、英國、北愛爾蘭及美

國擔任委員會成員。按非第 5 條第 1 款締約方(即已開發中國家)。

2.敦聘盧安達 Ms.Juliet Kabera 為執行委員會主席，比利時 Mr.Alain Wilmart 為副主席，以上任期自 2020 年 1 月 1 日起，為期 1 年。

（十三）蒙特婁議定書不限成員工作小組共同主席（Decision XXXI/15）

敦聘比利時 Mr.Alain Wilmart 先生及南非 Mr.Obed Baloyi 擔任，2020 年蒙特婁議定書不限成員工作小組共同主席。

（十四）蒙特利爾議定書締約方第 32 次會議時間及地點（Decision XXXI/16）

暫定於 2020 年 11 月 23 日至 27 日假烏茲別克首都塔什干召開蒙特利爾議定書締約方第 32 次會議。

伍、宣傳交流事項

本次 MOP-31 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。我國代表團也與鄰近國家如新加坡、越南、印尼及韓國代表詢問該國對吉佳利修正案的立場，並與相關空調熱泵、冷凍冷藏及歐盟能源與環境合作組織、義大利國家環境保護研究機構交流，詳細與談紀錄如表 6。

表 6、與國際專家交流之會議紀錄

單位	與談人	討論內容摘要
新加坡環境保護課/污染控制處 資深科學主任	Ms. Felicia Lim Yi Ying felicia_lim@nea.gov.sg	討論冷媒回收管理，表示該國主要管制 ODSs 的進口與出口，但未特別針對該國國內執行冷媒回收純化及再精製的廠商有特別管理的額外機制。惟廠商若要進出口原生、回收或純化冷媒時需向 NEA 申請許可。我方代表向其表示我國近來有廠商與該國 A-GAS 之新加坡分公司聯繫，並擬自該公司進口回收純化後之冷媒來臺灣，後續若有需雙方確認資訊需求時，其可向本署

單位	與談人	討論內容摘要
		以 E-mail 聯繫，至於規劃批准吉佳利修正案的相關程序方面，已著手國內 HFCs 使用與替代及相關資訊進行蒐研分析。
越南溫室氣體排放教育與臭氧保護處/自然資源與環境部氣候變遷部副處長	Ms. Nguyen Dang Thu Cuc vietoamozone@ronre.gov.vn	針對 HCFCs 管制與 HFCs 替代趨勢進行討論，未來可再針對相關資訊分享交流。
印尼減緩氣候變遷/環境與森林部主任	Ms. Emma Rachmawaty e_rachmawaty@yahoo.com	主要關注於推動 HCFCs 削減以符合蒙特婁議定書規範，但推動替代技術時，將朝低 GWP 值及兼顧能源效率的替代品為主。該國也將遵循吉佳利修正案，符合 2024 凍結消費量的目標，也推估於明年或後年進行相關批准程序。
業務與管理發展/冷媒與回收	Mr. Dott. Vincenzo Galantuc ci	義大利使用 HFCs 的範圍包括噴霧罐、滅火設施、家用與商用空調、家用與商用冷凍冷藏設備、運輸用空調與冷凍冷藏設備等，因此使用用途別與我國類似，皆相當廣泛。義大利依循歐盟的規範，因此早已於 2000 年～2005 年間陸續停用 HCFCs，2010 年以後即不再使用 HCFCs，且致力於 HFCs 的管制。因此，針對 HFCs 的使用用途別與替代技術，正針對不同用途別，分別進行衝擊分析與替代技術推廣研究，本次會談也提供其替代技術手冊供我國參考。
韓國代表團	-	正在研析 HFCs 使用情形與各用途別替代能力，以準備規劃管制政策，同時也在準備該國的批准程序，但該國批准毋須經過立法院，僅總理批准即可遞交，推估於明年應會進行相關程序。

圖 3、MOP31 預備會議主席 Ms. Laura Juliana Arciniegas

圖 4、新加坡代表 Ms. (Felicia) Lim Yi Ying

圖 5、美國空調熱泵及冷凍冷藏組織 Mr. James K. Walters

圖 6、歐盟能源與環境合作組織 EPEE Mr. Juergen Goeller（左三）

圖 7、越南自然資源與環境部氣候變遷處溫室氣體與臭氧層保護組組長 Ms. Nguyen Dang Thu Cuc

圖 8、印尼代表 Ms. Emma Rachmawaty(右一)

圖 9、義大利國家環境保護研究機構 Ms. Federica Moricci（左二）、Ms. Gonella Barbara（左四）及 Ms. Gabriella Rago（左五）

圖 10、美國國家海洋暨大氣總署地球系統研究實驗室 Stephen Montzka

陸、心得及建議

一、本次會議重點在建立各國遵循蒙特婁議定書之國內稽核策略及查獲未遵約後之因應制度，然因各國代表意見不同，最終決議內容多以「提醒（remind）」及「鼓勵（encourage）」等字眼，請各締約方若發現有未遵約時，檢視其過去提報之生產量與消費量是否要修正，但仍要求技術暨經濟評估委員會（TEAP）及科學評估委員會(SAP)針對 CFC-11 的使用與排放等資料進一步確認與研究。

二、各締約方關注低溫暖化潛勢值（GWP）替代品對設備能源效率的影響，因此要求 TEAP 針對此議題進行更多的研究供各締約方參考。而與我國現行政策也相關的議題也包括實驗與分析用途現況分析及豁免範圍時程資訊收集、關鍵與必要用途豁免審核結果、製程助劑豁免範圍等。

三、健康的臭氧層和氣候對實現所有永續發展目標至關重要。聯合國秘書長安東尼奧.古特雷斯(UN Secretary-General António Guterres)於 2019 年 9 月 16 日「國際臭氧層保護日」(International Day for the Preservation of the Ozone Layer)表示蒙特婁議定書「既是人類如何能夠合作因應全球挑戰的鼓舞人心案例，也是解決當前氣候危機的關鍵手段。」(an inspirational example of how humanity is capable of cooperating to address a global challenge and a key instrument for tackling todays climate crisis)，呼籲各界以同樣精神發揮更大的領導作用，落實巴黎協定及永續發展目標。迄今，蒙特婁議定書已展現創新科技及環境治

理的集體努力不只是修補臭氧破洞，並遵守聯合國多邊主義(multilateralism)精神共同應對脆弱性威脅及可行解決方案，逐步淘汰消耗臭氧層化學物質的使用，可在本世紀將全球變暖減少 0.4℃。

四、全球用於人類消費的所有糧食中約有三分之一被損失或浪費，嚴重影響了農民的收入，土地，水和能源等寶貴資源，並產生了溫室氣體。依據聯合國農糧規劃署(FAO)估計財務損失約為 9,400 億美元，並且產生溫室氣體排放量約為 44 億二氧化碳當量，約佔全球溫室氣體總排放量的 8%。因應極端氣候加劇威脅糧食損失和糧食安全，如何使用冷鏈系統(cold chain)提供安全性以應對這種影響的需求。為此，本屆大會通過「關於蒙特婁議定書對永續冷鏈減少糧食損失貢獻的羅馬宣言(Rome Declaration on the contribution of the Montreal Protocol to a sustainable cold chain to reduce food losses)，強調低 GWP 替汰冷媒及能源效率對冷鏈系統及糧食安全的重要性。

五、因應「吉加利修正案」和「巴黎協定」(Paris Agreement)的挑戰，歐洲能源與環境夥伴關係倡議永續冷卻白皮書(A five-step deliver sustainable cooling)提供有關冷凍空調更廣泛環境的 5 個步驟見解(包括：優化需求、能源效率、減緩衝擊、融資方案及再生能源)，及發展應用「HFC outlook model」來協助部門別預測且設定具企圖心之逐步淘汰目標(phase-down target)，提高能源效率並減少日益成長冷凍空調之能源需求，對實現碳中和做出貢獻。可預見未來，冷卻系統的使用將顯著增長，有須要確保永續的冷凍空調解決方案並應兼顧環境、經濟及全球競爭力。雖然，許多必需的技術已經可用，全球電力部門和冷凍空調產業有關公私部門及專家智庫組織正進一步探討創新變革，尋求能以最適成本及成本有效方式獲取最大效益，值得我國借鏡。

六、針對各國的大氣專家組成國際研究小組，並蒐空氣污染數據，最新的科學評估報告發現全球增加「一氟三氯甲烷」(CFC-11)排放量的 40%至 60%來自中國東部工廠。這件事件凸顯全球需要持續優化的監測和報告系統，以及完善的法規和強制執行。目前，中國政府除了嚴格控制對山東，河北，河南，江蘇，浙江和廣東等 11 個重點省市進行了專項檢查及查緝銷毀，並於 2019 年正式啟動了 ODSs 大氣監測網絡的規劃，以提高其預警和效能評估能力。

目前，正在組建專家團隊進行基礎科學研究，逐步建立和改善監測技術方法和品質。從 2021 年開始，將建立 ODSs 監測站，2022 年開始 ODSs 監測。

七、在開發中國家，消耗臭氧層物質的絕大多數消費是在冷凍空調部門，對社會經濟發展有關鍵作用。例如，2017 年 5 月歐盟和土耳其共同資助 F-Gas 技術和實施歐盟 F-Gas 法規援助計畫，提高大眾對替代品和逐步淘汰計劃的認識，進行技術人員認證方面的培訓及統計排放清冊，建立設備運營商和進口商的數據庫，並更新修訂 F-Gas 控制法規。通過使用視覺材料(例如視頻圖形，小冊子和海報)進行一系列研討會，與產業協同合作討論如何實現向低 GWP 替代品過渡以及防止 F-Gas 洩漏。該計畫將在 2020 年 5 月完成，修訂後的法規將作為指導廢氟氣管理部門的主要管理工具。

八、推動低 GWP 值替代議題已成為蒙特婁議定書後續重點工作，而能充分解決眼前許多問題的唯一方案就是必須加緊推動在部署與研發方面進行社會創新及產業轉型的必要性，例如財政激勵措施與可以促進大規模減少排放的新技術之挑戰及機會。因應蒙特婁議定書管制規範，我國將秉持積極參加相關國際環保公約，從「法治基礎」、「公共政策」、「創新科技」與「跨國組織」間著手探討臺灣如何有貢獻地參與「後吉佳利時期」(post-Kigali) 之可行性辦法 (approaches)，研擬成本有效(cost effective)及最低成本 (the lowest cost)之技術發展路徑，提升國際競爭力確保產業永續發展，並為全球脫碳經濟轉型升級做出貢獻，讓世界各國看到臺灣保護地球的努力成果。

九、在「吉佳利冷卻效率計畫」(the Kigali Cooling Efficiency Programme)的催化下，2019 年 4 月成立「冷卻聯盟」(Cool Coalition)連接來自全球公私部門 80 多個合作夥伴網絡，致力於擴大與冷卻，同時減少氣候影響。2019 年聯合國氣候行動高峰會議推動冷卻聯盟，使其成員國有可能在通往 2050 年淨零碳世界(2050 net zero carbon world)的道路上實現升溫低於 1℃ 的發展願景。同時，由「聯合國環境署臭氧行動」(UN Environment Ozone Action)與「空調，供暖和冷凍學會」(Air Conditioning, Heating, and Refrigeration Institute, AHRI)發起的一項「冷媒駕駛執照」(Refrigerant Driving License(RDL)倡議，旨在藉由產業協會會員的密切合作下，自主設定最低 資格要求，並尋求產業和政

府的國際認可。RDL 將涵蓋不同類型冷媒管理的要求，包括識別、處理、填充、回收和再循環、洩漏測試、儲存、記錄保存等的最佳做法。

十、爭取國際參與一直是國人的共同期待，我國各地駐館除了協助友邦發展之外，長期推動地區之經貿科研業務，扮演開拓與維繫兩國間產官學研交流，運用多元的方式促動產業連結。未來，應可借重我駐館豐沛的人脈，擴大與環境公約主辦國政府及產業與專家智庫間深化交流，分享環境治理之良好作法，活絡與創新綠色成長夥伴關係，開創臺灣外交新局。

十一、環境規劃署執行主任英格·安德森(Inger Andersen)於高階官員圓桌會議上強調：通過保護臭氧層，蒙特婁議定書已使人們生態系統和生物多樣性更加健康，取得的成就是全球共同努力，如同造就偉大的羅馬文明的永恆之城，以為後代子孫帶來長遠的影響。為此，當前國際政經局勢劇烈變化，人類永續發展面臨挑戰，臺灣也會在當前全球共同關切的議題上，與其他理念相近國家密切合作，展現臺灣的軟實力落實聯合國環境公約目標。

十二、建議

（一）我國雖然不是蒙特婁議定書締約國，但自始即自願遵守蒙特婁議定書之管制規範。過去國內消防產業、電子業、發泡產業、冷凍空調產業及其他相關產業，為與政府共同保護臭氧層，積極測試與轉用替代品，遵循蒙特婁議定書管制規範，積極停止使用 ODSs 物質，經統計 32 年來，我國從源頭削減已累積超過 40 萬公噸的氟氯碳化物及氟氯烴，以其溫暖化潛勢值換算，相當於累積削減 2,700 百萬公噸 CO_2 當量。

（二）我國長期發展備受國際肯定與環境變遷相關之基礎科學研究，充分具備大氣相關的科學研究能量，展現在大氣物理、海洋生態、以及有機化學等實際應用領域。另外，臺灣 2006 年發射的福衛三號衛星，已蒐集超過 1,000 萬大氣資料，免費提供給各國專家學者進行相關科學研究，今年福衛七號發射後提供的大氣觀測資料，將更有效提高準確度，可對全球環境變遷作出積極貢獻，著實是臺灣之光。

（三）隨著 CFCs 替代品由 HCFCs 逐漸轉為 HFCs，雖然 HFCs 非破壞臭氧

層物質，卻會讓全球暖化現象加劇，間接可能影響臭氧層恢復，據此，蒙特婁議定書已將 HFCs 納入推動低 GWP 值管制，依相同管制模式，從源頭消費量逐步削減 HFCs，以控制 2℃ 全球升溫，比京都議定書更積極管制 HFCs。同時，所有選擇方案都應仔細考慮，包括性能、成本、可用性、毒性、可燃性、全球變暖潛力和能源效率。所有冷媒應從搖籃到墳墓(from cradle to grave)整個鏈的正確處理，從運輸和儲存到良好的維修習慣，回收及再利用與報廢處理，以確保安全，優化設備性能，避免排放並節省成本。

（四）有關申報國家年度列管化學物質消費量資料一案，工業研院為長期協助我國參與 MOP 活動管道之一，根據以往的經驗，既然 UNEP 臭氧秘書處係依照程序辦理，除非有 UNEP 臭氧秘書處以正式函文要求我國回覆申報方式，後續如何因應臭氧秘書處針對我國 ODSs 申報資料的處理，可繼續探究最適當做法，優先維護能持續參與 MOP 活動，並掌握國際社會管制 ODSs 趨勢原則，提供我國研擬政策及產業應對行動參考。

（五）我國相關組織以 NGOs 名義積極向國際發聲，擴大及深化參與各領域的 NGOs 合作，建立永續夥伴關係，以讓世界更瞭解臺灣，更支持我國。

柒、附錄

附錄一、會議議程

附錄二、MOP-31 會議記錄報告

附錄三、ENB 會議記錄

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Thirty-First Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer
Rome, 4–8 November 2019

Provisional agenda

I. Preparatory segment (4–6 November 2019)

1. Opening of the preparatory segment:
   (a) Statement(s) by representative(s) of the Government of Italy;
   (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. Administrative matters:
   (a) Budget of the Trust Fund for the Montreal Protocol and financial reports.
   (b) Consideration of the membership of Montreal Protocol bodies for 2020:
      (i) Members of the Implementation Committee;
      (ii) Members of the Executive Committee of the Multilateral Fund;
      (iii) Co-chairs of the Open-ended Working Group.
4. Terms of reference for the study on the 2021–2023 replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol.
5. Potential areas of focus for the 2022 quadrennial assessment reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel.
6. Unexpected emissions of trichlorofluoromethane (CFC-11).
7. Ongoing reported emissions of carbon tetrachloride.
8. Issues related to exemptions under Articles 2A–2I of the Montreal Protocol:
   (a) Nominations for critical-use exemptions for methyl bromide for 2020 and 2021;
   (b) Stocks of methyl bromide;
   (c) Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol;
   (d) Process agents.

9. 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.

10. Terms of reference, composition, balance, fields of expertise and workload of the Technology and Economic Assessment Panel.

11. Membership of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol.

12. Request by Azerbaijan to be included among the parties to which the phase-down schedule for hydrofluorocarbons, as set out in paragraphs 2 and 4 of Article 2J of the Montreal Protocol, applies.

13. Safety standards.

14. Initial assessment by the Scientific Assessment Panel and the Technology and Economic Assessment Panel of five volatile fluoroorganic and related compounds found in the Arctic.

15. Consideration of nominations to the assessment panels.

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

17. Risk of non-compliance with hydrochlorofluorocarbon reduction targets for 2019 by the Democratic People's Republic of Korea.

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

19. Other matters.

II. High-level segment (7 and 8 November 2019)

1. Opening of the high-level segment:
   (a) Statement(s) by representative(s) of the Government of Italy;
   (b) Statement(s) by representative(s) of the United Nations Environment Programme;
   (c) Statement by the President of the Thirtieth Meeting of the Parties to the Montreal Protocol;
   (d) Opening statement by Pope Francis.
2. Organizational matters:
   (a) Election of officers for the Thirty-First Meeting of the Parties to the Montreal Protocol;
   (b) Adoption of the agenda of the high-level segment of the Thirty-First Meeting of the Parties to the Montreal Protocol;
   (c) Organization of work;
   (d) Credentials of representatives.
3. Presentations by the assessment panels on their synthesis of the 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 Thirty-First Meeting of the Parties.
7. Dates and venue for the Thirty-Second Meeting of the Parties to the Montreal Protocol.
8. Other matters.
9. Adoption of decisions by the Thirty-First Meeting of the Parties to the Montreal Protocol.
10. Adoption of the report.
11. Closure of the meeting.

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Thirty-First Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer
Rome, 4–8 November 2019

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

Introduction

1. The Thirty-First Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer was held at the headquarters of the Food and Agriculture Organization of the United Nations, Rome, from 4 to 8 November 2019.

Part one: preparatory segment (4–6 November 2019)

I. Opening of the preparatory segment

2. The preparatory segment was opened by its co-chairs, Mr. Alain Wilmart (Belgium) and Ms. Laura-Juliana Arciniegas (Colombia), on Monday, 4 November 2019 at 10.10 a.m.

3. Opening remarks were delivered by Mr. Roberto Morassut, Undersecretary of State of the Ministry of the Environment and Protection of Land and Sea of Italy; Mr. René Castro-Salazar, Assistant Director-General, Climate, Biodiversity, Land and Water Development of the Food and Agriculture Organization of the United Nations (FAO); and Ms. Tina Birmpili, Executive Secretary of the Ozone Secretariat.

4. In his opening statement, Mr. Morassut welcomed participants to Italy and to Rome. Recalling that the Fourteenth Meeting of the Parties had been held in that city in 2002, he said that his country was honoured to once again host the highest decision-making body of the first international environmental treaty to achieve universal ratification, which had proved to be a successful model of international cooperation and multilateralism. He wished to thank in particular the Ozone Secretariat and FAO for their cooperative efforts to make the meeting possible, and to stress the important role that FAO would play in a world increasingly concerned with the relationship of food security and the sustainability of rural systems to broader issues of peace and stability and the 2030 Agenda for Sustainable Development.

5. Italy had made every effort to promote and implement the provisions of the Montreal Protocol at the global and national levels as part of its role as a founding member of the European Union. It had complied with all its obligations to reduce and eliminate the production and consumption of ozone-depleting substances and was a major donor to the Multilateral Fund for the Implementation of the Montreal Protocol and a bilateral supporter of projects being implemented with assistance from the Fund. The Thirty-First Meeting of the Parties was the first since the entry into force of the Kigali Amendment, which, in conjunction with the Paris Agreement on Climate Change, showed that global policies for the protection of the ozone layer and international action to combat climate change were

now intrinsically and inseparably linked. Italy was committed to accelerating the process of its national ratification of the Kigali Amendment.

6. In conclusion, he wished to reaffirm his country's strong commitment to working with other members of the international community to put in place, in a synergistic and strategic manner, all the skills and resources necessary to ensure the transition to a sustainable world for present and future generations. The Montreal Protocol had demonstrated that human society, faced with the urgency of taking action to protect the human species and the planet, could harness the power of science to develop new paradigms of cooperation to achieve global aims.

7. In his opening statement, Mr. Castro-Salazar said that the Montreal Protocol had proved its value not only for protecting the ozone layer but also for demonstrating how multilateralism and international cooperation could deal with major environmental challenges, using all the tools and instruments available and basing action firmly on science. The results-based approach of the Protocol had focused policy and investment to achieve significant recovery of the ozone layer. There was great potential for further cooperation between the Montreal Protocol and FAO in such areas as climate change and biodiversity. The Kigali Amendment had raised awareness of the need to develop sustainable solutions in the refrigeration sector, especially for addressing the demand for cooling systems for food preservation. That was particularly important for tackling food loss, which would in turn improve the use of natural resources and help lower greenhouse gas emissions per unit of food consumption. It was essential to work together to address pressing global environmental issues.

8. In her opening statement, Ms. Birmpili highlighted the progress to date under the Montreal Protocol in ensuring the recovery of the ozone layer, with accompanying benefits for human health, economies, ecosystems and the climate. Protection of the ozone layer reduced damage to agriculture, fisheries and forests, and holding the meeting at FAO headquarters offered an opportunity for further cooperation with that organization. The Climate Action Summit held in September 2019 had underscored the importance of the Kigali Amendment, whose climate benefits could be significantly increased through improvements in the energy efficiency of cooling equipment. Indeed, the importance of cooling was the focus of the high-level round table at the current meeting, which would examine the Montreal Protocol's contribution to sustainable cold chains, with a view to reducing food loss.

9. Regarding the meeting agenda, she said that the issue of unexpected emissions of trichlorofluoromethane (CFC-11) would again be under discussion. It was vital, in addressing environmental threats, to understand and learn from past events, and in that regard the data from atmospheric monitoring had provided important information on CFC-11 emissions. However, significant gaps in global observational and research capabilities remained, and a greater number of strategically placed stations were needed in order to gather additional data to enable effective targeting of actions. She welcomed the efforts being made by the Government of China to address the issue of CFC-11 emissions through the inspection of carbon tetrachloride production and supply chains and the establishment of monitoring systems. It was important for the international community to remain vigilant and to work together to address all aspects of illegal emissions and resolve challenges in a spirit of mutual trust and cooperation.

10. While welcome progress had been made, there were still questions to be answered: Were there any other unrecognized emissions of CFC-11? Were they in other places in the world? Could other banned chemicals be produced and emitted? Continued vigilance would help answer those questions. It was important to recognize and act before small issues became big problems, and to be ready to make adjustments as circumstances changed and new opportunities or problems arose. As another example of how the past could be relevant to the future, the interconnectedness of the ozone layer with other elements of the global system necessitated a broad approach, as had been the case with hydrofluorocarbons (HFCs). An increase in the use of HFCs, and the resulting threat of climate forcing, had been an unintended consequence of the phase-out of ozone-depleting substances. Fortunately, the Montreal Protocol community had been agile enough to recognize a new opportunity to mitigate global warming by agreeing to a phase-down of HFCs. She urged the parties to the Protocol to consider the twin responsibilities of accountability and implementation in ensuring that the institutions and processes of the Protocol were robust enough to maximize positive effects on humanity and ensure that the planet could thrive for centuries to come.

II. Organizational matters

A. Attendance

11. The following parties to the Montreal Protocol were represented: Afghanistan, Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Cyprus, Czech Republic, Democratic People's Republic of Korea, Democratic Republic of the Congo, Denmark, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Eswatini, Ethiopia, European Union, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guinea, Guinea-Bissau, Holy See, Honduras, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Italy, Jamaica, Japan, Jordan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia (Federated States of), Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, North Macedonia, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Russian Federation, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovakia, Solomon Islands, Somalia, South Africa, South Sudan, Spain, Sri Lanka, State of Palestine, Sudan, Suriname, Sweden, Switzerland, Syrian Arab Republic, Thailand, Timor-Leste, Togo, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Uzbekistan, Vanuatu, Venezuela (Bolivarian Republic of), Viet Nam, Zambia, Zimbabwe.

12. The following United Nations bodies and specialized agencies were represented: Food and Agricultural Organization of the United Nations, secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol, United Nations Development Programme, United Nations Environment Programme, United Nations Industrial Development Organization, World Bank, World Health Organization. The Montreal Protocol assessment panels were also represented.

13. The following intergovernmental, non-governmental, industry, academic and other bodies were also represented: ACT Commodities, AGC Chemicals, Agropecuaria Malichita, Air-Conditioning Heating and Refrigeration Institute, Alliance for an Energy-Efficient Economy, Alliance for Responsible Atmospheric Policy, American Society of Heating, Refrigerating and Air Conditioning Engineers, Arkema Innovative Chemistry, Association of Ammonia Refrigeration, Association des Distributeurs, Conditionneurs, Récupérateurs & Retraiteurs de Réfrigérants (ADC3R),Basel Agency for Sustainable Energy, Blue Star Ltd., Carrier Transicold and Refrigeration Systems, Centro Studi Galileo, Climalife, Council on Energy, Environment and Water, Daikin, Danfoss (Denmark), Electrolux Major Appliances, Energy Studies Institute, Environmental Investigation Agency, European Association of Refrigeration and Air Conditioning Installers, European Environment Agency, European Fluorocarbons Technical Committee, European Partnership for Energy and the Environment, Expert Group, GIZ Proklima, Gluckman Consulting, Green Climate Fund, Gulf Cooperation Council, HEAT International, ICF International, Industrial Technology Research Institute, Institute for Governance and Sustainable Development, International Institute of Refrigeration, Japan Association of Refrigeration and Air Conditioning Contractors, Japan Fluorocarbon Manufacturers Association, Japan Refrigeration and Air Conditioning Industry Association, Kigali Cooling Efficiency Program, Lawrence Berkeley National Laboratory, Matthias Meier Technical Consulting, Mexichem UK Ltd., Manitoba Ozone Protection Association, Natural Resources Defence Council, Navigant Energy Germany, New Energy and Industrial Technology Development Organization, New York University, Nolan Sherry and Associates Ltd., Petra Engineering Industries, Pollet Environmental Consulting BVBA, Quimobásicos, Refrigerant Gas Manufacturers Association, Refrigerants Australia, Refrigeration and Air Conditioning Manufacturers Association, Shaffie Law and Policy LLC, Shecco, SRF Ltd., Stockholm Environment Institute, Sun Vat Sen University, Sustainable Energy for All, The Energy and Resources Institute, Tradewater, Trans-Mond Environment Ltd., United Technologies Climate, Controls and Security, United Technologies Corporation, University of California–Los Angeles, University of Southern California, Vertis Environmental Finance, Wagner Consulting International, Walton Hi Tech Industries Ltd., World Refrigeration Day, World Resources Institute, Zhejiang Juhua Co. Ltd., Zhejiang Quhua Flour-Chemistry Co. Ltd., Ökorecherche.

B. Officers

14. The preparatory segment was co-chaired by Mr. Wilmart and Ms. Arciniegas.

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.31/1, with the Rome Declaration to be considered under item 19 (other matters):

1. Opening of the preparatory segment:
    (a) Statement(s) by representative(s) of the Government of Italy;
    (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.
    (a) Budget of the Trust Fund for the Montreal Protocol and financial reports.
    (b) Consideration of the membership of Montreal Protocol bodies for 2020:
        (i) Members of the Implementation Committee;
        (ii) Members of the Executive Committee of the Multilateral Fund;
        (iii) Co-chairs of the Open-ended Working Group.
4. Terms of reference for the study on the 2021–2023 replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol.
5. Potential areas of focus for the 2022 quadrennial assessment reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel.
6. Unexpected emissions of trichlorofluoromethane (CFC-11).
7. Ongoing reported emissions of carbon tetrachloride.
8. Issues related to exemptions under Articles 2A–2I of the Montreal Protocol:
    (a) Nominations for critical-use exemptions for methyl bromide for 2020 and 2021;
    (b) Stocks of methyl bromide;
    (c) Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol;
    (d) Process agents.
9. 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.
10. Terms of reference, composition, balance, fields of expertise and workload of the Technology and Economic Assessment Panel.
11. Membership of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol.
12. Request by Azerbaijan to be included among the parties to which the phase-down schedule for hydrofluorocarbons, as set out in paragraphs 2 and 4 of Article 2J of the Montreal Protocol, applies.
13. Safety standards.

14. Initial assessment by the Scientific Assessment Panel and the Technology and Economic Assessment Panel of five volatile fluoroorganic and related compounds found in the Arctic.

15. Consideration of nominations to the assessment panels.

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

17. Risk of non-compliance with hydrochlorofluorocarbon reduction targets for 2019 by the Democratic People's Republic of Korea.

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

19. Other matters.

D. Organization of work

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

III. Administrative matters

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

17. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 10–15 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2), the note by the Secretariat on proposed budgets for 2020 and 2021 of the Trust Fund for the Montreal Protocol (UNEP/OzL.Pro.31/4), the note by the Secretariat on the financial report for the trust funds for the Vienna Convention for the Protection of Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer for the fiscal year 2018 (UNEP/OzL.Pro.31/5), and information notes on the proposed budget for 2020 of the Trust Fund for the Montreal Protocol (UNEP/OzL.Pro.31/INF/1) and the updated indicative financial report for the fiscal year 2019 (UNEP/OzL.Pro.31/INF/2).

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

19. Subsequently, after the committee had discussed the matter, the facilitator introduced the draft decision, which included the proposed budget for 2020 and 2021 agreed on after discussions in the budget committee.

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

B. Consideration of the membership of Montreal Protocol bodies for 2020

21. Introducing the item, the Co-Chair said that the parties needed to decide on the membership of the Implementation Committee, the Executive Committee and the Co-Chairs of the Open-ended Working Group for 2020. Information on the positions to be filled was presented in document UNEP/OzL.Pro.31/2, and draft decisions on the membership of the three bodies were contained in document UNEP/OzL.Pro.31/3.

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

IV. Terms of reference for the study on the 2021–2023 replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol

23. Introducing the item, the Co-Chair drew attention to the information contained in paragraphs 26–29 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2) and a draft decision

forwarded by the forty-first meeting of the Open-ended Working Group, held in Bangkok in July 2019, to the current meeting and contained in document UNEP/OzL.Pro.31/3.

24. The parties agreed to reconstitute the contact group that had discussed the matter at the forty-first meeting of the Open-ended Working Group, entrusting it with a mandate to develop a final proposal for consideration at the current meeting. The contact group would be co-chaired by Mr. Leslie Smith (Grenada) and Mr. Ralph Brieskorn (Netherlands).

25. Subsequently, after discussions in the contact group, the co-chair of the contact group introduced a draft decision on the matter.

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

V. Potential areas of focus for the 2022 quadrennial assessment reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel

27. Introducing the item, the Co-Chair drew attention to the information contained in paragraphs 30–36 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2) and in a note by the Secretariat on synthesis of the 2018 assessment reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel (UNEP/OzL.Pro.31/8). She recalled that the European Union had introduced a conference room paper on potential areas of focus at the forty-first meeting of the Open-ended Working Group as a basis for further discussion. The resulting draft decision had been forwarded to the current meeting and was contained in document UNEP/OzL.Pro.31/3.

28. The representative of the European Union recalled that after the forty-first meeting of the Open-ended Working Group, bilateral discussions had been held with various parties to determine what should be included in the draft decision, with the aim of providing the assessment panels with sufficiently detailed guidance for preparing the 2022 quadrennial assessment reports. Potential areas of focus included such emerging issues as the linkages between emissions of carbon tetrachloride and CFC-11, new volatile fluoroorganic compounds discovered in the Arctic regions, and the relationship between stratospheric ozone and solar radiation management.

29. Several representatives proposed additional matters for consideration in the quadrennial assessment reports, including destruction of banks of ozone-depleting substances, replacement technologies and equipment, issues pertaining to low-global-warming-potential alternatives in the phase-down of HFCs, energy efficiency, and emissions of short-lived ozone-depleting substances.

30. The parties agreed to establish a contact group, co-chaired by Mr. Samuel Paré (Burkina Faso) and Ms. Cynthia Newberg (United States of America), to further discuss potential areas of focus for the 2022 quadrennial assessment reports with a mandate to develop a final proposal for consideration by the parties at the current meeting, using the text proposed by the European Union as a basis for discussions.

31. Subsequently, after discussions in the contact group, the co-chair of the contact group introduced a draft decision on the matter.

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

VI. Unexpected emissions of trichlorofluoromethane (CFC-11)

33. Introducing the item, the Co-Chair recalled that at the forty-first meeting of the Open-ended Working Group the Scientific Assessment Panel and the Technology and Economic Assessment Panel had presented their preliminary reports on CFC-11 as requested in decision XXX/3. The preliminary report of the Scientific Assessment Panel had included new scientific information and a summary of the proceedings of the international symposium on the unexpected emissions of CFC-11 held in March 2019. The final report of the symposium had since been published in the SPARC newsletter and was available on the meeting portal. The preliminary report of the Technology and Economic Assessment Panel had covered the potential sources of emissions of CFC-11 and related controlled substances from potential production and uses, as well as from banks, in the relevant regions.

34. The meeting of the Open-ended Working Group had discussed those reports, as well as the document prepared by the Secretariat outlining the procedures by which the parties reviewed and ensured continuing compliance with obligations under the Montreal Protocol and the terms of agreements under the Multilateral Fund. A contact group had been established to consider technical and scientific issues, with a view to identifying the information that needed to be enhanced; institutional matters and processes under the Vienna Convention and the Montreal Protocol; and any other matters it deemed necessary to discuss. The report of the work of the contact group was set out in document UNEP/OzL.Pro.31/2.

35. Since the meeting, the Technology and Economic Assessment Panel had, in accordance with decision XXX/3, prepared its final report (summarized in document UNEP/OzL.Pro.31/2/Add.1), and China had published a note on the progress it had made in the monitoring and management of ozone-depleting substances (contained in document UNEP/OzL.Pro.31/INF/9).

36. Mr. Paul Newman, co-chair of the Scientific Assessment Panel, and Mr. Steve Montzka, a member of the Panel, presented their interim report on increased emissions of CFC-11. Ms. Helen Tope and Ms. Helen Walter-Terrinoni, co-chairs of the Technology and Economic Assessment Panel task force on unexpected emissions of CFC-11 established under decision XXX/3, presented a summary of their final report of September 2019. A summary of the presentations is set out in sections A and B of annex II to the present report.

37. All representatives who took the floor thanked the assessment panels for their reports, saying that they contained extremely useful information, and expressed satisfaction at the preliminary data showing reductions in emissions of CFC-11 in 2018 and 2019.

38. Responding to questions, Mr. Newman explained that emissions of HCFC-141b had appeared to peak in 2012 and had subsequently fallen. It was not possible to say whether that had been related to CFC-11 production. The rate of decline of atmospheric concentrations of CFC-11 appeared to have returned nearly to its pre-2012 level in 2018 and 2019, though further study of the data and further investigations of atmospheric dynamics would be necessary to confirm that. The trend would not become clear for another two years or so.

39. The monitoring stations in Japan and the Republic of Korea were sensitive to emissions arising from up to 1,000 kilometres away. They had therefore been capable of detecting emissions from the north-eastern Chinese provinces of Shandong and Hebei, so the Panel was confident in assigning 40 to 60 per cent of total CFC-11 emissions to that area. It was not possible to assign the remaining emissions to particular geographic sources, though it was clear that they did not emanate from North America, Europe or the southern hemisphere. In many parts of the globe the Panel was in effect scientifically blind because of the lack of monitoring stations.

40. Responding to a question about whether there could be natural sources of CFC-11 emissions, Mr Newman explained that CFC-11 was entirely anthropogenic; it did not occur naturally. Emissions had been monitored for many years and could always be related to industrial production. Ice cores from Greenland and Antarctica showed no evidence of CFC-11 – or other CFCs – from pre-industrial times.

41. Mr. Newman and Ms. Walter-Terrinoni then explained the difference between the two sets of estimates of emissions. The Scientific Assessment Panel derived its top-down estimates from measurements of CFC-11 in the atmosphere; while these could be expected to fall by about 2 per cent a year as a result of normal photolytic destruction, observations indicated that the fall was in fact about 1 per cent a year, making it clear that additional emissions were being released. The Technology and Economic Assessment Panel had produced bottom-up estimates of emissions by analysing CFC-11 production, use, banks and emissions at the global and regional levels, eliminating unlikely emissions sources, identifying likely emissions sources and estimating the quantity of newly produced CFC-11 needed to supply them.

42. Ms. Walter-Terrinoni explained that releases of CFC-11 tended to be uneven over time, leading to peaks and troughs in the graph of emissions. When foam was taken out of equipment or buildings at the end of its life, the blowing agent stayed within the foam matrix and was very difficult to remove; one party had reported that as much as about 15 per cent of the foam-blowing agent could be expected to be released at that point, but if the foam was crushed or shredded, the maximum release was likely to be up to 50 per cent.

43. Responding to questions about why CFC-11 should be used for foam blowing, Ms. Walter-Terrinoni explained that globally the production of closed-cell foams for insulation was increasing – for example, for use in refrigeration and buildings. The availability of HCFC-141b was falling, and its price was rising, because of efforts to encourage conversion away from the substances

as part of its ongoing phase-out. The other main alternatives were HFCs and hydrofluoroolefins, which could be three to four times as costly. In some cases, non-fluorocarbon alternatives such as hydrocarbons could be used – for example, in refrigerators – and they were comparatively cheap, so one would not expect CFC-11 to be used in those instances. In most cases, however, CFC-11 was likely to be the cheapest option, especially for spray foam. She agreed that the same price structure had been observed both in other parties operating under paragraph 1 of Article 5 of the Protocol (Article 5 parties) and in parties not so doing (non-Article 5 parties), or the price differential could be even higher, as in cases where import duties were levied on HFCs. In other use sectors, such as refrigeration, air-conditioning and aerosols, other alternatives were available at a lower cost, so the incentive to use CFC-11 was much smaller.

44. Responding to a question on the repurposing of HFC-32 plants to produce CFC-11, Ms. Tope explained that the process was not difficult: it would take about a week to flush the pipes and equipment and make adjustments to the operating conditions so as to be able to use carbon tetrachloride rather than methylene chloride as feedstock. In theory, HCFC-22 plants could be repurposed to produce CFC-11, but the Task Force had considered that less likely because of the higher degree of compliance monitoring of hydrochlorofluorocarbon (HCFC) plants. Plants producing HFCs other than HFC-32 could also in theory be repurposed, but that was not likely to be economically viable because of the different production processes involved, such as those involving vapour phase reactors.

45. Answering questions about the likely availability of carbon tetrachloride as feedstock for CFC-11, Ms. Tope said that globally, about 220,000 tonnes of carbon tetrachloride feedstock had been produced in 2016 and about 260,000 tonnes in 2017. Total capacity from co-production of carbon tetrachloride with chloromethanes in 2016 after existing local supplier commitments had been met was estimated at about 305,000 tonnes. Spare global capacity to produce carbon tetrachloride in perchloroethylene/carbon tetrachloride plants was estimated to be between 50,000 and 100,000 tonnes per year. In addition, a site that integrated production of chloromethanes, perchloroethylene and fluorochemicals offered opportunities for the liberation of carbon tetrachloride from chloromethane production and potential concealment of on-site diversion of carbon tetrachloride into CFC-11 production by using mixed chloromethanes feedstock in perchloroethylene production. Overall, from chloromethane production, only China possessed enough spare capacity to produce carbon tetrachloride in the volumes estimated to be necessary to produce the estimated production of CFC-11.

46. The Task Force had not looked at the volume of fugitive carbon tetrachloride emissions from estimated production volumes, but it could be assumed to be about 0.5 per cent of production. Mr. Newman added that atmospheric observations did not reveal any increase in carbon tetrachloride emissions up to 2016; the trend had remained relatively flat in recent years.

47. With regard to whether CFC-12 could be used as a feedstock, Ms. Tope said that it was theoretically possible but unlikely in practice, as more technically and commercially viable options were available; further details were available in the Task Force report. With regard to whether micro-scale plants were known to be used to produce ozone-depleting substances, the Task Force had considered that such facilities might be constructed as pilot-scale plants for process or market development or to supply very small quantities to service particular local markets; however, the only evidence that they had actually existed to produce CFC-11 derived from enforcement actions in China and investigations by the Environmental Investigation Agency.

48. Mr. Peter Sleigh, a member of the Task Force, added that the Task Force had initially been sceptical about how such micro-scale plants could work in practice, particularly as production of CFC-11 from carbon tetrachloride typically also produced CFC-12, and increased emissions of CFC-12 had not been observed. However, on the basis of the available information regarding those micro-scale plants, the Task Force had theorized that if the CFC-11 was taken out of the reactor vessel as soon as it was produced, CFC-12 production would be minimized. The CFC-11 thus produced would be contaminated with small volumes (1–2 per cent) of CFC-12 and would thus not be suitable for use in refrigeration and air-conditioning, for example, but could certainly be used for foam blowing.

49. Responding to a question about appropriate measures that could be taken to control unexpected production and emissions, Ms. Tope said that the Task Force report responding to decision XXX/3 also enumerated a number of areas that parties could investigate, such as better monitoring of trade in polyol blends.

50. Mr. Newman, Ms. Walter-Terrinoni and Ms. Tope all said that they would welcome the chance to discuss the issue bilaterally with interested parties.

51. Opening the floor for discussion, the Co-Chair drew attention to a report by the Secretariat on unexpected emissions of CFC-11 presenting an update to the overview provided at the forty-first meeting of the Open-ended Working Group (UNEP/OzL.Pro.31/6) and to a report by China on progress made in the monitoring and management system of ozone-depleting substances in that country (UNEP/OzL.Pro.31/INF/9, annex).

52. Most representatives who spoke thanked the Technology and Economic Assessment Panel and the Scientific Assessment Panel for their work to provide greater clarity regarding the unexpected emissions of CFC-11, with many also thanking the Ozone Secretariat for its work on the issue.

53. Many representatives thanked the Government of China for the activities undertaken in that country to address the CFC-11 emissions and the information provided in that regard, including in its report and at a side event held on the margins of the current meeting. One representative said that such information demonstrated the party's commitment to bringing the situation under control. Another expressed the hope that China would continue to report on the results of its activities at future meetings. A third urged other parties to support China in its efforts. A fourth said that the sharing of such information was useful for strengthening the sustainability of the Montreal Protocol. Some parties expressed their commitment to working collaboratively to end the production and use of CFC-11.

54. The representative of China then summarized the information set out in document UNEP/OzL.Pro.31/INF/9. She said that, although her Government had invited interested parties to visit China in order to better understand the situation on the ground, that invitation had unfortunately not been taken up by international experts owing to their heavy workloads. She described some of the actions that China had taken to deal with the issue, including strengthening legislation and building capacity, including through improved access to monitoring equipment, inspections of plants and establishment of a monitoring plan. Noting that her country remained the largest producer and consumer of ozone-depleting substances, she emphasized its commitment to achieving the objectives of the Montreal Protocol and expressed the hope that the international community would support it to that end. China had a zero-tolerance approach to illegal production, which had a negative impact on the environment, on markets and on the legitimate interests of businesses operating legally in the country. She stressed that work to resolve the issue of CFC-11 emissions should go hand in hand with accelerated efforts to achieve the overall objectives of the Protocol.

55. One representative said that the information provided by China showed that much-needed improvements had taken place in its national enforcement system for dealing with the substantial amount of unexplained emissions of CFC-11. Preliminary data provided by the Scientific Assessment Panel indicated that the party had made progress in changing the trajectory of the higher emissions, and he looked forward to updates to that preliminary data from the Panel in due course. He had drawn three main conclusions from the report of the Technology and Economic Assessment Panel: it was unlikely that past production and historical use could account for the increase in CFC-11 emissions; it was likely that there had been a resumption of use of newly produced CFC-11 in closed-cell foams; and expected emissions from the CFC-11 foam banks in North-East Asia were insufficient to account for the atmospheric-derived emissions from eastern mainland China. Thus, while there was some positive news, it was troubling that, for at least five years, there had been substantial amounts of unexplained emissions of CFC-11 that were not consistent with actions taken under the Montreal Protocol. Whether intended or unintended, and whether illegal or not at the national level, the production of CFC-11 was subject to controls under the Protocol. Each party was responsible for ensuring that it had phased out the production of CFC-11 in accordance with the provisions of the Protocol. He asked whether the party intended to revise its historical reporting of CFC-11 production under Articles 2 and 7 of the Protocol based on the discovery of illegal production facilities.

56. Another representative, while acknowledging that the data indicating a recent decrease in CFC-11 emissions was preliminary, said that it was nevertheless a positive signal. He emphasized the need for the decrease to be quantified and for the trend to be demonstrated over a longer period. Expressing concern regarding the continued threat posed to the ozone layer by CFC-11 emissions, he said that the quantity involved represented substantial illegal production and consumption. Given that, according to the Technology and Economic Assessment Panel's report, the emissions seemed to be linked to the production and use of CFC-11 in closed-cell foams during the period 2012–2017, he suggested that, without excluding other possibilities, it might be useful to focus continuing investigations on that sector.

57. One representative, noting that the phase-out of HCFC-141b might have led some companies to use CFC-11 for foam blowing, said that some parties might therefore unwittingly be importing foam made using CFC-11. Parties might need to rethink the approach to the phase-out of HCFC-141b, given

the perverse incentives that action might have caused. Another representative stressed the need to install traditional monitoring stations in areas generating CFC-11 emissions and increase the number and quality of inspections.

58. One representative said that the issue of CFC-11 emissions had foregrounded a problem hitherto not fully considered by parties, namely the risk of renewed production and use of substances already phased out under the Montreal Protocol. Urging all parties to remain vigilant about illegal production, consumption and trade, he expressed support for holding a broader discussion on ways in which the institutions of the Protocol could be strengthened to effectively address the potential for illegal activities and ensure the sustained phase out of ozone-depleting substances. Consideration of that issue could be undertaken in a re-established contact group on unexpected emissions of CFC-11, whose mandate as established at the forty-first meeting of the Open-ended Working Group was broad enough to consider both sets of issues.

59. Several representatives, including one speaking on behalf of a group of countries, expressed support for the re-establishment of the contact group. They suggested that, at the current meeting, the re-established contact group should consider what were the next steps to take in tackling CFC-11 emissions. A number of representatives expressed the hope that the representatives of Australia and Chile who had previously chaired the contact group would continue in that role.

60. Several representatives called for the adoption of a decision on CFC-11 at the current meeting. One said that he would submit a conference room paper containing a draft decision on the matter, while another said that his delegation reserved the right to do likewise. A third, stressing that the CFC-11 emissions undermined the work of the global community over the previous 30 years to protect the ozone layer, said that the Thirty-First Meeting of the Parties should adopt a decision that built on decision XXX/3, on unexpected emissions of CFC-11, to send a strong signal to the world on the seriousness of the issue and the resolve of the international community to address it. Several representatives emphasized the need to bring the discussions on unexpected emissions of CFC-11 to a close at the current meeting and to chart a way forward, including by adopting a decision on the matter.

61. Several representatives, including one speaking on behalf of a group of countries, drew attention to the many sources of important information on the CFC-11 emissions, including the most recent report by China, the side event held at the current meeting, the updated information provided by the Secretariat, the report of the contact group on unexpected emissions of CFC-11 at the forty-first meeting of the Open-ended Working Group (UNEP/OzL.Pro.WG.1/41/5, annex II), the recommendations[1] of the Multilateral Fund for the Implementation of the Montreal Protocol, the report in the Stratosphere-Troposphere Processes and Their Role in Climate (SPARC) newsletter of the international symposium on the unexpected increase in emissions of ozone-depleting CFC-11, and the conference room paper containing a proposed draft decision on carbon tetrachloride introduced by the representative of Switzerland at the forty-first meeting of the Working Group. One representative said that the SPARC report set out important related short- and long-term actions, including the organization of focused, internationally recognized measurements campaigns in priority areas that could improve knowledge about the location of production, improved emissions estimates, and the identification and analysis of “pinch points” where emissions might be more likely to occur.

62. One representative said that more information was required from the panels and the Ozone Secretariat, and that specific information was needed from China on sources of emissions and the reporting of production and consumption from illegal production activities, along with a description of ongoing and planned future activities to address the issue at the national level.

63. One representative, speaking on behalf of a group of countries, said that the previous mandate of the contact group had been divided into two main themes, namely the science on the one hand and the institutional matters and processes on the other. In his view, the scientific part of the discussion had run its course, and future work should focus on the second issue. Recalling the opening statement made by Ms. Birmpili at the current meeting, he stressed the importance of adapting approaches in the light of facts and of continuing work for the next 30 years to protect the ozone layer. There was a need to review the processes of the institutions of the Montreal Protocol, possibly in a smaller group, or initially in the contact group and thereafter in a smaller group.

64. One representative expressed support for the proposal of providing the contact group with a mandate that would focus on formulating actions to be adopted with a view to ensuring the future

[1] As contained in annex II to the overview of the procedures under the Multilateral Fund by which the parties review and ensure continuing compliance with the terms of agreements under the Fund (originally UNEP/OzL.Pro/ExCom/83/38).

sustainability of the Montreal Protocol, rather than focusing on specific cases of CFC-11 emissions. She said that any decision adopted on CFC-11 should not impede the work under the Montreal Protocol to achieve its phase-out objectives for the 2020 target date.

65. One representative, deeming it regrettable that his questions regarding the unexpected emissions of CFC-11 had gone unanswered, said that according to the Technology and Economic Assessment Panel's data the level of emissions corresponded to 40,000–70,000 tonnes of CFC-11 produced. Clarification was needed from China regarding whether its historical CFC-11 production and consumption data were being revised and regarding the relationship of that data to the party's obligations under articles 2 and 7 of the Protocol. Noting that numerous cases of illegal production facilities had been found in China and reported repeatedly, he asked what had been done to identify the downstream users of CFC-11 and what it was being used for, particularly given the apparently large volumes of CFC-11 being used in closed-cell foam.

66. One representative, speaking on behalf of a group of countries, drew attention to the importance of comprehensive and effective licensing systems and domestic enforcement systems as described in the report of the contact group on CFC-11 at the forty-first meeting of the Open-ended Working Group. Any decision on the matter to be adopted at the current meeting could include a reference to the meeting of the Ozone Research Managers to be held in the second quarter of 2020. The purpose of such a draft decision would be to avoid the emergence of a problem similar to the CFC-11 problem and to ensure that the current situation had been resolved. Recalling that, in its decision XXX/3, the Thirtieth Meeting of the Parties had requested the Scientific Assessment Panel to provide a final report on CFC-11 emissions to the Thirty-Second Meeting of the Parties, he said that it was important to consider the responsibilities of the various bodies under the Montreal Protocol, including the Meeting of the Parties and the Executive Committee. The prospect of commissioning third-party experts to review processes should be treated with caution.

67. Several representatives expressed support for the formation of a small group in addition to the contact group to discuss specific relevant issues.

68. Following the discussion, the parties agreed to re-establish the previously established contact group on unexpected emissions of CFC-11, with a modified mandate, namely to define further steps to address the situation of unexpected emissions of CFC-11, and to identify the institutional processes to be enhanced or strengthened to avoid recurrence and similar situations. The Co-Chair urged parties with specific proposals for draft decisions to hold informal discussions with a view to merging their proposals into a single draft decision for consideration and possible adoption by the Thirty-First Meeting of the Parties. It was later decided that the contact group would again be chaired by Ms. Annie Gabriel (Australia) and Mr. Osvaldo Alvarez-Perez (Chile).

69. Subsequently, the representative of the European Union introduced a conference room paper containing a draft decision on the matter. The parties agreed to consider the draft decision in the contact group.

70. Subsequently, the co-chair of the contact group introduced the draft decision that had been agreed on after lengthy discussions in the contact group. Another representative, thanking the co-facilitators and all the participants in the contact group for their hard work, nevertheless said that further consideration was needed of how to avoid such problems in the future. He proposed that the item be included on the agenda of the next meeting of the Open-Ended Working Group, and that it be considered in the light of, inter alia, the forthcoming report on related issues from the Implementation Committee.

71. The parties agreed to forward the draft decision for further consideration and possible adoption during the high-level segment, and to include the item on agenda of the next meeting of the Open-ended Working Group.

VII. Ongoing emissions of carbon tetrachloride

72. Introducing the item, the Co-Chair recalled that the issue of carbon tetrachloride emissions had been discussed at the forty-first meeting of the Open-ended Working Group as a result of the findings on carbon tetrachloride emissions and their sources that had been presented to the Thirtieth Meeting of the Parties by the Scientific Assessment Panel as part of the 2018 quadrennial assessment. That report had included new findings that had contributed to reducing the discrepancy between the top-down and bottom-up estimates of emission levels, and to a better understanding of emission sources.

73. Discussion at that meeting had highlighted the need to address the issue, as well as the linkages with the issues of CFC-11 emissions, feedstock uses of carbon tetrachloride and unregulated

industrial emissions of it. Suggested actions had included extended atmospheric monitoring, mitigation measures for emission sources, and relevant research, with guidance from the assessment panels.

74. Switzerland had subsequently introduced a proposal for a draft decision containing a list of possible actions. The contact group that had discussed the draft decision had agreed that any further work on the matter should take place in the framework of the mandate and control obligations of the Montreal Protocol and should take into account the workloads of the assessment panels. It had also agreed that clarity was needed about which gaps in knowledge needed to be closed and what work the panels and the parties could undertake to close those gaps. The draft decision had been forwarded to the Thirty-First Meeting of the Parties for further consideration and was set out in document UNEP/OzL.Pro.31/3.

75. The representative of Switzerland said that he welcomed the resumption of discussions on the matter, noting that 35,000 tonnes of carbon tetrachloride entered the atmosphere every year from sources that were still not fully understood. Stopping those emissions would accelerate the recovery of the ozone layer. Expressing thanks to all the parties that had contributed to the discussions at the most recent meeting of the Open-ended Working Group and thereafter, he said that a revised version of his proposed text was in preparation and that it contained, among other elements, a request to the assessment panels to consider the matter further, a call for parties to provide all relevant information, and a reference to the need to improve global monitoring capacity. Acknowledging that the issue overlapped with other items on the agenda, and that it was desirable to avoid duplicating efforts, he suggested that informal discussions continue, with the understanding that the contact group could subsequently be reconstituted.

76. All representatives who took the floor thanked Switzerland for raising the issue, agreed that it remained important, and expressed their desire to discuss it further. They also congratulated the assessment panels on their work to reduce data discrepancies with regard to carbon tetrachloride emissions. The draft decision was said to be comprehensive and cover most of the main topics; other topics that could be added included the use of carbon tetrachloride as a feedstock, its production as a by-product, and a request for more information on sources, users and end-uses. Some representatives thought that the contact group could be re-established right away, while others were of the view that, in the light of the overlaps with other items on the agenda, it would be preferable to continue informal discussions for the time being.

77. The meeting agreed to continue informal discussions on the topic until agenda items 5 (on potential areas of focus for the 2022 quadrennial assessment reports) and 6 (on unexpected emissions of CFC-11) had been fully discussed. After that, discussion of the way forward with regard to carbon tetrachloride emissions could resume in the plenary session.

78. Subsequently, the representative of Switzerland reported that participants in the informal discussions had agreed that it would be useful to give parties more time to consult with each other, with industry and with the Technology and Economic Assessment Panel to determine what additional information could usefully be collected to support mitigation measures.

79. He proposed that the text of the revised draft decision be annexed to the report of the current meeting and included in the documentation for the next meeting of the Open-ended Working Group as background material for discussion of the topic at that meeting. A number of representatives objected to the proposal to annex the draft decision to the report of the meeting, arguing that that would set an unhelpful precedent and that it would be preferable simply to reflect the contents of the draft decision in the report.

80. The representative of Switzerland therefore requested the inclusion of the item on the agenda of the next meeting of the Open-ended Working Group. He suggested that interested parties having any production or consumption of carbon tetrachloride might wish to gather the following information on their domestic industrial processes as a basis for further discussion of what information might be needed to address the issue of carbon tetrachloride emissions: the locations where such processes took place and the transport chains between them; the volumes of substances that were part of the production and consumption chain of carbon tetrachloride; and the monitoring arrangements in place for the surveillance of substance flows and/or emissions.

81. The parties took note of the information provided and agreed to include the item on the agenda of the next meeting of the Open-ended Working Group.

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

A. Nominations for critical-use exemptions for methyl bromide for 2020 and 2021

82. Introducing the sub-item, the Co-Chair recalled that at the forty-first meeting of the Open-Ended Working Group, the Methyl Bromide Technical Options Committee had presented its initial evaluation of the six critical-use nominations received from four parties. Following bilateral discussions with the nominating parties during and after the meeting, the Committee had finalized its evaluation, taking into account the additional information provided by the nominating parties. The Committee's final report on its evaluation of critical-use nominations for methyl bromide for 2019 was contained in volume 2 of the September 2019 report of the Technical and Economic Assessment Panel, with a summary provided in document UNEP/OzL.Pro.31/2/Add.1.

83. 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 II to the present report.

84. During the ensuing discussion, the representative of South Africa said that, owing to elections in his country, his delegation had been unable to attend the forty-first meeting of the Open-Ended Working Group and thus to interact with the Methyl Bromide Technical Options Committee before it finalized its assessment. The Committee's final recommendations were for lower exemptions than those requested by his Government. For pest control in mills, the recommendation allowed only one fumigation per year per mill, even though his Government had repeatedly pointed out that, because of specific conditions in the country, two fumigations were required. In addition, the Committee had reduced the nominated exemption for 2020 for houses on the assumption that a significant phase-in of sulfuryl fluoride, a registered alternative, would be possible in 2019 and 2020, despite his Government's contention that additional time was needed for phase-in, market penetration and testing of sulfuryl fluoride to ensure that it worked. While South Africa was not opposing the Committee's final recommendation and would use its existing stocks to offset the shortfall, the points mentioned should be taken into consideration in future evaluations of critical-use nominations.

85. The representative of Australia, speaking about his country's critical-use nomination, confirmed that if methyl iodide or another alternative became available in sufficient time, his Government would issue a permit only for the amount of methyl bromide required in 2021 as part of the transition period. He said that the Australian and Canadian delegations were preparing a draft decision on critical uses and would consult with the Argentinian and South African delegations before submitting the text for consideration.

86. The representative of Canada, referring to his country's critical-use nomination, said that Canada remained committed to phasing out methyl bromide. However, as was indicated in the Committee's report and presentation, for various reasons, chemical fumigant alternatives were no longer available on Prince Edward Island, and technical alternatives were the only potentially feasible option for strawberry runners. While preliminary results from soilless culture trials indicated that good results had been achieved in 2019, several more years of positive results would be needed, the technique still had to be optimized, and technical barriers remained to be overcome.

87. One representative, speaking on behalf of a group of countries, noted that technically and economically feasible alternatives had now been identified for virtually all applications of methyl bromide for pre-plant soil use. It was important for the Committee to continue receiving annual updates of economic information so that it could evaluate the cost of alternatives compared to that of methyl bromide in current uses. South Africa had shown great flexibility in accepting its reduced exemption because it had access to stocks of about 45 tonnes of methyl bromide. He wondered whether other parties with existing stocks could also reduce their nominations accordingly. If parties had more information on stocks, they could know where stocks existed and what they could be used for.

88. Subsequently, the representative of Australia introduced a conference room paper containing a draft decision on the matter. He explained that the text had been amended to include the statement that alternatives to the use of methyl bromide in almost all non-quarantine and pre-shipment uses had been identified, and to list the national commitments adopted by those parties that had had put forward nominations for critical uses.

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

B. Stocks of methyl bromide

90. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 53–56 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2) and paragraph 14 of the addendum to that document, and to the final report of the Technology and Economic Assessment Panel on critical use nominations. She recalled that at the forty-first meeting of the Open-ended Working Group, the European Union had introduced a conference room paper, co-sponsored by Norway, containing a proposal that parties be invited to provide information on their stocks of methyl bromide, and that the Panel be requested to clarify the distinction between exempted and controlled uses of the chemical. An informal group had been established to discuss the proposal, and the Open-ended Working Group had agreed that the issue be included on the agenda of the current meeting.

91. The representative of the European Union said that the aim of the proposal had been to assist the work of the Methyl Bromide Technical Options Committee in evaluating critical-use nominations, and the deliberations of the parties on related matters, by collating more reliable and comprehensive data on the volume of stocks of methyl bromide globally and what they were used for. He recalled that the proponents of the proposal had decided not to proceed with it at the Open-ended Working Group, but to consult further with parties and reconsider the issue at the current meeting. It could be useful for the matter to be included in the discussions of the informal group dealing with agenda item 8 (a) on nominations for critical-use exemptions for methyl bromide for 2020 and 2021.

92. In the ensuing discussion, there was general recognition that the issues related to the storage and use of methyl bromide merited further discussion. Some representatives spoke in favour of the elimination of methyl bromide and recounted their own countries' efforts to phase out the substance. Several others said that discussion of critical use nominations was best undertaken separately from consideration of stocks. One representative said that only a small number of parties were still requesting critical-use exemptions, while the issue of stocks was of global relevance, so that it was not apparent what could be gained by discussing the two issues together in one group.

93. The parties agreed that informal discussions should continue on the issue of stocks as a separate matter, with the possibility of developing and presenting a draft decision for consideration by the parties, and that the main interested parties should participate in the discussions on critical-use nominations to ascertain whether there was any potential for any aspects of the matter of stocks to be addressed in that group.

94. Subsequently, the representative of the European Union, also on behalf of Chile, Ecuador, Jordan, Norway and Switzerland, introduced a conference room paper containing a draft decision on the matter asking parties to report, on a voluntary basis, on methyl bromide stocks to facilitate the work of the Technology and Economic Assessment Panel. Another representative, questioning the need to begin reporting stocks of methyl bromide after a long period of not doing so, wondered whether the request would be easy for parties to implement. A number of representatives highlighted the voluntary nature of the reporting requested in the draft decision and said that it would benefit all parties. One representative said that it was important to continue and strengthen the search for alternatives to methyl bromide and that the provisions of the draft decision would support the elimination of methyl bromide use.

95. The parties agreed to hold informal discussions on the draft decision and report back in plenary session on the outcome of those discussions.

96. Subsequently, the representative of the European Union reported that progress had been made in the discussions. He said that the resulting text imposed no new obligations on any party; it simply proposed to invite parties to submit, on a voluntary basis, details on the volumes of all methyl bromide stocks, including those in mixtures, to the Secretariat by 1 July 2020 and requested the Secretariat to post the information on its website.

97. Many representatives agreed, pointing to the need for better information on stocks of methyl bromide to help in drawing up strategies to eliminate its use, as was suggested in the report of the Methyl Bromide Technical Options Committee. They said that the diversity of the sponsors of the draft decision demonstrated a wide degree of support for it. One representative said that the matter was so important that it should be made a mandatory requirement rather than a voluntary action. Another suggested that the draft decision incorporate provisions on the disposal of used containers, which was a problem in his country. A third, however, said that he did not see a reason to approve the draft decision; it was not clear to him what problem the decision was meant to solve.

98. The parties agreed to continue informal discussions on the draft decision.

99. Subsequently, the representative of the European Union reported that a revised text had been proposed by one party in the spirit of compromise. Since there had been insufficient time to reach consensus on the matter, he requested that the item be included on the agenda of the next meeting of the Open-ended Working Group.

100. The parties agreed to include the matter on the agenda of the forty-second meeting of the Open-ended Working Group.

C. Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol

101. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 57–61 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2), the report of the Technology and Economic Assessment Panel on laboratory and analytical uses, and section 5.1 of the Panel's May 2019 progress report. He recalled that the discussion of laboratory and analytical procedures at the forty-first meeting of the Open-ended Working Group had included a discussion of the recommendations of the Panel and its Medical and Chemicals Technical Options Committee, which included the removal of nine laboratory and analytical procedures from the existing global exemption.

102. In the ensuing discussion, several representatives spoke in favour of simplifying the framework through which the Montreal Protocol addressed controlled substances for laboratory and analytical uses. One representative said that consultations on the matter had continued intersessionally with the intention of setting out proposals in a conference room paper to be considered by the parties at the current meeting. The parties agreed to establish an informal group to continue discussion of the matter.

103. Subsequently, the representative of Canada introduced a conference room paper containing the draft decision that had been agreed on by participants in the informal group.

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

D. Process agents

105. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 62–68 and annex II of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2), section 5.3.3 of the Technology and Economic Assessment Panel May 2018 progress report (vol. 3) and section 5.1 of the May 2019 progress report (vol. 1). She recalled that at the Thirtieth Meeting of the Parties, parties had discussed possible actions with regard to table A (list of uses of controlled substances as process agents) and table B (emission limits for process agent uses) of decision X/14 on process agents. The Technology and Economic Assessment Panel had, as requested by decision XXIX/7, provided its full report on the matter, which had been discussed further at the forty-first meeting of the Open-ended Working Group.

106. The representative of the European Union said that his party would present a conference room paper containing a draft decision with the aim of updating the limits outlined for that party in tables A and B of decision X/14 and stressing the importance of reporting on such uses, on emissions and on technological developments to reduce such uses. The party would also continue to engage with other interested parties on the matter of updating the limits in the tables in decision X/14 for other parties with the intention of setting out proposals in a conference room paper to be considered by the parties at the current meeting. Subsequently, when the conference room paper had been introduced, it was agreed that interested parties would consult informally on the matter and report back in plenary session on the outcome of those discussions.

107. Subsequently, the representative of the European Union introduced a conference room paper containing the draft decision that had been agreed on after the informal discussions.

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

IX. 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

109. Introducing the item, the Co-Chair reminded participants that in decision XXX/5 the Technology and Economic Assessment Panel had been requested to prepare a report on the cost and availability of low-global-warming-potential technologies and equipment that maintained or enhanced energy efficiency, covering various refrigeration, air-conditioning and heat-pump sectors, in particular domestic air conditioning and commercial refrigeration, and taking into account conditions in different geographical regions, including countries with high-ambient-temperature conditions. The Panel had established a task force, which had presented its report at the forty-first meeting of the Open-ended Working Group.

110. The meeting had discussed the report and requested the inclusion of several further elements in an update for the Meeting of the Parties. The new version of the report was available on the meeting portal and an executive summary of it was contained in the addendum to the note by the Secretariat (UNEP/OzL.Pro.31/2/Add.1).

111. Ms. Helen Rochat, co-chair of the Technology and Economic Assessment Panel Task Force on energy efficiency, and Mr. Bassam Elassaad, Mr. Omar Abdelaziz and Ms. Gabrielle Dreyfus, lead chapter authors for the report of the Task Force, presented their report on the cost and availability of low-global-warming-potential technologies that maintain/enhance energy efficiency. A summary of the presentations is set out in section D of annex II to the present report. Other members of the Task Force joined the presenters in responding to questions from representatives.

112. All representatives who took the floor thanked the Task Force for producing its report, welcoming the useful information contained therein. Task Force members then responded to questions about the costs and benefits of particular technologies and substances.

113. Mr. Elassaad described the first stage of the PRAHA programme, which had not been able to test all the possible refrigerant-compressor combinations and had been limited to compressors available on the market at the time. The more recent PRAHA 2 programme had tested units with optimized compressors and heat exchangers for high-ambient-temperature conditions, which had showed improved levels of energy efficiency.

114. Mr. Alaa Olama responded to a question on the not-in-kind project carried out in Kuwait. The system that had been tested – evaporative cooling – had been found to be superior to mechanical vapour compression systems by 40 to 60 per cent. Similar results had been found in split-system equipment and commercial refrigeration in several other countries.

115. Mr. Roberto Peixoto, co-chair of the Task Force, described the benefits of using variable-speed compressors, which depended partly on the temperature profile; the flatter the daily profile, the lower the benefit in terms of energy saving. The high degree of savings demonstrated in tests in Brazil – 30 to 40 per cent – had been found in three cities and was in line with findings from other projects, including some in India, Indonesia and Turkey. Higher savings could be achieved depending on the temperature profile, the thermal load, the thermal inertia and other factors, and further research was under way.

116. Mr. Abdelaziz said that micro-channel heat exchangers could be manufactured in high-ambient-temperature countries, given access to sufficient capital; indeed, one factory was already manufacturing them in Egypt. Compressors in high-ambient-temperature countries were usually more expensive than those in lower-temperature countries, partly because they usually had higher capacities. Nevertheless, they were becoming increasingly available, and several test projects had shown that their energy efficiency levels were higher than those of compressors using HCFCs. Compressors using HFC-32 were already available in high-ambient-temperature countries, and one project in the United Arab Emirates had seen 15,000 units manufactured over four years.

117. Mr. Samir Hamid, commenting on energy efficiency comparisons between different technologies and refrigerants, said that more information on the topic was included in the previous report of the Task Force. A project on not-in-kind alternatives in Jordan had seen a 30 per cent improvement in energy efficiency. The market was generally very dynamic; if demand for energy-efficient equipment increased, costs and prices could be expected to fall. Unfortunately, no data were available on the quantification of the improvements in energy efficiency that had followed the ongoing phase-out of HCFC equipment; it was nevertheless clear that such improvements had occurred. Some of the information requested by representatives appeared in the previous report of the

Task Force, including definition of which HFCs had high global warming potential and information about the costs of maintenance and servicing.

118. Regarding the difference between the availability and the accessibility of alternative technologies and substances, Ms. Rochat said that it was difficult to assess. The mix of products on the market changed all the time; the only way to accurately judge accessibility was to purchase the product in question. A top-down analysis could never fully assess it. However, accessibility could be increased by increasing demand for particular products – for example, through bulk purchases or by grouping purchasers together. Task Force members also explained that the definition of "widely available" used in the report meant that a product was available from more than one supplier in more than one country. The Task Force had not analysed in detail market penetration in any particular country.

119. Replying to several questions about "environmental dumping", Ms. Dreyfus said that the activity, while legal, had clearly negative environmental and economic impacts. While at the time of the report's preparation limited information had been available on the extent and impact of the practice, more information was emerging. Environmental dumping tended to be correlated with the absence of national energy efficiency policies, with a lack of properly trained servicing technicians and familiarity with new substances, with a lack of safety standards, with a lack of policies designed to phase down high-global-warming-potential HFCs, and with an absence of market signals promoting demand for alternative low-global-warming-potential products. The report included two examples of programmes that had involved replacement of old equipment and recovery and destruction of the refrigerants it contained. The programme had thus stimulated demand for new equipment, an effect that could be enhanced through rebates and tax incentives. Another benefit was that the old equipment had been prevented from entering the second-hand market and undercutting new products in terms of price.

120. Task Force members drew attention to the ways in which some parties had implemented policies and regulations that had driven substantial improvements in energy efficiency during the transition to low-global-warming-potential alternatives. While it had not always been clear whether the policies or the transition had come first, both measures clearly worked together to promote positive outcomes.

121. Replying to a question about the situation in Saudi Arabia, Mr. Maher Mousa said that the programme of minimum energy performance standards had started as a voluntary one in 2007 and had become a mandatory requirement in 2012; the report contained a full account. The Gulf Mark ("G-mark") set of safety regulations applied across the Gulf Cooperation Council region; the timing of implementation of the standard for heating, ventilation, and air-conditioning equipment was decided by individual countries. In Saudi Arabia, the standard had been introduced in 2018 to limit the refrigerant charge in residential air conditioners.

122. Mr. Ashley Woodcock, co-chair of the Task Force, acknowledging the importance of a question on the cost of inertia – not doing anything – said that, while unfortunately the issue was outside the remit of the Task Force report, clearly any delay in addressing energy efficiency issues would mean continued imports of inefficient equipment. That would result in higher demand for electricity and a substantial economic cost for the lifetime of the equipment, which could be two decades.

123. After the question-and-answer session, the Co-Chair invited representatives to discuss the way forward. All who spoke underlined the importance of the linkages between the phase-down of high-global-warming-potential substances and technologies and the need to improve energy efficiency. One representative noted that more than 80 per cent of the climate impact of refrigeration and air-conditioning equipment derived from the electricity it consumed. Another cited encouraging evidence that the transition to low-global-warming-potential alternatives was being accompanied by improvements in energy efficiency in the refrigeration and air-conditioning sector.

124. Several representatives commented on the challenges facing high-ambient-temperature countries, which had few available alternatives for refrigerants and equipment components, particularly for the high-capacity residential air-conditioning common in those countries. The future availability of substances and equipment was also very uncertain. Some alternatives, such as hydrocarbons, worked acceptably in refrigeration but not in air conditioning. The incremental costs of the transition to low-global-warming-potential alternatives needed to be carefully assessed on a case-by-case basis. Some representatives said that their countries might face a choice between installing energy-efficient equipment and complying with the requirements of the Kigali Amendment. It was observed that other Article 5 parties – for example, small island developing States – faced

similar challenges concerning the accessibility of low-global-warming-potential GWP alternatives, as well as issues such as the toxicity and flammability of some substances.

125. One representative observed that parties had been on a steep learning curve over the last few years, thanks in part to three Technology and Economic Assessment Panel Task Force reports, a workshop and several discussions at meetings of the parties; those efforts had laid firm foundations for future progress. Given the growing impacts of climate change, it was no exaggeration to say that those efforts were life-saving, and the parties needed to continue their work and make further progress. As the technologies in question were changing rapidly, the Task Force should be invited to produce further updates on newly available technologies and the market penetration of energy-inefficient equipment. Also useful would be information on the impact of the ratification of the Kigali Amendment on the introduction of low-global-warming-potential alternatives; on the effects of measures to phase down HFCs in conjunction with improving energy efficiency; and on the potential for early replacement programmes to enhance the availability and accessibility of low-global-warming-potential alternatives.

126. Several representatives, including the European Union speaking on behalf of a group of parties, highlighted the valuable role of policy measures such as minimum energy performance standards and labelling, not only at the national but also the international level. More broadly, international cooperation, including information and technology exchange and cooperation in the formulation of standards and labelling policies and performance tests, was vital to success, as had been highlighted in the Task Force report. Building capacity in the servicing and maintenance sector was just as important as replacing equipment and represented an opportunity to create green jobs and enhance skills and prosperity. There were also opportunities in encouraging not-in-kind alternatives through modal shifts – for example, providing air-conditioning systems for whole buildings rather than rooms, or through district cooling systems.

127. Several representatives mentioned the need to provide financial support for the introduction of technologies with greater energy efficiency and to establish linkages with other national and international programmes and institutions supporting work on energy efficiency. It was recalled that both points had been identified in decision XXX/5, and that the work under the Montreal Protocol to develop synergies with energy partners had been recognized at the Fourth Meeting of Pacific Regional Energy and Transport Ministers, held in Samoa in September 2019. One representative highlighted the valuable role that industry-led programmes could play in supporting the transition, while another stressed the need to address intellectual property constraints. Several mentioned the issue of dumping of inefficient equipment, which risked driving up the demand for energy.

128. Some representatives supported the proposal to invite the Task Force to continue its work, pointing to the need for further information and data. They suggested that a contact group be established to discuss that and other options. One representative, however, observed that the Executive Committee of the Multilateral Fund had met only once since the adoption of decision XXX/5 and had not had time to implement all the steps mentioned in the decision. It had decided to prioritize the supporting of enabling activities in low-volume-consuming countries and would continue to work on other measures at future meetings. The decision had not been intended as a comprehensive solution but an initial set of steps to address a complex issue. While the topic merited further discussion, the Executive Committee should be given time to implement the steps agreed on in 2018 before further measures were proposed.

129. The meeting agreed that informal discussions should continue on the topic and the agenda item would remain open to allow any further suggestions to be made.

130. Subsequently, the representative of the Federated States of Micronesia introduced a conference room paper containing a draft decision that had been agreed on after the informal discussions.

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

X. Terms of reference, composition, balance, fields of expertise and workload of the Technology and Economic Assessment Panel

132. Introducing the item, the Co-Chair drew attention to the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2), the addendum thereto (UNEP/OzL.Pro.31/2/Add.1), a review of the terms of reference, composition, balance, fields of expertise and workload of the Technology and Economic Assessment Panel (UNEP/OzL.Pro.WG.1/41/4), the terms of reference of

the Technology and Economic Assessment Panel under decision XXIV/8, and the matrix of needed expertise on the Technology and Economic Assessment Panel and its technical options committees.

133. She recalled that at the forty-first meeting of the Open-ended Working Group, parties had considered how to strengthen the process of nomination and selection of members of the Technology and Economic Assessment Panel, its technical options committees and other subsidiary bodies. Informal discussions had been held on the matter, after which Saudi Arabia had introduced a draft decision on behalf of a group of parties. The draft decision had been discussed and amended by an informal group and forwarded to the Thirty-First Meeting of the Parties and was set out in document UNEP/OzL.Pro.31/3. The informal group had also suggested that the Technology and Economic Assessment Panel and the Ozone Secretariat consider whether the form for nominating experts should be updated to reflect current circumstances.

134. The meeting agreed to reconstitute the informal group as a contact group co-chaired by Mr. Philippe Chemouny (Canada) and Ms. Lara Haidar (Lebanon).

135. Subsequently, after the contact group's deliberations, the co-chair of the contact group introduced a conference room paper setting out a draft decision on the matter.

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

XI. Membership of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol

137. Introducing the item, the Co-Chair recalled that at the forty-first meeting of the Open-ended Working Group, Armenia and Bosnia and Herzegovina had submitted a conference room paper on behalf of parties in Eastern Europe and Central Asia containing a draft decision to add to the membership of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol one additional member from an Article 5 party and one additional member from a non-Article 5 party, with Eastern Europe and Central Asia being given a permanent seat among the membership from Article 5 parties, as opposed to the arrangement, based on a four-year rotation, that had been adopted in decision XVI/38. The proponents had stressed the equal right of all regions to participate in the work of the Executive Committee. An informal group established to discuss the draft decision had been unable to reach agreement. The proposed draft decision had been forwarded to the Thirty-First Meeting of the Parties and was set out in document UNEP/OzL.Pro.31/3.

138. The representative of Armenia, speaking on behalf of a group of parties in Eastern Europe and Central Asia, said that the principle underlying decision XVI/38, under which parties participated once every four years, was unclear. Any decision on the matter should be based on one of the principles in articles 1 and 2 of the Charter of the United Nations, namely the principle of the sovereign equality of all its members. All United Nations forums, including the Meeting of the Parties, should be guided by that principle, and objections to the adoption of the draft decision would equate to votes against the Charter.

139. Several other representatives expressed their support for the position expressed by the representative of Armenia. One suggested that the parties take a long-term view, saying that the ratification of the Kigali Amendment would give rise to broad projects requiring substantial funding, and that the countries of Eastern Europe and Central Asia wished to participate in the related discussions.

140. Several representatives raised concerns regarding the proposed draft decision and the characterization of the issue by the representative of Armenia. Two were reluctant to change the existing structure of the Executive Committee, which worked well in assisting countries with implementation of the Protocol, and a third said that the Executive Committee was based on geographical representation and had always worked transparently, providing financial and technical assistance to countries without distinction, in line with United Nations principles of equity and justice. One, noting that several issues had been raised during the discussion on the matter at the forty-first meeting of the Open-ended Working Group, pointed out that Eastern Europe and Central Asia was not a United Nations regional group, and that treating it as such might lead to confusion that could cause other countries to reconsider how they might seek greater representation on the Executive Committee. That view was echoed by another representative, while a third asked for more information on how the countries involved had attempted to address the situation and in what ways they believed that the current situation was affecting them negatively.

141. The representative of Armenia, supported by two other representatives, asked that a contact group be established to discuss the matter further, but two other representatives said that they preferred to hold informal discussions as a first step. Given the lack of consensus on the establishment of a contact group, the parties agreed to hold informal discussions on the matter.

142. Subsequently, the representative of Sweden reported that, while the informal discussions had helped to resolve some of the questions raised by parties, their original positions remained unchanged. The proposers of the draft decision had again requested the establishment of a contact group.

143. At a later stage of the meeting, the representative of Armenia thanked those parties that had participated in informal discussions and repeated her request for the establishment of a contact group in line with rule 26 of the rules of procedure. She believed that there was one fundamental question before those parties opposing the proposal: was the principle of equality, as stated in the Charter of the United Nations, legally binding on them?

144. The Co-Chair suggested that, since no consensus had been reached either on the issue itself or on the establishment of a contact group, the topic should be deferred for further consideration at the forty-second meeting of the Open-ended Working Group, in 2020.

145. The representative of Armenia said that she had not heard any party object to the establishment of a contact group, and that she was prepared to continue discussions in any format, formal or informal. Another representative, however, said that, as far as he knew, there was no consensus on the establishment of a contact group. A third added that it was his understanding that any contact groups formed at the current meeting would lapse at the conclusion of the meeting, and it would be up to the next meeting of the Open-ended Working Group to decide whether to establish a new contact group.

146. Responding to a request for clarification, the representative of the Secretariat confirmed that it had always been the practice of meetings of the parties to take decisions by consensus. How to proceed when there was no consensus was a matter for the parties to resolve.

147. The meeting agreed to defer the matter for further discussion at the next meeting of the Open-ended Working Group.

XII. Request by Azerbaijan to be included among the parties to which the phase-down schedule for hydrofluorocarbons, as set out in paragraphs 2 and 4 of Article 2J of the Montreal Protocol, applies

148. Introducing the item, the co-chair recalled that at its forty-first meeting the Open-ended Working Group had considered a request by Azerbaijan to be included in a group of five non-Article 5 parties – Belarus, Kazakhstan, the Russian Federation, Tajikistan and Uzbekistan – that would follow a phase-down schedule starting slightly later than the schedule for the other non-Article 5 parties. Azerbaijan had submitted a proposal on the matter and, after a discussion in plenary and bilateral discussions with interested parties, had indicated that it would amend the proposal to improve the version being forwarded to the Thirty-First Meeting of the Parties. The party had later informed the Secretariat that it would be unable to send a delegation to the current meeting. The parties had before them the original text, set out in document UNEP/OzL.Pro.31/3.

149. The parties agreed not to discuss the item at the meeting and to let Azerbaijan decide whether it wished to present the matter for consideration at a future meeting.

XIII. Safety standards

150. Introducing the item, the Co-Chair recalled that at its forty-first meeting the Open-ended Working Group had discussed the tabular overview of safety standards for flammable low-GWP refrigerants prepared by the Secretariat pursuant to decision XXIX/11. Parties had expressed appreciation for an online tool also developed by the Secretariat, had encouraged parties to continue providing information on safety standards to the Secretariat, and had requested the Secretariat to continue to update and develop the online tool. Several issues had been raised during the discussion, mainly regarding the importance of the review and revision of standards that would facilitate the expanded use of low-global-warming-potential refrigerants, but also regarding the need to consolidate information on standards, the appropriateness of certain standards to be used in specific regions, and the need of Article 5 parties for training and capacity-building. It had been agreed to defer further consideration of the issue to the Thirty-First Meeting of the Parties.

151. One representative, speaking on behalf of a group of countries, said that his party had been interested in safety standards for a number of years and had recently been working closely with

another party on the matter. Commending the Secretariat for setting up the interactive online tool, he encouraged other parties to share information on their standards and ensure that the platform was as complete and up-to-date as possible, which was the only way to publicize policy measures being taken to ensure that alternatives were available. Standards allowing broad, safe use of low-global-warming-potential refrigerants were essential to meeting the goals of the Kigali Amendment. As was indicated in the Technical and Economic Assessment Panel's report on energy efficiency, it was clear that safe appliances had to be designed, built and installed when using natural refrigerants. He noted recent progress made by the International Electrotechnical Commission (IEC) in amending the IEC 60335-2-89 standard to raise the charge limit for refrigeration equipment in the commercial refrigeration sector and stressed the importance of moving forward with IEC 60335-2-40 for split air-conditioning equipment to ensure swift continued progress. Noting that setting international standards was only part of the process, he urged all parties to ensure that amended standards were taken into account in national, local and regional legislation and requirements in order to facilitate the installation of equipment using low-global-warming-potential alternatives.

152. Another representative, echoing the comments made by the previous speaker, expressed the hope that the IEC standard for household electrical appliances would also be amended, creating the enabling conditions to make products with low-global-warming-potential refrigerants more broadly available and facilitate the adoption of such products.

153. The parties agreed to conclude the discussion on the agenda item.

XIV. Initial assessment by the Scientific Assessment Panel and the Technology and Economic Assessment Panel of five volatile fluoroorganic and related compounds found in the Arctic

154. Introducing the item, the Co-Chair recalled that in 2018 the representative of Norway had informed the Thirtieth Meeting of the Parties that a screening survey conducted by the Norwegian Institute for Air Research had resulted in the detection of five volatile fluoroorganic compounds in the Arctic atmosphere for the first time. Wishing to learn more about those anthropogenic substances, the Norwegian Government had sought guidance and help of other parties, the assessment panels, the scientific community and intergovernmental organizations, and had subsequently submitted a notification to the Secretariat and requested that appropriate action be taken in accordance with decision IX/24. The Secretariat had forwarded the information to the Scientific Assessment Panel for an assessment of the ozone-depleting potential of the substances and to the Technology and Economic Assessment Panel for an evaluation of the extent of use or potential use of any new substances considered by the Scientific Assessment Panel to have significant ozone-depleting potential and, if necessary, of the potential alternatives, along with recommendations for actions that the parties should consider taking.

155. Mr. Newman then made a presentation on the matter on behalf of both assessment panels. A summary of the presentation is set out in section E of annex II to the present report.

156. Replying to a question about where the substances were being emitted, he said that it was impossible to determine that on the basis of data from a single station.

157. Members of the Technology and Economic Assessment Panel then replied to questions about the function of the chemicals detected. Ms. Tope said that the Panel had used publicly available information and the members' expert knowledge of the chemicals market to determine their function, adding that the three chemicals used as solvents were specialty products and quite expensive. Mr. Ohnishi said that the two chemicals classified as perfluorocarbons were typically used to cool supercomputers, an application that had recently regained popularity because it was more energy efficient that cooling by air; that said, the demand created by that niche market was minimal. The chemical classified as a chlorofluorocarbon was a relatively new chemical that, according to the relevant scientific literature, was used as a solvent medium for special reactions such as fluorination and as an intermediate for hexachlorobutadiene, used for etching or cleaning in the semi-conductor manufacturing process. The remaining two chemicals were halogenated aromatics currently used as intermediates, in one case for herbicides, for which there was a relatively large market, and in the other case for a pharmaceutical ingredient, for which the market size was unknown.

158. The representative of Switzerland, noting that the chemicals could find their way into product development and calling for vigilance, informed the parties that his country had initiated a study to measure the levels of the newly detected substances in a suburban setting to learn more about their sources. He invited those interested to discuss the matter further in the margins of the meeting. A member of the Technology and Economic Assessment Panel, Mr. John Pyle, echoed the call for

vigilance; while such gases were not a threat to the ozone layer or the climate at their current low concentrations, they should be monitored to ensure that concentrations did not increase.

159. One representative said that he wished to thank the members of the Scientific Assessment Panel and the Technology and Economic Assessment Panel, and other scientists, for their contribution to knowledge on the five volatile fluoroorganic and related compounds found in the Arctic. While the quantities concerned were small, continued vigilance was warranted and necessary. Further monitoring activities needed to be undertaken to resolve uncertainties and fill knowledge gaps, and additional information on the status of the substances could be usefully provided in the next quadrennial report.

160. The parties agreed to conclude discussion on the item.

XV. Consideration of nominations to the assessment panels

161. Introducing the item, the Co-Chair recalled that, at its forty-first meeting, the Open-ended Working Group had considered the issue of nominations for positions on the Technology and Economic Assessment Panel. She outlined the relevant information set out in the note by the secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2, paras. 93–98) and the addendum thereto (UNEP/OzL.Pro.31/2/Add.1, paras. 22–23), noting that the Secretariat had received two nominations prior to that meeting: the nomination by Algeria of Mr. Sidi Menad Si-Ahmed to continue serving as a senior expert on the Panel for a period of four years and the nomination by Japan of Mr. Keiichi Ohnishi to continue serving as a co-chair of the Medical and Chemicals Technical Options Committee for an additional four-year period. The Technology and Economic Assessment Panel had provided information on the members whose terms would expire at the end of 2019, and the list was available in the Panel's May 2019 progress report and in the note by the Secretariat (UNEP/OzL.Pro.31/2, table 1).

162. At the forty-first meeting of the Open-ended Working Group, parties that were interested in the nominations or intended to nominate experts had been requested to engage in informal consultations with a view to preparing nominations to be considered at the Thirty-First Meeting of the Parties, and to consult the Panel to ensure that nominations would meet its requirements. Since then, the Secretariat had received an additional nomination, that by China of Mr. Jianjun Zhang, currently a co-chair of the Medical and Chemicals Technical Options Committee, to continue serving for an additional period of four years. A nomination had also been received at the current meeting: the nomination by Brazil of Ms. Suely Machado Carvalho, currently a senior expert on the Technology and Economic Assessment Panel, to continue serving for an additional four-year period.

163. Noting that the Environmental Effects Assessment Panel's two co-chairs, Mr. Nigel Paul and Mr. Min Shao, would soon retire, she said that they would need to be replaced. They were to be thanked for their tremendous contribution to the work of the Panel and to the achievement of the objectives of the Montreal Protocol.

164. The Co-Chair urged parties, when making their nominations, to take into account the matrix of needed expertise provided by the Technology and Economic Assessment Panel. Parties intending to nominate experts or interested in the nominations were encouraged to hold informal consultations in the margins of the meeting with a view to preparing nominations for consideration and possible adoption during the high-level segment.

165. Subsequently, the representative of the United States introduced a draft decision on the membership changes on the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel, set out in a conference room paper submitted by Algeria, Brazil, China, Egypt, India, Japan, the United Kingdom of Great Britain and Northern Ireland and the United States.

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

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

167. The President of the Implementation Committee, Mr. Patrick McInerney (Australia), presented a report on the outcomes of the sixty-second and sixty-third meetings of the Committee, including an overview of the draft decisions approved by the Committee for consideration by the Thirty-First Meeting of the Parties. As had been the trend in recent years, the agenda of both meetings had been light – a result of the continued high level of compliance by parties with their obligations under the

Montreal Protocol. All the parties subject to decisions on reporting obligations had returned to compliance, and all the parties subject to plans of action were in compliance with those plans.

168. He drew attention to a conference room paper setting out two draft decisions for consideration by the Thirty-First Meeting of the Parties, The first, on data and information provided by the parties in accordance with Article 7 of the Montreal Protocol, noted that all parties that should have reported such data had done so. That was a commendable effort, he said, and parties and the implementing agencies should be congratulated for meeting the reporting deadline. The second draft decision related to the requirement for each party that had ratified the Kigali Amendment to establish an HFC licensing system within three months of the entry into force of the Amendment for that party, and to report to the Secretariat on the establishment and operation of the system. Any Article 5 party that decided it was not in a position to establish and implement a licensing system by 1 January 2019 could delay taking those actions until 1 January 2021. The decision noted with appreciation that to date 41 parties to the Kigali Amendment to the Montreal Protocol had reported the establishment of licensing systems, as required by the Amendment, and that five other parties that had not yet ratified the Amendment had also reported the establishment of such systems.

169. He said that at the end of the first year of implementation of the Kigali Amendment it might be wise, despite the high levels of compliance with obligations, to take stock and ensure that the non-compliance mechanism was sufficiently well equipped to deal with future challenges. To that end, the Implementation Committee at its sixty-third meeting had considered a report prepared by the Secretariat at the Committee's request on possible ways of dealing with illegal production of and illegal trade in controlled substances under the Montreal Protocol, identifying potential gaps in the non-compliance procedure, challenges, tools, ideas and suggestions for improvement. The Committee had agreed that the information was relevant for all parties and that the report would therefore be annexed to the report of the Implementation Committee on the work of its sixty-third meeting. It had also agreed to recommend to the Thirty-First Meeting of the Parties that the matter be included on the agenda for the forty-second meeting of the Open-ended Working Group.

170. In the ensuing discussion, one representative thanked the Implementation Committee for its excellent work, while another highlighted minor drafting inconsistencies in the text of the draft decisions. It was agreed that an item dedicated to the issues covered in the above-mentioned report by the Secretariat would be added to the agenda of the forty-second meeting of the Open-ended Working Group.

171. Subsequently, the Co-Chair, noting that the previously presented conference room paper on compliance and data reporting had contained two draft decisions, the first addressing data and information provided by the parties in accordance with Article 7 of the Montreal Protocol and the second dealing with the establishment of licensing systems under paragraph 2 bis of Article 4B of the Protocol, informed participants that the second draft decision had been edited and set out in a new conference room paper. The representative of the United States then introduced the conference room paper in question.

172. After a brief discussion, the parties agreed to hold informal discussions on both draft decisions and report back in plenary session on the outcome of those discussions.

173. Subsequently, the parties agreed to forward both draft decisions for further consideration and possible adoption during the high-level segment.

XVII. Risk of non-compliance with hydrochlorofluorocarbon reduction targets for 2019 by the Democratic People's Republic of Korea

174. Introducing the item, the Co-Chair outlined the relevant information set out in the note by the secretariat (UNEP/OzL.Pro.31/2, paras. 101–105), recalling that, at its forty-first meeting, the Open-ended Working Group had considered the risk of non-compliance with HCFC reduction targets for 2019 by the Democratic People's Republic of Korea. At that meeting, the party had notified the Working Group that it faced the risk of being in non-compliance with its obligations with respect to HCFC owing to its inability to embark on a HCFC phase-out management plan and related activities as a consequence of restrictions arising from Security Council sanctions. At the same meeting, the Open-ended Working Group had considered a draft decision submitted by the Democratic People's Republic of Korea on the matter. Owing to a lack of support for the proposed draft decision, the discussions on the agenda item had been closed. At the same meeting, the President of the Implementation Committee had described the outcome of the consideration of the matter by the Committee – namely, agreement that any work undertaken by the Committee with respect to the Democratic People's Republic of Korea should comply with the applicable Security Council

resolutions, and that the Committee would discuss the matter further in the event of any future non-compliance by the party with its obligations under the Protocol (UNEP/OzL.Pro.WG.1/41/5, paras. 191–199). Subsequently, the Secretariat had received a request from the party to place the issue on the agenda of the Thirty-First Meeting of the Parties.

175. The representative of the Democratic People's Republic of Korea, introducing a conference room paper containing a draft decision on the matter, drew attention to the situation in her country and its risk of non-compliance with HCFC reduction targets from 2019 despite the efforts undertaken at the national level to meet the reduction targets. In the draft decision, the Executive Committee of the Multilateral Fund was requested, among other things, to exclude any condition or restriction irrelevant to the implementation of the Protocol when it considered granting assistance to parties operating under paragraph 1 of Article 5. She called on all parties to assist her country by resuming the provision of technical assistance and training to it in order that it might meet its HCFC-related obligations under the Protocol, and to permit it to exceed the limits laid down by the Montreal Protocol with regard to HCFC production and consumption until confirmation of the provision of such assistance and training.

176. One representative said that he could not accept the draft decision, which would have parties to the Montreal Protocol act in direct contravention of Security Council resolutions. Stressing that the Executive Committee had to take into account Security Council resolutions as well as applicable international law and rules, he noted that a series of sanctions by the Security Council, including in resolution 1718 of 2006, limited the types of financial and technical assistance that could be provided to the Democratic People's Republic of Korea. To ensure compliance with such sanctions, proposed projects needed to be approved by the Security Council Committee established pursuant to resolution 1718 before being approved by the Executive Committee. Parties must ensure that funding spent in the Democratic People's Republic of Korea did not contribute to programmes relating to missiles and weapons of mass destruction, especially because, as was noted in relevant resolutions of the Security Council, the country had a history of diverting economic assistance and the proceeds of trade and economic activity to support such programmes. His Government could not, therefore, support the draft decision proposed by the Democratic People's Republic of Korea. If the party reported non-compliance with its obligations under the Montreal Protocol, the matter would again be taken up by the Implementation Committee and brought the attention of the parties.

177. In the ensuing discussion, a number of representatives, including one speaking on behalf of a group of countries, expressed support for the position whereby, in accordance with international law, it was not possible for the Multilateral Fund to disburse any further funding for projects in the Democratic People's Republic of Korea until the party had met all the requirements stipulated in the relevant Security Council resolutions. The representative of the Democratic People's Republic of Korea repeated that the suspension of funding from the Multilateral Fund would place the party at risk of non-compliance with the provisions of the Montreal Protocol. One representative, speaking on behalf of a group of countries, said that any matter of non-compliance should be dealt with in the appropriate forum, namely the Implementation Committee.

178. The parties agreed to close discussion on the matter.

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

179. Introducing the item, the Co-Chair drew attention to the background information set out in paragraphs 106–108 of the note by the Secretariat on issues for discussion by and information for the attention of the Thirty-First Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Pro.31/2) and the note by the Secretariat on the status of ratification, acceptance, accession or approval of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP/OzL.Pro.31/INF/3). As was the custom of the Montreal Protocol, the Meeting of the Parties would take decisions recording the status of ratification of the Kigali Amendment, and urging those parties that had not already done so to consider ratifying it, until universal ratification was achieved. A draft decision on the matter was accordingly contained in document UNEP/OzL.Pro.31/3.

180. During the ensuing discussion, a number of representatives reported on their parties' progress towards ratification of the Kigali Amendment. Several expressed their commitment to the provisions of the Amendment and described national actions being undertaken to phase down production and consumption of HFCs. Some representatives called for further resources to be mobilized to ensure that parties had the means to implement the Amendment.

181. The parties agreed to forward the draft decision for consideration and possible adoption during the high-level segment of the current meeting.

XIX. Other matters: Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development

182. Introducing the item, the Co-Chair said that, as had been decided during the adoption of the agenda, the Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development would be discussed under the agenda item. The text was contained in annex V of document UNEP/OzL.Pro.31/2.

183. The representative of Italy said that his Government attached great importance to the Declaration, and he urged parties to endorse it. The Declaration aimed to highlight the role that the Montreal Protocol could play in supporting the development of sustainable cold chains to counteract food loss, thus contributing to a number of the Sustainable Development Goals, including Goal 2, on ending hunger; Goal 7, on affordable and clean energy; Goal 12, on responsible consumption and production; and Goal 13, on climate action. The Declaration complemented the theme of the high-level round-table discussion on the contribution of the Montreal Protocol to food loss reduction through sustainable cold chain development, which would take place during the high-level segment of the current meeting. Signature of the Declaration by parties was voluntary and non-binding.

184. During the ensuing discussion, many parties expressed support for the Declaration. One representative said that the initiative was very timely, given that the current meeting was being hosted by FAO, which had just launched the 2019 edition of its report *The State of Food and Agriculture*, focusing on food loss and waste reduction. Some representatives stressed the particular importance of cold chains in countries with high ambient temperatures, though one said that reference could have been made to the issue of safety in refrigeration and air-conditioning systems, as well as the efficiency and sustainability of those systems.

185. The representative of Italy said that he appreciated the widespread endorsement of and support for the Rome Declaration. The Co-Chair described the modalities by which parties could sign the Declaration either at the current meeting or during the intersessional period before the Thirty-Second Meeting of the Parties. It was agreed that the Declaration would be annexed to the report of the meeting along with the names of those parties that had endorsed it by the end of the meeting.

186. The Declaration is set out in annex I to the present report.

Part two: high-level segment (7 and 8 November 2019)

I. Opening of the high-level segment

187. The high-level segment of the Thirty-First Meeting of the Parties to the Montreal Protocol was opened at 10 a.m. on Thursday, 7 November 2019, by Ms. Liana Ghahramanyan (Armenia), President of the Thirtieth Meeting of the Parties.

188. Opening statements were delivered by Mr. Sergio Costa, Minister for the Environment and Protection of Land and Sea, Italy; Ms. Inger Andersen, Executive Director, UNEP; Mr. Pietro Parolin, Cardinal and Secretary of State, Holy See; Mr. Qu Dongyu, Director General, Food and Agriculture Organization of the United Nations (FAO); and Ms. Ghahramanyan.

189. In his opening address, Mr. Costa said that with the adoption of the Kigali Amendment the parties to the Montreal Protocol had achieved an extraordinary result, linking global policies pertaining to the dual challenges of ozone depletion and of climate change. He was grateful to the Executive Director of UNEP, the Ozone Secretariat and the staff of FAO for their cooperation with his Government to host the current meeting. Their collaboration with his ministry, including on reducing food loss and food waste, was crucial for achieving the 2030 targets of the Sustainable Development Goals. Agriculture, including climate-smart agriculture, provided an essential means of mitigating the impact of and adapting to the challenges of climate change. The theme of the high-level segment, “The contribution of the Montreal Protocol to a sustainable cold chain to reduce food loss”, was of special importance both for FAO and for the Montreal Protocol.

190. Recalling the words of the late Secretary-General of the United Nations Mr. Kofi Annan, who had characterized the Montreal Protocol as perhaps the single most successful international agreement to date, he said that the Protocol proved that policymakers could listen to the message of science and successfully and rapidly deploy actions in pursuit of a shared environmental objective, as well as creating an effective and efficient institutional framework that could generate green economic growth.

The Kigali Amendment signalled a historic juncture at which policymakers yet again had to heed the science and act quickly in response.

191. In her remarks, Ms. Andersen said that she was grateful to the Government of Italy for hosting the current meeting in the city of Rome, whose incredible history stretched back thousands of years in comparison to the relatively short existence of the Montreal Protocol. At a time when multiple environmental challenges threatened human existence, agreements such as the Protocol had never been more important. She wished to stress the importance of the Kigali Amendment to the Protocol, whose implementation could avoid global warming of 0.4ºC through the phasing down of hydrofluorocarbons (HFCs). On a warming planet, the need for life-saving cooling was growing, but the increased use of such cooling could not come at the expense of the climate. It was necessary, therefore, to explore greater energy efficiency, renewable energy and nature-based cooling solutions. To that end, and to bolster the implementation of the Kigali Amendment, UNEP had launched the Cool Coalition, with many of its members making commitments to reducing the climate impact of the cooling industry while increasing access to life-saving technology. The Kigali Amendment had been ratified by 88 countries to date; nothing short of universal ratification was acceptable.

192. The UNEP *Emissions Gap Report 2019*, to be launched shortly, highlighted the complete lack of progress in cutting global greenhouse gas emissions. Even if all current unconditional nationally determined contributions were implemented, the world would still be headed towards climate warming of 3.2ºC over pre-industrial era levels, which would cause fundamental changes in countries across the globe. Urging parties to remain vigilant on the issue of unexpected emissions of CFC-11 until the science confirmed a decline in the reported trend of those emissions, she highlighted the central role of science in vigilance and compliance and in helping governments to design and implement the right policies to address environmental challenges. In that regard, the Montreal Protocol's three assessment panels were to be commended for so conscientiously and effectively tracking progress and identifying emerging issues over the years. The environmental challenge was a single, global challenge, which all humankind must address together.

193. In his keynote statement, Mr. Parolin, speaking on behalf of Pope Francis, highlighted three lessons to be learned from the international ozone regime. First, the regime had arisen from broad and fruitful cooperation between the scientific community, the political sphere, economic actors and industry, and civil society, demonstrating that humankind could achieve important outcomes to safeguard the planet, promote human development, and care for the common good for the benefit of present and future generations. Second, the regime demonstrated that it was possible to limit and direct technology, putting it at the service of a healthier, more human, more social and integral progress, providing a reason to hope that although the post-industrial period might be remembered as one of the most irresponsible periods in history, humanity at the dawn of the twenty-first century would be remembered for having shouldered its responsibilities. Honest, fruitful dialogue, attentive to different needs and free of special interests, with all of humankind working together in a spirit of solidarity and creativity, was essential for building the future of the planet. Finally, the care of the environment needed to be anchored in awareness of the mysterious interconnectedness of all things. The Kigali Amendment highlighted that principle, representing a bridge between ozone depletion and global warming.

194. In his remarks, Mr. Qu Dongyu said that the Montreal Protocol was important for many reasons: in addition to being the most successful multilateral environmental agreement and at the heart of the recovery of the ozone layer, it also contributed to combating climate change and protecting food security. Some 1.3 billion tonnes of food were lost or wasted yearly worldwide, a phenomenon that produced approximately 8 per cent of global greenhouse gas emissions. The *State of Food and Agriculture in the World 2019* report clearly demonstrated that reducing food loss would contribute directly to reducing greenhouse gas emissions per unit of food consumed. Cold chains could help address food loss and ensure that farmers' produce reached markets in good condition and had a longer shelf life, with resulting benefits for the environment, farmers and consumers. More efficient, climate-friendly technology for cooling was critical for phasing out HFCs, extending the shelf life of foodstuffs, and reducing food loss and food waste. Innovation, too, was key to addressing challenges such as the use of plastic in food packaging and food culture.

195. In her remarks, Ms. Ghahramanyan said that it was difficult to overestimate the significance of the ozone layer and the vital role it played for life on Earth. She questioned whether the current efforts of the international community as it strove to meet the targets of the Sustainable Development Goals would have been possible without the joint efforts made in the context of the ozone regime. Saying that the integrity of the ozone layer was a precondition for life on earth, she urged participants, with that in mind, to continue their joint work for the benefit of present and future generations.

II. Organizational matters

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

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

President:	Mr. Alvin Da Breo (Grenada) (Latin American and Caribbean States)
Vice Presidents:	Mr. Ezzat Lewis Agaiby (Egypt) (African States)
	Ms. Norlin Jaafar (Malaysia) (Asian and Pacific States)
	Mr. Patrick McInerney (Australia) (Western European and other States)
Rapporteur:	Ms. Ramona Koska (Hungary) (Eastern European States)

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

197. The following agenda for the high-level segment was adopted, as amended, on the basis of the provisional agenda set out in document UNEP/OzL.Pro.31/1:

1. Opening of the high-level segment:
   - (a) Statement by the representative of the Government of Italy;
   - (b) Statement by the representative of the United Nations Environment Programme;
   - (c) Statement by the representative of the Holy See;
   - (d) Statement by the Director General of the Food and Agriculture Organization of the United Nations;
   - (e) Statement by the President of the Thirtieth Meeting of the Parties to the Montreal Protocol.
2. Organizational matters:
   - (a) Election of officers for the Thirty-First Meeting of the Parties to the Montreal Protocol;
   - (b) Adoption of the agenda of the high-level segment of the Thirty-First Meeting of the Parties to the Montreal Protocol;
   - (c) Organization of work;
   - (d) Credentials of representatives.
3. Presentations by the assessment panels on their synthesis of the 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 Thirty-First Meeting of the Parties.
7. Dates and venue for the Thirty-Second Meeting of the Parties to the Montreal Protocol.
8. Other matters.
9. Adoption of decisions by the Thirty-First Meeting of the Parties to the Montreal Protocol.
10. Adoption of the report.
11. Closure of the meeting.

C. Organization of work

198. The parties agreed to follow their customary procedures.

D. Credentials of representatives

199. The Bureau of the Thirty-First Meeting of the Parties to the Montreal Protocol approved the credentials of the representatives of 114 of the 170 parties represented at the meeting. The Bureau provisionally approved the participation of 2 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 their synthesis of the 2018 quadrennial assessments

200. Before the presentation by the assessment panels, participants were shown a video prepared by the Secretariat in recognition of the valuable role played by the panels in the implementation of the Montreal Protocol.

201. Ms. Birmpili then presented awards to two co-chairs of the Environmental Effects Assessment Panel, Mr. Nigel Paul and Mr. Min Shao, who were retiring from the Panel. On behalf of the ozone family, she thanked them both for their hard work in supporting the work of the parties over many years.

202. Mr. John Pyle, co-chair of the Scientific Assessment Panel, Ms. Bella Maranion, co-chair of the Technology and Economic Assessment Panel, and Mr. Paul, co-chair of the Environmental Effects Assessment Panel, gave a presentation covering the document “Twenty Questions and Answers about the Ozone Layer: 2018 Update”, the synthesis of the 2018 quadrennial assessment reports (contained in document UNEP/OzL.Pro/31/8) and a 2019 update on Antarctic ozone depletion. A summary of the presentation is set out in section F of annex II to the present report.

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

204. The parties took note of the information presented.

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

205. The Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol, Mr. Philippe Chemouny, reported on the work of the Executive Committee, the Multilateral Fund secretariat and the implementing agencies of the Fund since the Thirtieth Meeting of the Parties, summarizing the information provided in document UNEP/OzL.Pro.31/10. His statement is set out in annex III to the present report.

206. The parties took note of the information presented.

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

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

A. Statements by heads of delegation

208. Statements were made by the heads of delegation or their representatives of the following parties: Angola, Argentina, Bahamas, Bahrain, Bangladesh, Benin, Brazil, Cambodia, China, Congo, Costa Rica, Côte d'Ivoire, Cuba, Ethiopia, European Union, Fiji, Gambia, Grenada, Guatemala, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Kenya, Lebanon, Malawi, Malaysia, Mongolia, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Philippines, Russian Federation, Seychelles, Solomon Islands, Sri Lanka, Timor-Leste, Togo, Tunisia, Uganda, United Republic of Tanzania, Uzbekistan, Vanuatu and Viet Nam. A statement was also delivered by the representative of the International Institute of Refrigeration.

209. Representatives of many parties who spoke expressed thanks to the Government and people of Italy for their hospitality in hosting the meeting in the iconic city of Rome, and to the Food and Agriculture Organization of the United Nations for its logistical and other support to the meeting. Many also thanked the Ozone Secretariat, the secretariat and Executive Committee of the Multilateral Fund, the United Nations Environment Programme, 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.

210. 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, thereby contributing enormously to the safety and well-being of humanity. The Protocol, along with its London, Copenhagen, Montreal, Beijing and Kigali amendments, was widely recognized as a model instrument that had achieved universal ratification and united commitment to a common cause, namely protection and restoration of the ozone layer. Parties regularly achieved a very high rate of compliance with their treaty commitments, and many achieved their targets well ahead of the designated deadlines.

211. A number of factors contributing to that success were alluded to, including the strong political commitment and will of governments; work conducted in a spirit of unity and partnership, guided by the rules and norms of the Protocol's governing instruments and bodies and by the best scientific knowledge available; the involvement of a wide range of partners, including the institutions of the Protocol, political bodies, implementing agencies, the private sector and civil society; the application of a consensus approach in making decisions; and the solidarity and financial support provided by developed countries to developing ones to ensure the transition to more ozone- and climate-friendly alternatives.

212. Many representatives described the continuing work being undertaken in their own countries, with assistance from the Multilateral Fund and implementing agencies, to phase out ozone-depleting substances and to implement the various stages of their HCFC management plans and achieve compliance with the provisions of the Protocol, including through legislative, policy, institutional and programmatic measures. A wide range of activities were outlined, including the development of national programmes to eliminate ozone-depleting substances and convert existing technologies to more environmentally friendly alternatives; the strengthening of legal and policy frameworks; the introduction of import controls and monitoring mechanisms and quota and licensing systems to combat illegal trade; training and capacity-building for customs officers, as well as for service technicians in the refrigeration and air-conditioning sectors; educational and awareness-raising campaigns, including in the area of safety; the establishment of institutional and organizational structures to support national ozone units in policy formulation, information gathering and oversight; intersectoral collaboration involving a range of stakeholders, including through public-private partnership ventures; the recovery and recycling of refrigerants in the air-conditioning sector; the implementation of national standards and guidelines for refrigerants and for equipment using refrigerants; and the promotion of alternative substances and new technologies, particularly in the refrigeration, air-conditioning and foam sectors, with a focus on climate benefits and energy efficiency. Some representatives alluded to methyl bromide as a harmful substance requiring further efforts to achieve its global elimination.

213. With regard to the Kigali Amendment, many representatives emphasized its significance for the future direction of the Montreal Protocol and its critical role in global efforts to combat climate change through reduced greenhouse gas emissions. There was widespread recognition by parties of the urgent need to phase out the consumption and production of HFCs. Several highlighted the 0.5°C of global warming that could be avoided by the year 2100 through successful implementation of the Amendment, which would contribute significantly to the Paris Agreement's objective of keeping the global temperature rise well below 2°C. Several representatives, including those from small island developing States and other vulnerable States, gave examples of extreme climate events that had caused significant damage to the environment and infrastructure, and even loss of life, in their

countries. Several representatives alluded to the wider benefits to be derived from the phase-down of HFCs under the Amendment, including the achievement of a number of the Sustainable Development Goals, such as Goal 7 on affordable and clean energy, Goal 9 on sustainable industry and infrastructure and Goal 13 on climate action. A number of representatives stated that their countries were among the 88 that had ratified the Amendment as at 3 November 2019, thus enabling its entry into force, while several others reported on the status of their national processes towards ratification. Parties that had not yet ratified the Amendment were urged to do so. One representative said that the new stage of development of the Montreal Protocol marked by the adoption of the Kigali Amendment entailed undertaking new, ambitious tasks, which required a review of some old approaches rooted in the past practice and decisions of the parties to the Protocol.

214. A number of representatives described the actions being undertaken in their countries to implement the Kigali Amendment and to introduce climate-friendly technologies, including demonstration projects for converting manufacturing lines to environmentally friendly alternatives; the gathering of data on the current status of HFC use to support policy formulation; legislative measures, including regulating the import and disposal of HFCs; the implementation of safety measures for toxic and flammable substances, including by establishing standards and codes of practice; the inclusion of Amendment-related actions within wider environment and climate protection programmes and strategies; the introduction of Harmonized System codes for ozone-depleting substances and their substitutes, including HFCs and HFC-containing mixtures; the establishment of minimum energy performance standards and energy efficiency labelling standards; training for businesses and technicians on good practices in the refrigeration and air-conditioning sectors, supported by certification; the organization of capacity-building workshops and the development and dissemination of educational materials; and incentive programmes, including fiscal incentives, to promote energy efficiency.

215. The significant funding and other support provided by the Multilateral Fund and the implementing agencies was widely acknowledged. However, a number of representatives commented on the need for a reliable, sufficient flow of technical and financial assistance in order for parties to comply with their commitments under the Montreal Protocol, including the Kigali Amendment. One representative said that reducing the consumption and production of HFCs was a greater challenge than the preceding elimination of CFCs and HCFCs, and that the international community needed to consolidate efforts to reduce greenhouse gas emissions, including through support for effective capacity-building projects, with a particular focus on countries with low and very low consumption. Another called for greater commitment from the parties operating under Article 2 of the Protocol in spearheading implementation of the Kigali Amendment, given their earlier phase-down schedule. Yet another said that the principle of common but differentiated responsibility should continue to serve as a model for international cooperation in addressing emerging environmental challenges.

216. One representative said that the addition of financial support for the phase-down of HFCs to the continuing funding for the phase-out of ozone-depleting substances placed a significant extra burden on the principal funding partners. At the same time, the economic standings of parties had changed significantly in the three decades since the Multilateral Fund had first begun providing financial support to Article 5 parties, as a consequence of which a smaller percentage of non-Article 5 parties were increasingly supporting a larger and growing share of Article 5 parties. A review was therefore needed of the fairness and sustainability of the financial mechanism of the Montreal Protocol.

217. The market availability of affordable and cost-effective alternatives was viewed as a significant factor in compliance with the provisions of the Kigali Amendment. A number of representatives recognized the challenge faced by manufacturers in adopting new technologies, given safety and competitiveness considerations. Technology transfer, research and capacity-building needed to be enhanced to assist enterprises in that regard. Conversion technologies needed to be environmentally sound, energy efficient, affordable and safe. One representative said that the recently developed online tool for safety standards served as a useful reference for national implementation of standards. Another said that innovative building design was vital for energy efficiency. A third said that a revolution in the global market was starting to take place, with increased availability of a new generation of refrigeration equipment with low or no global warming potential and with proven energy efficiency, a development that demonstrated synergy between ozone and climate measures. Some representatives highlighted the continuing challenge faced by countries with high ambient temperatures in identifying appropriate and affordable technologies for the refrigeration and air-conditioning sectors.

218. A number of emerging challenges faced by the Montreal Protocol were likewise identified. Several representatives highlighted the unexpected increase in emissions of CFC-11 as a matter of

particular concern. One said that the development was a wake-up call for parties, indicating the importance of continued vigilance and monitoring in order to identify such challenges at an early stage and the need to improve the regulatory capacity of developing countries to deal with those challenges at inception. The development also indicated that compliance under the Protocol was a long-term process requiring trust and cooperation among parties in order to ensure sustainable implementation. Another representative, speaking on behalf of a group of countries, said that the recent unexpected emissions of CFC 11 had demonstrated that the success of the Protocol in protecting the ozone layer could not be taken for granted. It was important to consider how all parties could achieve improved enforcement of the Protocol and comply with their commitments in order to ensure continued recovery of the ozone layer. There was a need to review existing monitoring, verification and reporting systems and consider opportunities for enhanced and improved vigilance, with the end goal of ensuring sustained compliance.

219. One representative said that a further challenge requiring the attention of all parties was how to dispose of or manage stocks of unwanted ozone-depleting substances, including refrigerants. Another said that it was time to review the composition of the Executive Committee of the Multilateral Fund in line with the United Nations principle of fair geographical representation in the governing bodies of the organizations of the United Nations system. A third proposed a new initiative for the life-cycle-based management of fluorocarbons, including proper management of leaked and discarded fluorocarbons with a view to further reducing emissions.

220. Several representatives expressed their interest in the theme of the Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development. A number stressed the need for efficient cooling technologies to ensure well-articulated cold chains that reduced food loss, which in turn had significant implications for reducing food insecurity and poverty in developing countries, especially those with high ambient temperatures or agriculture-based economies. One representative said that the matter was very timely, given the recent launch of the 2019 edition of the FAO report *The State of Food and Agriculture*, which focused on food loss and waste reduction and pointed to the importance of advancing technologies that helped to reduce food loss without harming the environment. Some representatives, including one speaking on behalf of a group of countries, said that cooling in the food industry was a cross-cutting issue that could aid the attainment of a number of Sustainable Development Goals. The representative of the International Institute of Refrigeration said that the Rome Declaration was in line with the work of the Institute to help countries develop national cooling action plans to ensure food safety and health. Some representatives spoke of initiatives in their own countries to develop such plans.

221. A number of representatives placed the actions to protect the ozone layer under the Montreal Protocol in the wider context of efforts to protect human health and the environment and promote sustainable development. Such efforts included reversing deforestation and increasing forest cover, promoting clean and renewable energy, sustainable transportation, smart cities, green growth, waste management, environmentally aware agricultural practices, and inclusive policies in such areas as a healthy environment, job creation and employment, and social equality. Improvements in health and nutrition, food supply, distribution of resources and general well-being would help ensure that no one was left behind, which was one of the basic principles of the Sustainable Development Goals. Some representatives outlined a holistic, integrated paradigm whereby humanity lived in harmony with, and cared for, the planet Earth, protecting its natural resources for the benefit of all peoples. One representative spoke of the need to balance economic growth with environmental sustainability to ensure the preservation of natural capital and the quality of life of citizens.

222. Pursuant to such ideals, a number of representatives stressed the importance of cooperation and collaboration in undertaking activities at the national, regional and international levels for the betterment of the planet and humanity. The Montreal Protocol itself was an acknowledged success story of global cooperation and provided an example of how the international community could engage multiple partners in working together to identify and implement solutions to global challenges for a sustainable future.

223. 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.

B. Round-table discussion on the contribution of the Montreal Protocol to food loss reduction through sustainable cold chain development

224. The round-table discussion was moderated by Mr. Jim Walker, Director for Partnerships, Sustainable Energy for All, and the panellists were Ms. Krista Mikkonen, Minister for the Environment and Climate Change, Finland; Ms. Geeta Menon, Joint Secretary, Ministry of

Environment, Forests and Climate Change, India; Mr. Roberto Morassut, Undersecretary of State of the Ministry of the Environment and Protection of Land and Sea, Italy; Mr. Bintony Kutsaira, Minister for Natural Resources, Energy and Mining, Malawi; Ms. Khadeeja Naseem, Deputy Minister for the Environment, Maldives; Mr. René Castro-Salazar, Assistant-Director-General, Climate, Biodiversity, Land and Water Development, FAO; Mr. Jose Raul Rias Villarreal, Manager of New Projects for Agropecuaria Malichita, a vegetable producer and exporter based in northern Mexico; Mr. David Appel, President, Carrier Transicold and Refrigeration Systems, and a co-chair of the Global Food Cold Chain Council; Ms. Liz Goodwin, Director of Food Loss and Waste, World Resources Institute, and a representative of Champions 12.3, a cross-sector coalition for driving action on food waste; and Ms. Inger Andersen, Executive Director, UNEP.

225. Mr. Walker began by providing an overview of the linkages between the Montreal Protocol and the 2030 Agenda for Sustainable Development and their importance in addressing food waste and hunger. He said that 820 million people were still malnourished across the world. Meanwhile, one third of food produced globally was either lost or wasted each year, accounting for 10 per cent of greenhouse gas emissions and costing the global economy $1 trillion per year. Achieving a more sustainable cold chain would help feed a growing population, reduce the impact of climate change, boost wages and create jobs. The Kigali Amendment in particular presented an opportunity for the Montreal Protocol to contribute significantly to the goals of ending hunger, reducing food loss and waste, and providing sustainable energy for all.

1. Actions being taken by governments

226. Mr. Walker then asked those panellists representing parties to describe the actions their Governments were taking domestically and internationally to support the development of sustainable cold chains; the opportunities they saw for their Governments to do so; and the benefits that would accrue to people from the achievement of a sustainable cold chain.

227. Mr. Morassut highlighted two objectives to be pursued in line with Sustainable Development Goal 9: industrial innovation and infrastructure development. Those two objectives could be supported by instruments of the Montreal Protocol, in particular the Multilateral Fund, which provided resources for technological innovation and the creation of high-quality new jobs. National strategies could also make a contribution in that regard. The Italian Government, for instance, was set to adopt tax incentives aimed at encouraging business to invest in industrial innovation to introduce new technical services, enhance performance, create jobs and support sustainable development. The market was beginning to recognize the success of businesses that aimed for sustainable development, which augured well for the introduction of cooling techniques that both prevented food waste and avoided ozone depletion and global warming.

228. Ms. Menon spoke about the India Cooling Action Plan recently introduced in her country. A four-fold increase in cold chain infrastructure was anticipated over the next 30 years. The cold chain was crucial for achieving the Government's goal of doubling farmers' incomes by improving access to markets, and it would have major implications for the country's immunization programme. The Government of India aspired to develop a sustainable cold chain infrastructure that took into account the need to prevent global warming, improve energy efficiency, and reach those to whom the cold chain mattered most, namely farmers. It had identified the central challenges as being technology and refrigerant choices, energy efficiency and skills development.

229. Ms. Mikkonen said that Finland, and indeed the European Union as a whole, had been prioritizing circularity, which meant maximizing the value of materials and products by keeping them in use for as long as possible. In the European Union, legislation and regulation had proved to be efficient tools for controlling CFC and other fluorinated greenhouse gases (F-gases); thanks to European Union regulations in place since 2006, F-gas levels were set to fall significantly by 2030, with a corresponding increased market penetration of more environmentally friendly refrigerants. Technology had also proved to be an effective tool, leading to better energy efficiency. Regarding food waste, she said that it should be minimized but could also be used to produce biogas. It was important to remember that food loss manifested itself differently in different countries, occurring at an earlier stage in the food chain in developing countries and in households in developed countries. Tools for reusing such food waste were needed, such as collection systems for household food waste.

230. Mr. Kutsaira described the situation in Malawi, which, like most sub-Saharan developing countries, had inadequate cold chain infrastructure. The existing infrastructure was concentrated in the urban areas and often used older, inefficient technologies. Post-harvest food loss tended to occur in the rural areas. The Government recognized the critical role of the cold chain, and local refrigeration experts had been introduced to the use of energy-efficient, low-global-warming-potential technologies to support a sustainable cold chain. The Government was also introducing policies that encouraged

communities to switch to more energy-efficient cooling technologies, and it was expanding its rural electrification programme in a bid to improve the cold chain, cut post-harvest losses, and improve producers' incomes.

231. Ms. Naseem, noting that Maldives was a small island developing State with a population of 400,000 scattered across 190 islands, said that in her country food distribution was a difficult task, and that food quality and food waste in turn were heavily influenced by the efficiency of the food distribution system. An unbroken cold chain was crucial for food security, the health of the population and the economy of the tourism-dependent nation. Having access to appropriate technology and implementing a national cooling plan like that of India would help reduce food loss and support livelihoods, particularly given the strong impact of climate change on the island nation.

2. Actions being taken by international bodies and the private sector

232. Mr. Walker then invited the remaining panellists to share their thoughts about what needed to be done by 2030 to achieve sustainable cold chains, and how the synergies between the Montreal Protocol and the other organizations and initiatives working on food waste could be enhanced.

233. Mr. Castro said that two key elements were better cooperation between United Nations entities and the private sector accompanied by an immediate massive scaling up of technologies and approaches whose effectiveness had been demonstrated in pilot projects. Multilateral Fund resources could be supplemented with financing from the Green Climate Fund and other funds, and the relationships of FAO with governments, the farming and fishing industries, and fruit and vegetable producers could be a useful contribution.

234. Ms. Andersen, recalling that concern for climate change had led the Secretary-General to convene the recent Climate Action Summit, spoke about the Cool Coalition, whose 80 or so partners were considering smart buildings as well as the cold chain. The goal was to bring together the various actors from industry, science, government and international organizations. The role of UNEP was to provide norms and guidance that countries and regional entities would then adapt to their contexts. Just over a month old, the Coalition had already secured commitments from 20 countries to include cooling in their nationally determined contributions, along with additional commitments from the C40 Cities Climate Leadership Group and industry.

235. Ms. Goodwin drew attention to *Creating a Sustainable Food Future*, a World Resources Institute report that explored the question of how to feed 10 billion people by 2050 without using more land or generating more emissions. The most relevant action proposed in the report was to reduce demand and the single biggest action area to tackle food loss and waste. Champions 12.3 was a coalition of leaders from the public and private sectors and civil society committed to tackling food loss and waste to achieve Sustainable Development Goal target 12.3. Champions 12.3 promoted a simple "target, measure, act" strategy for countries and companies: set targets consistent with Sustainable Development Goals, measure food loss and waste, and take action based on those measurements. A sustainable cold chain was of fundamental importance for addressing food loss.

236. Speaking from the perspective of food producers, Mr. Raul Rios said that in agribusiness improved quality meant increased income for producers, and the best tool for improving quality was the cold chain. Cooling processes had enabled his company to expand its reach to the eastern United States and even Canada, halve its waste, and create more than 12,000 well-paying jobs. The most important input in the cold chain, power, represented up to 80 per cent of costs, and his company was interested in energy efficiency projects; it had implemented a photovoltaic project, with funding from the World Bank, to supply 10 per cent of its power requirements. Financial support for such projects had, however, diminished considerably in recent years, and the company had been obliged to turn its attention to projects with tangible short-term profits. It was worth noting that agricultural production in general could be 30 per cent higher if consumers accepted produce that, while not meeting their aesthetic expectations, retained its physical properties and taste.

237. Speaking from the perspective of the food chain industry, Mr. Appel said that, even though a sustainable cold chain could eliminate more than half of all perishable food waste, only 15 per cent of the perishable food produced worldwide was currently refrigerated. Opportunities for investment included pre-cooling facilities that allowed perishable food to be put into controlled environments immediately after having been harvested, in order to reduce spoilage; transport refrigeration equipment used to maintain proper temperature and humidity control during transport; and real-time temperature monitoring and tracking devices to help safeguard the safety and quality of perishable food as it moved along the cold chain. From a policy-setting perspective, reducing food loss was the only policy that both fed more people and reduced greenhouse gas emissions. By clearly establishing the connection between food loss and climate change, the Montreal Protocol community could help

countries gain access to United Nations climate funding for the development of their respective cold chains.

3. Calls to action

238. The panellists representing international bodies and the private sector, when asked how the Montreal Protocol community could accelerate the adoption of sustainable cold chains, suggested setting more ambitious goals; including the cold chain in upcoming nationally determined contributions for the Paris Agreement; engaging in more private-public partnerships; making the 2020s a decade of implementing cold storage; creating national cooling plans that were in line with the Kigali Amendment and included the cold chain; establishing national strategies for reducing food loss and waste, as called for in United Nations Environment Assembly resolution 4/2; providing incentives and financing for technology conversion to ensure that the practice was profitable; providing training to support the adoption of sustainable technologies; and demonstrating the economic viability of a sustainable cold chain.

239. The panellists representing governments, asked what steps the latter needed to take in order to achieve a sustainable cold chain, suggested setting incentives that discouraged the use of HCFCs and HFCs and encouraged the adoption of alternative technologies in general; linking existing incentives for cold-chain infrastructure development with the adoption of energy-efficient technologies and low-global-warming-potential refrigerants; ensuring access to electricity in rural areas; increasing awareness of the importance and availability of energy-efficient, low-global-warming-potential technologies; updating regulations to permit the adoption of sustainable cold chain technologies; developing new cold-chain infrastructure using energy-efficient cooling systems based on low-global-warming-potential refrigerants and retrofitting existing cold storage infrastructure to enable a switch to such systems; developing safety standards for flammable and toxic refrigerants; standardizing the design, construction and specifications of cold chain infrastructure components across segments; providing specialized training facilities for cold chain professionals and technicians; considering non-refrigerant-based technologies; adopting national plans for the prevention of food waste; and developing national, regional and international synergies, including through the sharing of best practices.

240. Asked to sum up their messages, the panellists said that tackling food waste and food loss was important and possible, and that a sustainable cold chain was central to that ambition. A sustainable cold chain would reduce greenhouse gases, cut food loss and food waste, and feed the planet's growing numbers of inhabitants. The Kigali Amendment was crucial for achieving a sustainable cold chain and should be ratified by all parties.

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

241. The Co-Chair of the preparatory segment reported that the work of the segment had concluded successfully, and that draft decisions had been approved for consideration and possible adoption during the high-level segment. The parties had agreed to defer further discussion of a number of issues to the forty-second meeting of the Open-ended Working Group, in 2020, including on item 7 (ongoing reported emissions of carbon tetrachloride); item 8 (b) (stocks of methyl bromide); and item 11 (membership of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol). They had agreed to close discussion on item 12 (request by Azerbaijan to be included among the parties to which the phase-down schedule for hydrofluorocarbons, as set out in paragraphs 2 and 4 of Article 2J of the Montreal Protocol, applies) and item 17 (risk of non-compliance with HCFC reduction targets for 2019 by the Democratic People's Republic of Korea).

242. On item 13 (safety standards), the parties had had constructive discussions but had agreed not to take any decision at the current meeting. On item 14 (initial assessment by the Scientific Assessment Panel and the Technology and Economic Assessment Panel of five volatile fluoroorganic and related compounds found in the Arctic), the parties had, after listening to the reports of the two assessment panels, concluded that there was no immediate reason for concern. Finally, all parties had been invited to sign the Rome Declaration proposed by the Government of Italy. In closing, she wished, on behalf of her Co-Chair and herself, to thank 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-Second Meeting of the Parties to the Montreal Protocol

243. The representative of Uzbekistan, expressing his country's desire to contribute to the development of international cooperation to protect the ozone layer, combat climate change, and implement the Sustainable Development Goals, presented the proposal of his Government to host the Thirty-Second Meeting of the Parties in Tashkent in November 2020. He gave a short audiovisual presentation on the merits of Uzbekistan as a venue for that meeting.

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

VIII. Other matters

245. The Thirty-First Meeting of the Parties took up no other matters during the high-level segment.

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

246. The Thirty-First Meeting of the Parties adopted the decisions approved during the preparatory segment, as set out in document UNEP/OzL.Pro.31/9/Add.1.

X. Adoption of the report

247. The parties adopted the present report on Saturday, 9 November 2019, on the basis of the draft report set out in documents UNEP/OzL.Pro.31/L.1 and UNEP/OzL.Pro.31/L.1/Add.1. The Ozone Secretariat was entrusted with the finalization of the report.

XI. Closure of the meeting

248. Following the customary exchange of courtesies, the meeting was declared closed at 12.30 a.m. on Saturday, 9 November 2019.

Annex I

Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development*

We, the ministers and heads of delegation of the following parties to the Montreal Protocol on Substances that Deplete the Ozone Layer Angola, Argentina, Australia, Austria, Bangladesh, Belarus, Belgium, Belize, Brazil,[1] Bosnia and Herzegovina, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Croatia, Czech Republic, Denmark, Ecuador, El Salvador, Estonia, European Union, Fiji, Finland, France, Gambia (Republic of the), Germany, Grenada, Guinea, Guinea-Bissau, Hungary, Iran (Islamic Republic of), Italy, Jordan, Kyrgyzstan, Liberia, Libya, Lithuania,[1] Luxembourg, Maldives, Micronesia (Federated States of), Montenegro, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Panama, Paraguay, Philippines, Poland, Qatar, Republic of Moldova, Rwanda, Saint Lucia, Senegal, Slovakia, Solomon Islands, South Sudan, Spain, Sri Lanka, Sudan, Suriname, Sweden, Switzerland, Syrian Arab Republic, Tunisia, Uganda, United States of America, Uzbekistan, Vanuatu, Venezuela (Bolivarian Republic of), Viet Nam,

Considering the discussions at the round table opening the high-level segment of the Thirty-First Meeting of the Parties to the Montreal Protocol at the headquarters of the Food and Agriculture Organization of the United Nations, which has a prominent role in reducing food losses,

Recalling that about one-third of all food produced globally for human consumption is either lost or wasted, which has severe impacts on farmers' incomes and precious resources such as land, water and energy and generates greenhouse gases,

Reaffirming the cooperation among parties in implementing the Montreal Protocol and recognizing that the Montreal Protocol and its Kigali Amendment have raised awareness of the need to develop sustainable and efficient solutions in the refrigeration and *air*-conditioning sector to meet future cooling demand, including cold-chain initiatives for food preservation,

Aware of the key role of the cold chain in the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals related to, inter alia, ending hunger and poverty, food security, improved nutrition, *climate* action, sustainable agriculture and fisheries, health and well-being,

1. *Stress* the importance of pursuing national action and international cooperation to promote the development of the cold chain, including by using sustainable and environmentally friendly refrigeration to reduce food loss;

2. *Underscore* the multiple benefits of promoting the exchange of information on the contribution of the cold chain to the Sustainable Development Goals and encourage the ongoing work under the Montreal Protocol to this end;

3. *Call for* strengthening cooperation and coordination between Governments, the institutions of the Montreal Protocol, the specialized agencies of the United Nations, existing private and public initiatives and all relevant stakeholders to exchange knowledge and promote innovation of energy-efficient solutions and technologies that reduce the use of substances controlled by the Montreal Protocol in the development of the cold chain, thereby contributing to the reduction of food loss and waste.

Rome, 8 November 2019

* The Rome Declaration is presented as received, without formal editing.

[1] Endorsed the Declaration after the meeting had ended.

Annex II

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

A. Interim report of the Scientific Assessment Panel on increased emissions of CFC-11

1. Dr. Paul A. Newman, Prof. John Pyle, and Prof. Bonfils Safari (Scientific Assessment Panel co-chairs) with Dr. Stephen Montzka (NOAA, USA) gave a presentation on the "SAP interim report on increased emissions of CFC-11." In response to recent observational findings concerning CFC-11, the Parties to the Montreal Protocol approved "Decision XXX/3: Unexpected emissions of CFC-11." This decision formally asked the Scientific Assessment Panel (SAP) to provide a summary report on this "… unexpected increase of CFC-11 emissions ..." , with an interim report is required for the 31st MOP.

2. The SAP presentation had 6 elements:

- Report Status
- CFC-11 observations and global network
- What's in WMO/UNEP [2018]?
- Rigby et al. [2019] showing regional emissions
- Preliminary updated results for 2018-2019
- Summary

3. The SAP has worked with the science community to push forward work on the CFC-11 issue. Two events have been completed in 2019: 1) the March 2019 Symposium on CFC-11 in Vienna, Austria; and 2) the publication of the SPARC Report in July 2019, "Report on the International Symposium on the Unexpected Increase in Emissions of Ozone-Depleting CFC-11." In December 2019 there will be a CFC-11 Special Session at AGU Fall meeting in San Francisco, USA.

4. The Report on CFC-11 for the 32nd MOP is in development. The SAP reported that the outline, and revised (extended) outline of the report is now complete, and the Author and Advisory Committee has been established. The Advisory Group includes: Paul Fraser (Australia), Neil Harris (UK), Jianxin Hu (China), Michelle Santee (USA), Paul A. Newman (SAP), David Fahey (SAP), Bonfils Safari (SAP), and John Pyle (SAP). The outline and their authors will cover five CFC-11 topics along with an Introduction and Summary:

1. **Introduction:** Advisory Group
2. **Observations:** Stefan Reimann (Switzerland), Bo Yao (China)
3. **Global emissions:** Steve Montzka (USA), Sunyoung Park (South Korea)
4. **Regional emissions:** Matt Rigby (UK), Andreas Stohl (Norway).
5. **Scenarios:** Guus Velders (Netherlands), Helen Walter-Terrinoni (USA).
6. **Modeling:** Martyn Chipperfield (UK), Michaela Hegglin (UK)
7. **Summary:** All

5. The SAP also recalled their discussion at the 41st OEWG. The foundation for global and regional ODS emissions determinations is based upon the precise, accurate, long-term measurements from two ground-based networks (NOAA and AGAGE). CFC-11 atmospheric levels and trends are estimated from the averages of these network observations. Derivation of the magnitude and trends of global emissions use time series of the average global abundance, and ODS atmospheric lifetime. Magnitude and trends of regional emissions are derived from network measurements combined with meteorological information of prevailing winds from source(s) to measurement sites (back trajectories).

6. In published studies available at the present time, measured CFC-11 levels continued to decline through 2017, but at a much slower rate than observed a few years prior (from 2002-2012). Monthly averaged observations were shown from around the world, along with maps of station locations. The global averaged observations were derived from 5 AGAGE stations, and 12 NOAA background sites.

7. The CFC-11 main findings from the Executive Summary of the "Scientific Assessment of Ozone Depletion: 2018" were again reiterated to the 31st MOP. Most particularly, there was an

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

unexpected increase in global total emissions of CFC-11 in recent years, confirming the initial paper by Montzka et al. [2018]. Global CFC-11 emissions derived from measurements by two independent networks increased after 2012, thereby slowing the steady decrease in atmospheric concentrations that had been observed in the decade prior to 2012 and which was reported in previous Assessments. The global concentration decline over 2014 to 2016 was only two-thirds as fast as it was from 2002 to 2012. While the observations also indicated that emissions of CFC-11 from eastern Asia had increased since 2012, the contribution of this region to the global emission rise was not well known. The country or countries in which emissions had increased was not identified in these earlier reports.

8. The presentation also included a slide from the peer-reviewed paper by Rigby et al. in Nature, "Increase in CFC-11 emissions from eastern China based on atmospheric observations." This study extended our understanding of global emissions through 2017 (emissions were also elevated in this year) and also used high-frequency atmospheric observations from Gosan, South Korea, and Hateruma, Japan and atmospheric chemical transport models to show that emissions from eastern mainland China had increased concurrently with the rise in global emissions; they were determined to be 7.0 ± 3.0 (±1s) Gg yr^{-1} higher in 2014–2017 than in 2008–2012. This emission increase was found in and around the northeastern provinces of Shandong and Hebei.

9. Dr. Stephen Montzka of the SAP provided preliminary NOAA measurement results for the 2018-2019 period and he also provided new preliminary AGAGE results courtesy of Dr. Sunyoung Park (Kyungpook Nat. Univ., Republic of Korea). These new 2018-2019 results showed: 1) an accelerating global concentration decline, 2) a decreasing Northern-Southern hemispheric concentration difference, 3) a decrease of concentrations in pollution plumes reaching Hawaii, and 4) decreased concentrations in pollution plumes reaching Jeju Isl., ROK. These new results imply that CFC-11 emissions have declined both globally and from eastern China since the 2014-2017 period.

10. In summary, the SAP showed that based on published data through 2017: 1) that atmospheric CFC-11 levels had continued to decline, but at a much lower rate than in earlier years than was expected, 2) there had been an unexpected increase of CFC-11 emissions, and 3) new research (published in Rigby et al., although not yet fully assessed by the SAP) had determined that 40-60% of these global emission increases had originated in eastern China. Drs. Montzka and Park used preliminary data in 2018-2019 (not published and not assessed by SAP) to show multiple lines of evidence implying that CFC-11 emissions have declined both globally and from eastern China since the 2014-2017 period. The SAP finally noted that the CFC-11 Report is in preparation and will be presented next year at the Meeting of the Parties.

B. Final report of the Technology and Economic Assessment Panel task force on unexpected emissions of CFC-11

11. Ms. Helen Walter-Terrinoni first reiterated Decision XXX/3: Unexpected Emissions of 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 consequently requesting that the Technology and Economic Assessment Panel 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.

12. Ms. Walter-Terrinoni noted that a submission was received from China for the preliminary report. Following the OEWG, additional information was submitted by China, the European Union, Japan, Mexico, Russia, and the United States for the final report. Ms. Walter-Terrinoni then shared the list of 22 Task Force members including 9 members from A5 parties and 5 female members.

13. Ms. Walter-Terrinoni then provided an overview of the Final Report of Unexpected CFC-11 Final Report noting that the Final Report builds on the Preliminary Report using additional information to complete the analysis, and to confirm or update assumptions. The report includes analyses CFC-11 production, usage, banks and emissions at the global and regional levels, eliminates unlikely additional emissions sources, identifies likely emissions sources and estimates the quantity of newly produced CFC-11 to supply them. It provides additional information on marketing and illicit international trade and considers questions raised at the 41st OEWG.

14. Ms. Walter-Terrinoni then provided additional background stating that CFC-11 was used as a foam-blowing agent (for open and closed cell foams), aerosol propellant, refrigerant (largely for

centrifugal chillers), and in smaller uses, e.g., asthma inhalers, tobacco expansion. Alternatives replaced former uses. She then stated that CFC-11 production/consumption in non-A5 parties was phased out in 1996, with some production for basic domestic needs. She then noted that while CFC-11 production/consumption in A5 parties was phased out in 2010. Some A5 parties were funded to complete their phase-out earlier and then stated that over time, CFC-11 is released into the atmosphere from banks of CFC-11 produced prior to the phase-out. These banks are made of CFC-11 remaining in closed cell foams and centrifugal chillers.

15. Ms Walter-Terrinoni then briefly provided background on the work of the scientists detecting the unexpected emissions mentioning both the Montzka *et al.* (Nature, May 2018) report of an unexpected, global increase in CFC-11 emissions of 13,000 ± 5,000 tonnes/year after 2012 cf. 2002-2012 from the northern hemisphere. She stated that the study suggests that there is a concurrent increase in CFC-11 emissions from eastern Asia, although the regional contribution to the global increase was not quantified, and that the increase in CFC-11 emissions arises from new post-2010 production that has not been reported to the Ozone Secretariat. She also mentioned the Rigby *et al.* (Nature, May 2019) reported increased CFC-11 emissions from eastern mainland China of 7,000 ± 3,000 (±1 standard deviation) tonnes/year in 2014-2017 compared with 2008-2012. She stated that these arise primarily from Shandong and Hebei provinces, accounting for at least 40-60% of the global increase in CFC-11 emissions and that there was no evidence for any significant increase in CFC-11 emissions for those other countries or regions that were adequately monitored by atmospheric measurements.

16. Ms. Walter-Terrinoni then stated that Pre-2010 production and usage is unlikely to account for CFC-11 emissions noting that a wide range of scenarios was developed to investigate the broadest possible quantities of potential emissions from pre-2010 production and usage. She then stated that the Task Force was able to identify a reasonable set of plausible assumptions for a “most likely” bottom-up emissions scenario, based on pre-2010 CFC-11 production, prior installation of foams/RAC, existing foams/RAC banks, and end-of-life management and that the emissions scenarios estimated from pre-2010 production, usage, and banks do not account for the increased atmospheric-derived emissions. She went on to say that based on Task Force analysis of CFC-11 production, usage, emissions and comparison against atmospheric-derived emissions, it is unlikely that pre-2010 production and usage can account for the unexpected CFC-11 emissions without new CFC-11 production and usage.

17. Ms. Walter-Terrinoni then showed the graph of the ”Most likely” scenario of bottom-up CFC-11 emissions (Figure 6.10 in the Final Report) which includes the “global atmospheric-derived emissions” representing the range from 2018 SAP Assessment Report, and the “most likely” scenario estimate of expected global emissions from past production, usage and existing banks. She then reiterated that the task force had examined a broad range of possible scenarios and none of them aligned with the derived atmospheric emissions after 2012.

18. She then explained that the Montzka *et al*. (2018) describes a change in atmospheric derived emissions in different time periods, from 2014-2016 compared to 2002-2012. In contrast, she stated the Task Force report describes the difference between the “most likely” expected emissions (the line) compared to the atmospheric-derived emissions from SAP Assessment Report (2018) in the same time period.

19. Ms. Walter-Terrinoni then went on to explain that the Final Report examined CFC-11 usage in closed-cell foam by region prior to 2010 stating that prior to 2010, most closed-cell foams were produced and used in Europe and North America (prior to 1996). Consequently, most of the global CFC-11 emissions occurred during foam manufacturing and installation, and during the lifetime of products containing those foams, within Europe and North America, the majority of the closed-cell foams in these regions was landfilled or destroyed locally at end-of-life, with low emissions, and that there are significant quantities of CFC-11 closed-cell foams still in buildings in Europe and North America as banks.

20. She went on to state that the Final Report includes analysis of CFC-11 emissions from closed-cell foams at their end of life based on available information in all regions, which includes extreme and unlikely scenarios. She then showed a pie chart of the foams produced by region and reiterated that 70% of foams produced prior to 2006 were produced, used and disposed of in Europe and North America.

21. Ms. Walter-Terrinoni went on to say that the CFC-11 emissions from regional foam banks are insufficient to explain atmospheric-derived emissions repeating that further analysis of regional banks was completed for the Final Report, incorporating the duration of foam use and the subsequent timing of emissions from dismantling foams. She went on to explain that the Task Force found that expected

emissions originating from the pre-2010 foam banks in every region are insufficient to explain the unexpected CFC-11 emissions and, more specifically, that the Task Force concluded that the expected emissions from the pre-2010 CFC-11 foam banks in Northeast Asia are insufficient to account for the atmospheric-derived CFC-11 emissions from eastern mainland China estimated by Rigby *et al.*

22. Ms. Walter-Terrinoni then explained that rresumption of newly produced CFC-11 usage in closed-cell foams is likely and then expanded on the conclusion stated at the Open-ended Working Group in 2019 saying that it is unlikely that there has been a resumption of newly produced CFC-11 usage in refrigeration and air-conditioning, flexible (open-cell) foams, aerosols, solvents, feedstock, tobacco expansion and other miscellaneous applications. She then repeated that it is likely that there has been a resumption of newly produced CFC-11 usage in closed-cell foams and stated that this will result in a combination of immediate CFC-11 emissions from foam installation and CFC-11 production and an increase in the foam banks, from which CFC-11 will be released over time.

23. Ms. Walter-Terrinoni then commented on the technical and economic factors could have facilitated reversion to CFC-11 in closed-cell foams including Increased demand for closed-cell foams for insulation, reduced availability of HCFC-141b due to the phase-out, price increases of HCFC-141b and prices of HFCs, and finally that reversion from other fluorocarbons to CFC-11 in closed-cell foam manufacture can be made with technical ease.

24. Ms. Walter-Terrinoni went on to say that mislabelling of polyol blends for foams could facilitate unintended usage and international trade specifying that parties use and/or import polyol blends labelled as containing HCFC-141b and HFCs. A5 parties import up to 7,500 tonnes per year HCFC-141b in polyol blends. She clarified that polyol blends could be mislabelled, intentionally or unintentionally, and then used by a recipient without knowing which blowing agent is actually in the blend resulting in CFC-11 emissions during foam installation in parties receiving CFC-11 polyol blends without their knowledge.

25. Ms. Tope stated that the Task Force estimates that 40,000 to 70,000 tonnes per year of CFC-11 production is required to account for the unexpected emissions in each year from 2013 to 2017. She noted that some of this CFC-11 production will be emitted during the production process, some during the manufacture of closed-cell foams, while the remainder will be banked in foams, from which CFC-11 will be released over time.

26. Ms. Tope explained that the Task Force considered the technical and economic feasibility of 22 potential CFC-11 production routes. She stated that one of the most likely routes used to produce the CFC-11 is carbon tetrachloride to CFC-11/12 produced on a large-scale in an existing HCFC-22 and/or an HFC-32 liquid-phase plant. She indicted that for these types of plants, spare capacity to produce CFC-11 on a large-scale would have been available in the period after 2012, where utilisation of spare capacity lowers total production costs. She added that another likely route is carbon tetrachloride to CFC-11 on micro-scale plants, which have capacities in the 100 to 2,000 tonnes per year range, using minimal equipment to make low-grade CFC-11 for foam blowing use. She noted that while some micro-scale plants could be contributing to production, it seems unlikely that a large number of micro-scale plants would be solely responsible for the estimated annual CFC-11 production of 40,000 to 70,000 tonnes per year. She stated that a range of between 45,000 to 120,000 tonnes per year of carbon tetrachloride would be required to supply the estimated 40,000 to 70,000 tonnes per year of estimated CFC-11 production, depending on the proportion of co-produced CFC-12. She noted that the carbon tetrachloride quantity required for CFC-11 production is expected to be at the lower end of this range if, as expected, the objective is to make CFC-11 to supply closed-cell foams. She explained that the quantity of CFC-12 co-produced with CFC-11 is dependent on the production route chosen, and how the plant is set up and operated, and that with CFC-11 as the expected target chemical, the range of CFC-12 co-production is up to 30% of total CFC-11/12 production for the most likely production routes. She noted that the Task Force had modelled estimated bottom-up emissions of CFC-12 but that the assumptions used to model CFC-12 emissions indicated high underlying uncertainty, and therefore estimates of bottom-up CFC-12 emissions and comparison against atmospheric-derived CFC-12 emissions are inconclusive. She outlined the possible fate of co-produced CFC-12, which includes destruction by thermal oxidation, usage as a refrigerant and/or aerosol propellant, usage as a feedstock, and/or release to the atmosphere.

27. In concluding, she reiterated that pre-2010 CFC-11 production and usage is unlikely to explain the increased CFC-11 emissions; newly produced CFC-11 usage in closed-cell foams is likely to explain the unexpected CFC-11 emissions; newly produced CFC-11 usage in closed-cell foams will result in an immediate increase of CFC-11 emissions and a long-term increase of emissions from CFC-11 foam banks; the expected emissions from the pre-2010 CFC-11 foam banks in Northeast Asia are insufficient to account for the atmospheric-derived emissions from eastern mainland China that are

reported in Rigby et al.; an estimated 40,000 to 70,000 tonnes/year CFC-11 production would be required to supply the post-2010 foams usage and other associated emissions; and 45,000 to 120,000 tonnes/year carbon tetrachloride would be required to supply the estimated CFC-11 production, which is likely to be at lower end of that range.

C. Final assessment by the Methyl Bromide Technical Options Committee of critical-use nominations for methyl bromide

28. On behalf of TEAP, the Methyl Bromide Technical Options Committee co-chairs, Marta Pizano and Ian Porter presented an overview of the trends and outcomes for the CUN nominations submitted in 2019 for use in 2020 and 2021.

29. In opening the presentation, Ms. Pizano provided an overview of the stock amounts reported by four parties at the end of 2018 (<1.0 t), indicating that only parties requesting CUNs are required to report on stocks, therefore total stocks are unknown. As in past opportunities, MBTOC did not adjust CUE recommendations to account for stocks, this being a decision to be taken by parties.

30. She then provided an overview of the outcome of the final assessments for CUE recommendations of MB (t) for 2020 and 2021, showing that of the six requests for CUNs for a total amount of 111.441t, MBTOC was recommending 89.161 t.

31. For the Australian strawberry runners the full amount nominated by the party of 28.98 t was recommended, as the party provided further substantive justification for needing this amount. MBTOC acknowledged that the party provided a transition plan for phasing-out MB, based on methyl iodide (MI), showing that if registration and availability is achieved by 2021, then the Australian Government will reduced the nominated amount by 50%.

32. Co-chair Ian Porter then indicated that MBTOC recommended the full amount of 5.261 t for the Canadian strawberry runners in 2019. He stated that regulations unique to PEI prohibit the use of all feasible chemical fumigant options, and that soilless culture, i.e. substrates, are the only option presently suitable for this nomination. Also, after the OEWG, the party had provided information justifying that substrates were not yet suitable for adoption, so the reduction made in the interim recommendation could not be met. The reason was that yields of nursery plants grown in substrates were delayed by 3 weeks compared to field grown plants and this was presently uneconomical.

33. Interim recommendations presented at the OEWG for CUNs requested by Argentina for the tomato and strawberry for 2020 had been accepted by the party and therefore were not reassessed. For strawberries, the nomination was reduced based on a dosage that met MBTOCs standard presumption for the uptake of barrier films. For tomatoes, the final recommendation was 12.79 t and for strawberry fruit production was 7.83 t.

34. Mr. Porter then indicated that the interim recommendations for pests in commodities and structures for 2019 from South Africa (RSA) had received no request for reassessment by the party after the OEWG and that these amounts were now final recommendations. For mills, MBTOC recommended 0.3 t, based on a reduction for allowance of only one fumigation per year at a 20 g/m^3 dose rate for the three mills nominated, to allow time for adoption of integrated pest management practices and sulfuryl fluoride, now a registered alternative. For houses, MBTOC recommended a 15% reduction based on adoption of heat as a key alternative.

35. In closing the presentation, Mr. Porter reminded the parties about the timelines for submission of CUNs in 2020, as required under Decision Dec XVI/6 1, bis.

D. Report of the Technology and Economic Assessment Panel on the cost and availability of low-global-warming-potential technologies that maintain/enhance energy efficiency

36. Ms. Hélène Rochat, co-chair of the energy efficiency task force (EETF), presented the EETF report prepared for the MOP 31. Ms. Hélène Rochat began by elaborating the mandate in sub-paragraph XXX of decision XXX/5, which requested the Technology and Economic Assessment Panel (TEAP) “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”. The final report built on the preliminary report presented in the 41st OEWG in July, taking into account questions from parties and discussion in the margins. Ms. Rochat presented the list of the 20 members of the task force and noted that 60% of the task force were from A5 Parties and 30% were female. The report had 5 chapters; Chapter 1 Introduction,

Chapter 2 Availability (Lead Mr. Bassam Elassaad), Chapter 3 Cost (lead Dr. Omar Abdelaziz), Chapter 4 Markets (lead Dr Gabrielle Dreyfus), and Chapter 5 Summary. The chapter lead author presented their own chapter.

37. Mr. Bassam Elassaad started by defining "availability" in terms of presence in the different regions and climatic zones of the world. The report did not cover "Not-in-Kind" (NIK) technologies as they were not part of the EETF mandate, and they have recently been reviewed in the RTOC assessment report. Mr. Elassaad presented updated tables showing the availability of technologies, with more detail on countries and regions. He concluded that medium and low GWP refrigerants for energy efficient appliances are widely available, while the products using these refrigerants are available to varying degrees. He noted that research & development (R&D) to increase energy efficiency (EE) is focusing on lower GWP technologies, although some development is still taking place on the high GWP HFCs. There is no new research and development to increase the EE of HCFCs as these are already phased-out in many countries and being phased-out in the remainder. The availability of components to build AC products, like variable speed compressors and microchannel condensers, was also discussed. For commercial refrigeration products, energy efficiency is determined by equipment design and the majority of technical options for improved energy consumption are currently in use and do not depend on the refrigerant being used. Mr. Elassaad presented novel findings of the PRAHA-1 and PRAHA-2 projects that assessed air conditioner performance in HAT regions. He finished by describing a project on transcritical CO_2 systems for commercial refrigeration in Jordan which has been shown to significantly improve EE.

38. Mr. Omar Abdelaziz presented on the capital and operating costs associated with the conversion towards energy efficient and low-GWP technologies. He indicated that the EETF force has identified the required additional capital and operating costs to convert manufacturing lines for ACs to accommodate transition to low GWP refrigerants, whilst improving EE at the same time. He then presented a table containing detailed information on the range of capital costs associated with conversion of a typical manufacturing line (~100,000 units/year) for a lower GWP room air conditioner with higher energy efficiency. The conversion cost to accommodate low GWP refrigerants was in the range USD 300,000 – 535,000, with an additional USD 1,000,000 – 2,000,000 to accommodate microchannel heat exchangers, for a total of USD 1.3 to 2 million. He noted that smaller diameter tubes and microchannel heat exchangers can reduce refrigerant charge, improve system efficiency and enable equipment to meet safety standards. Mr. Abdelaziz summarized the availability, potential energy efficiency improvement, and impact on product cost. He showed that using a variable speed compressor can improve the system efficiency by up to 30% but would result in 20% increase in unit cost. On the other hand, microchannel heat exchangers may improve system efficiency by up to 15% with no impact on the unit cost. He noted that microchannel heat exchangers are especially known for the impact the have on the refrigerant charge reduction of up to 40%. Finally, Mr. Abdelaziz discussed the concept of life cycle cost analysis for policy making, presenting a case study from the U.S. Department of Energy during the rulemaking process for the minimum efficiency performance standard for self-contained commercial refrigeration. This case study depicted the correlation between initial cost, performance, and life cycle cost, and demonstrated that the lowest life cycle cost of equipment is not necessarily the most efficient equipment.

39. Ms. Gabrielle Dreyfus presented the Chapter on the role of markets and policies in determining the availability of energy-efficient refrigeration and air-conditioning equipment containing low-GWP refrigerants. She stated that policies shape the market by creating an enabling environment for market development. Manufacturers respond to positive policy signals that promote energy efficiency and refrigerant transition by investing in research and development. She highlighted that a simultaneous transition toward lower-GWP and higher energy-efficiency equipment, reduces overall costs to manufacturer for research and development and capital investment cycles. In contrast, weak or absent energy-efficiency policies are associated with market dominance of inefficient and HCFC technologies in some regions.

40. She observed that the price that the consumer pays does not correlate well with energy efficiency, but with other characteristics, such as brand reputation influencing the retail price to a greater extent. Global experience in regional and institutional cooperation has demonstrated benefits in speed, scale, spending, and sustainability that could be applicable to improving energy efficiency during HFC phase-down. She noted that if this principle were expanded so that governments adopted common standards and metrics, where markets and climates are similar, the demand for products meeting those standards would go up, increasing scale and availability, and reducing price. For these reasons it would be important for developing countries to develop regional strategies to improve EE alongside regulatory support to move to low GWP refrigerants. Individual developing countries that have weak or absent MEPs, run the risk of importing low EE and high GWP AC equipment ("environmental dumping").

41. Ms Helene Rochat then summarised the EETF overall findings by stating that countries can use market policies and incentives to drive up energy efficiency during the phasing down of high-GWP HFCs in commercial refrigeration and air conditioning. This will bring environmental and economic benefits. The principles presented apply to other RACHP sectors as well. She concluded that international and regional cooperation will be important for market transformation and that A5 Parties could benefit from capacity building, support for market transformation including MEPS and/or labelling.

E. Initial assessment by the Scientific Assessment Panel and the Technology and Economic Assessment Panel of volatile fluoroorganic and related compounds found in the Arctic

42. Dr. Paul A. Newman, Prof. John Pyle, Prof. Bonfils Safari (Scientific Assessment Panel co-chairs) with Dr. Helen Tope and Dr. Keiichi Ohnishi (Technology and Economics Assessment Panel, MCTOC co-chairs) gave a presentation on the "New evidence for five synthetic chemicals reported by the Norwegian Institute for Air Research (NILU)."

43. The Norwegian government brought to the attention of the Parties (under Decision IX/24) the NILU-Norwegian Institute for Air Research 2018 report revealing the detection of five human-produced chemicals in air by filter-sampling at the Zeppelin station, Ny-Ålesund, Svalbard, Norway (79˚N, 12˚E). This report, "Screening Programme 2017 – AMAP Assessment compounds" (hereafter referred to as NILU [2018]) was funded by the Norwegian Environment Agency. It is a follow-up study during a summer 2017 campaign and followed from the Arctic Monitoring and Assessment Programme (AMAP), which had "identified 25 chemicals with physicochemical properties that raised concerns with respect to Arctic environments".

44. These five detected chemicals are:

- PFPHP — Perfluoroperhydrophenanthrene (Vitreon, Flutec PP 11), CAS 306-91-2, $C_{14}F_{24}$
- PFTBA — Tris(perfluorobutyl)-amine (FC-43), CAS 311-89-7, $C_{12}F_{27}N$
- TCHFB — 1,2,3,4-Tetrachlorohexafluorobutane, CAS 375-45-1, C4Cl4F6, CFC-316lbb
- DCTFP — 3,5-Dichloro-2,4,6-trifluoropyridine, CAS 1737-93-5, $C_5Cl_2F_3N$
- DCTCB — 1,2-Dichloro-3-(trichloromethyl)benzene, CAS 84613-97-8, $C_7H_3Cl_5$

45. In the SAP/TEAP presentation, information was provided on available chemical properties of these compounds, as well as usages and estimates of market size.

46. The presentation summarized that:

47. The five chemicals detected by NILU [2018] (PFPHP, PFTBA, TCHFB, DCTFP and DCTCB) occur in the Arctic atmosphere at very low concentrations (e.g., **the observed 0.51 ppq value of TCHFB is about 450,000 times smaller than the 2017 global CFC-11 mean value** of 229 ppt).

48. **PFTBA is a powerful GHG**, while the other four are likely to be powerful GHGs. Three (TCHFB, DCTFP, and DCTCB) are ODSs. However, at their current very low atmospheric concentrations, **these substances are not currently threats to the ozone layer and are likely to have a miniscule impact on climate.**

49. The measurement techniques provide only lower-limit quantitative estimates with large uncertainties, and the NILU [2018] report has not yet appeared in the peer-reviewed literature. These data therefore cannot be used for future trend studies.

50. NILU researchers are currently refining their observations to fill the gap in sampling and measurement of chemicals with vapor pressure between the very volatile greenhouse gases and the classical semi-volatiles like PCBs and chlorinated pesticides. Analyses of some of these chemicals (PTPHP, TCHFB, and DCTFP) for their atmospheric properties are in progress, but are not presently published.

F. Synthesis of the 2018 quadrennial assessment reports of the Scientific Assessment Panel, the Technology and Economic Assessment Panel and the Environmental Effects Assessment Panel

51. The presentation which summarized the synthesis of the 2018 Assessment Reports of the EEAP, TEAP and SAP was presented on behalf of those panels by Professor Nigel Paul, Ms. Bella Maranion and Professor John Pyle, Co-Chairs of the EEAP, TEAP and SAP, respectively. The Synthesis Report can be found at UNEP/OzL.Pro.31/8 and the presentation is available on the Ozone Secretariat web portal.

52. The report covered the current status of the Montreal Protocol: its successes, its challenges and the prospects for the future.

53. The successful phaseout of ODS in many sectors (foams, refrigeration, medical, aerosols, solvents, laboratory and analytical uses, agriculture, and fire suppression) was described, including its consequent impact on the continued decline of ODS in the atmosphere. Recovery of stratospheric ozone is now observed in various regions of the atmosphere.

54. Some current challenges were discussed. A very important issue is the unexpected increase in emissions of CFC-11, in part, at least, arising from east Asia. Work from TEAP and SAP (including new work since the publication of their 2018 Assessment reports), highlights the significant discrepancy between the emissions expected on the basis of compliance with the Montreal Protocol and the emissions derived from measurements of CFC-11 in the atmosphere.

55. Other issues which were highlighted included on-going uses of halon 1301 (civil aviation, oil and gas, military), which will require halon beyond when it is projected to be available from the existing bank, as well as the continued QPS use of methyl bromide.

56. The benefit to climate already achieved by the Montreal Protocol's phase out of ODS, many of which are also potent greenhouse gases, is well known. The future benefit of the Kigali Amendment, amounting to about 0.4°C avoided warming this century, was presented.

57. By protecting the stratospheric ozone layer and the climate, and by stimulating technical innovation across multiple sectors, the Montreal Protocol is contributing to the delivery of many of the United Nations Sustainable Development Goals (SDGs). These include SDG 2 (Zero hunger), SDG 3 (Good health and well-being) and multiple SDGs relating to environmental protection and sustainable economic growth.

58. Assuming compliance with the Montreal Protocol recovery of the stratospheric ozone layer to its 1980 levels is expected in the coming decades, with recovery over Antarctica projected for late this century.

59. The continued success of the Montreal Protocol in protecting stratospheric ozone, and consequent benefits for the SDGs, depends on continued compliance with the Protocol provisions.

60. In addition to the Synthesis Report, the SAP also reported on the 2019 Antarctic Ozone Hole. The **2019 hole** was the **smallest since 1983**. This small hole primarily resulted from **unusual stratospheric weather patterns** with higher temperatures over Antarctica. The SAP noted that this year's unusual conditions are **not** caused by climate change, but that the **Antarctic ozone hole will continue** until late in this century because of the continued high levels of ODS in the atmosphere.

61. The presentation also included information on the recently published "Twenty Questions and Answers About the Ozone Layer: 2018 Update." The 20Q&A document is the outreach and communication document of the Scientific Assessment Panel. The motivation behind this scientific publication is to tell the story of ozone depletion, ozone-depleting substances and the success of the Montreal Protocol. Electronic files of the 20 Questions/Answers booklet can be found at:

https://ozone.unep.org/20-questions-and-answers
https://www.esrl.noaa.gov/csd/assessments/ozone/2018/twentyquestions

Annex III

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

Mr. President, distinguished delegates.

On behalf of the Executive Committee of the Multilateral Fund, I am pleased to report to the Parties on the relevant decisions taken since the Thirtieth Meeting of the Parties in 2018.

In my report I will present some of the significant achievements focusing on ongoing work related to HCFC phase-out; on matters related to monitoring, reporting, verification and enforceable licensing and quotas systems, including the increase in global emissions of CFC-11; and further development of the policies in respect to the Kigali Amendment. I draw your attention to document 31/9 which includes full information on policy matters; projects, their implementation and monitoring; and business planning, financial and administrative matters.

In the period under review, the largest part of the Executive Committee's work continued to be focused on monitoring the implementation of HCFC phase-out management plans, referred to as HPMPs, and an HCFC production phase-out management plan, referred to as an HPPMP. The ongoing HPMPs for 144 Article 5 countries[1] will address approximately 61.5 per cent of the HCFC consumption baseline, including the conversion of almost all of the foam-manufacturing enterprises and a significant number of the air-conditioning manufacturing enterprises, mainly to low-GWP technologies. Through their approved HPMPs, all countries are continuing to address the refrigeration-servicing sector.

The Executive Committee allocated a considerable amount of time of its meetings to in-depth discussions of the issue of monitoring, reporting, verification and enforceable licensing and quotas systems, as well as the increase in global emissions of CFC-11.

Following the Parties' discussions and in response to their decision XXX/3, the Executive Committee discussed a document that outlined the related Fund policies and procedures with emphasis on the regulatory framework established by Article 5 countries under the Multilateral Fund; the relevance of the institutional strengthening projects through which funding has been provided to the national ozone units; the mandatory reporting on consumption and production of controlled substances and the consistency of the reported levels of consumption and production; the monitoring and evaluation activities; the conditions in multi-year agreements that need to be met before releasing funding tranches; the roles and responsibilities of the bilateral and implementing agencies; the implications of non-compliance with the Agreements; and the role of the UNEP's Compliance Assistance Programme in providing compliance assistance to Article 5 countries, and the tools, products and services that it has developed for customs and enforcement officers.

The Committee further considered a document which contained an overview of current monitoring, reporting, verification and enforceable licensing and quota systems, including the requirements and practices of the systems for reporting back to the Executive Committee that had been developed with support from the Multilateral Fund as well as ways to further strengthen the relevant procedures, systems and frameworks.

The two documents were made available to the Parties at their Forty-first meeting of the Open-ended Working Group, and the Committee will consider this matter again at its 84th meeting, taking into account any decisions that the Parties might take at this Meeting.

Mr. President, at its 83rd meeting, the Committee extensively discussed the issue of unexpected emissions of CFC-11 based on a series of reports including in relation to monitoring, reporting, verification and enforcement systems in China. The Committee welcomed a number of regulatory and enforcement actions to be undertaken by the Government of China, and noted that the Government would undertake additional steps in support of its enforcement actions and consider a number of suggestions intended to supplement and augment its regulatory and enforcement actions. These suggestions include engaging a non-governmental consultant to carry out a study to determine the

* The statement is presented as received, without formal editing.

[1] Except the Syrian Arab Republic.

regulatory, enforcement, policy or market circumstances that might have led to the illegal production and use of CFC-11 and CFC-12. The Government of China undertook to report to the 84th and 86th meetings on the progress in implementing these activities.

With regard to the development of the policies related to the implementation of the Kigali Amendment, the Executive Committee focused its deliberations on the further development of draft cost guidelines for funding the phase-down of HFCs, energy efficiency, enabling activities for the phase-down of HFCs, the consideration of HFC investment project proposals to gather information on incremental costs, key aspects related to HFC-23 by-product control technologies and the level and modalities of funding for HFC phase-down in the refrigeration servicing sector.

- In continuing its deliberations on the cost guidelines, the Executive Committee focused on the starting point for sustained aggregate reductions in HFCs for the consumption and production sectors, the units to be used to measure the reductions and the methodology for setting the starting point, as well as how the interim use of high-global-warming potential technologies should be treated in the relation to the starting point for reduction in consumption. The Committee agreed on a basis for continuing its discussions on the cost guidelines at the 84th and future meetings, including on the matter of disposal of controlled substances, in light of the final report on the evaluation of pilot demonstration projects on ODS disposal and destruction.
- The Committee discussed a number of matters related to energy efficiency, such as: the way to operationalize paragraph 16 of decision XXVIII/2 and paragraph 2 of decision XXX/5, where the discussions resulted in a well-advanced draft recommendation as the basis for further consideration at its meeting in December; information on relevant funds and financial institutions mobilizing resources for energy efficiency that might be utilized when phasing down HFCs; and a report of the Technology and Economic Assessment Panel on issues related to energy efficiency. The Committee will continue its deliberations at its 84th meeting.
- The Committee has so far approved funding for enabling activities in 131 Article 5 countries, noting that those countries that had not yet ratified the Kigali Amendment submitted a letter indicating the intent of the Government concerned to make best efforts to ratify the Kigali Amendment as early as possible. In implementing these activities, the Committee provided flexibility for Article 5 countries to also undertake a number of activities related to energy efficiency using the funding already approved, as was decided by the Parties in decision XXX/5. It is expected that these activities will be completed by June 2020 and final reports submitted to the Committee within six months of the project completion highlighting lessons learned.
- In addition to the six HFC investment projects approved at previous meetings, at its 82nd meeting, the Committee approved three projects to convert enterprises manufacturing products and equipment in the foam and refrigeration sectors.
- The Committee had several discussions on options for controlling HFC-23 by-product emissions. At its 83rd meeting, the Committee started the discussion of one investment project proposal to control HFC-23 by-product emissions, and approved funding for preparation of a project proposal for the control of HFC-23 by-product emissions in the HCFC production sector. The two project proposals will be discussed at the 84th meeting.
- Discussions on the level and modalities of funding for HFC phase-down in the refrigeration servicing sector, which started at the 80th meeting, continued. At its 82nd meeting, the Committee discussed a preliminary document on all aspects related to refrigeration servicing sector that support the HFC phase-down and requested the Secretariat to prepare, for the 85th meeting, an analysis of the level and modalities of funding, taking into account the flexibility that Article 5 countries had in implementing their servicing sector activities and the activities in their HPMPs.
- With regard to the fast-start support for the implementation of the Kigali Amendment, provided voluntarily by 17 non-Article 5 parties, I am pleased to report that all of them had paid their contributions, totalling approximately US $25.5 million, by the 82nd meeting, and that all the funds had been disbursed by the 83rd meeting mainly for implementation of enabling activities for Article 5 group 1 countries, and for a few stand-alone HFC investment projects.

Work of implementing agencies

I would like to briefly address the main achievements of the implementing agencies of the Multilateral Fund during this reporting period, which were requested by the Committee to apply their corporate gender policies in the preparation and implementation of projects funded by the Multilateral Fund.

UNDP

UNDP has continued assisting 47 countries with the implementation of HPMPs. With regard to the Kigali Amendment, UNDP has provided support to 16 countries with their enabling activities and to another five countries to develop HFC investment projects. UNDP has also continued to enhance the capacity building of Article 5 countries. For example, in May 2019, UNDP organized a workshop on HFC alternatives, which brought together participants from 20 Article 5 countries and experts to discuss challenges, opportunities and solutions to effectively implement the Kigali Amendment.

UNEP

UNEP, through its OzonAction Compliance Assistance Programme, assists all Article 5 Parties with meeting and sustaining their Montreal Protocol commitments. It assisted 102 countries with the implementation of HPMPs, 104 countries with institutional strengthening projects, and 90 countries with HFC enabling activities in support of the Kigali Amendment. UNEP's current focus includes strengthening of national monitoring, reporting, verification and enforcement systems through policy measures, training of customs and enforcement officers, as well as regional networking. UNEP continues supporting the refrigeration servicing sector to safely and smoothly transition to new technologies. UNEP also builds the capacity of new national ozone officers to efficiently assume their new responsibilities.

UNIDO

UNIDO is currently implementing HPMPs in 72 countries, institutional strengthening projects in eleven countries and HFC enabling activities in 31 countries, as a result of which, a number of Article 5 parties have already ratified the Kigali Amendment. Furthermore, UNIDO is implementing four HFC investment projects. Seven country-level projects and two regional projects are undertaken to demonstrate climate friendly and energy-efficient alternative technologies to HCFCs, trans-critical CO_2 refrigeration technology for supermarkets, refrigerant quality and feasibility study on district cooling. UNIDO organized a workshop “Kigali in action” that brought together national ozone units and provided an opportunity for sharing experiences and learning from each other.

World Bank

The World Bank is currently assisting its partner countries in implementing their HPMPs, valued at nearly US $190 million, to reduce, as a priority, HCFC consumption at the enterprise level. A key goal in the World Bank country engagement is sustainable phase-out, which is why the Bank continues to focus on project design and preparation where country context and desired results are framed by due diligence, quality assurance, and risk management requirements. This establishes a system for countries to track and monitor project progress through completion. The Bank has also delivered technical assistance and advisory services for ratification of, and initial compliance with, the Kigali Amendment in three countries, through enabling activity funding.

Mr. President, distinguished delegates.

I would like to thank the Parties for their strong commitment to the implementation of the Montreal Protocol, and in particular their efforts to bring forward the activities aimed at the implementation of the Kigali Amendment. I would also like to take this opportunity to express my sincere appreciation to the Chair and members of the 2018 Executive Committee and my fellow members of the 2019 Executive Committee, the Fund Secretariat, and the bilateral and implementing agencies, for their continued hard work and dedication to our common goals.

Thank you.

MOP 31 FINAL

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Summary of the Thirty-first Meeting of the Parties to the Montreal Protocol: 4-8 November 2019

The President of the thirty-first Meeting of the Parties to the Montreal Protocol (MOP 31), Martin Alvin Da Breo (Grenada), closed the meeting in the early hours of Saturday morning thanking the Montreal Protocol's "dedicated soldiers for a job well done." The MOP successfully completed five days of negotiations, with the most pressing agenda items—terms of reference (ToR) for the study on the 2021-2023 replenishment of the Multilateral Fund (MLF), the unexpected emissions of trichlorofluoromethane (CFC-11), and the areas of focus for the 2022 quadrennial assessment reports of the Scientific Assessment Panel (SAP), the Technology and Economic Assessment Panel (TEAP) and the Environmental Effects Assessment Panel (EEAP)—requiring careful negotiation to balance different parties' agendas.

In particular, parties had to find a middle ground that would, in the MLF Study ToR, allow for scenarios for implementation of the Kigali Amendment and funding for alternatives to hydrofluorocarbons (HFCs), while also including language that would, in some parties' views, increase the transparency of potential fund disbursement.

Parties tried to balance investigating and resolving the unexpected emissions of CFC-11 by analyzing institutional processes to avoid similar situations in the future. These negotiations included how to alert parties about similar issues in the future by gathering more information on the current situation and whether impugning parties was a constructive way forward.

On the areas of focus for the 2022 quadrennial assessment, parties sought to include new and emerging challenges, such as energy efficiency in light of the HFC phase-down, while also maintaining a focus on ozone layer depletion without overburdening the Assessment Panels, which already have a myriad of tasks to complete.

MOP 31 also addressed: review of the TEAP's ToR, composition, balance, fields of expertise, and workload; ongoing reported emissions of carbon tetrachloride (CTC); critical use exemptions (CUEs); and issues of non-compliance. Parties were also invited to sign the Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Management.

MOP 31 convened from 4-8 November 2019 in Rome, Italy, at the headquarters of the Food and Agriculture Organization of the United Nations (FAO).

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.

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 198 parties, which represents universal ratification.

Montreal Protocol: In September 1987, efforts to negotiate binding obligations to reduce ODS usage led to the adoption of the Montreal Protocol, which entered into force in January 1989. The Montreal Protocol introduced control measures for some CFCs and halons for developed countries (non-Article 5 parties).

In this Issue

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Developing countries (Article 5 parties) were granted a grace period, allowing them to increase their ODS use before taking on commitments. The Protocol has been ratified by 198 parties.

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

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 CTC and methyl chloroform. MOP 2 also established the MLF, which meets the incremental costs incurred by Article 5 parties in implementing the Protocol's control measures and finances clearinghouse functions. The Fund is replenished every three years.

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

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

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

Kigali Amendment: At MOP 28, held in Kigali, Rwanda, in 2016, delegates agreed to amend the Protocol to include HFCs as part of its ambit and to set phase-down schedules for HFCs. HFCs are produced as replacements for CFCs and thus a result of ODS phase-out. HFCs are not a threat to the ozone layer but have a high global warming potential. To date, 88 parties to the Montreal Protocol have ratified the Kigali Amendment, which entered into force on 1 January 2019.

COP 11/MOP 29: The eleventh meeting of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer (COP 11) and MOP 29 met from 20-24 November 2017, in Montreal, Canada. COP 11/MOP 29 adopted decisions including: essential-use exemptions and critical-use exemptions; future availability of halons; and energy efficiency. They also adopted a decision agreeing on a USD 540 million replenishment of the MLF for the triennium 2018-2020.

MOP 30: Convened from 5-9 November 2018 in Quito, Ecuador, MOP 30 adopted decisions on, *inter alia*: issues important to the January 2019 entry into force of the Kigali Amendment; approved destruction technologies to be used for HFCs; the MLF Executive Committee's (ExCom) progress in developing guidelines for the financing of the HFC phase-down; Article 5 parties' access to energy-efficient technologies in the refrigeration, air conditioning and heat pump sectors; a proposal to permit essential use exemptions for HCFCs for specific uses by certain parties; and unexpected increases in CFC-11 emissions.

MOP 31 Report

Preparatory Segment

Roberto Morassut, Undersecretary of State, Italian Ministry of the Environment, Land and Sea, welcomed delegates to MOP 31 on Monday, 4 November 2019. He applauded the Montreal Protocol as an extraordinary example of international cooperation that will continue to inspire global environmental policies to transition towards a sustainable world for current and future generations.

René Castro-Salazar, Assistant Director-General, Climate, Biodiversity, Land, and Water Development, FAO, stressed the urgency for countries to work together to reduce food waste, noting it would be possible for current food production to feed the entire world if waste were eliminated.

Tina Birmpili, Executive Secretary, Ozone Secretariat, underscored the importance of energy efficiency for cold chains and food security. She praised China's efforts to combat the unexpected CFC-11 emissions and, recalling the importance of monitoring and observation for detecting the unexpected CFC-11 emissions, called for more monitoring stations globally.

Organizational Matters: Alain Wilmart (Belgium), Co-Chair of the forty-first meeting of the Open-ended Working Group (OEWG 41), introduced the agenda for the preparatory segment (UNEP/OzL.Pro.31/1). Italy requested including discussion of the Rome Declaration under "Other matters," saying it will link the Montreal Protocol's contribution to reducing food waste through sustainable cold chain development. The agenda was adopted as amended.

Delegates agreed to the organization of work, as proposed (UNEP/OzL.Pro.31/1/Add.1).

High-Level Segment

MOP 30 President Liana Ghahramanyan (Armenia) opened the High-Level Segment on Thursday, 7 November 2019. Sergio Costa, Italian Minister for the Environment, Land, and Sea, underscored the Government of Italy's commitment to the 2030 Agenda for Sustainable Development and addressing environmental challenges so that "no one is left behind."

Inger Andersen, UNEP Executive Director, underscored the interconnectedness of environmental challenges and stated that "nothing short of universal ratification of the Kigali Amendment is acceptable." She encouraged parties to remain vigilant in their commitment to this Protocol.

Cardinal Pietro Parolin, Secretary of State, Holy See, on behalf of Pope Francis, cited aspects of a successful model of environmental protection and human development, such as dialogue on shared responsibilities and utilizing technology that takes interconnectedness into account.

Qu Dongyu, FAO Director-General, highlighted the impact that sustainable food chains can have on agriculture and food production. He reiterated that there are clear benefits to phasing down HFCs, and addressing these through, among others, synergies, and innovation will ensure positive results.

Organizational Matters: MOP 31 elected by acclamation: Martin Alvin Da Breo (Grenada) as President; Ezzat Lewis Agaiby (Egypt), Norlin Jaafar (Malaysia), and Patrick McInerney

(Australia) as Vice-Presidents, and Ramona Koska (Hungary) as rapporteur.

MOP 31 President Da Breo introduced the agenda (UNEP/OzL.Pro.31/1) and organization of work (UNEP/OzL.Pro.31/1/Add.1), which were adopted. He urged parties to submit their credentials as soon as possible.

High-Level Roundtable on the Contribution of the Montreal Protocol to the Development of Sustainable Cold Chains and the Reduction of Food Loss: The high-level roundtable discussion took place on Thursday, 7 November 2019. Key topics highlighted by panelists included: public-private partnerships can play a role in expanding a country's cold chain; norms and standards are key; and cold chains are vital for increasing local and global access to market.

A summary of the roundtable discussion is available at: http://enb.iisd.org/vol19/enb19151e.html

Presentations by the Assessment Panels on their Synthesis of the 2018 Quadrennial Assessments: The **r**epresentatives from the SAP, TEAP, and EEAP presented their synthesis report on Thursday afternoon. They noted that:

- implementation of the Protocol has significantly lowered the occurrence of cataracts and skin cancer;
- 2019 marked the smallest ozone hole since 1983 due to unusual meteorological conditions not related to climate change;
- the decline of methyl bromide in the atmosphere has ceased; and
- CTC emissions are higher than expected due to unaccounted emission sources and revised CTC lifetimes.

They underscored that understanding ODS banks is key to understanding ozone recovery.

Presentation by the Chair of the MLF Executive Committee: MLF ExCom Chair Philippe Chemouny (Canada) presented on activities undertaken since MOP 30 (UNEP/OzL.Pro.31/9) on Thursday afternoon. He provided updates on three broad areas: policy matters; the status of MLF-funded projects; and business planning, and administrative and financial matters. The thematic areas addressed included HCFCs, global emissions of CFC-11, and the Kigali Amendment.

Statements by Heads of Delegation: MOP 31 President Da Breo invited heads of delegation to make statements on Thursday and Friday. Many lauded the Protocol's success as well as MLF assistance to assist with the phase-out of HCFCs and other ODS. They also underscored cold chains' role in sustainable development. The Bahamas, Brazil, Nigeria, Pakistan, Tunisia, and Venezuela outlined their steps to implement the Protocol. The Gambia, Mongolia, and the Seychelles highlighted efforts to develop national capacities.

Cuba, Guatemala, and the Russian Federation noted steps to ratify the Kigali Amendment. Côte d'Ivoire highlighted the Abidjan Appeal, which urges African Union members to ratify the Kigali Amendment.

Fiji, Niger, Sierra Leone, and Vanuatu highlighted the Kigali Amendment as a "turning point" in the Protocol's link to broader climate change efforts. Timor-Leste and Nepal underscored the challenges of implementing the Kigali Amendment in spite of the challenge it represents.

Malaysia and Uganda urged for alternatives to HFCs to be made available in Article 5 countries at reasonable and competitive prices. Cambodia, Iran, Myanmar, and Nicaragua called for more financial and technical support for ODS phase-down. Argentina urged that the MLF complete the cost guidelines to fund the HFC phase-down. Solomon Islands said that they are strengthening their ODS control systems in anticipation of the HFC phase-down. Indonesia and Lebanon urged more support for capacity building and technological assistance in finding future feasible alternative to HFCs.

Uzbekistan emphasized their intention to focus on international cooperation to achieve a just and green economic transition. Benin praised the Protocol as a source of hope for their country, particularly because they have very low ODS consumption but will benefit disproportionately from their phase-down. Ethiopia highlighted using forestry as a vehicle for climate action.

Kenya stated that ODS phase-out has had an emphasis on low-global warming potential (GWP) and energy efficiency alternatives. India underscored that cooling is needed across different sectors of the economy, and sustainable cooling helps to ensure minimal environment impact. Sri Lanka emphasized that a well-established and efficient cold chain could address many issues in food security for his country. The International Institute of Refrigeration reiterated the cooling sector's critical role in supporting human health.

The Philippines urged parties to address the management and disposal of unwanted ODS. Bangladesh underscored its effective use of public-private partnerships to phase out ODS. Grenada said they have facilitated the introduction and use of natural refrigerants, with zero ozone depleting potential and negligible global warming potential in the domestic cooling sector.

Japan expressed concern that the unexpected emissions of CFC-11 have brought the credibility of the Protocol into question. The European Union (EU) questioned, in light of the CFC-11 emissions, how parties can achieve better enforcement of the Protocol and avoid backsliding on existing commitments and limit any delay in the recovery of the ozone layer.

Closing Session: ***Report by the Co-Chairs of the preparatory segment and consideration of the decisions recommended for adoption by MOP 31:*** Late Friday evening, OEWG 41 Co-Chair Laura Juliana Arciniegas gave the report of the Co-Chairs of the preparatory segment, noting that during the course of the negotiations, parties had reached agreement on most issues. She noted that more than 70 parties had signed the draft Rome Declaration.

Adoption of report and decisions by MOP 31: On Friday evening, MOP 31 Rapporteur Koska introduced the compilation of decisions (UNEP/OzL.Pro.31/L.2, L.2/Add.1, L.2/Add.2, and L.2/Add.3). Delegates adopted the decisions without amendment.

MOP 31 Rapporteur Koska reviewed the report of the meeting (UNEP/OzL.Pro.31/L.1, L.1/Add.1, and Annex) paragraph-by-paragraph, noting the Secretariat is entrusted with completing the report where necessary. Delegates adopted the report with minor textual amendments.

MOP 31 President Da Breo thanked all "the dedicated soldiers for a job well done." He closed MOP 31 at 12:33 am on Saturday, 9 November 2019.

MOP 31 Outcomes

All decisions were adopted without amendment late Friday evening by the HLS.

Budget of the Trust Fund for the Montreal Protocol and Financial Reports: OEWG 41 Co-Chair Alain Wilmart introduced this agenda item on Monday morning (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/3, UNEP/OzL.Pro.31/4, UNEP/

OzL.Pro.31/INF/1 and UNEP/OzL.Pro.31/INF/2). The Budget Committee met throughout the week, concluding its work on Friday. Canada introduced the draft decision (UNEP/OzL.Pro.31/CRP.13) on Friday evening. Delegates agreed to forward the decision to the HLS.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.13), the MOP decides to, *inter alia*:

- approve the budget of USD 5,322,308 for 2020, and take note of the indicative budget for 2021, as set out in an annex to the MOP 31 report;
- authorize the Executive Secretary, on an exceptional basis, to draw upon the available cash balance for 2020 for specific activities in an amount up to USD 366,346;
- reaffirm that a working capital reserve shall be maintained at a level of 15% of the annual budget to be used to meet the final expenditures under the Trust Fund;
- encourage parties and other stakeholders to assist the members of the three assessment panels and their subsidiary bodies with a view to ensuring their continued participation in Montreal Protocol assessment activities;
- 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 Montreal Protocol Trust Fund to enhance transparency with regard to the actual income and expenses of the Trust Fund; and
- request the Executive Secretary to prepare budgets and work programmes for the years 2021 and 2022, specifically a zero nominal growth scenario and a scenario based on further recommended adjustments to the zero nominal growth scenario based on projected needs.

Consideration of the Membership of Montreal Protocol Bodies for 2020: On Wednesday morning, the Secretariat reported they are still expecting nominations for three members of the ImpCom, five members of the MLF ExCom and the OEWG 42 Co-Chairs. The Secretariat and OEWG 41 Co-Chair Arciniegas urged countries to submit nominations by Wednesday afternoon. On Friday morning, OEWG 41 Co-Chair Arciniegas noted that the nominations had been received and would be sent to the HLS for adoption.

Members of the ImpCom: In its decision (UNEP/OzL.Pro.31/L.2), the MOP confirms the positions of the EU, Guinea Bissau, Paraguay, Saudi Arabia, and Turkey as members of the ImpCom for one further year. It confirms Australia, China, Nicaragua, Poland, and Uganda as members of the ImpCom for a two-year period beginning 1 January 2020.

The MOP notes the selection of Maryam Al-Dabbagh (Saudi Arabia) to serve as President and Cornelius Rhein (EU) to serve as Vice President and Rapporteur of the ImpCom for one year beginning 1 January 2020.

Members of the MLF ExCom: In its decision (UNEP/OzL.Pro.31/L.2), the MOP:

- endorses the selection of Bahrain, Bangladesh, Chile, Djibouti, India, Rwanda, and Suriname as members of the ExCom representing Article 5 parties;
- endorses the selection of Australia, Belgium, Czech Republic, Japan, Switzerland, United Kingdom, and United States as members of the ExCom representing non-Article 5 parties; and
- notes the selection of Juliet Kabera (Rwanda) to serve as Chair and Alain Wilmart (Belgium) to serve as Vice-Chair of the ExCom.

Co-Chairs of the OEWG: In its decision (UNEP/OzL.Pro.31/L.2), the MOP endorsed Alain Wilmart (Belgium) and Obed Baloyi (South Africa) as OEWG 42 Co-Chairs.

Terms of Reference for the Study on the 2021-2023 MLF Replenishment: OEWG 41 Co-Chair Wilmart introduced this agenda item on Monday morning, noting the MLF replenishment is necessary for Article 5 parties to comply with their obligations under the Protocol during the 2021-2023 implementation period (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/3, and UNEP/OzL.Pro.WG.1/41/5).

Opening the floor for comments, the US flagged its intention to introduce some new concepts to the existing ToR. A contact group was established, facilitated by Ralph Brieskorn (Netherlands) and Leslie Smith (Grenada), which met throughout the week.

Parties discussed their request that the TEAP prepare a report for MOP 32 on appropriate funding levels for the 2021-2023 replenishment of the MLF. They deliberated on, *inter alia*:

- identifying scenarios to increase funding for low-volume-consuming countries and how this funding could be used;
- limiting the TEAP's reporting burden and workload while satisfying party requests;
- streamlining and simplifying the draft decision text;
- addressing the Kigali Amendment in the decision text in such a way to account for the different potential scenarios with respect to ratification status; and
- support to prepare for and implement the HFC phase-down.

On Friday, parties continued to address bracketed text in the draft decision regarding, *inter alia*:

- funding for demonstration projects;
- referencing the special needs of low-volume-consuming countries;
- whether the report should treat all parties as a whole or all parties individually;
- funding to maintain or enhance energy efficiency of low-global warming potential (low-GWP) technology in the HFC phase-down; and
- funding for the introduction of zero- or low-GWP HFC alternatives in the servicing and end users sector.

However, on the issue of whether the report should "identify the level of funding within the estimated funding requirements associated with an individual country that exceeds 15% of the total amount of funding," parties struggled to reach consensus. Proponents maintained that this information would enhance transparency for funders and allow them to see where their resources go, further noting that this request does not entail any extra work for the TEAP. Opposing parties argued that funding should be allocated on a task-by-task basis based on the potential results of a project. After multiple huddles, delegates arrived at a compromise position whereby the text in question was deleted in favor of new text that specified that parties may request this information from the TEAP after their report has been submitted.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.15), the MOP requests the TEAP to prepare a report for submission to OEWG 42 to enable MOP 32 to adopt a decision on the appropriate level of the 2021-2023 replenishment of the MLF.

The report should take the following into account, *inter alia*:

- all control measures and MOP and ExCom decisions, including decision XXVIII/2 and the decisions of MOP 31 and the ExCom at its meetings, that necessitate expenditure by the MLF during 2021-2023;

- the need to consider the special needs of low volume- and very-low-volume-consuming countries;
- the need to allocate resources to enable all Article 5 parties to achieve and/or maintain compliance with Protocol requirements, taking into account the reductions and commitments made by Article 5 parties under approved HCFC phase-out management plans, noting that TEAP shall provide any information/clarification as requested by any party relating to the allocation of resources;
- the need to allocate resources for Article 5 parties to comply with the Kigali Amendment, including the preparation and, if needed, the implementation of phase-down plans for HFCs;
- the need to allocate resources to low-volume consuming countries for the introduction of zero- or low-GWP HFC alternatives and to maintain energy efficiency in line with any relevant decisions of the ExCom; and
- three scenarios representing different potential levels of ratification of the Kigali Amendment when estimating the funding requirement for the phase-down of HFCs.

In addition, the report should provide indicative figures of the estimated funding required to phase out HCFCs that could enable Article 5 parties to leapfrog from HCFCs to the use of low- or zero-GWP alternatives, taking into account global warming potential, energy use, safety, and other relevant factors. The indicative figures should be provided for a range of typical scenarios, including a low-volume consuming country, a small manufacturing country and a medium-sized manufacturing country, and be provided for 2021-2023, 2024-2026, and 2027-2029, with the understanding that those figures will be updated in subsequent replenishment studies.

Potential Areas of Focus for the 2022 Quadrennial Assessment Reports of the SAP, the EEAP, and the TEAP: OEWG 41 Co-Chair Arciniegas introduced this agenda item on Monday morning (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/3, and UNEP/OzL.Pro.31/8). The EU outlined the draft decision, saying he wanted the decision to include sufficient detail to guide the Assessment Panels. Additional areas of focus, he said, could include dichloromethane and CTC emissions, short-lived substances, and five volatile fluoroorganic compounds found in the Arctic. Japan and Nigeria expressed interest in ODS banks' elimination. India stressed the need to focus on the most recent commitments such as the HFC phase-down, and China underscored the importance of cost and availability of technologies for replacing HFCs and overall phase-out of ODS.

A contact group, co-facilitated by Cindy Newberg (US) and Samuel Paré (Burkina Faso), was established to consider the issue and met from Tuesday through Friday. Parties aimed to provide detailed recommendations for the assessment panels, ensuring the requests are within their ToRs and are reasonable under the requirements of the Montreal Protocol. Parties stressed the need to keep recommendations specific. They worked to keep focus on ozone layer depletion and incorporate HFCs and their linkage to climate in the draft decision without overburdening the TEAP.

The decision was agreed and presented to MOP on Friday evening, where it was forwarded to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.12), the MOP requests the assessment panels to:

- prepare quadrennial assessment reports and submit them to the Secretariat by 31 December 2022 for consideration by the OEWG and the MOP, and present a synthesis report by 30 April 2023; and
- notify parties of any significant developments, which, in their opinion, deserve such notice, in accordance with decision IV/13 (Data and information provided by the parties in accordance with Article 7 of the Montreal Protocol).

The MOP requests the EEAP to assess the effect of changes in the ozone layer, UV radiation, and their interaction with the climate system, on:

- the biosphere, biodiversity, and ecosystem health, including on biogeochemical processes and global cycles;
- human health; and
- ecosystem services, agriculture, and damage to materials, including for construction, transport, photovoltaic use, and microplastics.

The MOP requests the SAP to include in its report, *inter alia*:

- an assessment of the state of the ozone layer and its future evolution;
- an evaluation of global and polar stratospheric ozone, including the Antarctic ozone hole and Arctic winter/spring ozone depletion and the predicted changes in those phenomena;
- an evaluation of trends in the top-down derived emissions, abundances, and fate in the atmosphere of trace gases of relevance to the Montreal Protocol, in particular controlled substances and other substances of importance to the ozone layer;
- an evaluation of consistency with reported production and consumption of those substances and the likely implications for the state of the ozone layer, including its interaction with the climate system;
- an assessment of the interaction between changes in stratospheric ozone and the climate system, including possible future policy scenarios relating to ozone depletion and climate impacts;
- early identification and quantification, where possible, of any other issues of importance to the ozone layer and the climate system consistent with the objectives of the Vienna Convention and the Montreal Protocol; and
- relevant information on any newly detected substances that are relevant for the Montreal Protocol.

The MOP requests the TEAP to include an assessment and evaluation on:

- technical progress in production and consumption sectors in the transition to technically and economically feasible and sustainable alternatives and practices;
- status of banks and stocks of controlled substances, and the options available for managing them;
- challenges facing all Montreal Protocol parties in implementing Protocol obligations and maintaining the phase-outs already achieved, especially those on substitutes and substitution technologies;
- the impact of the phase-out of controlled ODS and the phase-down of HFCs on sustainable development; and
- technical advancements in developing alternatives to HFCs suitable for usage in countries with high ambient temperatures, particularly with regards to energy efficiency and safety.

Unexpected Emissions of CFC-11: OEWG 41 Co-Chair Arciniegas introduced this item on Monday morning (UNEP/OzL.Pro.31/CRP.4). The SAP presented its interim report, noting evidence indicating the increase in CFC-11 emissions: a slowing global decline in atmospheric concentration; an increasing North-South hemispheric concentration difference; and increased concentration in pollution plumes reaching Hawaii as well as

Jeju Island, Republic of Korea. The SAP concluded, noting that updated measurements post-2017 suggest that global CFC-11 emissions are still declining.

The TEAP Task Force on Unexpected CFC-11 Emissions presented the main findings, stating:

- the pre-2010 production and usage of CFC-11 is unlikely to account for the current emissions;
- emissions from regional foam banks are insufficient to explain atmospheric-derived emissions as its likely usage is for closed-cell foams; and
- it is likely the result of new CFC-11 production.

The Task Force cited technical and economic factors encouraging CFC-11 usage in closed-cell foams such as the reduced availability of HCFC-141b due to phase-out, and price increases in HCFC-141b and HFCs.

In the ensuing discussion, China updated the MOP on its efforts to address illegal use of CFC-11, saying progress has been achieved through measures such as:

- amending existing legislation to ensure it is effective and robust;
- implementing campaigns to strengthen capacity;
- providing teams, equipment, and laboratory facilities for testing ODS;
- deploying additional inspection units and monitoring equipment; and
- formulating a monitoring plan.

Norway and many others expressed concern about the unexpected CFC-11 emissions and queried how to ensure such a situation does not reoccur. The US and Canada noted much of the information is preliminary, requesting continued updates from the SAP. Many supported re-establishing the OEWG 41 contact group, and suggested narrowing the contact group's mandate to address institutional matters and processes only.

The US, supported by Canada, suggested a draft decision addressing two issues: first, ensuring that such an issue does not reoccur; and second, examining in more detail what has already transpired in accordance with the provisions of the Protocol. The US posed a number of questions to China, including whether their reporting has been amended to account for CFC-11 production and what has been done to address the downstream users of CFC-11. Kuwait, supported by Burkina Faso and Australia, expressed their desire to resolve this issue at MOP 31 so parties can concentrate on other potential challenges. Canada, supported by Australia, the EU, and Iraq, called for strengthening monitoring and enforcement activities. Canada and Australia also highlighted their concern that the CFC-11 experience demonstrates the risk that countries may revert to substances that have already been phased out.

The contact group was re-established with an updated mandate, and met from Tuesday through late Friday evening. It was co-facilitated by Annie Gabriel (Australia) and Osvaldo Álvarez-Pérez (Chile). OEWG 41 Co-Chair Arciniegas requested parties with concrete proposals to meet and agree on a single conference room paper (CRP) to present to plenary prior to the contact group meeting.

During contact group discussions, parties discussed how institutional processes could be enhanced and strengthened to prevent similar situations from arising. Delegates also discussed the steps needed to address the unexpected emissions. They explored the possibility of mandating the TEAP and SAP to address the aforementioned issues; however, it was noted that it is challenging to increase parties' reporting requirements when they already face high reporting obligations and would require additional financial support from the MLF to comply.

On Wednesday, the EU presented its draft decision (UNEP/OzL.Pro.31/CRP.4), saying it attempts to deliver on the mandate of the contact group to both resolve the issue of the unexpected emissions that has "shocked the ozone family" and to look at institutional processes to prevent similar situations from occurring in the future. He noted the CRP does not address long-term measures and recommended open, intersessional discussions on these issues that should result in presentations to OEWG 42 and MOP 32.

On the final day of MOP 31, delegates deliberated over outstanding issues for most of the day in order to finalize the decision on unexpected CFC-11 emissions. Delegates deliberated at length on the language of the decision, debating the validity and rationale for explicitly mentioning a specific country party versus keeping the guidance on more general terms.

Parties endeavored to strengthen the language so that there is a clear differentiation between illegal activity and illegal trade of substances banned by the Protocol.

Other complexities encountered in the final lengthy hours of the CFC-11 contact group were how to assign responsibilities among the Ozone Secretariat, ExCom, and TEAP for parties to report on the potential discovery of illegal production of controlled substances.

Upon final agreement of the decision text, delegates returned to plenary. Co-Facilitator Álvarez-Pérez presented the draft decision (UNEP/OzL.Pro.31/CRP.4/Rev.1). The EU said, given numerous forthcoming reports related to this topic, parties agreed to consider information that will be available from these sources during the intersessional period, with discussions on this topic to resume at OEWG 42.

Delegates agreed to forward the decision to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.4/Rev.1), the MOP, *inter alia*:

- requests any party that becomes aware of information on CFC-11 emissions that indicates the party has exceeded its maximum-allowed level of production or consumption to submit to the Secretariat without undue delay a description of the specific circumstances that it considers to be the cause of the unexpected CFC-11 emissions;
- reminds parties to update their Article 7 reports if they become aware of new data;
- reminds parties to report all production of controlled substances, whether intended or not intended, to enable the calculation of production and consumption;
- encourages parties to take steps to ensure that controlled substances produced for feedstock are not directed towards non-feedstock purposes or for the illegal production of CFC-11;
- encourages parties to take action to discover and prevent the illegal production, import, export, and consumption of controlled substances;
- reminds parties to ensure that any imports and exports of controlled substances for feedstock and exempted uses are included in licensing systems;
- requests the TEAP provide a report to MOP 32 on, among others, any new compelling information that becomes available as well as an analysis of CFC-11 banks, linkages between the

level of production of anhydrous hydrogen fluoride, CTC, and unexpected CFC-11emissions, information on the types of CFC-11 products, the disposition of any such products, and opportunities and methods to detect such products and potentially recover the associated CFC-11, and identifying possible drivers for illegal production and trade;
- requests the SAP work with Ozone Research Managers at their meeting in 2020 to identify gaps in global coverage of atmospheric monitoring of controlled substances and to provide options on ways to enhance such monitoring;
- invites parties to provide as soon as possible to the Secretariat, any available CFC-11 atmospheric monitoring data that is relevant to the unexpected CFC-11 emissions and requests the Ozone Secretariat to make this data available to the parties;
- notes that parties who become aware of information on CFC-11 emissions that indicates its maximum-allowed level of production or consumption of CFC-11 has been exceeded, should submit a description of the specific circumstances that it considers to be the cause of the unexpected CFC 11 emissions to the Secretariat without undue delay; and
- encourages all parties to take action to prevent the illegal production, import, export, and consumption of controlled substances and ensure that any imports and exports of controlled substances for feedstock and exempted uses are included in licensing systems.

Ongoing Reported Emissions of CTC: On Monday, OEWG 41 Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2), noting the issue of CTC emissions was raised during OEWG 41, and recalled that, *inter alia*, parties requested that there be expanded atmospheric monitoring of such emissions and further mitigation options be offered by the Assessment Panels.

Switzerland emphasized that addressing these emissions is crucial to avoid a threat to the Montreal Protocol's efficacy and underscored their commitment to work with parties to make use of the synergies with other agenda items to avoid duplication of work. Supporting Switzerland's proposal, Burkina Faso, Norway, and Senegal said more information is needed on the characteristics of these emissions and possible alternative uses of CTC.

The EU and the US responded saying that the 2022 quadrennial assessment reports and unexpected emissions of CFC-11 should be fully considered before finalizing the way forward on CTC emissions.

OEWG 41 Co-Chair Wilmart proposed informal discussions take place on this agenda item and, upon completion of the agenda items on CFC-11 and the focus areas for the 2022 quadrennial assessment reports, plenary would return to this matter, to which delegates agreed.

On Friday morning, OEWG 41 Co-Chair Wilmart returned to this agenda item, requesting an update on discussions. Switzerland said that informal contact group discussions had noted the inability to determine the source of the CTC emissions, and many parties favored a concise decision that would request information from parties on their sources of CTC production. However, consensus was yet to be reached, so informal discussions continued during the day.

On Friday evening, Switzerland suggested that time be provided for intersessional consultations among parties, industry, and the TEAP. Switzerland said a revised version of the draft decision had been submitted, featuring one concise but comprehensive paragraph. He requested it not be introduced in the plenary, but instead, included as an annex to the meeting report and included on the agenda for OEWG 42.

Co-Chair Wilmart clarified that it is not normal practice and requested the text be resubmitted as a meeting document instead. Switzerland reintroduced the decision as a document, highlighting that the data assist the TEAP in its work to understand CTC emissions more fully. When asked to agree to include this document as an annex to the report of the meeting, the US, supported by Australia and Canada, noted that it is not standard practice to attach a document that has not been extensively discussed or agreed. Parties agreed to instead capture Switzerland's draft decision as a statement in the report of the meeting. With that, this agenda item was closed.

Issues Related to Exemptions under Articles 2A–2I of the Montreal Protocol: ***Nominations for CUEs for methyl bromide for 2020 and 2021:*** OEWG 41 Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/2/Add.1) on Monday. Methyl Bromide Technical Options Committee (MBTOC) Co-Chairs Marta Pizano and Ian Porter presented their recommendations on the CUEs requested by Australia, Canada, Argentina, and South Africa. South Africa said it accepted the MBTOC's recommendation, but noted fumigation needs to take place twice yearly and the alternative to methyl bromide, sulfuryl fluoride, is yet to penetrate their domestic market. Australia confirmed its commitment to use methyl iodide as an alternative and said they are preparing a CRP. Canada thanked the MBTOC for acknowledging the lack of methyl bromide substrates and confirmed ongoing efforts to identify alternatives.

Australia introduced its CRP (UNEP/OzL.Pro.31/CRP.7), stating that it indicates the total tonnage requested for exemptions by Australia, Argentina, Canada, and South Africa. Parties agreed to forward the CRP to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.7), the MOP:
- permits, for each party and for the agreed critical-use categories for 2020 and 2021, the levels of production and consumption for 2020 and 2021, which are necessary to satisfy critical uses;
- decides that parties shall endeavor to license, permit, authorize, or allocate quantities of methyl bromide for the critical use categories set out in the decision's annex;
- decides that each party that has an agreed CUE shall renew its commitment to ensure that the criteria in paragraph 1 of decision IX/6 (CUEs for methyl bromide) are applied in licensing, permitting, or authorizing critical uses of methyl bromide, and to request that each party report on these to the Secretariat;
- decides that parties submitting future requests for methyl bromide CUEs shall also comply with the provisions of decision IX/6, and that non-Article 5 parties shall demonstrate that research programmes are in place to develop and deploy alternatives to and substitutes for methyl bromide; and
- calls upon Article 5 parties requesting CUEs to submit their national management strategies in accordance with paragraph 3 of decision Ex.I/4.

The annex sets out the agreed critical-use categories, as well as the permitted levels of production and consumption for each party concerned.

Stocks of methyl bromide: OEWG 41 Co-Chair Arciniegas introduced this agenda item (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/2/Add.1) on Tuesday. She recalled the draft decision introduced by the EU at OEWG 41, stating it was not forwarded to MOP 31 since parties could not agree on: the definition of methyl bromide stocks, and differentiation between various types of stocks. The EU reemphasized their interest in the issue, stating that reporting on methyl bromide stocks could be incorporated into the draft decision on CUEs. He asked that the agenda item remain open for a potential CRP to be submitted later. Barbados, supported by Chile, preferred the agenda items on reporting on stocks and CUEs be discussed separately.

OEWG 41 Co-Chair Arciniegas proposed, and delegates agreed, that both agenda items remain open, with the EU participating in the CUE CRP discussion, while assessing the feasibility of a separate CRP on stocks.

On Wednesday, the EU proposed a draft decision (UNEP/OzL.Pro.31/CRP.5), calling for voluntary reporting on the volumes of all methyl bromide stocks by 1 July 2020.

The US opposed, stating it is unclear what "all stocks" would mean and how the data will benefit all parties. Chile and Ecuador stated that information on stocks will encourage the search for alternatives. Parties agreed to continue informal discussions, including with the MBTOC.

On Friday during the morning plenary, delegates agreed to forward the decision to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.5), the MOP invites parties to voluntarily submit information on the volumes of methyl bromide stocks, including mixtures, to the Secretariat by 1 July 2020. It also requests the Secretariat post the details of those methyl bromide stocks reported by parties.

Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol: OEWG 41 Co-Chair Wilmart introduced this agenda item on Tuesday morning (UNEP/OzL.Pro.31/2). Canada requested additional time to finalize a draft decision. Switzerland, the EU, and the US noted that simplifying procedures will benefit both the parties and the TEAP.

Delegates agreed to continue informally, and presented a draft decision (UNEP/OzL.Pro.31/CRP.14) on Friday night, which was forwarded to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.14), the MOP extends the global laboratory and analytical-use (LAU) exemption indefinitely beyond 2021. Additionally, MOP 31, *inter alia*:

- requests the Secretariat to include information on production and consumption trends of ODS for LAU in the annual report on Article 7 data submitted to the parties;
- requests the Secretariat make available to parties, through its web site, the consolidated indicative list of LAU of ODS that are globally exempted and the list of uses that parties agree are no longer exempted;
- encourages parties to further reduce their production and consumption of ODS for LAU and to facilitate the introduction of laboratory standards that do not require such substances; and
- requests TEAP to report within their quadrennial reports on any progress made by parties in reducing their production and consumption of ODS for LAU, any new alternatives for these uses, and laboratory standards that can be performed without such substances.

Process Agents: OEWG 41 Co-Chair Arciniegas introduced this agenda item on Tuesday morning, recalling that MOP 30 had considered recommendations from the TEAP to update tables on ODS currently used as process agents (UNEP/OzL.Pro.31/2). The EU mentioned a CRP they are developing that will propose updating the necessary tables. OEWG 41 Co-Chair Arciniegas requested the CRP be finalized and brought to plenary for further discussion.

On Wednesday afternoon, the EU introduced the draft decision (UNEP/OzL.Pro.31/CRP.3), stating it seeks to update Table A on uses of controlled substances as process agents and delete process agents that are no longer required. Regarding Table B on limits for process agent uses, the EU said it aims to adjust the makeup and maximum emissions associated with the deleted process agents. Canada and the US mentioned there had been insufficient time to review the CRP and requested time for further discussion with the EU.

Informal discussion continued until the Friday night session, when the EU introduced UNEP/OzL.Pro.31/CRP.3/Rev.1, which the delegates agreed to forward to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.3/Rev.1), the MOP decides to update Tables A and B of decision X/14. It also requests the TEAP, in its quadrennial report, to report on any progress made by parties in reducing their use and emissions of controlled substances as process agents and on any new alternatives to such uses on the understanding that should new, compelling information become available, this should be reported in their annual progress report.

Access of Article 5 Parties to Energy-Efficient Technologies in the Refrigeration, Air-Conditioning and Heat-Pump (RACHP) Sectors: OEWG 41 Co-Chair Wilmart introduced this item on Tuesday (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/2/Add.1, and UNEP/OzL.Pro.WG.1/41/5).

The TEAP Task Force on Energy Efficiency presented its report, concluding that, *inter alia*:

- technologies to enhance the energy efficiency of air-conditioning and commercial refrigeration equipment during the HFC phase-down are available;
- countries can use market policies and incentives to increase energy efficiency during the phase down of high-GWP HFCs;
- international and regional cooperation is key for market transformation; and
- Article 5 parties can benefit from capacity building and market transformation support.

The TEAP Task Force responded to questions from parties, stating that: their analysis did not consider accessibility, only availability; delaying energy efficient equipment uptake can result in additional costs over the equipment's lifetime; and the price of energy-efficient equipment tends to be higher in countries with high ambient temperatures.

Argentina, Bahrain, Barbados, Burkina Faso, India, Kuwait, and Samoa noted that both availability of and access to efficient technologies are unevenly distributed globally. The Federated States of Micronesia requested the TEAP to continue providing updates on changing technology and market conditions. Colombia, supported by the EU and Australia, requested: international efficiency standards be developed; additional policy measures be explored; and international cooperation and knowledge-sharing be emphasized. Colombia, supported by Argentina, requested the MLF support greater cooperation and capacity building in countries facing availability limitations or

higher costs to adopt and implement high-efficiency technologies. Canada noted the ExCom has already committed to, *inter alia*: supporting countries with training programmes to introduce energy efficient technologies; and identifying best practices for energy efficiency.

Co-Chair Wilmart proposed, and delegates agreed, to continue discussions informally. Informal discussions took place throughout the week, with a contact group established on Friday to consider a draft decision (UNEP/OzL.Pro.31/CRP.9).

Parties reported that the draft decision requests the TEAP to provide additional information on the policy frameworks necessary to enhance energy efficiency in the RAHCP sector in Article 5 countries, and report on new developments with respect to availability and accessibility of energy efficient equipment, as well as the market penetration of inefficient equipment. The decision further requested the MLF ExCom to consider TEAP reports while developing the cost guidance on maintaining and/or enhancing the energy efficiency of replacement technologies and equipment with low- or zero-GWP in the process of phasing down HFCs.

Many believed that while the subject is important, the additional requests may overburden the TEAP. There was also concern that language on requests for "pertinent aspects" and "market penetration of inefficient equipment" may be too subjective for the TEAP to adequately fulfil. Some delegates voiced concern that certain aspects of the requests may be too prescriptive for parties. They suggested that the decision be "focused and achievable," so that the information received is "comprehensive and useful." Parties urged that the decision language reflect that the discussion on energy efficiency stems from the adoption of the Kigali Amendment.

The revised draft decision was introduced in plenary on Friday evening, where it was forwarded to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.9/Rev.2), the MOP requests that the TEAP prepare a report for MOP 32's consideration, which addresses any new developments with respect to best practices, availability, accessibility, and cost of energy efficient technologies in the RACHP sector as regards the implementation of the Kigali Amendment.

Terms of Reference, Composition, Balance, Fields of Expertise, and Workload of the TEAP: OEWG 41 Co-Chair Arciniegas introduced this agenda item on Tuesday morning, reminding the parties that the draft decision was introduced by Saudi Arabia at OEWG 41 and forwarded to MOP 31 for further considerations (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.WG.1/41/4 and UNEP/OzL.Pro.24/10). A contact group, co-facilitated by Lara Haidar (Lebanon) and Philippe Chemouny (Canada), was established to further consider the draft decision.

The contact group met from Tuesday through Friday to consider the draft decision contained in UNEP/OzL.Pro.31/3. Parties considered language to ensure there is sound, clear, and transparent implementation of the TEAP's ToR. They also discussed the need for the TEAP to provide a summary outlining the actions that the TEAP and its technical options committees (TOCs) undertook to ensure implementation of decision XXIV/8 (ToR, code of conduct, and disclosure and conflict of interest guidelines for the TEAPs, and its TOCs and temporary subsidiary bodies), as well as ensuring that the matrix of needed expertise is compiled in line with decision XXIV/8.

Co-Facilitator Chemouny introduced the draft decision (UNEP/OzL.Pro.31/CRP.11) on Friday evening, saying that the main aspect of the decision is the request for TEAP to provide an annual progress report summarizing steps taken to ensure adherence with the Panel's ToR.

Delegates agreed to forward the draft decision to the HLS, where it was adopted.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.11), the MOP:

- reiterates the importance of the TEAP's ToR and section 2.9 of the annex to decision XXIV/8 (Guidelines for nominations and matrix of expertise) and also to reiterate the importance of the annex, which defines the requirements and information to be included in the matrix of needed expertise;
- requests that the TEAP provide, as part of its annual progress report, a summary outlining the procedures that the Panel and its TOCs have undertaken to ensure adherence to the Panel's ToR through clear and transparent procedures;
- requests parties, when nominating experts to the TEAP, TOCs, or temporary subsidiary bodies, use the Panel's nomination form and associated guidelines so as to facilitate the submission of appropriate nominations by parties, taking into account the matrix of needed expertise, geographical and gender balance, in addition to expertise needed to address new issues related to the Kigali Amendment;
- requests the Ozone Secretariat to make the TEAP nomination form available on the Secretariat's website and to make the forms submitted by parties nominating members to the Panel available on meeting portals so as to facilitate the review by and discussions among the parties of the proposed nominations; and
- urges the parties to follow the TEAP ToR and consult the Panel Co-Chairs and refer to the matrix of needed expertise prior to making nominations for appointments to the Panel.

Membership of the MLF ExCom: OEWG 41 Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/3) on Tuesday, proposing establishment of an informal contact group. Armenia called for a permanent seat on the MLF ExCom for a member of the Eastern Europe and Central Asia group, and, with the Russian Federation supporting, urged adopting the draft decision. The US and Jordan opposed the draft decision, noting that ExCom representation is currently balanced in representation. The US expressed willingness to discuss the concerns of the Eastern Europe and Central Asia group regarding MLF project approval and execution in an informal contact group. Armenia, supported by Georgia and Kyrgyzstan, requested establishing a formal contact group.

Due to the lack of consensus, an informal contact group was established. Armenia updated the plenary on the status of informal and bilateral consultations on Friday morning, stating that their original questions on this matter are still outstanding and requested, with support from Bosnia and Herzegovina, the establishment of a formal contact group to continue discussions. Reminding parties of the limited time remaining and numerous outstanding agenda items, OEWG 41 Co-Chair Wilmart requested discussion on this agenda item be suspended until OEWG 42. Parties agreed to close this agenda item and revisit the establishment of a formal contact group on the matter at OEWG 42.

Request by Azerbaijan to be included among the Parties to which the Phase-down Schedule for HFCs, as set out in paragraphs 2 and 4 of Article 2J of the Montreal Protocol, applies: OEWG 41 Co-Chair Arciniegas introduced this agenda item (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/3) on Tuesday. She suggested, since the Government of Azerbaijan was not present at MOP 31, the agenda item be closed with the possibility that it be reintroduced at a future meeting. Delegates agreed.

Safety Standards: OEWG 41 Co-Chair Wilmart introduced this agenda item on Tuesday, reminding delegates about the online tool developed by the Ozone Secretariat (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/2/Add.1). The EU stressed that revised safety standards are crucial for implementation of the Kigali Amendment. China called for revised standards on household appliances. Noting no further interventions, OEWG 41 Co-Chair Wilmart closed the agenda item.

Initial Assessment by the SAP and the TEAP of Five Volatile Fluoroorganic and Related Compounds found in the Arctic: Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2) on Tuesday. The SAP and the TEAP presented their initial assessment, noting the five chemicals occur at very low concentrations. They added that although three of the gases are ODS, these substances are currently not threats to the ozone layer and their climate impact is likely negligible.

Responding to Norway, the TEAP said it used publicly available information and its own expert knowledge of the chemicals market to determine the availability and market value of these chemicals. The SAP, responding to Barbados, said that due to science limitations, the origins of the emissions are unknown, but climatological observations suggest they originated from Norway. The SAP said it would be better placed to address this in the future as measurement techniques improve.

Switzerland suggested controlled studies to better understand the impacts of these chemicals. Co-Chair Wilmart closed this agenda item.

Co-Chair Wilmart returned to this agenda item on Wednesday morning. Norway queried which sectors the ODS are being used in and requested this information be included in the next quadrennial report. Noting no other interventions, Co-Chair Wilmart closed the agenda item.

Consideration of Nominations to the Assessment Panels: OEWG 41 Co-Chair Arciniegas introduced this agenda item on Tuesday, noting two additional nominations received since OEWG 41 (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/2/Add.1, and UNEP/OzL.Pro.24/10). OEWG 41 Co-Chair Arciniegas asked parties to follow the guidelines and matrix available for nominating panelists. The US introduced the draft decision (UNEP/OzL.Pro.31/CRP.10) on Friday night, outlining the new nominees. Delegates agreed to forward the decision to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.31/CRP.10), the MOP endorses the appointment of:

- Krishna K. Pandey (India) and Paul Barnes (US) as the new Co-Chairs of the EEAP;
- Jianjun Zhang (China) as Co-Chair of the Medical and Chemicals TOC (MCTOC) for an additional four-year term;
- Omar Abdelaziz (Egypt) as a new Co-Chair of the Refrigeration TOC for a four-year term;
- Keiichi Ohnishi (Japan) as Co-Chair of the MCTOC for an additional four-year term;
- Sidi Menad Si Ahmed (Algeria) as senior expert of the TEAP for an additional one-year term; and
- Suely Carvalho (Brazil) as senior expert of the TEAP for an additional four-year term.

Compliance and Data Reporting Issues: The Work and Recommended Decisions of the ImpCom: Co-Chair Wilmart introduced this agenda item on Tuesday (UNEP/OzL.Pro.31/2). Patrick McInerney (Australia), ImpCom President, reported on the ImpCom's 62nd and 63rd meetings. He noted that the CRP contains two draft decisions that cover data reporting and HFC licensing systems, remarking that all parties are currently in compliance. He explained that the CRP also urges: periodic review of HFC licensing systems; stocktaking to ensure noncompliance mechanisms are well-suited to meet future challenges; and identifying possible gaps in compliance enforcement. McInerney added that the ImpCom had also requested the Secretariat to provide information on the possible ways of dealing with illegal production and illegal trade of controlled substances, which is appended to the Committee's report and will be made available in the coming days. Co-Chair Wilmart suggested this issue be forwarded to OEWG 42 for further discussion. After noting a request from the US to make minor amendments for clarity, delegates agreed.

On Wednesday, OEWG 41 Co-Chair Wilmart informed the plenary that Part A of the original CRP (UNEP/OzL.Pro.31/CRP.2) has been finalized and proposed it be forwarded to the HLS for adoption.

The US introduced UNEP/OzL.Pro.31/CRP.6 that clarifies language of Part B of UNEP/OzL.Pro.31/CRP.2. Parties supported the clarifications but said more time is needed to review the latter CRP. Both draft decisions remained open for further deliberations.

On Friday morning, OEWG 41 Co-Chair Wilmart returned to this agenda item, where parties agreed to forward the two CRPs to the HLS.

Final Outcome: In the decision on data and information provided by the parties in accordance with Article 7 of the Montreal Protocol (UNEP/OzL.Pro.31/CRP.2), the MOP:

- notes that all parties need to report data and that, as of 30 September 2019, 169 parties had done so;
- notes 103 of those parties had reported their data by 30 June 2019; and
- encourages parties to continue reporting consumption and production data as soon as figures are available, and preferably by 30 June each year.

In the decision on licensing systems under Article 4B, paragraph 2 *bis* of the Montreal Protocol (UNEP/OzL.Pro.31/CRP.6), the MOP:

- urges all parties to the Protocol that have ratified, approved, or accepted the Kigali Amendment and that already operate licensing systems for controlled substances under Annex F to the Montreal Protocol to ensure those licensing systems include the import and export of new, used, recycled, and reclaimed controlled substances and that they are implemented and enforced effectively;
- encourages all parties to the Protocol that have ratified, approved, or accepted the Kigali Amendment to the Protocol and that have not yet done so to establish and implement import and export licensing systems consistent for controlled substances listed in Annex F to the Protocol; and
- review periodically the status of the establishment and implementation of import and export licensing systems for

controlled substances under Annex F to the Protocol by all parties to the Protocol that have ratified, approved, or accepted the Kigali Amendment.

Risk of Non-Compliance with HCFC Reduction Targets for 2019 by the Democratic People's Republic of Korea (DPRK): OEWG 41 Co-Chair Arciniegas introduced this item (UNEP/OzL.Pro.31/2) on Tuesday, and it was addressed in the preparatory segment on Tuesday and Wednesday. The DPRK said that although the agenda item had been closed at OEWG 41, they requested its inclusion on the MOP 31 agenda. She said that DPRK has been unable to receive technical and monetary assistance to phase out HCFCs due to UN sanctions, which puts them at risk of non-compliance. She also questioned what kind of penalty the DPRK could expect if this happens. The US opposed a draft decision proposed by the DPRK, saying Protocol decisions will have to comply with Security Council sanctions. Australia, the EU, Japan, and US stated there has been no change in circumstances since OEWG 41 that would justify changing the decision to withhold funding from the DPRK. They noted their support for the ExCom's decision on this matter as it is consistent with UN Security Council resolutions.

Co-Chair Arciniegas noted a lack of consensus on this issue and proposed recording these interventions in the report of the meeting and closing the agenda item. Delegates agreed**.**

Status of Ratification of the Kigali Amendment to the Montreal Protocol: OEWG 41 Co-Chair Arciniegas introduced this item on Wednesday morning (UNEP/OzL.Pro31/2, UNEP/OzL.Pro.31/3 and UNEP/OzL.Pro31/INF/3). She said 88 parties have ratified the Kigali Amendment. Armenia, Brazil, Dominican Republic, Kenya, Sudan, Tanzania, Tunisia, and Zimbabwe reported that ratification is underway. Argentina, Guinea, Malaysia, and Mozambique emphasized their intention to deposit instruments of ratification with the UN shortly. Argentina and Malaysia urged progress on matters of funding to ensure an effective HFC phase-down. OEWG 41 Co-Chair Arciniegas urged parties that have not yet done so, to ratify. The draft decision was forwarded to the HLS for adoption.

Final Outcome: In its decision (UNEP/OzL.Pro.30/L.2), MOP 31 notes that as of 8 November 2019, 88 parties have ratified, approved, or accepted the Kigali Amendment to the Montreal Protocol. The MOP also urges all parties that have not yet done so, to consider ratifying, approving, or accepting the Kigali Amendment in order to ensure broad participation and achieve the goals of the Amendment.

Dates and Venue of MOP 32: On Friday evening, Uzbekistan offered to host MOP 32 in Tashkent, Uzbekistan, saying it would be a great honor to host the Montreal Protocol Meeting of the Parties. MOP 31 President Da Breo thanked Uzbekistan for their offer, noting that the dates will be confirmed.

Other Matters: On Wednesday morning, OEWG 41 Co-Chair Wilmart opened this agenda item, inviting Italy to speak on the Rome Declaration. Italy noted the Declaration, on the contribution of the Protocol to the sustainable cold chain to reduce food loss, is linked not only to the mandate of the Protocol but also several of the Sustainable Development Goals (SDGs). He said the Declaration, the text of which was finalized at OEWG 41, will appear as an annex to the MOP 31 meeting report. Italy reminded delegates that the topic would be discussed at the ministerial roundtable during the HLS and parties are invited to sign the Declaration on a voluntary basis up until MOP 32. Many parties thanked Italy for this initiative, stating their intention to sign the Declaration and urging other parties to do so.

Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development: As of 8 November 2019, the Rome Declaration has been signed by 76, and is open for signature up until the start of MOP 32 in November 2020.

In the Declaration (UNEP/OzL.Pro.31/L.1/Annex), the Ministers of the 76 countries recall that approximately one-third of all food produced globally is either lost or wasted. They reaffirm the cooperation among parties in implementing the Montreal Protocol, recognize the Protocol and its Kigali Amendment have raised awareness for developing sustainable and efficient solutions in the refrigeration and air conditioning (RAC) sector, and are aware of the cold chain's key role in implementing the 2030 Agenda for Sustainable Development and the SDGs.

The Ministers:

- stress the importance of pursuing national action and international cooperation to promote cold chain development, including by using sustainable and environmentally friendly refrigeration to reduce food loss;
- underscore the multiple benefits of promoting information exchange on the contribution of the cold chain to the SDGs and encourage the ongoing work under the Montreal Protocol to this end; and
- call for strengthening cooperation and coordination between governments, the Protocol's institutions, UN specialized agencies, existing private and public initiatives, and all relevant stakeholders to exchange knowledge and promote innovation of energy-efficient solutions and technologies that reduce the use of Protocol-controlled substances in developing the cold chain, thereby contributing to the reduction of food loss and waste.

A Brief Analysis of MOP 31

UN Environment Programme Executive Director Inger Andersen, addressing the High-Level Segment (HLS), called on parties to "uphold their responsibility to the ozone layer." Considering the Protocol's 32-year legacy of success, this was foremost in the minds of many as the thirty-first Meeting of the Parties to the Montreal Protocol (MOP 31) convened in Rome. By looking back and shoring up the legacy of the Protocol, parties also looked forward and, using scientific precision and further galvanizing the institutional structures, tried to ensure that the Montreal Protocol can weather future complexities that are emerging as global challenges become increasingly interlinked.

Throughout the week, parties acknowledged the Kigali Amendment is the bridge between the ozone and climate regimes. As the week at the UN Food and Agriculture Organization headquarters demonstrated, the Amendment also connects to issues of food security and sustainable agriculture. The issue of access to energy efficient technology for developing countries (Article 5 parties) underscores the Amendment's far-reaching impacts. Parties sought to ensure these matters were addressed by including these issues in in the Terms of Reference (ToR) for the Study on the MLF replenishment by the Technology and Economic Assessment Panel (TEAP) for the 2021-2023 period and as areas of focus for the 2022 Quadrennial Assessment.

Arguably, the impetus for this elevated commitment to fortify the pillars of the Protocol was the overarching issue of the unexpected CFC-11 emissions—a matter that has been extensively deliberated by parties for the last two years and continued to confound them at MOP 31. The reemergence of issues they thought had been resolved—CFCs were phased out in 2010—has mobilized parties to confront the issues at hand in addition to ensuring that the Protocol remains fit-for-purpose.

This analysis assesses whether MOP 31, in light of the above challenges, took sufficient steps to "uphold their responsibility to the ozone layer," and ensure the Protocol's legacy continues as global environmental challenges converge.

Inward Reflection

Pope Francis' letter to the MOP underscored that the Montreal Protocol has reason to be proud. He lauded it as an example of a successful international agreement that understands the interconnectedness of life and nature and does not shy away from shouldering its responsibility in the global environmental agenda.

The unexpected emissions of CFC-11 was therefore, as one delegate said, an issue that has "shocked the ozone family." The Implementation Committee (ImpCom), in anticipation that this was the first of many such challenges, had requested a note from the Secretariat on the Protocol's current compliance systems. Providing an update to the MOP on compliance and data reporting issues, the ImpCom suggested that this note be forwarded to the next Open-ended Working Group (OEWG) meeting. There parties will be given the opportunity to consider and assess if they are sufficient for effective implementation.

Global monitoring and observations detected that approximately 50% of the unexpected emissions have come from China. As a result, China has taken steps to address illegal CFC-11 use. Parties spent many hours deliberating if this action is sufficient in the short term. More broadly, parties discussed the need to enhance monitoring and observation in order to effectively identify sources in the event of unexpected ODS emissions in the future. As one delegate was heard saying, "How can we take sufficient action when we don't have sufficient monitoring and observation capacity?"

After working late into the final evening of the MOP, parties decided to focus on general guidance with an emphasis on information gathering on illegal activities and illegal trade of banned substances, while encouraging intersessional discussion. Some observers said the decision provides delegates with an opportunity to reflect on the issue and have more concrete suggestions at the next OEWG meeting. Throughout MOP 31 delegates emphasized the need to rise to the challenge of resolving the CFC-11 issue, as many noted this will serve as a "litmus test" of the Protocol's ability to effectively address and resolve compliance matters.

Sufficient Action

Delegates universally acknowledged that one of the key challenges ahead is the implementation of the Kigali Amendment. Adopted by parties in 2016, the Kigali Amendment aims to address HFC emissions, which were created to replace HCFCs. Though HFCs are not ODS, they are potent greenhouse gases. Article 5 parties repeatedly stated that access to energy efficient alternatives to HFCs is key for their ability to effectively phase down HFCs. They also stressed the need for the Multilateral Fund (MLF) to augment its funding support on this basis.

Delegates at MOP 31 were tasked with deciding on the ToR for the Study on the MLF replenishment by the TEAP for the 2021-2023 period. Article 5 parties were eager for HFC alternatives, energy efficiency, and other support for Kigali Amendment implementation to be prioritized in the replenishment study. Non-Article 5 parties, however, expressed reluctance.

The non-Article 5 parties have raised concerns on how MLF funding has been disbursed in recent years—noting fewer countries have received funding and, as a result, they receive larger shares of total funds available. One civil society observer also suggested that non-Article 5 parties are concerned some Article 5 parties do not appear to need MLF funding.

The negotiations on the ToR for the MLF Study hit a roadblock on this particular issue. Some parties suggested detailing which Article-5 parties would receive funding, with the proponents suggesting this will allow for greater buy-in from governments and potentially ease MLF funding concerns. Ultimately, however, this language was not included in the final decision as the opponents urged for funding to be allocated on a task-by-task basis, rather than a country-by-country basis. The compromise decision states that country-specific information could be requested from the TEAP as needed.

Delivering Big Time

Former Canadian Prime Minister Brian Mulroney stated at MOP 29, marking the 30th anniversary of the Montreal Protocol, that "history will judge you and all of us, not on the speeches we make, but on the results we deliver. In that the Montreal Protocol has delivered big time." But despite the commitment of parties, science, and industry to strive for continued results, many expressed concern that the emerging complexities for this Protocol have the potential to loom over past glories if they are not addressed successfully.

As Inger Andersen stated, these emerging complexities include "the linked threats of climate change, the erosion of nature and pollution of the air, land, and sea," emphasizing that multilateral agreements "have never been more important." While the Kigali Amendment links the Montreal Protocol to climate action, the Rome Declaration on the Montreal Protocol's contribution to food loss reduction underpins the link to food security, strengthening the Protocol's wide-reaching place in the sustainable development agenda.

Delegates worked long and hard throughout the week to continue strengthening the aspects of the Protocol that have ensured its historical achievements. They reaffirmed their commitment to maintaining scientific vigilance, and ensuring that the institutional pillars of the Protocol remain dynamic and flexible in changing times. The decisions taken at MOP 31 will help the Montreal Protocol to continue "delivering big time."

Upcoming Meetings

Global Science, Technology and Innovation Conference (G-STIC) 2019: The Conference will discuss accelerating technological transitions for the SDGs through identifying clusters of market-ready technological solutions and start building a living library of transformative technologies across sectors. **dates:** 20-22 November 2019 **location:** Brussels, Belgium **www:** https://2019.gstic.org/

Third Meeting of the Conference of the Parties to the Minamata Convention on Mercury: COP-3 is expected to discuss, *inter alia*, waste thresholds, releases, interim storage,

contaminated sites, open burning of waste, review of Annexes A and B, and harmonized customs codes. **dates:** 25-29 November 2019 **location:** Geneva, Switzerland **www:** http://www.mercuryconvention.org

UNFCCC COP 25: Formerly scheduled to be held in Santiago, Chile, the UN Climate Change Conference has relocated to Madrid. The Conference will feature the 25th session of the Conference of the Parties (COP 25) to the UNFCCC, the 15th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP 15), and the 2nd session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA 2), along with meetings of the UNFCCC subsidiary bodies. **dates:** 2-13 December 2019 **location:** Madrid, Spain **www:** https://unfccc.int/cop25

4th Meeting of the Intersessional Process (IP4) considering the Strategic Approach and the Sound Management of Chemicals and Waste beyond 2020: IP4 is expected to continue the discussions on a possible post-2020 platform for chemicals and waste and will convene ahead of the fifth session of the International Conference on Chemicals Management (ICCM-5), scheduled for 5-9 October 2020 in Bonn, Germany. **dates:** 23-26 March 2020 **location:** Bucharest, Romania **www:** http://www.saicm.org/

11th ORM: The 11th Ozone Research Managers (ORM) meeting is expected to provide parties with information on needs for research, observations, data stewardship, and capacity building. **dates:** 1-3 April 2020 **location:** Geneva, Switzerland **www:** https://ozone.unep.org/meetings

8th International Nitrogen Initiative Conference: The conference is expected to stimulate an exchange among policymakers and other relevant stakeholders of results, ideas, and visions to improve future holistic management of reactive nitrogen. **dates:** 3-7 May 2020 **location:** Berlin, Germany **www:** https://ini2020.com/

85th MLF ExCom: The Multilateral Fund (MLF) Executive Committee (ExCom) will continue to look at reports with specific reporting requirements and status of contributions and disbursements. **dates:** 25-29 May 2020 **location:** Montreal, Canada **www:** http://www.multilateralfund.org/

Sustainable Energy for All Forum 2020: Convening under the theme, "Building Speed, Reaching Scale, Closing the Gap," the Sustainable Energy for All (SEforALL) Forum will take stock of progress towards implementing SDG 7 (Affordable and Clean Energy) and provide an opportunity to develop new partnerships, launch new financial instruments to close the energy access gap, and connect with energy leaders from communities, cities, politics, business, and finance. The Forum will also seek to raise the ambition of the next round of Nationally Determined Contributions (NDCs) under the Paris Agreement on climate change. **dates:** 26-28 May 2020 **location:** Kigali, Rwanda **www:** http://seforallforum.org/forum-2020

12th Helsinki Chemicals Forum (HCF): HCF 2020 is organized by the Chemicals Forum Association, in cooperation with the European Chemicals Agency, the European Commission, the European Chemical Industry Council, and the Finnish Government with local partners, including the City of Helsinki, the Chemical Industry Federation of Finland, and the University of Helsinki. **dates:** 4-5 June 2020 **location:** Helsinki, Finland **www:** https://helsinkichemicalsforum.messukeskus.com/

64th ImpCom: The Montreal Protocol Implementation Committee meets regularly to assess parties' status of compliance with their obligations under the Protocol. **date:** 10 July 2020 **location:** Montreal, Canada **www:** https://ozone.unep.org/

42nd Meeting of the Open-Ended Working Group (OEWG 42) of the Parties to the Montreal Protocol: OEWG 42 will convene to prepare for the COP 12/MOP 32. **dates:** 13-17 July 2020 **location:** Montreal, Canada **www:** https://ozone.unep.org/meetings

ICCM5: The top decision-making body of the Strategic Approach to International Chemicals Management (SAICM) will meet at the Fifth Meeting of the International Conference on Chemicals Management (ICCM5) to, *inter alia*, consider a possible post-2020 platform for addressing chemicals and waste. **dates:** 5-9 October 2020 **location:** Bonn, Germany **www:** http://www.saicm.org

86th MLF ExCom: The Multilateral Fund (MLF) Executive Committee (ExCom) will continue to look at reports with specific reporting requirements and status of contributions and disbursements. **dates:** 16-20 November 2020 **location:** TBC **www:** http://www.multilateralfund.org/

65th ImpCom: The Implementation Committee of the Montreal Protocol meets regularly to assess parties' status of compliance with their obligations under the Protocol. **date:** 20 November 2020 **location:** TBC **www:** https://ozone.unep.org/meetings

COP 12/ MOP 32: The Joint 12th Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer (COP 12) and 32nd Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (MOP 32) will review implementation of the Convention and the Protocol. **dates:** 23-27 November 2020 (TBC) **location:** TBC **www:** https://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
CUEs	Critical Use Exemptions
EEAP	Environmental Effects Assessment Panel
ExCom	Executive Committee (MLF)
FAO	Food and Agriculture Organization of the UN
GWP	Global Warming Potential
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
HLS	High-level Segment
ImpCom	Implementation Committee
MBTOC	Methyl Bromide Technical Options Committee
MLF	Multilateral Fund
MOP	Meeting of the Parties
ODS	Ozone depleting substances
OEWG	Open-ended Working Group
SAP	Scientific Assessment Panel
TEAP	Technology and Economic Assessment Panel
TOC	Technical Options Committee
ToR	Terms of Reference
UNEP	United Nations Environment Programme
UV	Ultraviolet

MOP 31 #1

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Thirty-first Meeting of the Parties to the Montreal Protocol: 4-8 November 2019

The thirty-first Meeting of the Parties to the Montreal Protocol (MOP 31) convenes for the first time since the entry into force of the Kigali Amendment and with the news that the ozone hole is the smallest on record. Parties will build on discussions that took place at the Open-ended Working Group in July 2019, taking decisions to further the implementation of the Protocol. The high-level segment (HLS) is expected to focus on the Montreal Protocol's contribution to reducing food loss through developing sustainable cold chains.

Expectations for the Meeting

Delegates at MOP 31 will resume the discussions they began at the 41st meeting of the Open-Ended Working Group (OEWG 41), which took place in July 2019. The most high-profile of these will be the discussions on the unexpected emissions of trichlorofluoromethane (CFC-11). The Scientific Assessment Panel (SAP) and the Technology and Economic Assessment Panel (TEAP) will present their updated reports to the MOP. The Ozone Secretariat will also present their updated overview document to MOPs. Parties are expected to take these updates into account, and discuss a way forward on the issue.

At OEWG 41, parties forwarded a number of draft decisions for MOP 31 to consider. These include:

- The terms of reference (ToR) for the study on the 2021-2023 replenishment of the Multilateral Fund (MLF), which considers including allocating resources for: enabling all Article 5 parties to achieve and/or maintain compliance with the Protocol's control measures; ensuring enhanced and improved vigilance through strengthening existing monitoring, verification, and reporting systems, and ensure sustained compliance; and preparing hydrofluorocarbon (HFC) phase-down plans.
- The draft decision on the ToR for the study on the 2021-2023 MLF replenishment also requests the TEAP provide indicative figures for the resources required: for phasing out hydrochlorofluorocarbons (HCFCs) that could be associated with enabling Article 5 parties to encourage using low- or zero-global-warming-potential alternatives; and for any resources needed to phase down HFCs in accordance with the Kigali Amendment.
- A draft decision on the potential areas of focus for the 2022 quadrennial assessment reports of the SAP, the TEAP and the Environmental Effects Assessment Panel (EEAP), which requests: the EEAP to, *inter alia*, assess socio-economic effects, such as on ecosystem services, agriculture, and damage to materials; the SAP to, *inter alia*, identify and quantify, where possible, any other issues, including new issues, of importance to the ozone layer and the objectives of the Vienna Convention and the Montreal Protocol; and the TEAP to, *inter alia*, assess and evaluate the status of banks, including stocks of controlled substances and the options available for eliminating them and avoiding emissions to the atmosphere.
- A draft decision on ongoing reported emissions of carbon tetrachloride (CTC), which requests the TEAP and the SAP to establish a joint CTC emissions task force to update the state of knowledge on potential emission sources and emission pathways of CTC and identify priorities for further research, including suggesting mitigation measures for reducing emissions.

Additional agenda items for consideration by the MOP include administrative issues, such as: the budget of the trust fund for the Montreal Protocol and financial reports; and consideration of the membership of Montreal Protocol bodies for 2020.

MOP 31 is convened in two parts: the preparatory segment, which convenes from 4-6 November; and the high-level segment, which convenes from 7-8 November. The HLS will feature a high-level roundtable on the sustainable cold food chain. Parties will also consider the adoption of a "Rome Declaration," as one of the outcome documents of the meeting.

A Brief History of the Montreal Protocol

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.

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 usage of ozone depleting

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substances (ODS). The Convention now has 198 parties, which represents universal ratification.

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

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

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 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 Implementation Committee (ImpCom) to examine possible non-compliance and make recommendations to the MOP aimed at securing full compliance.

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

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

Kigali Amendment: At MOP 28, held in Kigali, Rwanda, in 2016, delegates agreed to amend the Protocol to include HFCs as part of its ambit and to set phase-down schedules for HFCs. HFCs are produced as replacements for CFCs and thus a result of ODS phase-out. HFCs are not a threat to the ozone layer but have a high global warming potential. To date, 88 parties to the Montreal Protocol have ratified the Kigali Amendment, which entered into force on 1 January 2019.

COP 11/MOP 29: The eleventh meeting of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer (COP 11) and MOP 29 met from 20-24 November 2017, in Montreal, Canada. COP 11/MOP 29 adopted decisions including: essential-use exemptions and critical-use exemptions; future availability of halons; and energy efficiency. They also adopted a decision agreeing on a USD 540 million replenishment of the MLF for the triennium 2018-2020.

MOP 30: Convened from 5-9 November 2018 in Quito, Ecuador, MOP 30 adopted decisions on, *inter alia*: issues important to the January 2019 entry into force of the Kigali Amendment; approved destruction technologies to be used for HFCs; the MLF Executive Committee's (ExCom) progress in developing guidelines for the financing of the HFC phase-down; Article 5 parties' access to energy-efficient technologies in the refrigeration, air conditioning and heat pump sectors; a proposal to permit essential use exemptions for HCFCs for specific uses by certain parties; and unexpected increases in CFC-11 emissions.

Intersessional Highlights

ExCom 82: The 82nd meeting of the MLF ExCom met in Montreal, Canada, from 3-7 December 2018. The ExCom discussions included, among other items, contributions to and status of the Fund, country programme data, and business planning for the period 2019 to 2021. They also addressed: a desk study on the evaluation of HCFC phase-out management plan (HPMP) preparation activities to assist with the implementation of the Kigali Amendment; matters arising from OEWG 40 and MOP 30 focusing on the increase in the global emissions of CFC-11; and policy matters related to the Kigali Amendment.

ExCom 83: The 83rd meeting of the MLF ExCom met in Montreal, Canada, from 27-31 May 2019. The ExCom discussed, *inter alia*: the report on Secretariat activities; the status of contributions and disbursements; the report on country programme data and prospects for compliance; and project reports. On matters related to the Kigali Amendment, delegates addressed issues of energy efficiency, developing cost guidelines for the HFC phase-down in Article 5 countries, and key aspects related to HFC-23 by-product control technologies.

ImpCom 62: The 62nd meeting of the ImpCom met in Bangkok, Thailand, on 29 June 2019. The ImpCom considered, among others: the Democratic People's Republic of Korea's risk of non-compliance relating to HCFCs; status updates from the Central African Republic, Kazakhstan, Libya, Ukraine, and Yemen; and presentations by the Secretariat and the MLF on implementation activities.

OEWG 41: OEWG 41 met in Bangkok, Thailand, from 1-5 July 2019. The discussions laid the groundwork for MOP 31, including, *inter alia*:

- issues related to unexpected emissions of CFC-11, which addressed two aspects—technical and scientific issues, with a view to identifying information that needs to be enhanced, and institutional matters and processes, including monitoring, reporting and verification, compliance, licensing and illegal trade;
- ToR for the study on the 2021-2023 replenishment of the MLF, with parties discussing allocating resources for preparing HFC phase-down plans; and maintaining and/or enhancing energy efficiency of low- or zero-GWP technologies and equipment while phasing down HFCs;
- review of the ToR, composition, balance, fields of expertise and workload of the TEAP, with delegates suggesting taking into account geographical and gender balance, and expertise needed to address new issues related to the Kigali Amendment, such as energy efficiency, safety standards, and climate benefits; and
- ToR for the 2022 Quadrennial Assessment, with suggestions including "the urgent need to turn attention to short lived substances and ODS banks."

Discussions on safety standards were noted in the meeting report but not forwarded for MOP 31's consideration.

MOP 31 #2

Earth Negotiations Bulletin

A Reporting Service for Environment and Development Negotiations

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MOP 31 Highlights: Monday, 4 November 2019

The preparatory segment of the thirty-first Meeting of the Parties to the Montreal Protocol (MOP 31) opened on Monday, 4 November 2019 in Rome, Italy. In the morning, delegates heard opening statements and addressed organizational and administrative matters. They also addressed: the terms of reference (ToR) for the study on the 2021–2023 replenishment of the Multilateral Fund (MLF); potential areas of focus for the 2022 quadrennial assessment reports of the Scientific Assessment Panel (SAP), the Environmental Effects Assessment Panel (EEAP) and the Technology and Economic Assessment Panel (TEAP); ongoing reported emissions of carbon tetrachloride (CTC); and the unexpected emissions of trichlorofluoromethane (CFC-11).

In the afternoon, delegates continued discussions on CFC-11, and deliberated on nominations for critical-use exemptions (CUEs) for methyl bromide for 2020 and 2021.

Opening of the Preparatory Segment

Welcoming delegates, Roberto Morassut, Undersecretary of State, Italian Ministry of the Environment, Land and Sea, applauded the Montreal Protocol as an extraordinary example of international cooperation that will continue to inspire global environmental policies to transition towards a sustainable world for current and future generations. Morassut thanked his colleagues for the spirit of friendship and trust that is a hallmark of the Montreal Protocol, and noted Italy's commitment to working towards the rapid ratification and implementation of the Kigali Amendment.

René Castro-Salazar, Assistant Director-General, Climate, Biodiversity, Land and Water Development, FAO, stressed the urgency for countries to work together to reduce food waste, noting it would be possible for current food production to feed the entire world if waste were eliminated. Underscoring the need for international cooperation to have a positive impact on people, climate and biodiversity, Castro-Salazar noted his organization's efforts to bring Ministers of Environment and Agriculture together—for the first time ever—at the 15th meeting of the Conference of the Parties (COP 15) to the Convention on Biological Diversity (CBD) in China in 2020.

Tina Birmpili, Executive Secretary, Ozone Secretariat, underscored the importance of energy efficiency for cold chains and food security. She praised China's efforts to combat the unexpected CFC-11 emissions and, recalling the importance of monitoring and observation for detecting the unexpected CFC-11 emissions, called for more monitoring stations globally. Birmpili stressed the Protocol's link to other conventions and the post-2020 processes for biodiversity and chemicals. She mentioned the UN Environment Programme's (UNEP) 50th anniversary in 2022 as a chance to convey the Montreal Protocol's success.

Organizational Matters

OEWG 41 Co-Chair Alain Wilmart (Belgium) presented the agenda (UNEP/OzL.Pro.31/1). ITALY requested including discussion of the Rome Declaration under "Other Matters," underscoring that the Rome Declaration will link the Montreal Protocol's contribution to reducing food waste through sustainable cold chain development. The agenda was adopted as amended. Delegates agreed to the organization of work.

Administrative Matters

Budget of the Trust Fund for the Montreal Protocol and financial reports: OEWG 41 Co-Chair Wilmart introduced this item (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/3, UNEP/OzL.Pro.31/4, UNEP/OzL.Pro.31/INF/1 and UNEP/OzL.Pro.31/INF/2). He requested parties indicate if they are interested in participating in the Budget Committee, stating it would convene immediately following the close of the morning session.

Consideration of the membership of the Montreal Protocol bodies for 2020: Noting the need for parties to decide on the membership of the Implementation Committee (ImpCom), the MLF Executive Committee (ExCom) as well as the OEWG 42 Co-Chairs, OEWG 41 Co-Chair Laura Juliana Arciniegas (Colombia) asked parties to notify the Secretariat of their nominations as they are decided.

ToR for the Study on the 2021-2023 MLF Replenishment

OEWG 41 Co-Chair Wilmart introduced this item, noting the MLF replenishment is necessary for Article 5 parties to comply with their obligations under the Protocol during the 2021-2023 implementation period (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/3, and UNEP/OzL.Pro.WG.1/41/5). Opening the floor for comments, the US said it would introduce some new concepts to the existing ToR. A contact group was established, facilitated by Ralph Brieskorn (the Netherlands) and Leslie Smith (Grenada).

Potential Areas of Focus for the 2022 Quadrennial Assessment Reports of the SAP, EEAP and TEAP

OEWG 41 Co-Chair Arciniegas introduced this agenda item (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/3, and UNEP/OzL.Pro.31/8). The EUROPEAN UNION (EU) outlined the draft decision, saying he wanted the decision to include sufficient detail to guide the Assessment Panels for a focused report in 2022. Additional areas of focus, he said, include a-dichloromethane and CTC emissions, short-lived substances, and five volatile fluoroorganic compounds found in the Arctic. Supported by a number of parties, the EU suggested a contact group be established. JAPAN and NIGERIA expressed interest in banks elimination as outlined in the CRP. INDIA stressed the assessments should focus on the most recent commitments such as the HFC phase-down. CHINA underscored the importance of cost and availability of technologies for replacing HFCs, and overall phase out of ozone depleting substances (ODS). NIGERIA, MALAYSIA, and MEXICO underscored energy efficiency for the HFC phase-down, while AUSTRALIA proposed updating the Assessment Panels' ToR. OEWG 41 Co-Chair Arciniegas established a contact group co-facilitated by Cindy Newberg (US) and Samuel Paré (Burkina Faso).

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Unexpected Emissions of CFC-11

OEWG 41 Co-Chair Arciniegas introduced this agenda item (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/2/Add.1, UNEP/OzLPro/31/6, UNEP/OzL.Pro.31/INF/9, UNEP/OzL.Pro.WG.1/41/5, UNEP/OzL.Pro.WG.1/41/3, and UNEP/OzL.Pro.WG.1/41/3/Add.1).

The SAP presented its interim report, stating it has worked with the scientific community to address CFC-11 emissions. They noted where the monitoring stations are located and added that the estimated increase in global emissions of CFC-11 from 2014-2016 is not currently a threat to the ozone layer; but, if these emissions were to continue at a sustained rate, they could pose a threat.

The SAP noted evidence indicating the increase in CFC-11 emissions: a slowing global concentration decline; an increasing North-South hemispheric concentration difference; and increased concentrations in pollution plumes reaching Hawaii as well as Jeju Island, Republic of Korea. The SAP concluded, noting that updated measurements post-2017 suggest that the global CFC-11 emissions are declining.

The TEAP Task Force on Unexpected CFC-11 Emissions presented the main findings in their final report. They found that: the pre-2010 production and usage of CFC-11 is unlikely to account for the current emissions; emissions from regional foam banks are insufficient to explain atmospheric-derived emissions as its likely usage is for closed-cell foams; and it is likely the result of new CFC-11 production.

The Task Force cited technical and economic factors encouraging CFC-11 usage in closed-cell foams such as the reduced availability of HCFC-141b due to phase-out, and price increases in HCFC-141b and HFCs. They further posited that the mislabeling of polyol blends for foams could result in CFC-11 emissions without the knowledge of users.

Responding to questions from parties, the SAP noted that while the decline in CFC-11 emissions in 2018-2019 has not been quantified, they can confirm that the emissions have decreased and are now closer to pre-2012 rates. They also underscored that CFC-11 is 100% anthropogenic, so the possibility of natural causes has been ruled out.

OEWG 41 Co-Chair Arciniegas then invited parties to provide further comments.

CHINA updated on its efforts to address illegal use of CFC-11, saying progress has been achieved through measures such as: amending existing legislation to ensure it is effective and robust; implementing campaigns to strengthen capacity, such as local training workshops; providing teams, equipment, and laboratory facilities for testing ODS; deploying additional inspection units and monitoring equipment; and formulating a monitoring plan. Noting China's willingness to continue to share information and collaborate, she urged that solutions on this issue not detract from the other important objectives of the Protocol.

NORWAY and many others expressed concern regarding unexpected CFC-11 emissions and queried how to ensure such a situation does not reoccur. The US and CANADA noted much of the information is preliminary and requested continued updates from the SAP. Supported by CHINA, KUWAIT, IRAN, AUSTRALIA, CANADA, and the EU, the US urged that the contact group established at OEWG 41 be re-established. The EU, supported by CHINA, suggested the contact group's mandate be narrowed to address institutional matters and processes only.

The US, supported by CANADA, indicated his desire to draft a decision addressing two issues: ensuring that such an issue does not reoccur and examining in more detail what has already transpired in accordance with the provisions of the Protocol. The US posed a number of questions to China, including whether reporting has been amended to account for CFC-11 production and what has been done to address the downstream users of CFC-11. KUWAIT, supported by BURKINA FASO and AUSTRALIA, expressed their desire to resolve this issue at the MOP so parties can concentrate on other potential challenges. CANADA, supported by AUSTRALIA, the EU, and IRAQ, supported strengthening monitoring and enforcement activities. CANADA and AUSTRALIA also highlighted their concern that the CFC-11 experience demonstrates the risk that countries may revert to substances that have already been phased out.

The contact group was re-established with an updated mandate. OEWG 41 Co-Chair Arciniegas requested parties with concrete proposals on this issue meet to agree on a single CRP to present to plenary prior to the contact group meeting.

Ongoing Reported Emissions of CTC

OEWG 41 Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2), noting that the issue of CTC emissions was raised during OEWG 41, in relation to the unexpected emissions of CFC-11 and recalled that, inter alia, parties requested that there be expanded atmospheric monitoring of such emissions and further mitigation options be offered by the Assessment Panels.

SWITZERLAND said that addressing these emissions is crucial to avoid a threat to the Montreal Protocol's efficacy and underscored their commitment to work with parties to make use of the synergies with other agenda items to avoid duplication of work.

The EU and US responded saying that the 2022 quadrennial assessment reports and unexpected emissions of CFC-11 should be fully considered before finalizing the way forward on CTC emissions.

Supporting Switzerland's proposal, BURKINA FASO, NORWAY, and SENEGAL said more information is needed on the characteristics of these emissions and possible alternative uses of CTC.

Co-Chair Wilmart proposed informal discussions take place on this agenda item and, upon completion of addressing CFC-11 and the focus areas for the 2022 quadrennial assessment reports, plenary return to the matter, to which delegates agreed.

Issues Related to Exemptions under Articles 2A-2I of the Montreal Protocol

Nominations for CUEs for methyl bromide for 2020 and 2021: OEWG 41 Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/2/Add.1). Methyl Bromide Technical Options Committee (MBTOC) Co-Chairs Marta Pizano and Ian Porter presented their recommendations on the CUEs requested by Australia, Canada, Argentina, and South Africa. SOUTH AFRICA said it accepted the MBTOC's recommendation, but noted fumigation needs to take place twice yearly and the alternative to methyl bromide, sulfuryl fluoride, is yet to penetrate the market. AUSTRALIA confirmed its commitment to use methyl iodide as an alternative and said they are preparing a CRP with Canada, and in consultation with Argentina and South Africa. CANADA thanked the MBTOC for acknowledging the lack of methyl bromide substrates and confirmed ongoing efforts to identify alternatives.

In the Corridors

Delegates arrived at MOP 31 prepared for yet another packed agenda. The Ancient Roman saying "Amat Victoria Curam"—victory loves preparation—some observers said was apt. They noted that for delegates to conclude MOP 31 with a sense of victory, they will have to conclude work on a number of "meaty" issues, including the key agenda items on the unexpected emissions of CFC-11, the ToR for the 2021-2023 MLF replenishment study, and the potential areas of focus for the 2022 quadrennial assessment reports.

In order to ensure the Protocol's continued success, some delegates suggested parties will have to work hard to address the recent challenges facing the Protocol. These challenges, they said, necessitate that parties reflect on what has led to the Protocol's success, address what needs to be changed in light of changing circumstances, and collectively agree on a way forward.

Given that contact group and informal discussions began immediately, many delegates were left hoping that come Friday, they could say "Veni, Vidi, Vici"—I came, I saw, I conquered.

MOP 31 #3

Earth Negotiations Bulletin

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MOP 31 Highlights: Tuesday, 5 November 2019

The thirty-first Meeting of the Parties to the Montreal Protocol (MOP 31) convened for its second day on Tuesday, 5 November 2019 in Rome, Italy. In the morning, addressed: stocks of methyl bromide; development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol; and Article 5 parties' access to energy-efficient technologies in the refrigeration, air-conditioning and heat-pump (RACHP) sectors.

In the afternoon, discussion continued on energy-efficient technologies, and addressed, *inter alia:* the terms of reference (ToR), composition, balance, fields of expertise and workload of the Technology and Economic Assessment Panel (TEAP); Multilateral Fund (MLF) Executive Committee (ExCom) membership; safety standards; initial assessment by the Scientific Assessment Panel (SAP) and the TEAP of five volatile fluoroorganic and related compounds found in the Arctic; consideration of nominations to the Assessment Panels; the Implementation Committee (ImpCom) report; and the Democratic People's Republic of Korea's (DPRK) risk of non-compliance with HCFC reduction targets for 2019.

Contact groups on the 2022 quadrennial assessment, and CFC-11, as well as the Budget Committee, met during the day.

Issues Related to Exemptions under Articles 2A–2I of the Montreal Protocol

Stocks of methyl bromide: OEWG 41 Co-Chair Arciniegas introduced this agenda item (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/2/Add.1). She recalled the draft decision introduced by the EU at OEWG 41, stating it was not forwarded to MOP 31. The EU reemphasized their interest in the issue, stating that reporting on methyl bromide stocks could be incorporated into the draft decision on critical use exemptions (CUEs) being prepared by Canada. He asked that the agenda item remain open for a potential CRP to be submitted later.

ECUADOR and JORDAN supported assessment of global methyl bromide stocks. BARBADOS, supported by CHILE, preferred the agenda items on reporting on stocks and CUEs be discussed separately.

OEWG 41 Co-Chair Arciniegas proposed, and delegates agreed, that both agenda items remain open, with the EU participating in the CUEs CRP discussion led by CANADA and assessing the feasibility of a separate CRP on stocks.

Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol: OEWG 41 Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2). CANADA reported more time is needed to finalize a draft decision. SWITZERLAND, the EU, and US noted that simplifying procedures will benefit both the parties and the TEAP. Co-Chair Wilmart said discussions would continue informally.

Process Agents: OEWG 41 Co-Chair Arciniegas introduced this item (UNEP/OzL.Pro.31/2). She recalled that MOP 30 had considered recommendations from the TEAP to update tables on ozone depleting substances (ODS) currently used as process agents. The EU said a CRP is being developed that will propose updating the necessary tables. OEWG 41 Co-Chair Arciniegas requested the CRP be finalized and brought to plenary for further discussion.

Article 5 Parties' Access to Energy-Efficient Technologies in the RACHP Sectors

OEWG 41 Co-Chair Wilmart introduced this item (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/2/Add.1 and UNEP/OzL.Pro.WG.1/41/5). The TEAP Task Force on Energy Efficiency, in its presentation, concluded that: technologies to enhance the energy efficiency of air-conditioning (AC) and commercial refrigeration (CR) equipment during the HFC phase-down are available; countries can use market policies and incentives to increase energy efficiency during the phase down of high-GWP HFCs in CR and ACs; international and regional cooperation is key for market transformation; and Article 5 parties can benefit from capacity building and market transformation support.

Responding to questions from parties, the TEAP Task Force said their analysis did not consider accessibility, only availability, and noted that availability did not differentiate between types of technology or their market penetration.

The TEAP Task Force also stated, *inter alia*, that: delaying energy efficient equipment's uptake can result in additional costs over the equipment's lifetime; and, the price of energy efficient equipment tends to be higher in countries with high ambient temperatures.

ARGENTINA, BAHRAIN, BARBADOS, BURKINA FASO, KUWAIT, INDIA, and SAMOA noted that both availability of and access to efficient technologies are unevenly distributed globally. The FEDERATED STATES OF MICRONESIA requested the TEAP continue providing updates on changing technology and market conditions. COLOMBIA, supported by the EU and AUSTRALIA, requested: international efficiency standards be developed; additional policy measures be explored; and, international cooperation and knowledge-sharing be emphasized. COLOMBIA, supported by ARGENTINA, requested the MLF support greater cooperation and capacity building in countries facing availability limitations or higher costs to adopt and implement high-efficiency technologies. CANADA noted the ExCom has already committed to, *inter alia*: supporting countries with training programmes to introduce energy efficient technologies; and identifying best practices for energy efficiency.

Co-Chair Wilmart proposed, and delegates agreed, to continue discussions informally.

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ToR, Composition, Balance, Fields of Expertise and Workload of the TEAP

OEWG 41 Co-Chair Arciniegas introduced this agenda item reminding the parties that the CRP introduced by Saudi Arabia at OEWG 41 was forwarded to the MOP 31 with brackets (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/3, UNEP/OzL.Pro.WG.1/41/4 and UNEP/OzL.Pro.24/10). She proposed reestablishing the contact group with Lara Haidar (Lebanon) and Philippe Chemouny (Canada) as co-facilitators. Delegates agreed.

Membership of the MLF ExCom

OEWG 41 Co-Chair Wilmart introduced this agenda item, proposing an informal contact group be established (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/3). ARMENIA called a permanent seat on the MLF ExCom for a member of the Eastern Europe and Central Asia group, and, with the RUSSIAN FEDERATION, urged adopting the draft decision.

The US and JORDAN opposed the draft decision, noting that ExCom representation is currently efficient and has equal representation. The US expressed willingness to discuss the concerns of the Eastern Europe and Central Asia group regarding MLF project approval and execution in an informal contact group. ARMENIA, supported by GEORGIA and KYRGYZSTAN, requested establishing a formal contact group. OEWG 41 Co-Chair Wilmart established an informal contact group.

Request by Azerbaijan to be included among the Parties to which the Phase-Down Schedule for HFCs, as set out in Paragraphs 2 and 4 of Article 2J of the Montreal Protocol, Applies

OEWG 41 Co-Chair Arciniegas introduced this agenda item (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/3). She suggested, as Azerbaijan is not present at MOP 31, the agenda item be closed with the possibility that it be reintroduced at a future meeting. Delegates agreed.

Safety Standards

OEWG 41 Co-Chair Wilmart introduced this agenda item, reminding delegates about the online tool developed by the Ozone Secretariat (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/2/Add.1). The EU stressed that revised safety standards are crucial for implementation of the Kigali Amendment. CHINA called for revised standards on household appliances. OEWG 41 Co-Chair Wilmart closed the agenda item.

Initial Assessment by the SAP and TEAP of Five Volatile Fluoroorganic and Related Compounds Found In the Arctic

Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/2). The SAP and TEAP presented their initial assessment, noting the five chemicals occur at very low concentrations. They added that although three of the gases are ODS, these substances are currently not threats to the ozone layer and their climate impact is likely negligible.

Responding to NORWAY, the TEAP said it used publicly available information and its own expert knowledge on the chemicals market to determine the availability and market value of these chemicals. SAP, responding to BARBADOS, said that due to science limitations, the origins of the emissions are unknown, but climatological observations suggest they originated from Norway. The SAP said it would be better placed to address this in the future as measurement techniques improve.

SWITZERLAND suggested controlled studies to better understand the impacts of these chemicals. Co-Chair Wilmart closed this agenda item.

Consideration of Nominations to the Assessment Panels

OEWG 41 Co-Chair Arciniegas opened this agenda item, noting two additional nominations received since OEWG 41 (UNEP/OzL.Pro.31/2, UNEP/OzL.Pro.31/2/Add.1 and UNEP/OzL.Pro.24/10). The US informed plenary that the EEAP has been contacted about an additional nomination, and she will consult with other parties and report to plenary on the matter.

OEWG 41 Co-Chair Arciniegas asked parties to follow the guidelines and matrix available for nominating panelists.

Compliance and Data Reporting Issues: The Work and Recommended Decisions of the ImpCom

Co-Chair Wilmart introduced this agenda item (UNEP/OzL.Pro.31/CRP.2). Patrick McInerney (Australia), ImpCom President, reported on the ImpCom's 62nd and 63rd meetings. He noted the CRP contains two draft decisions that cover data reporting and HFC licensing systems, remarking that all parties are currently in compliance. He explained that the CRP also urges: periodic review of HFC licensing systems; stocktaking to ensure noncompliance mechanisms are well-suited to meet future challenges; and identifying possible gaps in compliance enforcement. He noted the ImpCom had also requested the Secretariat provide information on the possible ways of dealing with illegal production and illegal trade of controlled substances, which is appended to the Committee's report and will be made available in the coming days. Co-Chair Wilmart suggested this issue be forwarded to OEWG 42 for further discussion. After noting a request from the US to make minor amendments for clarity, delegates agreed.

Risk of Non-Compliance with HCFC Reduction Targets for 2019 by the Democratic People's Republic of Korea

OEWG 41 Co-Chair Arciniegas introduced this item (UNEP/OzL.Pro.31/2). The DPRK said that although the agenda item had been closed at OEWG 41, they requested its inclusion on the MOP 31 agenda, noting that being unable to receive technical and monetary assistance to phase out HCFCs puts them at risk of non-compliance. The US opposed a draft decision proposed by the DPRK, saying Protocol decisions will have to comply with Security Council sanctions.

Co-Chair Wilmart suggested the item be taken up on Wednesday morning.

Contact Group Discussions

CFC-11 Contact Group: Parties discussed how institutional processes could be enhanced and strengthened to prevent similar situations arising. Parties also discussed the steps needed to address the unexpected emissions.

Delegates explored the possibility of mandating the TEAP and SAP to address the aforementioned issues; however, it was noted that it is challenging to enhance reporting requirements for parties —particularly Article 5 parties—who already face high reporting obligations and would require additional funding support from the MLF for any additional obligations. Another party queried whether this single compliance anomaly necessitates significant changes, given that Protocol requirements are otherwise effective.

In the Corridors

"Festina lente"—make haste slowly—one delegate said, seemed to be at the back of parties' minds as they realized that despite the need to act quickly to address emerging issues, careful planning will still be needed. Delegates continued to debate how to balance the need to strengthen monitoring and compliance, to avoid repeats of CFC-11, without creating additional reporting burdens on Article 5 countries. As one seasoned observer stated, even though monitoring and compliance are key for continued success, more obligations require more funding and resources, which need to be found somewhere.

MOP 31 #4

Earth Negotiations Bulletin

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MOP 31 Highlights: Wednesday, 6 November 2019

Delegates convened for the final day of the thirty-first Meeting of the Parties to the Montreal Protocol's (MOP 31) preparatory segment on Wednesday, 6 November 2019 in Rome, Italy. In the morning, addressed, among others: the Democratic People's Republic Of Korea's (DPRK) risk of non-compliance with HCFC reduction targets for 2019; the Rome Declaration on the contribution of the Montreal Protocol to the sustainable cold chain to reduce food loss; Montreal Protocol bodies' membership for 2020; and, the status of ratification of the Kigali Amendment.

Plenary adjourned for contact group and informal discussions to take place. Delegates gathered to discuss 2022 quadrennial assessment reports, the Multilateral Fund (MLF) Replenishment Study, and the Technology and Economic Assessment Panel (TEAP) Terms of Reference (ToR).

Plenary reconvened in the afternoon to hear an update from parties on outstanding agenda items.

In the evening, the contact group on CFC-11, and the informal group on the MLF Executive Committee (ExCom) Membership met.

As MOP 31 was unable to conclude its work in the preparatory segment, it will run in parallel to the high-level segment (HLS). One draft decision, on the status of ratification of the Kigali Amendment, was forwarded to the HLS for adoption.

Having had a very full agenda, and cognizant of time running out, delegates were constructive in their deliberations, with many recognizing that smaller settings out of plenary would be the most conducive way to make progress.

Consideration of the Membership of Montreal Protocol Bodies for 2020

In the morning, the Secretariat reported they are still expecting three nominations for the Implementation Committee (ImpCom), five for the MLF ExCom and OEWG 42 Co-Chair nominations. He said the MOP31 presidents are to be nominated by Malaysia, and the Latin America and Caribbean Region. The Secretariat and OEWG 41 Co-Chair Arciniegas urged countries to submit nominations by Wednesday afternoon.

Unexpected Emissions of CFC-11

Reporting to plenary in the morning, the contact group co-facilitators described the two mandates of the discussion: how institutional processes can be strengthened, and enhanced; and, further steps to address the situation of unexpected CFC-11 emissions. They added that parties are encouraged to provide suggestions for a concrete proposal on this matter for presentation at plenary.

OEWG 41 Co-Chair Arciniegas returned to this agenda item in the afternoon. The EU presented its CRP (UNEP/OzL.Pro.31/CRP.4), saying it attempts to deliver on the mandate of the contact group to both resolve the issue of the unexpected emissions that has "shocked the ozone family" and to look at institutional processes to prevent similar situations recurring in the future. He noted the CRP does not address longer-term measures and recommended open, intersessional discussions on these issues that should result in presentations to OEWG 42 and MOP 32.

The contact group met in the evening to further consider the CRP.

Ongoing Reported Emissions of Carbon Tetrachloride

In the afternoon, SWITZERLAND reported to plenary that there had been insufficient time to confer with other parties on the margin of the MOP, and requested OEWG 41 Co-Chair Wilmart re-open this issue in a contact group. OEWG 41 Co-Chair Wilmart requested the Secretariat to assign a time and venue for further informal discussion.

Issues related to Exemptions under Articles 2A–2I of the Montreal Protocol

Nominations for Critical-Use Exemptions (CUEs) for Methyl Bromide for 2020 and 2021: In the afternoon, AUSTRALIA informed plenary that a draft decision on the CUEs will soon be available.

Stocks of Methyl Bromide: In the afternoon, OEWG 41 Co-Chair Arciniegas informed plenary that a CRP had been prepared by the EU, co-sponsored by Chile, Ecuador, Jordan, Norway, and Switzerland (UNEP/OzL.Pro.31/CRP.5). The EU said the CRP proposes voluntary reporting on the volumes of all methyl bromide stocks by 1 July 2020. The US opposed, stating it is unclear what "all stocks" would mean and how the data will benefit all parties. CHILE and ECUADOR stated that information on stocks will encourage the search for alternatives. OEWG 41 Co-Chair Arciniegas proposed more informal discussion on the issue and parties agreed.

Process Agents: In the afternoon, the EU introduced the draft decision (UNEP/OzL.Pro.31/CRP.3), stating it seeks to update Table A on uses of controlled substances as process agents and delete process agents that are no longer required. Regarding Table B on limits for process agent uses, the EU said it aims to adjust the makeup and maximum emissions associated with the deleted process agents. CANADA and US said there had been insufficient

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time to review the CRP and further discussion with the EU is needed. OEWG 41 Co-Chair Arciniegas requested that they do so and report back to plenary so that the draft decision may be forwarded to the HLS.

Article 5 Parties' Access to Energy-Efficient Technologies in the Refrigeration, Air-Conditioning and Heat-Pump Sectors

FEDERATED STATES OF MICRONESIA reported to the afternoon plenary that there is strong interest amongst parties to see this issue progress, and requested the TEAP further study the topic, noting more time is needed for informal discussions to define the specific requests to the TEAP.

Initial Assessment by the SAP and TEAP of Five Volatile Fluoroorganic and Related Compounds Found In the Arctic

Co-Chair Wilmart returned to this agenda item on Wednesday morning. NORWAY queried which sectors the ODS are being used in and requested this information be included in the next quadrennial report.

Compliance and Data Reporting Issues: the Work and Recommended Decisions of the ImpCom

In the afternoon, OEWG 41 Co-Chair Wilmart informed the plenary that part A of the original CRP (UNEP/OzL.Pro.31/CRP.2) is finalized and proposed it be forwarded to the HLS for adoption.

The US introduced UNEP/OzL.Pro.31/CRP.6 that clarifies language of part B of UNEP/OzL.Pro.31/CRP.2. Parties supported the clarifications but said more time is needed to review the latter CRP. Both draft decisions remain open for further deliberations.

Risk of Non-compliance with HCFC Reduction Targets for 2019 by the DPRK

Co-Chair Arciniegas resumed discussion on this agenda item on Wednesday morning (UNEP/OzL.Pro.31/2 and UNEP/OzL.Pro.31/CRP.1). DPRK reiterated their likely noncompliance with the requirements of the Protocol given their inability to receive funding for implementation, and questioned what kind of penalty they may expect in the event of noncompliance. AUSTRALIA, the EU, JAPAN, and US noted there has been no change in circumstances since OEWG 41, when this issue was initially raised, that would justify changing the decision to withhold funding from the DPRK. They noted their support for the ExCom's decision on this matter given it is consistent with UN Security Council resolutions.

Co-Chair Arciniegas noted a lack of consensus on this issue and proposed recording these interventions in the report of the meeting and closing the agenda item. Delegates agreed.

Status of ratification of the Kigali Amendment to the Montreal Protocol

OEWG 41 Co-Chair Arciniegas opened this agenda item on Wednesday morning (UNEP/OzL.Pro31/2, UNEP/OzL.Pro.31/3 and UNEP/OzL.Pro31/INF/3). She said 88 parties have ratified the Kigali Amendment. ARMENIA, BRAZIL, DOMINICAN REPUBLIC, KENYA, SUDAN, TANZANIA, TUNISIA, and ZIMBABWE reported that ratification is underway. ARGENTINA, GUINEA, MALAYSIA and MOZAMBIQUE emphasized their intention to deposit instruments of ratification with the UN shortly. ARGENTINA and MALAYSIA urged progress on matters of funding to ensure an effective HFC phase down. OEWG 41 Co-Chair Arciniegas urged parties that have not yet done so, to ratify, and noted the draft decision will be forwarded to the HLS for adoption.

Other matters

In the morning, OEWG 41 Co-Chair Wilmart opened this agenda item, inviting Italy to speak on the Rome Declaration. ITALY noted the Declaration, on the contribution of the Protocol to the sustainable cold chain to reduce food loss, is linked not only to the mandate of the Protocol but also several of the Sustainable Development Goals (SDGs). He said the Declaration, the text of which was finalized at OEWG 41, will appear as an annex to the MOP 31 meeting report. ITALY reminded delegates that the topic will be discussed at the ministerial roundtable during the HLS and parties are invited to sign the Declaration on a voluntary basis up until MOP 32.

Many parties thanked Italy for this initiative, stating their intention to sign the Declaration and urging other parties to do so.

Contact Groups

2022 Quadrennial Assessment: Parties continued their work, addressing topics for the TEAP and the SAP. Parties aimed to provide detailed recommendations for the assessment panels, ensuring that the requests are within their ToRs and are reasonable under the requirements of the Montreal Protocol. The contact group is expected to address Environmental Effects Assessment Panel-related issues on Thursday.

MLF Replenishment Study Contact Group: Parties discussed their request that the TEAP prepare a report for MOP 32 on the appropriate level of funding for the 2021-2023 replenishment of the MLF. They deliberated on, *inter alia*: identifying scenarios to increase funding for low-volume-consuming countries and how this funding could be used; limiting the TEAP's reporting burden and workload while satisfying party requests; streamlining and simplifying the draft decision text; and, addressing the Kigali Amendment in the decision text in such a way to account for the different potential scenarios with respect to ratification status, and support to prepare for and implement the HFC phase-down.

TEAP ToR Contact Group: Parties considered language to ensure that there is sound, clear and transparent implementation of the TEAP ToR. They also discussed the need for the TEAP to provide a summary outlining the actions the TEAP and its Technical Options Committees (TOCs) undertook to ensure implementation of Decision XXIV/8 (ToR, code of conduct and disclosure and conflict of interest guidelines for the TEAPs, and its TOCs and temporary subsidiary bodies), as well as ensuring that the matrix of needed expertise is compiled in line with Decision XXIV/8.

In the Corridors

On the third day of MOP 31, delegates—now fully immersed in negotiations—charged forward, each uniquely focused on their topic of priority. As one delegate observed, there has been a realization that the only way to sufficiently tackle the many issues at hand is to divide and conquer, and, "thankfully in the 'ozone family,' there is the trust and maturity to do so."

Whether it was the continued issue of unexpected CFC-11 emissions or Norway's continued pursuit to better understand the ODS usage in the Arctic, delegates maintained that scientific vigilance and commitment to push the boundaries of science itself, which is a trademark for this Protocol, will not be abandoned. As Heraclitus once said, "Everything flows and nothing abides, everything gives way and nothing stays fixed."

The state of science relevant to the Protocol is never still, but how things will flow for the remainder of the week remains to be seen, particularly as parties begin to tackle Kigali Amendment implementation, which is expected to permeate discussions.

MOP 31 #5

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MOP 31 Highlights: Thursday, 7 November 2019

The penultimate day of the thirty-first Meeting of the Parties to the Montreal Protocol (MOP 31) convened on Thursday, 7 November 2019, in Rome, Italy. The High-Level Segment (HLS) opened with statements from dignitaries, following which delegates participated in a high-level roundtable on the Montreal Protocol's contribution to the cold food supply chain. Delegates then heard the findings of the Assessment Panels' 2018 synthesis report, the report of the Multilateral Fund's (MLF) Executive Committee (ExCom) and statements from heads of delegations.

The preparatory segment convened briefly in the afternoon to hear updates on outstanding agenda items. Contact groups and informal discussions took place throughout the day.

In the afternoon, Tina Birmpli, Executive Secretary, Ozone Secretariat, recognized the two outgoing co-chairs of the Environmental Effects Assessment Panel (EEAP), Nigel Paul and Min Shao, for their work with the Protocol.

High-Level Segment

MOP 31 President Liana Ghahramanyan (Armenia) opened the HLS. Sergio Costa, Italian Minister for the Environment, Land and Sea, welcomed guests, underscoring the Government of Italy's commitment to the UN 2030 Agenda for Sustainable Development and addressing environmental challenges so that "no one is left behind." He noted MOP 31 marks the beginning of several international conferences that Italy is hosting in the coming year.

Inger Andersen, UNEP Executive Director, highlighted that "this eternal city where the great Roman civilization was built, is a model for this Protocol, which can also achieve lasting impacts for generations." Andersen underscored the interconnectedness of environmental challenges and stated that "nothing short of universal ratification of the Kigali Amendment is acceptable." She encouraged parties to remain vigilant in their commitment to this Protocol.

Cardinal Pietro Parolin, Secretary of State, Holy See, on behalf of Pope Francis, cited aspects of a successful model of environmental protection and human development, such as dialogue on shared responsibilities and utilizing technology that takes interconnectedness into account. He urged delegates to consistently reflect whether "the goals of our progress are for the common good?"

Qu Dongyu, FAO Director General, highlighted the impact that sustainable food chains can have on agriculture and food production. He reiterated that there are clear benefits to phasing down HFCs, and lamented the prevalence of plastic pollution in the agriculture industry. He said addressing these through, among others, synergies, and innovation will ensure positive results. Dongyu stated environmentally-friendly practices are a necessity for the agricultural sector.

Organizational Matters: MOP 31 elected by acclamation: As MOP 31 President, Martin Alvin Da Breo (Grenada) for the Latin American and Caribbean States; and, as Vice-Presidents, Ezzat Lewis Agaiby (Egypt) for African States, Norlin Jaafar (Malaysia) for Asia-Pacific States, and Patrick McInerney (Australia) for Western European and other States. The nominee for rapporteur from Eastern European States remains to be decided.

MOP 31 President Da Breo introduced the agenda (UNEP/OzL.Pro.31/1, Part II) and organization of work, which were adopted without amendment. He urged parties to submit their credentials as soon as possible.

High-Level Roundtable Discussion: Jim Walker, Sustainable Energy for All, moderated the discussion on the contribution of the Montreal Protocol to food loss reduction through sustainable cold chain development. The roundtable featured: Inger Andersen; Roberto Morassut, Undersecretary of State, Ministry of the Environment, Italy; Krista Mikkonen, Minister of Environment and Climate Change, Finland; Khadeeja Naseem, Deputy Minister of Environment, Maldives; Geeta Menon, Joint Secretary, Ministry of Environment, Forest and Climate Change, India; Bintony Kutsaira, Minister of Natural Resources, Energy and Mining, Malawi; René Castro-Salazar, Assistant Director-General, Climate, Biodiversity, Land and Water Development, FAO; Jose Raul Rios, Agropecuaria Malichita, Mexico; Liz Goodwin, Director, Food Loss and Waste, World Resource Institute; and, David Appel, President, Carrier Transcold.

On the relevance of cold chains and actions taken, Morassut noted that Italy is set to adopt tax incentives to encourage new technology development and job creation. Menon described India's Cooling Action Plan and recent legislation to increase farmers' income by improving cold chains. Minister Mikkonen underscored that circular economy is a high priority for Finland and the EU. Minister Kutsaira lamented the partial coverage of cold chain infrastructure in rural Malawi. Deputy Minister Naseem stressed the importance of an unbroken cold chain for population health and tourism since almost all food is imported through Maldives' central port and then distributed across its 190 islands.

Walker asked the panelists what actions are needed to achieve the SDGs. Castro-Salazar stressed the urgency of scaling up successful pilot projects and facilitating coordination between the UN and industry. Andersen stressed the creation of norms and standards and mentioned the Cool Coalition, launched in 2019. Rios noted that improved cold chains have helped decrease food waste two-fold and create 12,000 jobs, and facilitated integration with international markets. Appel indicated the potential for cold chains to curb greenhouse gas emissions significantly by reducing food waste. Goodwin presented the findings of a recent report with recommendations aimed to reduce emissions from food waste, including improving food production without expanding land use.

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In their calls for action, Andersen urged parties to incorporate cold chain plans into NDCs, Goodwin called for increasing public-private partnerships (PPPs) to facilitate industry participation, and Rios emphasized the importance of economic incentives.

Participants also discussed the possibility for cooperation in sustainable cold chains at both national and international levels. Menon highlighted India's efforts to link sustainable cold chain infrastructure development to energy efficiency, safety and design standards, and specialized training. Minister Mikkonen stated cooperation between governments and businesses can foster innovation, while Morassut emphasized Italy's efforts to utilize PPPs. Minister Kutsaira urged that cooperative efforts should focus on areas where infrastructure is currently lacking.

Participants concluded by emphasizing the role that sustainable cold chains play in, *inter alia*: price stabilization; food security; enhanced profitability; more secure livelihoods; social and economic development gains; fair and just sustainability transitions; SDG attainment; research, development and innovation; synergistic action; and, restoration of degraded lands.

Closing, Walker stressed that "the pilot phase of sustainable cold chain infrastructure is over, it is time to go to scale."

Presentations by the Assessment Panels on their Synthesis of the 2018 Quadrennial Assessments: Representatives from SAP, TEAP, and EEAP presented the synthesis report, noting that: the implementation of the Protocol has significantly lowered the occurrence of cataract and skin cancer; 2019 has marked the smallest ozone hole since 1983 due to unusual meteorological conditions not related to climate change; the decline of methyl bromide in the atmosphere has ceased; and, carbon tetrachloride (CTC) emissions are higher than expected due to unaccounted emission sources and revised CTC lifetimes. They underscored that understanding ODS banks is key to understanding ozone recovery.

Presentation by the MLF ExCom Chair: MLF ExCom Chair Philippe Chemouny (Canada) presented on activities undertaken since MOP 31 (UNEP/OzL.Pro.31/9). He provided updates on: firstly, policy matters related to HCFCs, global emissions of CFC-11 and the Kigali Amendment; secondly, the status of MLF-funded projects, including their number and type, the ODS reductions achieved to date, and the status of monitoring, reporting and verification (MRV); and, thirdly, business planning, and, administrative and financial matters, including the status of contributions and disbursements, budgets, costs and business plans.

Statements by Heads of Delegation: TUNISIA, PAKISTAN, NIGERIA and the BAHAMAS outlined their steps to implement the Protocol. The GAMBIA highlighted efforts to develop national capacities. MALAYSIA and UGANDA urged alternatives to HFCs be made available in Article 5 countries at reasonable and competitive prices.

JAPAN expressed concern that the unexpected emissions of CFC-11 have brought the credibility of the Protocol into question. NIGER and VANUATU highlighted the status of the Kigali Amendment as a "turning point" in the Protocol's link to broader climate change efforts.

TANZANIA and COSTA RICA lauded the Protocol's successes. TIMOR-LESTE said they are committed to implementing the Kigali Amendment in spite of the challenge it represents. UZBEKISTAN emphasized their intention to focus on international cooperation to achieve a just and green economic transition.

BENIN praised the Protocol as a source of hope for their country, particularly because they have very low ODS consumption but will benefit disproportionately from their phase-down. ETHIOPIA highlighted using forestry as a vehicle for climate action.

Preparatory Segment

In the afternoon, OEWG 41 Co-Chairs Wilmart and Arciniegas reconvened plenary to hear an update on outstanding agenda items.

MLF ExCom Membership: ARMENIA reported that parties' positions remained the same regarding representation in ExCom Membership.

Development and Availability of Laboratory and Analytical Procedures that can be performed without using Controlled Substances under the Protocol: CANADA said it intends to submit a CRP on the matter shortly.

Contact Groups

MLF Replenishment: Parties continued their discussion on the draft decision text requesting the TEAP prepare a report on the appropriate level of funding for the 2021-2023 replenishment of the MLF. They considered: when and how to differentiate between low-volume-consuming countries and Article 5 countries; adequately capturing both energy efficiency and HFC phase-down goals; limitations on the amount of detail that can be requested of the TEAP; what leap-frogging might look like in different contexts; and, how to ensure that funding is justly distributed across all countries who need it. Ultimately, parties bracketed more text than they agreed, and noted their need for additional time to discuss.

CTC: Discussions oscillated between whether to request information from the TEAP on CTC usages in an intermediate report or whether to allow TEAP enough time to provide this information in the quadrennial report. Delegates agreed to continue informal discussions.

CFC-11: Parties addressed the complexities of the TEAP mandate on reporting on CFC-11 emissions, and questioned whether TEAP should be responsible for monitoring and reporting on illegal trade of CFC-11. Some maintained that TEAP's mandate is to examine and report on the economic drivers for illegal trade. After a lengthy discussion, the group concluded with an agreement to continue informal discussions on the margins of MOP 31.

In the Corridors

The high-level roundtable on food waste reduction through sustainable cold chain development was viewed by many as the most important event of the day. It represented a growing sentiment among many delegates that new technology in the cooling sector can connect the dots among the many multilateral environmental agreements and contribute to the achievement of multiple international goals. As one observer stressed, this presented a reminder that the Protocol cannot and should not work in isolation; it is, in fact, providing parties with a unique chance to spearhead action on climate change through the implementation of the Kigali Amendment.

However, many delegates were concerned about the lack of progress in negotiations on the MLF replenishment since financial support is crucial for new technology development. Major MLF donors were heard expressing concern over the distribution of funds and growth in the number of Article 5 parties over the last 30 years. They questioned whether the current resource allocations are sustainable in the long term.

ENB Summary and Analysis: The Earth Negotiations Bulletin summary and analysis of MOP 31 will be available on Monday, 11 November 2019, online at: http://enb.iisd.org/ozone/mop31/