

**Montreal Protocol
on Substances that
Deplete the Ozone Layer**

Distr.: Limited
4 July 2023
Original: English

**Open-ended Working Group of the Parties
to the Montreal Protocol on Substances
that Deplete the Ozone Layer
Forty-fifth meeting
Bangkok, 3–7 July 2023**

**Draft report of the forty-fifth meeting of the Open-ended
Working Group of the Parties to the Montreal Protocol on
Substances that Deplete the Ozone Layer****I. Opening of the meeting**

1. The forty-fifth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer was held at the United Nations Conference Centre, Bangkok, from 3 to 7 July 2023. The meeting was co-chaired by Ralph Brieskorn (Kingdom of the Netherlands) and Vidémé Amèh Djossou (Togo).
2. Mr. Brieskorn opened the meeting at 10.05 a.m. on Monday, 3 July 2023. Opening statements were delivered by Dechen Tsering, Director, Regional Office for Asia and the Pacific, United Nations Environment Programme (UNEP), and Megumi Seki, Executive Secretary, Ozone Secretariat.
3. In her remarks, Ms. Tsering noted that the overall theme of the sixth session of the United Nations Environment Assembly of the United Nations Environment Programme, due to be held in early 2024, would be the consideration of effective, inclusive and sustainable multilateral actions to tackle climate change, biodiversity loss and pollution, and that the approach and work of the Montreal Protocol had much to contribute, as they addressed each element of the triple planetary crisis. The recovery of the ozone layer contributed to tackling nature loss and the return to safe UV-B levels helped to protect ecosystems and biodiversity; decreases in UV-B radiation led to a reduced net production of ground-level ozone, helping to counter the pollution crisis and benefitting human health; and the phasing down and phasing out of chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), most of which were potent greenhouse gases, helped to tackle climate change. With regard to mitigating global warming in particular, she encouraged Parties that had not already done so to join the 150 Parties that had ratified the Kigali Amendment to the Montreal Protocol, as the planned phase-down of HFCs by 2047 could prevent the emission of up to 105 million tons of carbon dioxide-equivalent of greenhouse gases and, by 2100, up to 0.4°C of global temperature rise could be avoided. She further noted that the present meeting was taking place at a critical point, as parties operating under paragraph 1 of Article 5 (Article 5 parties) were striving to sustain their commitments for the phase-out of HCFCs while preparing for the HFC phase-down.
4. Turning to the refrigeration and air conditioning sector, she noted the sector's importance to society's well-being, in particular by preserving food and medicines, including vaccines, and providing cool living and working spaces, and to the global economy, for example through the employment of skilled workers. UNEP was therefore leading a Cool Coalition to support the presidency of the twenty-eighth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in its call for parties to join the Global Cooling Pledge, which consisted of a range of policy actions, from nature-based solutions and sustainable cold chains to appliance efficiency policy and innovation investment, that allowed State and non-State actors to enhance their commitments to climate mitigation, adaptation, resilience and investment towards

sustainable cooling. Sustainable cooling was an opportunity to cut global warming, improve the lives of hundreds of millions of people, and realize huge financial savings. In closing, she encouraged all parties to strengthen their national legislation and policy frameworks related to the Montreal Protocol, and to facilitate the introduction of ozone and climate friendly technologies, including by addressing the challenges related to their market adoption.

5. Welcoming participants to the forty-fifth meeting of the Open-ended Working Group, Ms. Seki invited participants to observe a minute of silence in memory of Daniel Albritton, one of the first co-chairs of the Scientific Assessment Panel, who had died in April 2023. Ms. Seki recalled that he had steered the Panel successfully through several quadrennial assessments and had been an acclaimed atmospheric scientist and an amazing communicator who had been able to convey complex science to decision makers and the general public in simple language. He would also be remembered as having been a gentle person who treated everyone with respect, tolerance and kindness.

6. Turning to the agenda for the meeting, Ms. Seki drew attention to several key topics to be considered at the meeting. She noted first that the agenda item on strengthening Montreal Protocol institutions, including combating illegal trade, would be based on the key points from the rich discussions held at the workshop on that theme, held on 2 July. The synthesis report of the assessment panels on the 2022 quadrennial assessment, which was due to be presented formally at the Thirty-Fifth Meeting of the Parties to the Montreal Protocol, in late 2023, was now available and would inform discussions on several agenda items at the present meeting. In addition, parties would start discussions at the present meeting on the terms of reference for the next quadrennial assessment, which was due to be completed in 2026. The strength of the assessment process and science-based decision-making approach of the Montreal Protocol were widely recognized as a useful model by other intergovernmental processes, including the ad hoc global assessments dialogue and the ad hoc open-ended working group on a science-policy panel to contribute further to the sound management of chemicals and waste and to prevent pollution. The co-chairs of the ad hoc open-ended working group had worked with the Ozone Secretariat to raise awareness and the visibility of the assessment process of the Montreal Protocol, including presenting lessons learned.

7. The replenishment of the Multilateral Fund for the period 2024–2026 was another key issue to be discussed at the present meeting, with the replenishment task force of the Technology and Economic Assessment Panel providing the highest ever estimate of funding required, as a consequence of Article 5 parties beginning to implement HFC phase-down activities while still phasing out HCFCs. Energy efficiency and low- or zero-global-warming-potential (GWP) technologies would also be considered, on the basis of a progress report prepared by the Technology and Economic Assessment Panel, in conjunction with the issue of the illegal importation of inefficient cooling equipment. Furthermore, parties would consider the adjustment proposal put forward regarding the low HFC baselines, resulting from reduced economic activities during the coronavirus disease (COVID-19) pandemic, that would affect Group 1 Article 5 parties in particular, in view of the freeze in HFCs for those parties from 1 January 2024 onward.

8. In closing, she recalled that the Secretariat, in line with other United Nations entities, had recently established an environmental management system policy to reduce carbon emissions in its operations and events. The policy had been applied for the first time in 2022 to the meetings of the parties and of the Open-Ended Working Group, and the sustainability scores of both meetings had been pleasingly high. The sound environmental policies of the United Nations Conference Centre in Bangkok coupled with the excellent conference support team provided the ideal setting for what she hoped would be a successful and fruitful meeting.

II. Organizational matters

A. Attendance

9. The following parties to the Montreal Protocol were represented: [to be completed]

10. The following United Nations entities, organizations and specialized agencies were represented: [to be completed]

11. The following intergovernmental, non-governmental, industry, academic and other bodies were represented as observers: [to be completed]

B. Adoption of the agenda

12. The Working Group adopted the following agenda on the basis of the provisional agenda set out in document UNEP/OzL.Pro.WG.1/45/1/Rev.2:

1. Opening of the meeting.
2. Organizational matters:
 - (a) Adoption of the agenda;
 - (b) Organization of work.
3. The 2022 quadrennial assessment of the Montreal Protocol (decision XXXI/2):
 - (a) Presentations and discussion on issues arising from the 2022 quadrennial assessment and synthesis reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel;
 - (b) Information on the consumption and production of hydrofluorocarbons not listed in Annex F (decision XXIX/12);
 - (c) Information on the availability of hydrochlorofluorocarbons (decision XXX/2, para. 4);
 - (d) Update to the report of the working group of the Technology and Economic Assessment Panel on information on alternatives to hydrofluorocarbons (decision XXVIII/2);
 - (e) Potential areas of focus for the 2026 quadrennial assessment;
 - (f) Future availability of halons and their alternatives (UNEP/OzL.Pro.WG.1/44/4, para. 140);
 - (g) Any other issues.
4. Report of the Technology and Economic Assessment Panel on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the period 2024–2026 (decision XXXIV/2).
5. Strengthening Montreal Protocol institutions, including for combating illegal trade (decision XXXIV/8):
 - (a) Outcomes of the workshop on strengthening the effective implementation and enforcement of the Montreal Protocol (UNEP/OzL.Pro.WG.1/45/6);
 - (b) Background documents prepared by the Secretariat in accordance with decision XXXIV/8 (UNEP/OzL.Pro.WG.1/45/5, UNEP/OzL.Pro.WG.1/45/5/Add.1 and UNEP/OzL.Pro.WG.1/45/5/Add.2).
6. Energy-efficient and low- or zero-global-warming-potential technologies:
 - (a) Report by the Technology and Economic Assessment Panel (decision XXXIV/3);
 - (b) Illegal import of certain refrigeration, air-conditioning and heat pump products and equipment (decision XXXIV/4).
7. Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring:
 - (a) Report by the Secretariat (decision XXXIII/4);
 - (b) Report by the Technology and Economic Assessment Panel (decision XXXIV/5).
8. Technology and Economic Assessment Panel 2023 report, including issues relating to:
 - (a) Nomination for critical-use exemption for methyl bromide for 2024;
 - (b) Ongoing emissions of carbon tetrachloride (decision XXXIV/6);
 - (c) Quarantine and pre-shipment uses of methyl bromide for which alternatives are available (decision XXXIV/10, para. 4);
 - (d) Existing challenges and potential options for the future configuration and function of Panel technical options committees (decision XXXIV/11, para. 1);
 - (e) Panel membership changes;

- (f) Any other issues.
- 9. Stocks of methyl bromide (decision XXXIV/10, para. 3).
- 10. Potential impacts of the coronavirus disease (COVID-19) pandemic on hydrofluorocarbon consumption for Group 1 parties operating under paragraph 1 of Article 5:
 - (a) Hydrofluorocarbons consumption data reported by relevant Group 1 parties operating under paragraph 1 of Article 5 (decision XXXIV/13, paras. 1 and 2);
 - (b) Proposed adjustments to the Montreal Protocol.
- 11. Other matters.
- 12. Adoption of the report of the meeting.
- 13. Closure of the meeting.
- 13. Under agenda item 3 (g), “Any other issues”, the Working Group agreed to consider very short-lived substances, including dichloromethane; feedstocks; emissions of HFC-23; changes to the list of approved destruction technologies; and management of the life cycle of refrigerants.
- 14. At the time of adoption of the agenda, several representatives made statements regarding the continuing armed conflict in Ukraine. A summary of those statements is set out in annex [--] to the present report.

C. Organization of work

- 15. In response to a request from one representative for summaries of the discussions at side events to be provided to participants in the present meeting as promptly as possible, the representative of the Secretariat said that she would endeavour to accommodate the request, in particular for the benefit of small delegations. The request from one representative to bring forward the discussion on the proposed adjustments to the Montreal Protocol under agenda item 10 (b), owing to the sensitivity of the matter and the potential benefit of full consideration in a contact group, would also be borne in mind.
- 16. The Working Group agreed to the organization of work proposed by the Co-Chair, namely to establish contact and informal groups as necessary and to avoid, to the extent possible, the holding of contact or informal group meetings in parallel with each other or with plenary meetings. Morning plenary sessions would run from 10 a.m. to 1 p.m. and afternoon sessions from 3 to 6 p.m.

III. The 2022 quadrennial assessment of the Montreal Protocol (decision XXXI/2)

A. Presentations and discussion on issues arising from the 2022 quadrennial assessment and synthesis reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel

- 17. Introducing the sub-item, the Co-Chair drew attention to the note by the Secretariat on issues for discussion by and information for the attention of the Open-ended Working Group at its forty-fifth meeting (UNEP/OzL.Pro.WG.1/41/2/Rev.1) and the addendum thereto (UNEP/OzL.Pro.WG.1/45/2/Add.1), which summarized the highlights of the 2022 quadrennial assessment reports prepared by the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel and its technical options committees. He also highlighted the note by the Secretariat that contained, in its annex, in English only, a synthesis of the 2022 assessment reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel (UNEP/OzL.Pro.WG.1/45/3).
- 18. The Working Group then heard presentations on the main findings and conclusions of the 2022 quadrennial assessment reports. David Fahey, Bonfils Safari and Paul A. Newman, co-chairs of the Scientific Assessment Panel, described the Panel’s main findings. They were followed by Janet F. Bornman, Paul Barnes and Krishna Pandey, co-chairs of the Environmental Effects Assessment Panel, who presented the results of the Panel’s investigations. Summaries of the presentations by the co-chairs of the Scientific Assessment Panel and of the Environmental Effects Assessment Panel, as

prepared by the presenters, are set out in section [--] of annex [--] to the present report, without formal editing.

19. Ashley Woodcock, co-chair of the Technology and Economic Assessment Panel, provided an overview of the Panel's assessment report, including key messages, after which co-chairs of the technical options committees summarized the findings of the report as follows: Paulo Altoé – Flexible and Rigid Foams Technical Options Committee; Adam Chattaway – Fire Suppression Technical Options Committee; Ian Porter – Methyl Bromide Technical Options Committee; Helen Tope – Medical and Chemicals Technical Options Committee; and Roberto Peixoto – Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee. Finally, Marta Pizano, co-chair of the Technology and Economic Assessment Panel, summarized the Panel's findings on the impact of the phase-out of ozone-depleting substances on sustainable development. Summaries of the presentations, as prepared by the presenters, are set out in section [--] of annex [--] to the present report, without formal editing.

20. In the ensuing question-and-answer session, many representatives had specific questions on the quadrennial assessment, which members of the assessment panels proceeded to answer.

21. A number of questions related to CFC emissions, the uncertainty surrounding them and whether additional work was being done or should be done. Mr. Newman and Mr. Fahey both addressed the issue. From a scientific perspective, it was clear that ozone-depleting substances were declining in the atmosphere overall and across all the nations of the world, and ozone levels were increasing. Nevertheless, continued vigilance, including through ongoing monitoring, was needed: ozone was a fundamental gas for Earth's atmosphere and close attention had to be paid to it. Unexpected emissions of controlled substances had been found, and while they had subsequently declined, they had not yet all been accounted for. Furthermore, natural phenomena had also had an impact on the ozone layer, comparable to that of refrigerants: the water vapour from the Hunga Tonga volcano, for instance, was expected to cause a large change in the Antarctic ozone hole during the current season, the difference being that the volcano's impact would be short-lived, with the material leaving the atmosphere within a couple of years.

22. Whether additional work was called for was a policy question; various policy options in terms of further controls that could enhance the recovery of the ozone layer and lessen climate change were included in the Scientific Assessment Panel's 2022 assessment report.

23. Reacting to a comment on the imbalance in the distribution of the global monitoring network, Mr. Newman confirmed that there was an imbalance, which the Scientific Assessment Panel would be very keen to see corrected through an increase in the number of stations to cover the regions where there were gaps. He cautioned, however, that building the stations was a highly technical process.

24. Stephen Montzka of the Scientific Assessment Panel assured representatives that the scientific community was continuing to measure trichlorofluoromethane (CFC-11) and related substances by tracking their emissions and working with the Technology and Economic Assessment Panel to understand the magnitude of emissions from banks created from production before 2010 and newly produced banks. Scientists in the Scientific Assessment Panel continued their efforts to refine and improve methodologies and observational networks to enable more accurate and precise estimates of emissions from gases controlled under the Montreal Protocol.

25. Mr. Newman also addressed a question regarding the implication of the loss of satellites in terms of the ability to track changes in the stratosphere. Noting that instruments in space degraded over time, he confirmed that the Aura satellite with its microwave limb sounder had been orbiting since 2004 and was optimistically expected to continue taking measurements into 2025. The few missions that were in planning to make similar observations had not yet been approved and would not be operational before 2030 even if approved. There would therefore be a gap in the ability to monitor the stratosphere, particularly for specific chemicals that were involved with ozone depletion, including chlorine monoxide, hydrogen chloride and nitric acid, the latter being intimately involved with ozone depletion in the Arctic and the Antarctic. Observations of those important constituents would no longer be available, although there were satellites that would continue to make ozone profiles and aerosol profiles.

26. Regarding the recovery of the ozone hole to date, there was evidence of an increase in ozone over Antarctica as chlorine and bromine levels fell, although that recovery was currently not particularly large. Nevertheless, ozone levels were no longer declining and had recovered somewhat, and full recovery was forecast by around 2066.

27. Responding to a question regarding those emission reductions that would deliver the greatest gain in fighting climate changes, Mr. Newman named carbon dioxide, methane and nitrous oxide: a

3 per cent reduction in anthropogenic nitrous oxide emissions on average over the period 2023-2070, for instance, increase global ozone by about a half a Dobson unit but would decrease radiative forcing by 0.4 watts per metre squared, which was fairly substantial. Those emissions were not controlled under the Montreal Protocol, however; with respect to controlled substances, phasing down very-high-GWP HFCs could yield very large gains, and eliminating banks would also yield a positive gain for climate.

28. Mr. Newman also addressed a number of questions on very short-lived substances. He began by noting that controlling dichloromethane would have a very rapid impact on ozone depletion because of its short lifetime. A fairly good reduction of ozone depletion would also result from controlling very short-lived chlorine. Regarding assignment of an ozone-depleting potential figure or range to very short-lived substances, he responded that it was very difficult to calculate because it depended on where the substance was emitted: a substance emitted in the tropics could enter the stratosphere easily, while a short-lived species emitted in the mid-latitudes was less likely to make it out of the troposphere and into the stratosphere to cause ozone depletion. Consequently, there was no single value that could be put into the table.

29. Turning to a question on the emission reductions that could have the biggest short-term effect and magnitude in terms of reducing equivalent effective stratospheric chlorine, Mr. Newman suggested three measures to achieve at least a short-term effect: control or remove banks of ozone-depleting substances, which would have an immediate and long-term effect; eliminate anthropogenic, very short-lived chlorine substances, which could have a very immediate effect; and eliminate feedstock emissions, which could have a direct effect.

30. Returning to the topic of banks of ozone-depleting substances, Mr. Newman confirmed that a good understanding was needed of what banks existed and the rate at which they were emitting in order to understand atmospheric levels of ozone-depleting substances. He cautioned, however, that the instruments used for measurements were very sophisticated and precise – for every trillion molecules they had to be able to detect one molecule of ozone-depleting substance – and measurement had to be done by highly technical personnel.

31. Also on the topic of banks, Ms. Tope responded to a question regarding transboundary movements of waste and a concern around dumping, explaining that the related recommendation to parties was to consider how the Montreal Protocol could work with other international treaties to facilitate transboundary movement of end-of-life ozone-depleting substances and HFCs. While the Panel recognized the importance of countries managing waste and avoiding inappropriate transboundary movements of waste, it had wanted to bring to parties' attention the fact that some of the administrative aspects of that process could create a barrier to recovery, recycling and environmentally sound destruction of end-of-life ozone-depleting substances and HFCs, and thus lead to emissions at end of life rather than environmentally sound management. The intention had been to encourage the Meeting of the Parties and other international treaty bodies to get together, talk about the issues and the various policy objectives, and perhaps try to facilitate and encourage recovery, recycling and environmentally sound destruction.

32. Several representatives asked for additional clarity on unexplained emissions of carbon tetrachloride and HFC-23, and in particular on discrepancies between bottom-up and top-down atmospheric observations, as well as feedstock uses. Providing context on the matter, Mr. Newman said that good progress had been made in understanding the imbalance between the bottom-up and top-down estimates of carbon tetrachloride. For HFCs, however, a fairly large discrepancy remained: reporting under the United Nations Framework Convention on Climate Change only accounted for 31 per cent of HFC-23 emissions when this was included in the analysis of the global total CO₂ equivalent emissions derived from observations. Hence there remained a scientific problem in matching the bottom-up estimates that the Technology and Economic Assessment Panel provided to the top-down estimates derived from atmospheric observations.

33. Also speaking on the matter, Ms. Tope noted that a report to be provided to the Meeting of the Parties in response to decision XXXIV/7 would cover bottom-up estimation of HFC-23 emissions and might help to provide some perspective. For the current assessment, new information on non-chloromethane production had been available on the inventory of bottom-up emissions of carbon tetrachloride, such as identification of the vinyl chain production process as a new potential source of emissions.

34. Asked what had led the Scientific Assessment Panel to recalculate the lifetime of carbon tetrachloride, leading to an increase in the gap between top-down and bottom-up estimates, Mr. Newman explained that the lifetime estimates had changed not because of any change in the calculated rate of breakdown of carbon tetrachloride in the stratosphere but because the Panel had also

taken into account loss of carbon tetrachloride to the oceans, a complex process to estimate. There had nevertheless been great improvements in solving the budget of carbon tetrachloride in the last 20 years, and there was overlap at the edges of the top-down and bottom-up emissions estimates.

35. With respect to questions on feedstock uses, their management and the possible need to monitor them, Ms. Tope drew attention to sections in both the assessment report and the progress report on best practices in controlling emissions of controlled substances that were products, co-products, intermediates or feedstocks. Those sections outlined the range of good practice approaches that industry could take to minimize emissions of feedstocks. The topic was also relevant to the discussion of the response to decision XXXIV/5 and gaps in monitoring.

36. Also responding to specific questions on HFCs used as etchants in the semiconductor industry, which some countries reported as feedstock applications and others as emissions applications, Ms. Tope explained that the Technology and Economic Assessment Panel did not currently have much information on conversion and recovery rates and their impact on emissions, and would welcome information from parties on such emissions. The Panel had looked at semiconductor manufacturing for the first time in the context of the current assessment, and had wanted to bring the inconsistency in the way parties were treating such HFC use to the parties' attention. She clarified that when HFC-23, for instance, was used as an etching gas, it was combined with silicon as the substrate to be etched. In the plasma process, the HFC-23 formed ions and radicals, and then fluorine radicals reacted with the silicon substrate to create the silicon fluoride coating. How that should be treated for the purposes of Article 7 reporting was not clear. She said that, from her perspective, it was not a traditional feedstock-type use, which was more likely to be the combination of two chemicals to create a new chemical and then having that chemical isolated. While that was her understanding of a feedstock use, the matter had been brought to the parties' attention because it probably required clarification.

37. Turning to a question on trifluoroacetic acid (TFA) and HFC production from HCFC-22 and associated emissions of HFC-23 and PFC-318, and whether more work could be done on the topic, Ms. Tope said that more accurate data would be needed from parties. The Panel did not have accurate information on possible emission factors or current abatement levels, which it would need, nor did it have information on whether those processes currently required incineration – thermal oxidation – to destroy those emissions, which it would be grateful to receive.

38. Members of the Environmental Effects Assessment Panel were also asked about TFA, its accumulation and phytotoxic effects and possible ways to remove it. Ms. Bornman, while cautioning that very few studies had been done and the conclusions of those that had were not always robust, responded that the most important thing would be to look at the concentration in oceans, which was 200 nanograms per litre – noting that one nanogram was extremely small. The Panel had only found two studies on aquatic plants tested so far and there was no observed effect at very high concentrations in a laboratory setting. For smaller amounts in water, a study had been done in Germany on rainwater samples, at an average concentration of 703 nanograms per litre. In a laboratory rat experiment, rats had been given TFA salts in drinking water at very high concentrations, up to 600 milligrams per litre, with no significant effects at 30 milligrams and a few potential impacts on enzyme activity in the liver at 120 and 600 milligrams. For animals, including humans, the most important message seemed to be that, although there was a lot of TFA that could accumulate in the environment, it was water soluble and therefore did not accumulate, which was often forgotten. That said, the full story of potential biological effects of TFA was not yet known, and the Panel encouraged continuous monitoring and assessment of any potential effects.

39. Regarding information suggesting that HFC-23 emissions had abated considerably while atmospheric measurements suggested otherwise, Mr. Montzka confirmed that HFC-23 global emission magnitudes and trends derived from atmospheric measurements contrasted with expectations of a substantial increase in abatement of HFC-23 emissions. The source of that abatement information was cited in the Scientific Assessment Panel's report as being reports of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol, and more specifically reports related to product emissions of HFC-23.

40. Representatives also had a number of questions relating to low-GWP alternatives. Responding to a question on supply shortages related to supply chain and logistics issues, raw material shortages, manufacturing issues and severe weather, Ms. Helen Walter-Terrinoni, co-chair of the Flexible and Rigid Foams Technical Options Committee, acknowledged that a mismatch between available capacity or supply of next-generation foam blowing agents had been exacerbated by several events, including the COVID-19 pandemic and weather events that had affected the operation of several facilities. There had since been some easing in that regard, with new capacity recently coming on line.

The same problem could recur, however, if more capacity was not developed or other steps were not taken.

41. Turning to a question on refrigerant charge reduction for HFC systems or equipment, covered in section 7.3 of the same assessment report, she said that the two main strategies for charge reduction related to equipment design, and more specifically to heat exchanger design using new architectures like microchannels or small diameter tubes, and the design and volume of the compressor.

42. Also on the same general topic, Mr. Omar Abdelaziz, co-chair of the Refrigeration, Air Conditioning and Heat Pump Technical Options Committee, addressed a question on HFO technology for air conditioning in cars and related risks, such as flammability. He explained that the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee had looked at safety considerations and the impact of updates in safety standards and had described any updates on the safety standards, as well as new refrigerant charge limits, for each technology sectors. In certain specific applications or specific conditions, the Committee's 2022 assessment report also described how parties could cope with new higher charges in terms of maintaining safety for users.

43. Mr. Abdelaziz also provided clarifications regarding the key messages in the 2022 assessment report of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee. Regarding the difference between direct versus indirect impacts of high-GWP refrigerants, he said that one factor could not be addressed without addressing the other one. In general, most industrialized countries were moving towards higher-energy-efficiency products but were also working with lower-GWP refrigerants. For building energy efficiency, the answer was integration and synergy: if cooling demand could be reduced and energy efficiency improved, then the required capacity and system charge could be reduced.

44. In terms of the accessibility of alternatives and how it hindered the implementation of the Kigali Amendment, there was a dual responsibility between importing and exporting countries, the problem being that importing countries often did not have the regulatory framework needed to only allow in energy-efficient equipment with lower-GWP refrigerants, which created a disparity.

45. Mr. Peixoto addressed a question about the limits for the use of natural refrigerants, saying that the choice of refrigerant was based on weighing a set of criteria, covering environmental issues, suitability of the application, a safety assessment and regional and national regulations, as was mentioned in one of the key messages of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee. Energy efficiency, or energy consumption, was also one of the criteria. A CO₂ transcritical system, for instance, was a natural refrigerant installation that had not been used in warmer climates because of the energy penalty, but with technological developments such as multi-ejector, parallel compression, transcritical CO₂ systems were now also used in warmer countries. Technology was thus changing the limits of the use of natural refrigerants.

46. A number of the refrigerant-related questions were addressed in the 2022 assessment report of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee. Thus, in response to questions regarding options for high temperature heat pumps above 100°C, Mr. Peixoto noted that district heating alternative systems had been implemented using ammonia, but he mainly drew attention to chapter 10 of the report, which dealt with industrial refrigeration and large installations and presented several refrigerant alternatives, including details on their properties. For questions on the energy efficiency side of the equation, Mr. Abdelaziz referred parties to the dedicated sections on energy efficiency within each chapter of the report.

47. Ms. Walter-Terrinoni responded to queries about the supply of alternative foam-blowing agents, saying that several years earlier, the Flexible and Rigid Foams Technical Options Committee had reported that for alternatives, including HFOs and hydrocarbons, specifically cyclopentane, supply was insufficient to meet demand, based on reports from several companies. Additional capacity had come on line in recent years, and the same companies now reported that the situation had eased somewhat, and supply had increased.

48. A number of questions were posed on aerosol injection, or solar radiation management, its impact on the ozone layer and recent developments and findings. Responding, Mr. Fahey began by speaking about timing in terms of effects on the ozone layer, explaining that injection of stratospheric aerosols that caused a meaningful change of global temperatures would almost certainly have a meaningful effect on stratospheric ozone within a year. Such changes had been seen in the case of volcanos causing explosive injections of aerosols into the stratosphere, a good example being the Hunga Tonga volcano, which was expected to increase the Antarctic ozone hole in the current season, although, as mentioned previously, this would not be long-lived. Discussion on the possibilities of conducting stratospheric aerosol injection in order to cool the planet had recently increased. From a

scientific perspective, that could be seen as an indication of the urgency of providing the scientific foundation for any decision on whether to conduct climate intervention, and, as the Panel had pointed out in the 2022 assessment, there were substantial uncertainties with regard to the effects on stratospheric ozone, and on the environment more broadly. As more theoretical studies were conducted on the topic, there was increasing detail and comprehension of the potential unintended effects of such climate interventions. A global legal framework was lacking and did not appear imminent, but scientists would welcome the opportunity to carry out a comprehensive international scientific assessment on the topic to support a future legal framework.

49. Mr. Montzka addressed a question on emissions of methyl bromide, saying that its atmospheric abundance had varied between 6.5 and 6.9 parts per trillion over the period 2016–2020, with no systematic trend or change over that period but rather year-to-year variability, consistent with the known anthropogenic production and emission changes over the period. He also confirmed that the pre-industrial atmospheric level for methyl bromide was 5.5 parts per trillion, based on measurements from air trapped in snow and ice in Antarctica.

50. Several questions on the topic of halons were addressed by Mr. Chattaway and Mr. Daniel Verdonik, co-chair of the Fire Suppression Technical Options Committee. Regarding the reported destruction of some halons, Mr. Chattaway confirmed that halon 1301 had been destroyed under a carbon credit system to satisfy corporate environmental sustainability goals. The halon had been recovered from a fire suppression system and had been perfectly usable. The company had proceeded with the destruction despite being requested not to. The Fire Suppression Technical Options Committee was concerned that the move could set a precedent and lead to further destruction of good halon, which would deplete the bank and could lead to a need for future production.

51. Mr. Chattaway also addressed questions about alternatives to halon. He began by noting that there were many listed in the 2022 assessment report of the Technology and Economic Assessment Panel, but that the Fire Suppression Technical Options Committee was not aware of any new fire suppression agents at an advanced development stage. The time scale for development and approval of a new agent was long, certainly in excess of ten years, and it was safe to assume that no new products were imminent. In terms of uptake of the available alternatives, with the exception of civil aviation, meaning aircraft engines and cargo compartments, none of the new halon system fire suppression systems used halon 1301. There were, however, several enduring or legacy uses, including military, oil and gas, and nuclear power plants, where a retrofit of the original halon system was not practical or feasible, for reasons such as available space, the weight of the system and temperature requirements. There were still some fixed systems protecting, for example, telecom suites and some marine uses. Those were typically decommissioned at the end of life of the asset and the halon was recovered and recycled into the available 1301 bank to support other enduring uses such as civil aviation. In terms of halon 1211, the only significant use remaining was portable extinguishers in civil aviation. All new aircraft were fitted with a halon replacement called 2-BTP, and for the existing aircraft fleets, halon 1211 was gradually being replaced; however, 2-BTP could be considered a per- and polyfluoroalkyl substance (PFAS) under some definitions, including the definition used by the Organisation for Economic Co-operation and Development.

52. Mr. Verdonik responded to a question regarding uncertainties over the possible run-out date for halon 1301 available from banks. He indicated that the 19-year window provided was based on uncertainties essentially in two different areas. First, every time the Fire Suppression Technical Options Committee performed the analysis there was more halon being tied up in so-called enduring uses, with life extensions of legacy systems to keep them in existence for longer than originally anticipated. Better information on how much was really tied up in such existing systems and a better understanding of the future of those systems would be helpful in reducing the uncertainty. The second area was how much halon was coming out of the non-enduring uses, such as ship breaking, which was generating significantly less halon than had been projected. It was not clear whether the halon was no longer in the ships being broken due to end of life, or whether it was being diverted earlier in the ship-breaking process. Clarity on that would help reduce uncertainty. In addition, halon emission estimates based on atmospheric abundances were greater than expected based on a bottom-up approach, which the Fire Suppression Technical Options Committee thought might not be coming from the fire protection bank but rather from feedstock production and use; greater insight into what the actual feedstock production and use emissions were would greatly reduce the uncertainty and would provide a much better idea of whether the emission estimates from the Committee's model were accurate.

53. After the question and answer session, a number of representatives delivered statements. All the representatives who spoke thanked the assessment panels for their hard work, and particularly

complimented the Scientific Assessment Panel on its publication entitled “Twenty Questions & Answers about the Ozone Layer”.

54. One representative of an Article 5 party said that his Government was advising stakeholders in his country not to purchase equipment using HFCs, given the approaching phase-down targets. His Government was also doing its best to reduce the use of methyl bromide for quarantine and pre-shipment applications, though this was proving to be challenging, not least because illegal trade in methyl bromide had been observed.

55. Other representatives drew a number of conclusions from the presentations of the assessment panels, including that early and fast action to transition away from the use of controlled substances would deliver the best outcomes for the ozone layer and the climate. There was good news in the panels’ assessments, including on the evidence for the recovery of the ozone layer and the halting of unexpected emissions of CFC-11.

56. They expressed their concern, however, at some of the panels’ findings, including the high levels of emissions from feedstock and its by-products, including HFC-23, and the fact that some emissions remained unexplained due to limitations in global monitoring networks. Other matters of concern included increasing concentrations of minor CFC species, the failure of atmospheric concentrations of carbon tetrachloride to fall, and the emissions of very short-lived substances such as dichloromethane. They looked forward to being able to discuss those issues further during the meeting.

57. One representative drew attention to the risks posed by the accumulation of trifluoroacetic acid in the environment, including in fresh water and in trees, from the breakdown of HFCs and hydrofluoroolefins (HFOs). She considered that given its persistent nature, its release into the environment should be minimized. She also expressed her concern at the increasing use of per- and polyfluoroalkyl substances (PFAS), many of them as alternatives to substances controlled under the Montreal Protocol. She believed that parties needed to take into consideration all the potential consequences for the climate and environment when assessing the use of alternatives to controlled substances.

58. Another representative highlighted the fact that the future of atmospheric ozone levels depended partly on emissions of substances such as water, hydrogen, methane or nitrogen oxides, whether from new aircraft fleets, rockets, volcanic eruptions or intentional injections of sulphate aerosols into the stratosphere to reduce global warming. In the light of the Scientific Assessment Panel’s information on the matter, and of the “One Atmosphere” report published by UNEP in February 2023, her delegation was considering submitting a draft decision at the present meeting designed to alert the global scientific community to the need to factor in the effects on the recovery of the ozone layer of stratospheric aerosol injection activities aimed at solar radiation management.

B. Information on the consumption and production of hydrofluorocarbons not listed in Annex F (decision XXIX/12)

59. Introducing the sub-item, the Co-Chair recalled that, at the Twenty-Ninth Meeting of the Parties, in decision XXIX/12 on the consideration of HFCs not listed as controlled substances in Annex F to the Protocol, the parties had requested the assessment panels to provide in their quadrennial reports, in 2023 and every four years thereafter, information on the consumption and production of HFCs not listed in Annex F of the Protocol which had a GWP no lower than the lowest GWP of the HFCs listed in Annex F. A response to that decision was provided in the 2022 quadrennial assessment report of the Medical and Chemicals Technical Options Committee and a summary of the information was provided in an addendum to the note by the Secretariat (UNEP/OzL.Pro.WG.1/45/2/Add.1, paras. 8–13).

60. All the representatives who spoke, including one speaking on behalf of a group of parties, thanked the assessment panels for the comprehensive nature of the information provided.

61. Several representatives requested further information regarding the HFCs and the hydrofluoroolefin (HFO) identified as exceeding the GWP threshold (GWP 53), including on the extent and expected growth of commercial use of those substances. In addition, one representative requested further information regarding the implications for the implementation of the HFC phase-down by parties, in particular Article 5 parties, of the identified substances, and one representative, speaking on behalf a group of parties, supported the continued monitoring of three HFCs in particular, as identified in the report. One representative expressed concern regarding the commercial use of fluorinated substances, including hydrofluoroethers and perfluorocarbons (PFCs), with high-GWP levels and noted the importance of continued monitoring of the situation by the

panels. Several representatives, including one speaking on behalf of a group of parties, said that they wanted to continue discussions regarding such substances and the associated ozone and climate change impacts at the present meeting, noting that within the European Union the use of all fluorinated gases was regulated and the use of sulfur hexafluoride (SF-6) in new switch gear was soon to be banned. One representative requested information specifically on the use of hydrofluoroethers as inhalation anaesthetics and another representative, speaking on behalf of a group of parties, offered to share information on measures taken in those parties in that regard. One representative thanked the panels for their excellent work on solvents in particular, noting that it was pleasing that only low levels of production of intermediates and solvents had been identified but that it remained prudent to consider the issue on a regular basis. He therefore requested that information on replacements for solvents be included in the 2026 quadrennial assessment. Another representative requested information on alternatives to the HFCs used in inhalers for managing asthma.

62. The Co-Chair requested the Medical and Chemicals Technical Options Committee to note the issues raised by representatives and concluded its consideration of the matter.

C. Information on the availability of hydrochlorofluorocarbons (decision XXX/2, para. 4)

63. Introducing the sub-item, the Co-Chair recalled that, at the Thirtieth Meeting of the Parties, in decision XXX/2 on adjustments to the Montreal Protocol, the parties had requested the Technology and Economic Assessment Panel to provide information on the availability of HCFCs in its quadrennial assessment reports to be presented in 2023 and 2027. The information was to include amounts available from recovery, recycling and reclamation, and best available information on country-level and total known stocks, as well as availability of alternative options for the “servicing tail” after the last control measure for HCFCs under the Montreal Protocol. A response to that decision was provided in chapter 3 of the 2022 quadrennial report of the Technology and Economic Assessment Panel and a summary of the information was provided in an addendum to the note by the Secretariat (UNEP/OzL.Pro.WG.1/45/2/Add.1, paras. 14–16).

64. In response to the query of one representative regarding the performance levels of recycled HCFCs in refrigeration and air conditioning, fire suppression, rocket engine manufacturing and medical aerosol applications, including any sector-specific industry experience, a representative of the Technology and Economic Assessment Panel said that if the recycling and recovery of HCFCs met the required specifications, then the HCFCs could be reused successfully.

65. One representative expressed concern regarding the baseline established for HCFCs for his country, as the data available did not accurately reflect the national situation, in particular with regard to illegally imported substances, and the future need for HCFCs in the country for agricultural use was considerable. Without significantly increased levels of technical and financial support, in particular in relation to data collection, his country would not be able to achieve the targets set.

66. One representative requested additional information on management mechanisms for stockpiles of HCFCs.

67. The Working Group took note of the information provided by the Technology and Economic Assessment Panel on the availability of HCFCs.

D. Update to the report of the working group of the Technology and Economic Assessment Panel on information on alternatives to hydrofluorocarbons (decision XXVIII/2)

68. Introducing the sub-item, the Co-Chair recalled that, at the Twenty-Eighth Meeting of the Parties, in decision XXVIII/2 related to the amendment phasing down HFCs, the parties had requested the Technology and Economic Assessment Panel to conduct periodic reviews of alternatives, using the criteria set out in paragraph 1 (a) of decision XXVI/9, in 2022 and every five years thereafter, and to provide technological and economic assessments of the latest available and emerging alternatives to HFCs. In 2022, the Technology and Economic Assessment Panel had noted that parties had formulated a similar request to examine alternatives under paragraph 6 (e) of decision XXXI/2 on the potential areas of focus for the 2022 quadrennial assessment reports but was unclear as to how to harmonize the request with that made under decision XXVIII/2 and therefore requested guidance from the parties in that regard. In order to allow parties to consider alternatives to HFCs at the Thirty-Fourth Meeting of the Parties, a working group under the Technology and Economic Assessment Panel had prepared a report, presented in volume 5 of the 2022 report of the Panel, that had been compiled from the quadrennial assessment reports of the technical options committees being prepared at the time. The

addendum to the note by the Secretariat (UNEP/OzL.Pro.WG.1/45/2/Add.1, paras. 30–33) contained a summary of the information on alternatives to HFCs contained in the 2022 quadrennial assessment reports of the Technology and Economic Assessment Panel and its technical options committees, which was consistent with the report produced by the working group under the Technology and Economic Assessment Panel.

69. The Thirty-Fourth Meeting of the Parties had considered aligning future periodic reviews on alternatives to HFCs with the preparation of the quadrennial assessment reports, as both could then be presented to the Working Group, allowing more time for consideration of the report before the next Meeting of the Parties. Parties had agreed on the need for the periodic review to remain a separate agenda item in order to preserve the intent of decision XXVIII/2 but had agreed to defer to 2023 consideration of the alignment of future periodic reviews with the quadrennial assessment reports.

70. He said that parties might therefore wish to consider the information on alternatives to HFCs, as well as the possible alignment of future periodic reviews on alternatives with quadrennial assessment reports.

71. Several representatives, including one speaking on behalf of a group of parties, requested additional information on the alternatives included in future reports, namely the level of market penetration and any challenges associated with a particular alternative, to support parties in decision-making, in particular in sectors where many alternatives were listed.

72. Several representatives noted that, although propane was a climate-friendly alternative, it was highly flammable and so financial and technical support was required by their countries in order to raise awareness among the public of the potential dangers, to develop the skills of technicians and engineers in the refrigeration and air conditioning industry regarding the safe handling of propane, and to ensure effective labelling and certification schemes. In addition, one representative noted that certain types of propane were currently prohibitively expensive and requested the Technology and Economic Assessment Panel to provide information regarding improving accessibility to such substances.

73. Several representatives noted that the availability of safe and economically viable low-GWP alternatives to HFCs remained a challenge, in particular in the refrigeration and air-conditioning and fire suppression sectors and for Article 5 parties, and requested information from the Technology and Economic Assessment Panel on future plans in that regard. Furthermore, one representative drew attention to the fact that in excess of 100 projects financed by the Multilateral Fund for the Implementation of the Montreal Protocol were currently behind schedule, the main reason being the scarcity of low-GWP alternatives both in local and global markets, leading some countries to turn to higher-GWP alternatives. She therefore encouraged the Technology and Economic Assessment Panel to analyse the progress of projects under the Multilateral Fund in order to obtain an accurate picture of the current availability of low-GWP alternatives. In relation to the fire suppression sector, several representatives underscored the importance of additional information on low-GWP alternatives to halons, in particular regarding the availability and managing the introduction of such alternatives.

74. Several representatives, including one speaking on behalf of a group of parties expressed a preference for aligning the future periodic reviews on alternatives with the quadrennial assessment reports but remained flexible on the issue. One representative expressed a preference for preserving the process as established under decision XXVIII/2.

75. One representative, speaking on behalf of a group of parties, sought clarification from the Technology and Economic Assessment Panel regarding the reasoning for restricting the recommended use of R-290 to monobloc units located outdoors.

76. The Working Group agreed to include consideration of the alignment of future periodic reviews on alternatives to HFCs within the mandate of the contact group established under sub-item 3 (e) on potential areas of focus for the 2026 quadrennial assessment.

77. [to be completed]

E. Potential areas of focus for the 2026 quadrennial assessment

78. Introducing the sub-item, the Co-Chair drew attention to paragraph 19 of the note by the Secretariat on issues for discussion by and information for the attention of the Open-ended Working Group at its forty-fifth meeting (UNEP/OzL.Pro.WG.1/45/2), as well as terms of reference for the 2022 assessment contained in decision XXXI/2. He recalled that the three assessment panels had made presentations on their 2022 assessment reports under sub-item 3 (a) on presentations and discussion on issues arising from the 2022 quadrennial assessment and synthesis reports of the Scientific Assessment

Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel.

79. The representative of the European Union introduced a draft decision, set out in a conference room paper, on potential areas of focus for the 2026 quadrennial assessment. He outlined proposed areas of focus for the 2026 reports of the Environmental Effects Assessment Panel, the Scientific Assessment Panel and the Technology and Economic Assessment Panel.

80. He suggested that the proposal be discussed in a contact group with a view to giving clear instructions to the three assessment panels.

81. Several representatives said that more in-depth discussion of the proposal or the clarification of certain of the issues therein was required. One representative noted that the proposal referred to issues being discussed under other agenda items and, as such, they required particular attention. Another representative expressed the view that the information in the proposal could be grouped together in a different manner and streamlined. He said that the potential areas of focus should be more general and less prescriptive.

82. Some representatives said that the three assessment panels should focus on the implementation of the Montreal Protocol and the Kigali Amendment rather than diversifying the scope of the quadrennial reports by introducing new elements already addressed under other conventions.

83. During the discussion, several new areas of focus were proposed and a number of the areas in the European Union proposal were endorsed. Those focus areas included raw materials used as feedstock and input materials; improvement of the safety of low GWP alternatives; assessment of whether the production of hydrofluoroolefins resulted in fugitive high-GWP HCFCs; the strengthening of national implementation frameworks; assessment of low-GWP alternatives and alternative technologies, especially in key industries and fields; how to improve and maintain energy efficiency while phasing down HFCs; solar radiation management; skin cancer rates globally; atmospheric concentrations of chemicals such as HFC-23; the effect of volcanic eruptions and supersonic flights on the ozone layer; refrigeration management; banks; recycling and reuse, and the use of HFCs in applications that did not have a corresponding prior HCFC use.

84. One representative recalled that, in decision XVIII/2, the parties had asked for specific reporting of alternatives to HFCs. The reporting schedule, however, was not aligned with the timing of the quadrennial reports, and she proposed that they be aligned to reduce the burden on the Technology and Economic Assessment Panel and to ensure consistency in the information provided to parties. Another representative agreed that the issue should be discussed, with the appropriate forum to be found.

85. Several representatives stressed the challenges faced by Article 5 parties and the importance of funding to enable them to meet their compliance targets. One representative asked if there had ever been any analysis of what would happen if Article 5 parties did not receive the funding they needed; some others requested that the challenges faced by such countries and their need for support be considered both in the 2026 report and in a contact group on the present agenda item.

86. The Working Group agreed to establish a contact group, to be co-chaired by Leslie Smith (Grenada) and Cindy Newberg (United States), to consider further potential areas of focus for the 2026 quadrennial assessment, taking into account the proposal submitted by the European Union.

87. [to be completed]

F. Future availability of halons and their alternatives (UNEP/OzL.Pro.WG.1/44/4, para. 140)

88. Introducing the sub-item, the Co-Chair recalled that the Thirtieth Meeting of the Parties, in 2018, had adopted decision XXX/7 on the future availability of halons and their alternatives. In that decision, the parties had requested the Technology and Economic Assessment Panel, through its Halons Technical Options Committee (subsequently renamed the Fire Suppression Technical Options Committee (FSTOC)), to continue engaging with the International Maritime Organization and the International Civil Aviation Organization to better assess future amounts of halons available to support civil aviation.

89. The Panel had also been requested to identify relevant alternatives already available or in development; ways to enhance the recovery of halons from the breaking of ships; and specific needs, other sources of recoverable halon and opportunities for recycling. The Fire Suppression Technical Options Committee had submitted a report on those issues in the Technology and Economic

Assessment Panel 2020 progress report, with updates in the Panel's 2022 progress report and 2022 quadrennial assessment report. A summary of that information was provided in the note by the Secretariat (UNEP/OzL.Pro.WG.1/45/2/Add.1).

90. Several representatives expressed concern at the possibility of shortages of halons, particularly halon-1301, for civil aviation, possibly as early as 2030. That problem could be exacerbated by other factors. One representative observed, for example, that the phase-down of HFCs had already led one manufacturer to cease production of HFC alternatives to halons for fire suppression. The possible classification of some HFCs as PFAS could also have an impact. There were also potential problems with a lack of awareness of the availability of reclaimed halons, and with some countries' restrictions on the transboundary movements of halons, including in aircraft. Other representatives agreed that it would be undesirable to have to see new production of halons, or the application of the essential-use exemption procedure to halons.

91. One representative observed that an assessment of needs for halons within his party had suggested that supply was likely to remain stable for the immediate future. Given longer-term uncertainties, however, his party had prohibited the destruction of halons in order to ensure the maximum level of recovery and reclamation.

92. Representatives also expressed concern about the discrepancies between modelled and observed atmospheric concentrations of halons and about possible emissions from feedstock and servicing uses.

93. One representative asked about the possible use of trifluoroiodomethane as an alternative for fire suppression applications, particularly given its high toxicity, ozone-depleting potential and price. In response, Mr. Verdonik, the co-chair of the Fire Suppression Technical Options Committee, said that trifluoroiodomethane had been under consideration for many years, but only for use for fire suppression in aircraft engines and auxiliary power units, which was the smaller of the two main uses of halon-1301. The Committee was monitoring the situation carefully, given the substance's high ozone-depleting potential, which was in reality even higher when it was emitted at aircraft altitudes.

94. [to be completed]

G. Any other issues

1. Emissions of HFC-23

95. The representative of the United States, speaking also on behalf of Australia, Canada and Norway, introduced a draft decision, set out in a conference room paper, explaining that it was intended to deal with unexplained emissions of HFC-23 in recent years. In the draft decision, the Scientific Assessment Panel and the Technology and Economic Assessment Panel were requested to provide updated information on the topic. He was aware that the issue was scheduled for discussion at the Thirty-Fifth Meeting of the Parties in any event, but expressed the view that the information requested in the draft decision was additional to that expected, and should assist discussions by the parties. In the draft decision, parties with relevant information were requested to provide it, and parties and other scientific and atmospheric organizations and institutions were encouraged to support efforts to undertake further study of emissions of HFC-23, and parties were encouraged to take appropriate measures to implement their HFC-23 obligations, in accordance with the provisions of the Kigali Amendment.

96. One representative asked for the clarification of some elements of the proposal, including on potential other sources of emissions of HFC-23; how other scientific institutions would be approached; and on the justification for reiterating parties' existing obligation with regard to the control of HFC-23 emissions. She also suggested that it might be better for further discussion to take place after the scheduled report of the Technology and Economic Assessment Panel to the Thirty-Fifth Meeting of the Parties.

97. Other representatives supported the proposal, observing that although the main source of emissions of HFC-23 was as a by-product from the production of HCFC-22, there were other sources too, and that the additional information requested in the draft decision would be helpful. Another representative stressed the efforts his party had made to ensure that enterprises controlled emissions of HFC-23, and pointed out that many of the scientific studies of emissions related to the period before 2019, which was before the entry into force of the Kigali Amendment and the beginning of parties' obligations with regard to HFC-23 emissions. Several representatives said that they would appreciate the opportunity to discuss the draft decision with its proponents and possibly to suggest additions and modifications.

98. Mr. Newman, speaking on behalf of the Scientific Assessment Panel, said that a side event on HFC-23 emissions was due to be held the following day, on 5 July. The Panel intended to update its data on emissions in time for the Thirty-Sixth Meeting of the Parties in 2024. Ms. Tope, speaking on behalf of the Technology and Economic Assessment Panel, observed that HFC-23 was emitted as a by-product from the manufacture of tetrafluoroethylene and hexafluoropropene from HCFC-22 feedstock. The Panel would be reporting to the Thirty-Fifth Meeting of the Parties later in the year, and that report would help to identify gaps in the data; the Panel would appreciate receiving more quantitative data on the issues from parties.

99. Responding to the points made, the representative of the United States explained that parties' requirements under the Kigali Amendment related only to HFC-23 emissions from the production of HCFC-22, whereas it was clear that there were other sources of emissions, and that was a matter of concern. He expressed the view that parties would benefit from more data than was provided through the standard data reports under Article 7 of the Protocol. Although the Technology and Economic Assessment Panel was due to report to the Thirty-Fifth Meeting of the Parties, he believed that the information requested in the draft decision would not duplicate the information in that report. He said that he would be happy to amend the draft decision after the Panel's report had become available, but was of the view that it was helpful to put the issues forward for discussion at the present meeting.

100. The Working Group agreed to establish a contact group, to be co-chaired by Shontelle Washington (Barbados) and Heidi Stockhaus (Germany), to discuss the matter further.

2. Very short-lived substances

101. The representative of Canada, speaking also on behalf of Australia, Switzerland and the United States, introduced a draft decision, set out in a conference room paper, explaining that it had been written in response to the Scientific Assessment Panel's finding that very short-lived substances had a significant impact on ozone depletion, particularly in the lower stratosphere. The Panel had calculated that the positive effect on the ozone layer from 2020 to 2070 of eliminating emissions of very short-lived substances in 2023 would be about 1 Dobson Unit, about half the effect of eliminating all emissions of ozone-depleting substances in 2023.

102. The most significant very short-lived substance was dichloromethane. As recent studies had shown, its ozone-depleting potential was small, at 0.01–0.02, but given that 1.8 million tons had been produced in 2020, including about 1.45 million tons for emissive uses, and that the use was growing at about 10 per cent a year, its overall impact was large. He emphasized that the draft decision was not aimed at uses of those substances as feedstock.

103. Given that dichloromethane was toxic, a number of jurisdictions and companies had already restricted its use, which demonstrated both that alternatives were available and that options for reducing production existed outside the Montreal Protocol. Nevertheless, he felt that the parties to the Protocol should pay attention to the issues and promote activities leading to a reduction in emissions. Accordingly, in the draft decision the Technology and Economic Assessment Panel was requested to include in its 2024 progress report information on existing and projected production, use and emissions of dichloromethane and other very short-lived substances, and alternatives and measures for reducing emissions. Parties were also encouraged to take action to reduce the use and emissions of dichloromethane in applications for which alternatives were available and emissions control measures were feasible. He added that the draft decision was modelled partly on the approach parties had taken in the past to controlling n-propyl bromide, another short-lived substance.

104. A number of representatives indicated that they would welcome the opportunity to discuss the topic further.

105. [to be completed]

3. Destruction technologies for controlled substances

106. The representative of the European Union introduced a draft decision, set out in a conference room paper, on destruction technologies for controlled substances, explaining that domestic legislation in the European Union was closely tied to destruction technologies approved under the Montreal Protocol, hence the European Union had an interest in keeping the list of technologies approved for destruction as up-to-date as possible. The draft decision provided for the addition of the cement kilns technology for the destruction of diluted sources of HFCs, as recommended by the Technology and Economic Assessment Panel. It further reflected the Panel's recommendation on consolidating the list of technologies by grouping the portable plasma arc technology under the existing nitrogen plasma arc destruction technology. It also provided for the Panel to report on the matter to the Open-ended Working Group prior to the Thirty-Seventh Meeting of the Parties, or earlier if possible. Thus, parties

would be invited to submit to the secretariat any information that might be relevant to destruction technologies so that the Panel could take it into account when assessing the technologies. The delegation of the European Union was interested in speaking with other parties in the margins of the present meeting with a view to making progress on the issue.

107. Many representatives took the floor to welcome the draft decision and indicate their interest in discussing the matter. Although there was general support for the text of the draft decision as presented, some representatives introduced slight notes of caution. One, noting that the rationale for adding cement kiln technology was that it met the destruction and removal efficiency criteria of 99.99 per cent for concentrated streams and therefore should qualify for diluted streams that required a lower 95 per cent efficiency, sought confirmation from the Medical and Chemicals Technical Options Committee that, when assessing the listed destruction technologies as requested in the decision, it would consider whether other technologies could similarly be approved for diluted sources. Another asked for an opportunity to check with the Technology and Economic Assessment Panel to ensure that the matter was not already covered by past decisions directing the Panel to keep technologies under review. That concern was subsequently echoed by another representative.

108. Several representatives took the opportunity to underscore their countries' need for an easily accessible destruction facility, possible in the form of a regional centre, that would handle small quantities to be destroyed and allow for pooled collection.

109. The Working Group agreed to hold informal discussions on the matter in the margins of the present meeting.

110. [to be completed]

4. Feedstocks

111. Introducing the sub-item, the representative of Australia noted that the production of ozone-depleting substances for feedstock uses had increased by 75 per cent over the last 10 years, and that a review of the Panel reports and presentations provided to the Open-Ended Working Group had highlighted issues associated with that production. She cited a range of issues of concern that were, or were likely to be, associated with feedstock, including increased concentrations of HFC-23 in the atmosphere, sustained concentrations of carbon tetrachloride in the atmosphere and an increasing global abundances of minor CFC species in the atmosphere. There was also increased use of short-lived substances such as dichloromethane that were not controlled by the Montreal Protocol as feedstocks. In addition, halon 1301 concentrations in the atmosphere were not dropping at the rate expected. While each of those issues individually was of concern, collectively they pointed to a larger systemic issue with feedstocks. The Panel reports cited the rapidly expanding use of ozone-depleting substances and HFCs as feedstocks and their consequent emissions as a key concern, and underscored the importance of gaining a better understanding of and monitoring emissions from production for feedstock uses, by-product emissions, emissions of controlled substances as intermediates and emissions from feedstock use, owing to their contribution to overall global emissions. The use of controlled chemicals as feedstocks had been omitted from calculations of consumption and production on the understanding that emissions from feedstock uses were negligible, but based on the reports that was no longer the case. The parties had last considered the overall issue of feedstocks at the Twenty-Fourth Meeting of the Parties and it was perhaps time to take a fresh look at the issue, informed by science and technical advice. The delegation of Australia was interested in discussing the matter further, with a view to finding a way forward and possibly developing a draft decision on the matter.

112. Several representatives, including one speaking on behalf of a group of parties, thanked the representative of Australia for proposing the matter for discussion and indicated their interest in participating in any such discussion. One recalled that there had been valuable reflections on the matter at the workshop held on 2 July, the day before the opening of the present meeting, and advised drawing on those reflections in any discussion.

113. As the issue was related to agenda item 8 (b), on ongoing emissions of carbon tetrachloride, and to agenda item 7 (b), relating to the report by the Technology and Economic Assessment Panel in response to decision XXXIV/5 on chemical pathways and sources of industrial emissions, one representative suggested that it might be worth establishing a group to address the three agenda items together. He also pointed out that it was unclear whether the emissions estimated by the Scientific Assessment Panel were from the use of substances as feedstock or from the production of substances to be used as feedstock and in the production of substances for controlled uses, such as HCFC-22 and HFCs. Adding that it was important to note that, according to the report prepared in response to decision XXXIV/5, the production of substances for both feedstock and controlled uses generated

higher emission ranges than the use of feedstock in the various processes, he suggested that it would be helpful to have the Scientific Assessment Panel provide further explanations of their feedstock emissions estimates at some stage.

114. The Open-ended Working Group agreed to hold informal discussions on the matter in the margins of the meeting.

115. [to be completed]

5. Life cycle refrigeration management

116. Introducing the sub-item, the representative of the Federated States of Micronesia explained that her delegation had elected to spotlight the topic of life cycle refrigerant management at the present meeting because of the opportunity that a systemic approach to managing refrigerants offered to support compliance with the Kigali Amendment and secure additional climate and economic benefits. Many elements of life cycle refrigerant management, including servicing measures to address leakage; technologies for reclaiming, recycling and reusing refrigerants; and technologies for destruction; were not being employed, despite the many benefits they offered for the atmosphere and local economies. Her delegation was of the view that without explicit, concerted action within the Protocol, many of those benefits would be lost or become inaccessible, and therefore wished to encourage a deeper conversation about what could be done to enable parties to do more. As parties were aware, leakage and venting of controlled substances contributed to climate change. In addition, destruction was not a compliance obligation, yet the assessment panel reports made it clear that quantities available for recovery would increase and that timely efforts to establish and finance end-of-life management capacity to prevent HFC emissions could have a significant impact. Her delegation was therefore interested in hearing the views of other parties on what could feasibly be done under the Montreal Protocol to enhance and improve the sustainable management of controlled refrigerants.

117. Several representatives welcomed the opportunity to discuss the matter, with some underscoring the challenges their countries faced, in refrigerant recovery for some, and in destruction for others.

118. One representative, while thanking the representative of the Federated States of Micronesia for raising the issue and indicating his willingness to participate in a discussion, said that his goal in doing so would be more to gain a better understanding of the issues and challenges that countries were facing. He recalled that the Multilateral Fund, through the HCFC phase-out management plans, had been providing assistance for a large part of the cycle of refrigerant management for the past 30 years, including for servicing and for recovery, recycling and in some cases reclamation of refrigerants, and that assistance would continue under the Kigali implementation plans. He allowed that less attention had been paid to the end of the cycle and the disposal of substances that could not be reclaimed or reused; however, between 2010 and 2015, under the Multilateral Fund, around 15 pilot projects had been implemented in countries to collect and destroy unwanted controlled substances, through a funding window that was open to all countries. Some of the projects had yielded interesting results while others had experienced challenges, in part owing to the collection of the substances that required end-of-life management, but also simply in terms of identifying quantities of waste that would provide the economies of scales that justified investment in destruction. As a result, the Executive Committee had recently discussed the need to first develop inventories, and, at its ninety-first meeting, had established a funding window for the preparation of national inventories of banks of used or unwanted controlled substances and the development of a plan for the collection, transportation and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction. That funding window was open to all countries and, in his view, represented a good first step in addressing life cycle management of refrigerants. Given that new funding window, together with the assistance being provided through the HCFC phase-out management plans and the Kigali implementation plans, it could be argued that the full life cycle of refrigerants was already being considered by the Multilateral Fund in its work.

119. The Open-ended Working Group agreed to hold informal discussions on the matter in the margins of the meeting.

120. [to be completed]

IV. Report of the Technology and Economic Assessment Panel on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the period 2024–2026 (decision XXXIV/2)

121. Introducing the item, the Co-Chair said that, in preparation for a decision by the parties on the replenishment of the Multilateral Fund for the triennium 2024–2026, the replenishment task force of the Technology and Economic Assessment Panel had carried out a study in accordance with the terms of reference set out in decision XXXIV/2. The Panel had issued a report on the study as volume 3 of its 2023 report, entitled “Assessment of the funding requirement for the replenishment of the Multilateral Fund for the period 2024–2026”, which had been available on the meeting portal since 21 May 2023. A summary of the task force report was set out in the related note by the Secretariat (UNEP/OzL.Pro.WG.1/45/2/Add.2) and the executive summary was set out in the annex thereto.

122. The main findings of the report were presented by Shiqiu Zhang and Bella Maranion, a summary of which, prepared by the presenters, is set out in section [--] of annex [--] to the present report.

123. In the ensuing discussion, many representatives, including one speaking on behalf of a group of parties, thanked the task force for its work and said that the report was a good basis for future discussions on the replenishment of the Multilateral Fund.

124. Several representatives, including one speaking on behalf of a group of parties, however, raised issues regarding the methodology and assumptions in the report. One of them expressed a preference for estimations based on assumptions that varied, such as different cost-effectiveness values of interventions, as opposed to the number of countries that had ratified the Kigali Amendment. Another representative also queried the small range between the high and low estimates for the replenishment provided by the task force, especially given that it had been working with highly uncertain values. In that regard, one representative pointed out that the consolidated business plan of the Multilateral Fund, on which the task force had drawn, covered only the period 2023–2025, not the entire replenishment period. Another representative expressed concern regarding the approach used to calculate funding to reduce HFCs, which was based on total quantities in carbon dioxide-equivalent for both the HCFC and HFC components of the baselines, instead of actual consumption of HFCs. That approach should be reviewed as it implied that the consumption funded for phase-out in each country was equal to the maximum allowed according to the baseline. Similarly, the task force had used cost-effectiveness thresholds that had been agreed or were being considered by the Executive Committee, which were not the average values used to fund projects, but the maximum values that countries could receive for the different sectors. Most projects, apart from those in the servicing sector, were approved at cost-effectiveness values below the threshold levels. He proposed using an approach similar to that used in the previous replenishment reports. Ms. Maranion offered to answer specific questions on the methodology in any potential contact group.

125. Several representatives, including one speaking on behalf of a group of parties pointed out that HCFC phase-out and HFC phase-down would be taking place simultaneously and that the workload for Article 5 parties would be considerable. It was thus necessary to discuss and to understand better their future needs in terms of support from the Multilateral Fund. Some representatives, including one speaking on behalf of a group of parties stressed the importance of synergies between the two activities, particularly in the consumption and servicing sectors, and welcomed consideration of possible incentives for early action on limiting further growth of HFC. In response, Ms. Maranion said that the task force sought guidance from parties how to include the issue of greater synergy in the supplementary report for the Meeting of the Parties.

126. Several representatives, including one speaking on behalf of a group of parties, pointed out that additional decisions had been taken by the Executive Committee of the Multilateral Fund at its ninety-second meeting, which had been held since the issuance of the report. The calculations and estimations in the report by the task force would therefore need to be updated on the basis of those decisions, namely in relation to eligible incremental costs in the refrigeration servicing sector for stage I of the Kigali HFC implementation plans; the funding window established for pilot projects to maintain and/or enhance energy efficiency in the context of HFC phase-down; and the funding agreed for the preparation of the national inventories of banks of used or unwanted controlled substances and a plan for the collection, transport and disposal of such substances.

127. Specifically on the subject of HCFCs, some representatives said that funding for new HCFC phase-out management plans needed to be based on the requests for funding tranches as they were

actually submitted rather than on estimates made according to a tranche distribution by percentage. Furthermore, any HCFC phase-out management plan still to be submitted by any country during the triennium was likely to be for a total phase-out, and the use of HCFCs beyond 2026 could be very limited. That likelihood needed to be reflected in the analysis by the task force. Ms. Maranion said that the calculations related to HCFC phase-out management plans had been based purely on compliance obligations, namely the percentage reduction targets, and had not taken into account the fact that newly submitted HCFC phase-out management plans might be implemented more quickly.

128. In relation to HFCs, one representative said that it would be useful for the task force to consider the likely number of industries that would be submitting projects related to energy efficiency under stage I of the Kigali HFC implementation plans. Funding needs for installation and assembly in different applications, particularly for small and medium-sized enterprises, also needed to be addressed. Some representatives were of the view that there should be a realistic assessment of the level of HFC servicing needed, especially for non-low-volume-consuming countries. Most such countries had both manufacturing and servicing sectors, and HFC consumption was likely to be lower in the servicing sector and higher in manufacturing sector.

129. One representative, supported by another, pointed out that the funding for HFC phase-down in the estimates seemed only to include what was needed for Kigali HFC implementation plans and stressed that individual HFC projects could be funded separately and thus needed to be included.

130. In response to a question by one representative about the impact of the lack of a decision by the Executive Committee on cost guidelines for the phase-down of HFCs in Article 5 parties, Ms. Maranion said that it had been challenging for the task force, which had attempted to fill gaps in data and to refer to historical approaches and previous experience under HCFC phase-out management plans.

131. Another representative expressed the view that all measures that related to conditions imposed on the approval of projects within the scope of the Multilateral Fund should be financed with money from the fund itself. In that regard, some representatives said that activities related to gender mainstreaming should be fully integrated into the resources to be provided by the Multilateral Fund in the following replenishment period.

132. Several representatives said that the implementation of the Kigali amendment provided an opportunity to achieve a double impact for the benefit of the climate. The financing available therefore needed to be commensurate with the efforts to be made by parties. One representative said that, at its ninety-second meeting, the Executive Committee had held discussions on the provision of support to parties that wished to accelerate their HFC phase-down, doing so earlier than the schedule set out in the Kigali Amendment. He advocated frontloading the funding available to help countries be more ambitious and said that the replenishment should enable that to happen. Another representative said that accelerated HFC phase down beyond the first 10 per cent target should be considered only when the HCFC component of the baseline was more than 10 per cent. Yet another representative said that financing was key for countries' in transitioning to technologies that used climate friendly refrigerants with low ozone-depleting potential, adding that importing and low-volume-consuming countries required such resources the most.

133. One representative highlighted the issue of the HFC baselines being based on years in which consumption was low owing to the COVID-19 pandemic. The freeze of imports for 2024 at the baseline level would be very challenging. Another representative noted that some data needed to calculate the HFC baselines were due only in September 2023 and she said that she looked forward to the relevant updates being made in the supplementary report.

134. One representative encouraged those parties that had yet to ratify the Kigali Amendment to do so as soon as possible.

135. In response to a request by one representative that the task force share the details of its calculations in the report with the parties, either in the form of annexes to the report or an excel sheet, Ms. Maranion said that the task force had tried to include as much information as possible in the report, but some of the data were not aggregated and some were confidential. She would try to answer specific questions as best she could.

136. One representative highlighted the discrepancy between the executive summary and the introduction to the report, which both stated that only the HCFC target in 2025 and the HFC target for Group 1 countries in 2029 were considered in the funding estimates for those substances in the replenishment for the period 2024–2026, and the body of the report and the presentations made by the task force, which made it clear that the task forces had included funding to allow countries to make progress towards achieving the respective 2030 and 2032 targets.

137. One representative called on the parties to analyse the financing guidelines for countries in which imports had increased, leading to a change in their classification, as that significantly affected the financing for which they were eligible.
138. In response to a question by one representative about the rationale for turning to an expert who was currently working with an implementing agency, Ms. Maranion said that the individuals on the task force were chosen for their expertise so that the task force could respond as effectively as possible to requests from the parties.
139. In response to a suggestion by some representatives that funding to address the issue of the safety of flammable refrigerants should be included in the replenishment, Ms. Maranion said that the cost of project preparation had been included, not the specific elements that might be included in the projects.
140. Several representatives proposed further discussion in a contact group.
141. The Working Group agreed to establish a contact group on [--], to be co-chaired by Alain Wilmart (Belgium) and Sergio Merino (Mexico), to consider further the report of the Technology and Economic Assessment Panel on the replenishment of the Multilateral Fund for the period 2024–2026 (decision XXXIV/2).
142. [to be completed]

V. Strengthening Montreal Protocol institutions, including for combating illegal trade (decision XXXIV/8)

A. Outcomes of the workshop on strengthening the effective implementation and enforcement of the Montreal Protocol (UNEP/OzL.Pro.WG.1/45/6)

B. Background documents prepared by the Secretariat in accordance with decision XXXIV/8 (UNEP/OzL.Pro.WG.1/45/5, UNEP/OzL.Pro.WG.1/45/5/Add.1 and UNEP/OzL.Pro.WG.1/45/5/Add.2)

143. At the suggestion of the Co-Chair, the Working Group considered sub-items 5 (a) and (b) at the same time. On behalf of the parties, the Co-Chair thanked the facilitators, rapporteurs and presenters for their excellent contributions to the workshop on strengthening the effective implementation and enforcement of the Montreal Protocol that had been held on Sunday, 2 July 2023 in response to decision XXXIV/8, and the Secretariat for having organized it. He drew attention to the summary of the workshop outcomes (UNEP/OzL.Pro.WG.1/45/6).
144. He also drew attention to a background information paper on issues to be discussed at the workshop on strengthening the effective implementation and enforcement of the Montreal Protocol (UNEP/OzL.Pro.WG.1/45/5); a note by the Secretariat on a summary of illegal trade practices and approaches taken by national authorities to identify and address such cases (UNEP/OzL.Pro.WG.1/45/5/Add.1); and a note by the Secretariat on a summary of common features of licensing systems (UNEP/OzL.Pro.WG.1/45/5/Add.2). He invited parties to suggest ways to take forward the outcomes of the workshop as well as other issues included in the background documents.
145. All the representatives who spoke congratulated the Secretariat and the rapporteurs and panellists for the excellent organization of a highly interesting and useful event and expressed their thanks for the meeting documents provided by the Secretariat. One representative highlighted the importance of providing documents in the six official languages of the United Nations to ensure full participation.
146. One representative drew attention to the importance of the informal prior informed consent (iPIC) process to combating illegal trade, explaining that in his country in 2020 the process had contributed to the successful prevention of the illegal import of HCFC-123. Another representative observed that the intermediary agents who organized international trade were important stakeholders to involve in those kinds of discussions. Both suggested that future similar workshops would benefit from the participation of customs officers, port authorities, environment agencies and other enforcement agencies.
147. A number of representatives suggested that capacity-building for national frameworks for data collection and reporting, particularly for customs officers, would be helpful, together with recommendations for specific actions to strengthen monitoring and verification of imports and exports,

and collaboration with the international community. One representative highlighted the problems caused by illegal traders, who targeted countries with weak enforcement capacities and created fraudulent import documentation designed to look legitimate. Customs officers lacked the equipment and expertise to be able to interrupt such illegal trade.

148. One representative called for strengthening mechanisms for scrutiny of feedstock uses of controlled substances. Another representative highlighted the problem of the disposal of substances seized when illegal trade was interrupted; this was not always managed and monitored carefully enough.

149. One representative suggested that further discussion on how to promote the sharing of information on illegal trade, not just when cases were fully proven but when they were suspected in advance, as called for in decision XXXIV/8; that approach could help other parties to better prevent illegal trade in the first place. He also suggested further discussion on the common features of successful licensing and quota systems.

150. Several representatives agreed to the suggestion of further discussions, particularly on illegal trade and on licensing and quota systems; it was important to retain the record of the Montreal Protocol as the most successful multilateral environmental agreement. Some of the other topics that had been discussed at the workshop were already scheduled for discussion under other items on the agenda of the Open-Ended Working Group at the present meeting. One representative called for the scope of further discussions to be limited to strengthening the institutional process through administrative or institutional actions that were pragmatic, achievable in the near term and did not aim at changing the Montreal Protocol.

151. Another representative suggested that the discussion should also include breaches of domestic regulations aimed at implementing the Montreal Protocol; national systems for monitoring imports and exports and the importance of cooperation between different agencies within countries; the need for on-the-ground as well as atmospheric measurements of emissions; information on transboundary trade; and appropriate sanctions in cases of illegal trade. He expressed the view that it would be useful to identify the essential elements of licensing and quota and reporting systems, in order to assist parties in the process of developing those measures for HFCs. He also queried whether it would be possible to give the Implementation Committee under the Non-Compliance Procedure of the Montreal Protocol a new role in providing advice and guidance to parties. Finally, he expressed an interest in exploring possibilities for mechanisms to allow new substances to be included in the Protocol without needing an amendment process, as had been discussed in the early 2000s, and raised the possibility of developing a conference room paper for consideration at the present meeting of the Open-ended Working Group or at the Thirty-Fifth Meeting of the Parties.

152. The Working Group agreed to establish an informal group, to be co-facilitated by Martin Bjørnholst (Denmark) and Miruza Mohamed (Maldives), to facilitate further discussion of the matter.

153. [to be completed]

VI. Energy-efficient and low- or zero-global-warming-potential technologies

A. Report by the Technology and Economic Assessment Panel (decision XXXIV/3)

154. [to be completed]

B. Illegal import of certain refrigeration, air-conditioning and heat pump products and equipment (decision XXXIV/4)

155. [to be completed]

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

A. Report by the Secretariat (decision XXXIII/4)

156. [to be completed]

B. Report by the Technology and Economic Assessment Panel (decision XXXIV/5)

157. [to be completed]

VIII. Technology and Economic Assessment Panel 2023 report, including issues relating to

A. Nomination for critical-use exemption for methyl bromide for 2024

158. [to be completed]

B. Ongoing emissions of carbon tetrachloride (decision XXXIV/6)

159. [to be completed]

C. Quarantine and pre-shipment uses of methyl bromide for which alternatives are available (decision XXXIV/10, para. 4)

160. [to be completed]

D. Existing challenges and potential options for the future configuration and function of Panel technical options committees (decision XXXIV/11, para. 1)

161. [to be completed]

E. Panel membership changes

162. [to be completed]

F. Any other issues

163. [to be completed]

IX. Stocks of methyl bromide (decision XXXIV/10, para. 3)

164. [to be completed]

X. Potential impacts of the coronavirus disease (COVID-19) pandemic on hydrofluorocarbon consumption for Group 1 parties operating under paragraph 1 of Article 5

165. [to be completed]

A. Hydrofluorocarbons consumption data reported by relevant Group 1 parties operating under paragraph 1 of Article 5 (decision XXXIV/13, paras. 1 and 2)

166. [to be completed]

B. Proposed adjustments to the Montreal Protocol

167. [to be completed]

XI. Other matters

168. [to be completed]

XII. Adoption of the report of the meeting

169. [to be completed]

XIII. Closure of the meeting

170. [to be completed]

Annex [--]

Summaries of statements at the time of the adoption of the agenda

1. The representative of Ukraine said that for nine years Ukraine had been fighting a full-scale war waged by the Russian Federation, in which genocide and ecocide were taking place with already irreversible consequences not only for Ukrainian but also for global biodiversity, and for the sustainable development of the European continent and the world. She added that, in recent years, Ukraine had made progress in developing a system for monitoring and regulating controlled substances, but no policy was effective without peace. She asked the Russian Federation to cease hostilities. She said that the temporary occupation of Ukrainian territories meant that reliable data for reporting could not be obtained and that the war had caused a great deal of destruction, which had led to the release of large amounts of refrigerant from cooling systems, reducing the impact of Parties' efforts to implement the Protocol.
 2. The representative of the United States of America, speaking on behalf of Australia, Canada, Israel, Japan, Norway, Switzerland, the United Kingdom of Great Britain and Northern Ireland and the United States of America, condemned what he termed the ongoing brutal attack by the Russian Federation on civilians and critical infrastructure in Ukraine, which also caused environmental damage and transboundary harm. He reaffirmed the principles of the United Nations Charter as well as unwavering commitment to a comprehensive, just, and lasting peace in Ukraine. According to him, the actions of the Russian Federation were a violation of international law and the United Nations Charter and those responsible should be held to account. He called on the Russian Federation to abide by its international obligations, cease all hostilities in Ukraine, withdraw its troops and facilitate humanitarian aid in the country.
 3. The representative of the European Union said that multilateral cooperation, based on mutual respect, was crucial for addressing the huge environmental challenges faced by humanity. She therefore expressed full solidarity with the people of Ukraine, condemning what she termed the unprovoked and unjustified aggression by the Russian Federation. She continued that the invasion of a sovereign country by the Russian Federation was a gross violation of international law and the United Nations Charter and was severely undermining international security, causing immense human suffering and exacerbating the challenges that the global environmental community was seeking to address.
 4. The representative of Georgia, expressing full support for Ukraine and the Ukrainian people, said that the actions of the Russian Federation were unjustified, unprovoked and premeditated and had gravely altered the security environment and had had humanitarian and environmental costs that could reverse sustainable development and hinder humanity's efforts in tackling several environmental challenges. He expressed concern about attacks on civilian infrastructure and civilian casualties and what he termed a clear violation of international law and the United Nations Charter. He expressed unwavering support to Ukrainian independence, sovereignty and territorial integrity, and the hope that the war would soon be over.
 5. The representative of the Russian Federation, noting that a political discussion should not take place at the present meeting, refuted the claims of an unprovoked act of aggression against Ukraine. In his view, numerous provocations had come from various directions over many years, in particular, the military coup in the Ukrainian capital in 2014, which had led to attacks on the Russian-speaking civilian population of eastern Ukraine, whose people had turned to the Russian Federation for help. According to him, another aim of the military operation of the Russian Federation was to eliminate the military potential of the regime in Ukraine and to rid eastern Ukraine of fascists. As a result, he said, the West was trying to destroy the Russian Federation by arming Ukraine. He also stated that the information about the situation in Ukraine received by the majority of countries was distorted, including in relation to the hostile actions of Ukraine and their environmental consequences, and that freedom of speech was being undermined by the banning of Russian media.
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