

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

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**Open-ended Working Group of the Parties  
to the Montreal Protocol on Substances  
that Deplete the Ozone Layer  
Forty-sixth meeting  
Montreal, Canada, 8–12 July 2024**

**Draft report of the forty-sixth meeting of the Open-ended  
Working Group of the Parties to the Montreal Protocol on  
Substances that Deplete the Ozone Layer****Addendum****I. Presentations by the Technology and Economic Assessment Panel  
and the Scientific Assessment Panel and discussions on:**

- A. Very short-lived substances (decision XXXV/6)**
- B. Feedstock uses of controlled substances (decision XXXV/8)**
- C. Emissions of carbon tetrachloride (decision XXXV/9)**

**1. Discussion****Feedstock uses of controlled substances (decision XXXV/8)**

1. [continued]
2. Subsequently, the representative of Australia introduced a conference room paper, also on behalf of Canada, Norway and Switzerland, containing a draft decision on feedstock uses of controlled substances. The draft decision was intended to reflect concerns regarding the increasing use of controlled substances as feedstock and the associated increase in emissions, as identified by the atmospheric measurements of such substances. In the draft decision, parties were urged to take steps to minimize their emissions of controlled substances and encouraged to promote the use of best practices and technologies to reduce such emissions. Parties should also report intentional production where such production was measurable. In addition, parties were invited to share information regarding their national procedures and frameworks for the management of such production and use with the Secretariat so that the Secretariat could then summarize such information for the benefit of all the parties. Finally, the draft decision contained a request for the Executive Committee to consider establishing a funding envelope to support up to two production-sector-related projects to demonstrate best practices and technologies for minimizing emissions of control substances used as feedstock, potentially providing useful quantitative information for parties in order to assist them in reducing emissions and developing and sharing that information with others.
3. Some representatives expressed the view that, as the issue of feedstock uses had already been discussed many times at previous meetings and would continue to be covered in the progress reports of the Medical and Chemicals Technical Options Committee, there was no need for further discussion

of the issue. One representative recalled that, as controlled substances used as feedstock were then present in the final product, it was appropriate to consider the entire life cycle of those products rather than focusing solely on feedstocks. Another representative noted that it would only be appropriate to discuss possible action by parties on the issue if additional funding was secured through the Multilateral Fund to support national ozone units in carrying out additional tasks.

4. Other representatives, including one speaking on behalf of a group of parties, expressed their support for discussing the matter further in a contact group. Several representatives, including one speaking on behalf of a group of parties, noted that the Technology and Economic Assessment Panel 2024 progress report contained a significant amount of new information on feedstocks, including in relation to emission factors, and that an increase in associated emissions had been identified confirming that the issue merited further consideration. A number of representatives expressed the view that sufficient information had now been obtained from the Panel and that it would be timely to discuss what action should be taken by parties on the matter. Several representatives also drew attention to the call in the draft decision to the Executive Committee to consider funding for projects related to reducing emissions from feedstock, which was a direct response to previous requests from some parties for support, including in terms of capacity-building, in tackling the issue, and they therefore encouraged those parties to engage in the discussions, providing more information on the type of support that would be most beneficial. One representative also noted that the fact that the draft decision invited, rather than required, parties to submit information on best practices and technology meant that no additional burden would be placed on those parties that did not wish, or were not in a position, to submit such information.

5. The Open-ended Working Group agreed to establish an informal group, to be co-facilitated by Michel Gauvin (Canada) and Leslie Smith (Grenada), to discuss the matter further, taking into account the draft decision submitted by Australia, Canada, Norway and Switzerland.

6. [to be completed]

## **II. Enhancing the global and regional atmospheric monitoring of substances controlled by the Montreal Protocol (decision XXXV/14)**

7. [continued]

8. All the representatives who spoke thanked Mr. Newman and Ms. Mylona for their presentations. Several representatives noted the progress that had been made in gathering the information required by the parties, saying that there was now sufficient information for a decision to be taken on the matter and for the process of enhancing atmospheric monitoring to get under way.

9. Cornelius Rhein, a member of the steering committee of the European Union-funded pilot project, thanked all those involved in the project, particularly the scientific members of the steering committee and other contributors including the secretariat of the Multilateral Fund, the Massachusetts Institute of Technology, the University of Bristol and the University of Dhaka. He requested more in-depth discussion of the possible involvement of the Multilateral Fund in the financing of the enhancement of the global network, stating that there were options additional to those included in the documents by the Secretariat that he would gladly explain.

10. In response to a question about the cost of running existing monitoring networks, Mr. Newman said that the cost of running the Advanced Global Atmospheric Gases Experiment network was about \$9 million annually in operational costs. More information about the cost of the network of the National Oceanic and Atmospheric Administration could be provided by Mr. Montzka. In response to a question about possible future stations, he said that 10 additional stations would be ideal, particularly in the regions where monitoring was lacking, but even 3 to 5 stations would be a significant improvement if they were located in the right regions. The cost of establishing a station was dependent on a number of factors, namely whether there was existing infrastructure or whether it had to be created, whether personnel were paid directly or by other organizations and whether laboratory and analysis facilities existed or services were offered in kind.

11. In response to a question about the wide range of the potential funding required to establish a new station, Ms. Mylona said that the funding estimates were rough estimates and the actual funding required would depend on the specific set-up chosen. The operating and capital costs could be as low as \$50,000 if existing facilities or an existing network were used and if personnel were on loan or provided services in kind, but the cost would be much higher if it was necessary to build infrastructure. One representative highlighted potential risks associated with currency fluctuations, inflation and other

economic factors, while another noted that costs were usually calculated on a commercial basis, but there might be increases when it was known that the client was the United Nations.

12. Questions were asked with regard to the process for taking decisions about new stations and the prioritization process. One representative expressed the view that the scientific considerations should come first, followed closely by a cost-benefit analysis. Mr. Newman said that his first priority would be the establishment of stations in regions where measurements were lacking, followed closely by host country authorization and cost. There would certainly be places in which it would be too expensive to establish a station and, if more than one station could be set up elsewhere for the same amount, then that would have to be given serious consideration. A steering committee could be established to help make such decisions.

13. Several representatives spoke in favour of the option of a step-by-step approach to establishing and maintaining a monitoring site set out in document UNEP/OzL.Pro.WG.1/46/2/Add.1. They also stressed the importance of agreeing on the level of ambition desired in the long term. One of the representatives said that she saw the benefit of both options – a step-by-step approach and a programmatic approach – depending on the speed of progress and the comprehensiveness of the programme desired. She said that the step-by-step approach would allow for a quicker start-up and a more iterative approach, whereas the programmatic approach offered potential economies of scale and greater visibility for donors. She considered a step-by-step approach better if the aim were to start work in 2024.

14. Several representatives said that they were in favour of transferring, to the General Trust Fund for Financing Activities on Research and Systematic Observations relevant to the Vienna Convention, a portion of the cash balances from either the Trust Fund for the Vienna Convention for the Protection of the Ozone Layer or the Trust Fund for the Montreal Protocol on Substances that Deplete the Ozone Layer, or perhaps a portion from each. One of them, however, expressed concern that the General Trust Fund worked on the basis of voluntary contributions and had faced the challenge over many years of ensuring that there was enough money in the Fund for its original purpose. She stressed the need to avoid undermining the existing activities of the Fund by transferring money for a new type of activity. She proposed that the available cash balances could support both the activities already mandated by the General Trust Fund and the new activities being discussed. Another representative, however, suggested that there be some kind of demarcation of the funding within the General Trust Fund so that funds provided for one purpose were not used for another. One representative drew attention to certain procedural issues that would need to be addressed. For instance, both the Vienna Convention Trust Fund and the General Trust Fund were under the responsibility of the Conference of the Parties to the Vienna Convention, which met only every three years. The mandate and the mode of operation of the General Trust Fund might also need to be examined.

15. Several representatives spoke of the desirability of cost effectiveness and optimizing limited financial resources. The proposals made were for cost-sharing mechanisms, the use of existing facilities and in-kind support. One representative proposed that the parties negotiate with the Global Atmosphere Watch of the World Meteorological Organization (WMO) on the use of stations in areas of interest to them. In response to a question about how the Secretariat was planning to engage with other organizations, Ms. Mylona said that an initial study had just been carried out to try to establish what other organizations might be approached. The list included WMO, the Global Environment Facility (GEF), the Comprehensive Nuclear-Test-Ban Treaty Organization and the Green Climate Fund. The idea was to conduct a mapping of the monitoring stations and associated facilities, such as laboratories, of such organizations and then assess whether certain stations were able to monitor controlled substances. Some representatives proposed the addition, to the network, of stations in their countries. One representative stressed the importance of considering the use of existing stations that were no longer in operation, such as one in his country, as a way of reducing costs. Another representative said that his country was geographically well placed to host a new station. One representative underscored the importance of stations being integrated within national frameworks and institutions to ensure their sustainability.

16. Some representatives expressed the view that it would be good, at least initially, to keep the financing process within the Montreal Protocol family, as it would probably be more efficient in the short term and provide parties with greater control. One representative said that, although he was of the view that there were a number of organizations, such as GEF, the Green Climate Fund and the Bezos Earth Fund, that could all deal with the financial side of enhancing the monitoring network, the parties had no institutional authority over any of those bodies. The parties would have to develop memorandums of understanding with the organizations and work out means of communicating or operating with them. Another representative also noted the many administrative considerations that related to the management of external funds and contributions. A third representative said that,

although he was interested to hear about other sources of funding, he was concerned about the sustainability of such funds.

17. One representative noted that mandating the Multilateral Fund would have to be done in a targeted way to ensure that its core function remained to support Article 5 parties in complying with their control obligations. Some representatives underscored the need to consider the additional workload for the Multilateral Fund Secretariat, the additional administrative costs and the role of the Executive Committee and the implementing and bilateral agencies.

18. In response to a question about past experience of dealing with atmospheric monitoring, Ms. Mylona recalled that, in its decision VI/2, the Conference of the Parties to the Vienna Convention had established the General Trust Fund to provide complementary support for the continued maintenance and calibration of the existing ground-based stations of the WMO Global Atmosphere Watch for monitoring column ozone, ozone profiles and ultraviolet radiation to address balanced global coverage. The same decision stated that consideration might also be given to supporting other activities identified by the Ozone Research Managers and in consultation with the Co-Chairs of the Scientific Assessment Panel and the Environmental Effects Assessment Panel. In 2014, in decision X/3, the Conference of the Parties to the Vienna Convention had established a small advisory committee to develop a long-term strategy and short-term plan for the Trust Fund and evaluate project proposals, a task that had previously been carried out by the Ozone Secretariat in cooperation with WMO. Any action regarding the monitoring of controlled substances would therefore probably require decisions by both the Conference of the Parties to the Vienna Convention and the Meeting of the Parties to the Montreal Protocol.

19. In response to a question about flask sampling and high-frequency station measurements, Mr. Newman explained that a high-frequency station could take measurements every two hours because the instrument used to do so was located at the station. Flask measurements could be made at any desired frequency, such as on a monthly, weekly or daily basis, or even more frequently. Flask measurements, however, required more human involvement so there was a diminishing return if the measurements were taken very frequently as it became much more costly. The analysis of the flasks was done in analytic laboratories using similar technology as that used for the analysis of high-frequency measurements. Mr. Newman also mentioned a number of other measurement methods, including from aircrafts or satellites, stating that they were all less successful.

20. Several representatives asked for more information about the gaps in monitoring in Africa and about the fact that African stations had been largely absent from the map shown in the presentation. Mr. Newman explained that the reason that there were no data from the newly set-up station in Rwanda related to a problem with the measuring instrument. Regarding the station on Mount Kenya, Mr. Newman explained that the information gathered at the station was used quite extensively, but the station did not collect observations on ozone-depleting substances.

21. In response to a question about the impact of natural variations on emissions and observations of the surface, Mr Newman said that the scientific community was aware that climate change would lead to changes, for example, in monsoons or the transport of emitted air over stations. Fortunately, meteorological data was of very high quality, so it was possible to gauge the effect of natural variations and changes in those variations.

22. Some representatives highlighted the need for funding, technology transfer and capacity-building to enable Article 5 parties to contribute fully to the monitoring network. Another representative stressed the importance of data-related matters in new monitoring activities, including calibration, data-sharing, peer review, data management and data carving, as well as top-down inverse modelling to complement any expanded monitoring.

23. The Working Group agreed to establish a contact group, to be co-chaired by Liana Ghahramanyan (Armenia) and Alessandro Giuliano Peru (Italy), to discuss the matter further.

24. Subsequently, the representative of the United States, speaking also on behalf of Canada, introduced a draft decision on enhancing the regional atmospheric monitoring of substances controlled by the Montreal Protocol, as set out in a conference room paper. He began by noting that the draft decision was linked to a related decision that would need to be taken by the Conference of the Parties to the Vienna Convention. It provided for a staged approach, the first stage being to identify and evaluate potential monitoring sites and the second being to move forward with the establishment of a limited number of stations. For the first stage, the Secretariat would be requested to transfer the funds required to identify and evaluate potential monitoring sites to the General Trust Fund for Financing Activities on Research and Systematic Observations relevant to the Vienna Convention, and to continue supporting the activities of the General Trust Fund by working to map possible sites for the

monitoring of controlled substances. Parties to the Vienna Convention would be invited to request the advisory committee of the General Trust Fund, in evaluating potential sites, to take into consideration five criteria, namely the suitability of the sites for providing regionally representative data covering areas with substantial volumes of controlled substances; the potential for a dedicated implementing partner; existing infrastructure; the coordination of data calibration; and the sharing of data between scientific monitoring stations. The advisory committee would also be requested to modify the terms of reference of the General Trust Fund to specifically add atmospheric monitoring of controlled substances as a purpose of the fund; modify its own terms of reference to allow it to invite additional experts and establish a subcommittee on the monitoring of controlled substances; and report on progress and any results to the Thirty-Seventh Meeting of the Parties. For the second stage, the Executive Committee of the Multilateral Fund would be requested to consider a funding modality to support a limited number of pilot projects to enhance regional atmospheric monitoring of controlled substance, guided by the scientific advice of the advisory committee of the General Trust Fund, and to report to the Thirty-Seventh Meeting of the Parties on work undertaken to develop such a funding modality. The proponents were keen to hear other parties' thoughts on the proposal and to discuss it further in the contact group.

25. A number of representatives, including one speaking on behalf of a group of parties, thanked the delegations of the United States and Canada for formulating a text to serve as a basis for more specific discussion on the topic, and expressed support for discussing the proposal further in the contact group. Several noted that the views expressed during the earlier discussion on the topic were well reflected in the proposed text.

26. [to be completed]

### **III. Presentation of the Technology and Economic Assessment Panel 2024 progress report and discussions on:**

27. The Co-Chair, introducing the agenda item, drew attention to the Technology and Economic Assessment Panel 2024 progress report (vol. 1) and to the summaries of the issues set out in a note by the Secretariat (UNEP/OzL.Pro.WG.1/46/2, paras. 20–27) and an addendum thereto (UNEP/OzL.Pro.WG.1/46/2/Add.1, paras. 77–115 and annex II). She also drew attention to the interim report of the Technology and Economic Assessment Panel on the evaluation of 2024 critical-use nominations for methyl bromide and related issues (vol. 2).

28. Following an introduction by Bella Maranion, Co-Chair of the Panel, members of the Panel and its technical options committees summarized the findings of the Panel's 2024 progress report and of its interim report on the evaluation of 2024 critical-use nominations for methyl bromide and related issues 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; Omar Abdelaziz – Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee; Helen Tope – Medical and Chemicals Technical Options Committee; and Ashley Woodcock, Co-Chair of the Panel – organization and work of the Panel. A summary of the presentation is set out in section [--] of annex [--] to the present report, without formal editing.

29. During the ensuing discussion, many representatives took the floor, thanking the Panel for its work and presentation and posing a number of questions, to which members of the Panel subsequently responded.

30. Questions related to refrigeration were addressed by Mr. Abdelaziz, who began by clarifying that the wording “good technology options” in the progress report referred to available and accessible technology options. In addition, a reference in the progress report to a new energy-efficiency project had been included to highlight the significant remaining scope for financing of similar projects, as just over \$5.2 million of a funding window of \$20 million had so far been allocated, and parties were encouraged to submit additional energy efficiency projects for consideration before the ninety-sixth meeting of the Executive Committee.

31. Regarding how recently updated standards IEC 6335-2-89 and IEC 6335-2-41 for commercial refrigeration would affect the introduction of flammable refrigerants, Mr. Abdelaziz said that they allowed for larger flammable refrigerant charge and would expand the use of flammable refreshments in refrigeration, air-conditioning and heat pump applications. The updated standards would enter into force in the near future and would be covered in the 2026 assessment report. He noted that hydrocarbons were generally widely adopted in residential refrigerators and self-contained commercial refrigeration in some parties, and the new standards could be expected to result in expansion towards smaller-size air-conditioning applications.

32. Responding to questions on energy efficiency, Mr. Abdelaziz referred representatives to previous task force and working group reports containing detailed information on the processes for improving energy efficiency when converting air conditioning and refrigeration. He noted that assessing the energy efficiency of air-conditioning and home refrigeration products would require a focus on the equipment itself, in particular equipment and component design, which had not been possible for the purposes of the May 2024 progress report. In terms of refrigerant performance related to the thermal performance and energy efficiency, Mr. Abdelaziz referred representatives to previous Energy Efficiency Task Force reports, as well as resources available on the public website of the Air Conditioning, Heating, and Refrigeration Institute public website and articles published by the United States Department of Energy. Regarding refrigerant blends, he drew attention to section 6.2.2 of the progress report, where all 18 new blends were listed, and to the 2022 assessment report, where all other refrigerant blends were listed, thus making all blend compositions available to parties, along with GWP, ozone-depleting potential and other pertinent information. He also noted that the same standards applied to both single component refrigerants and refrigerant blends.

33. With regard to electric vehicle cooling, Mr. Abdelaziz explained that battery electric vehicles were a challenge because cooling of the electric batteries had to be considered as well as cabin comfort. That called for a holistic view of the system that would provide cooling and heating and sometimes act as a heat pump, not just an air conditioner. Therefore, rather than just considering mobile air conditioning using HFO-1234yf, the Panel had considered all thermal management opportunities with a view to synergies, leading to the creation of the new concept of electric vehicle thermal management. With transport refrigeration, while the industry had moved to R-452a, which was still a relatively high-GWP alternative, additional work was being done on carbon dioxide (R-744) and hydrocarbon (R-290).

34. Answering a query regarding the processes that should be followed for decommissioned halons other than halon 1301, Mr. Chattaway said that the destruction of halon 1211 and 2402 should be avoided. There were numerous companies specializing in the recycling of halon and other fluorocarbons at the global level that could facilitate the collection of such materials and shipment to new users, thereby overcoming any issues associated with transboundary shipment.

35. Several representatives had questions regarding the 26 per cent emission factor used for halons. Mr. Chattaway began by clarifying that it reflected total emissions across the life cycle of the halon 1301 manufactured, transported and used as feedstock. The 26 per cent figure was not implausible but was not certain either, and the Panel would very much like to have more information to enable it to refine its estimate. The Panel would also welcome more historical data, to give it a better feel for how to look at and examine the data. Turning to the question of why the Fire Suppression Technical Options Committee felt that emissions over the last few years could not be attributed to emissions from banks, he said that the emissions were simply too large. Banks were finite, and a large emission representing a significant fraction of the banks would reduce the size of the banks and thus the new baseline. In addition, it would be physically impossible for the emissions curve to go up and down against the same baseline, meaning that the bulges seen in the curve had to be attributable to something other than emissions from a finite bank.

36. Regarding the 26 per cent emission factor, Ms. Tope, responding to a more general question of whether the Panel had ever seen known processes with such a high factor, began by recalling that emission factors now being applied by the Panel were for modern-day regulated manufacturing. In addition, the Panel relied on modelling to estimate emission factors for a broad range of substances and processes, intended to assist in policy decision-making. Nevertheless, the estimates were not exact, although they could be refined with new information. She also drew attention to the fact that, as mentioned in the Panel's 2024 report, the most likely emission factors would probably not be applicable for the use of halon 1301 and fipronil production, owing to the differences in how controlled substances were used as feedstocks and the processes used. For fipronil, the relevant process flow sheets and patents relating to the process routes to produce fipronil indicated differences in the use of halon 1301 feedstock; in small-tonnage production, halon 1301 was being fed in excess, generating excess halon 1301 that would need to be recovered, recycled or incinerated. It was plausible that the emission factor for such a process would be higher than the Panel's generic emission factor. The same could be said for any small production facility, semi-tech production facility, pre-commercial pilot manufacturing facility or open process. The Panel aimed to estimate the most likely emission factors but there would always be circumstances, such as in the production of fipronil, where an emission factor did not apply.

37. Turning to the question of the derogation of 12 years plus 18 months for potentially critical applications like aviation fire suppression, Mr. Chattaway noted that fire protection on aircraft was challenging. Many of the potential candidate agents were not efficient enough to be used on aircraft,

and the remaining candidates were largely included in the per- and polyfluoroalkyl substances (PFAS) group of chemicals. He said that, in his view, the derogation period, while welcome, might not be long enough. He agreed with a comment by one representative that the longevity of halon banks should be extended for as long as possible. Safety and security considerations, which the Panel referred to as performance factors, made halon very difficult to replace, particularly in aircraft applications.

38. Responding to the questions and comments related to foams, Mr. Altoé first addressed a request for information regarding suitable foam blowing agents for use in countries with high-ambient-temperature environments, saying that HCFC-141b was effective but required precautions, in particular when using it in remote areas, as it could sometimes boil off from the polyol mixture. A foam with similar levels of performance prepared with a polyol mixture containing HCFC-141b could be produced by combining HFOs with a larger amount of water and then could be used in environments with a high ambient temperature, as well as with methyl formate or methylal, which would ensure that the mixture remained cost-effective. Overall, the science of formulations had progressed considerably in the past two years, and there were new additives, meaning surfactants and catalysts, that could now be used to produce fairly stable formulations. Much progress had been made on water-blown formulations, which were very safe and could be competitive, and should be the first option considered when seeking new blowing agents or replacements for either CFCs or HFCs. He cautioned, however, that using hydrocarbon formulations as a spray could be a serious hazard and should be monitored.

39. Addressing comments regarding the limited availability of hydrochlorofluoro-olefins (HCFOs) and HFOs, Mr. Altoé observed that HCFO producers appeared to be keen to supply the market, had six plants up and running and claimed that their materials were available globally. Prices nevertheless reflected the limited availability of such materials.

40. Responding to a comment regarding the availability in one party of a process to recover old foams, destroy the ozone-depleting substances in them and reuse the foam matrix to make new foam, Mr. Altoé confirmed that the Panel was aware of such processes. The Flexible and Rigid Foams Technical Options Committee was monitoring a number of shredders installed globally, but there were unfortunately not many of them. Foams could also be recycled via chemolysis, to create a new polyol to be fed into the circular economy. The Committee was also monitoring how foams from end-of-life buildings could be put back into the circular economy, but they were only used in a few cases to produce new blocks, roofs and panels. Addressing a concern regarding the phase-down and eventual phase-out of HFC-152a, Mr. Altoé said that one alternative was to use carbon dioxide with an oxygenated blowing agent, although that approach required a significant investment, and a lower-cost approach was to use HFO-1234ze in combination with an oxygenated blowing agent to reduce the cost of the extruded polystyrene.

41. Addressing methyl-bromide-related questions and comments, Mr. Porter first responded to a query regarding a gap between methyl bromide production and consumption for quarantine and pre-shipment uses. He noted that the Panel, which merely used the data recorded by the Secretariat, was not well placed to evaluate the gap. That said, consumption was basically production plus imports minus exports, and production should be easy to measure, although it was difficult to monitor imports and exports. Addressing the gap would require the parties to have processes in place to record imports and exports and improve their reporting.

42. Addressing a comment regarding the use of hydrogen cyanide (HCN), a highly toxic product, as an alternative for pre-shipment uses, Mr. Porter said that it was used at very low levels and that companies registering such products ensured that they were used safely. HCN was generally used for empty structures, with people kept well away, as was the case for most fumigants. In general, the health and safety and environmental agencies of the various countries, not the Panel, assessed product applicability: if a product was registered and effective, the Panel considered it to be a valid alternative.

43. Ms. Pizano, addressing comments on pre-shipment uses of methyl bromide, affirmed that the Methyl Bromide Technical Options Committee considered regional availability, logistics and technical and economic feasibility to be key issues in its assessment of alternatives. The Committee welcomed any relevant information from parties in that respect. Speaking about the Committee's suggestion that parties consider removing the exemption for pre-shipment uses of methyl bromide, she said that the Committee was aware of instances where the use of methyl bromide did not fit the definition of quarantine and pre-shipment, in which case the use would be considered non-compliant. The concern was that there was sometimes confusion or insufficient understanding regarding the use of methyl bromide. In suggesting that the parties consider removing the exemption for pre-shipment uses, the Committee merely wished to underscore that it had identified readily available, technically and economically feasible alternatives for pre-shipment uses of methyl bromide.

44. Ms. Pizano also responded to a question regarding the handling of empty cylinders of methyl bromide, which she said was an ongoing issue. She agreed that finding a way to destroy leftover methyl bromide in an economically feasible manner was likely to be difficult, and suggested that interested parties meet with the Methyl Bromide Technical Options Committee in the margins of the current meeting to discuss the matter, with a view to finding a more general solution.

45. On the topic of metered-dose inhalers (MDIs), one representative stressed the need to maintain their availability until safe alternatives that were economically feasible for all those who needed them became available. Addressing the issue of the availability of alternatives, Ms. Tope informed the Working Group that three companies had indicated that their clinical studies for inhalers using alternative propellants would be completed in 2025. Based on that information, the Panel's best estimate, given regulatory processes, was that alternative inhalers would not reach the market before 2026. Even then, they would enter the market slowly because of the need to ramp up production, and transitioning all inhalers to lower-GWP alternatives could be expected to take a long time.

46. Many representatives posed questions related to PFAS, including trifluoroacetic acid (TFA). Ms. Tope said that the Panel continued to report on PFAS regulations being developed at the national level but was currently unable to provide information on their potential impact, as many such regulations were still under development. She confirmed that the Panel was aware of the recent proposal in the European Union to regulate TFA due to reproductive toxicity effects as well as the underlying studies for that, and was monitoring developments. She drew the parties' attention to the fact that, owing to the uncertainties in the regulatory environment, a number of companies had indicated that they were delaying decision-making pending the outcome of policy developments. Such delays were in turn delaying the phase-out of ozone depleting substances and could also affect the phase-out of high-GWP products. The Panel was monitoring the situation and would update parties as needed.

47. One representative, speaking on behalf of a group of parties, spoke about the regulatory process underway for PFAS in his jurisdiction, which applied the precautionary principle as the basis of environmental law. That same principle was being applied to PFAS. He took issue with the mention in the Panel's report that the legislation was creating uncertainty, saying that the regulatory approach was intended to create clarity for industry and certainty for the public, who were concerned about the forever chemicals and their health effects. With respect to the status of the regulatory process in his jurisdiction, an extensive stakeholder consultation had taken place and committees on risk assessment and socioeconomic analysis were currently assessing the proposals at the sectoral level. The process was a comprehensive assessment of where PFAS would remain essential for society. Exemptions were already foreseen for fire suppressing agents for aviation, industrial precision cleaning fluids for some aerosols and phones, and more exemptions could still be added. That said, he took issue with the Panel's assertion that the hydrochlorofluorocarbon (HCFC) phase-out could be delayed because of the PFAS issue, saying that sufficient suitable alternatives, many of which were not PFAS, were already available to ensure the phase-out. Similarly, in his view it was incorrect to say that the PFAS issue would slow the roll-out of heat pumps, as such equipment was coming into the market, and the restrictions placed on heat pumps with regard to high-GWP refrigerants was actually spurring development innovation, such as the small monoblocks with propane that had only recently come on the market.

48. Janet Bornman, Co-Chair of the Environmental Effects Assessment Panel, addressed a question regarding the health risks of PFAS and TFA in relation to HFOs. She explained that the many studies done in animals on a laboratory scale had not found toxicity at the levels of TFA found in the environment, and it did not currently seem that the amount of TFA in the environment caused a toxic response; however, because TFA was very persistent in the environment, the potential for increased toxicity to animals, including humans, continued to be assessed. There was a lot of uncertainty about measurements, source and fate, including transport from the atmosphere to water bodies. Part of the uncertainty for characterizing amounts of TFA stemmed from the fact that it was not only from the breakdown of CFC replacements but also potentially from natural sources, which were very difficult to measure. At the same time, there were point sources of high TFA levels, namely factories producing trifluoromethyl group (CF<sub>3</sub>) moiety compounds for different uses, such as the production of pharmaceuticals, pesticides and plastics. CF<sub>3</sub> moiety was used because it gave stability to many compounds, and at such factories it was a large point source of TFA, which was of concern to people working in or living near such factories and perhaps drinking the local water or eating plants, which also absorbed TFA. At the same time, TFA taken up by organisms was passed out and did not accumulate in the organism; however, research had not yet determined whether damage might be done during transport through the body.



49. One representative spoke about the need for qualified experts for the technical options committees, suggesting that more effort be made to reach out to experts in developing countries, either through existing committee members, who might be aware of experts in developing countries, or by soliciting nominations from developing country parties. Mr. Woodcock welcomed the comments and encouraged representatives to look at the Panel's matrix of needed expertise and enter into bilateral discussions with that Panel about potential candidates. He also pointed out that the experts worked on an entirely volunteer basis but that the travel of experts from Article 5 parties was funded. Travel for experts from parties not operating under paragraph 1 of Article 5 (non-Article 5 parties) was not currently funded, but with the new difficult funding environment, the Panel was now requesting that travel funding be provided for all experts.

#### **A. Nominations for critical-use exemptions for methyl bromide for 2025**

50. Introducing the sub-item, the Co-Chair recalled that the Technology and Economic Assessment Panel had reported only one nomination for a critical-use exemption, which had been submitted by Canada for 2025. The Methyl Bromide Technical Options Committee's evaluation of the nomination was provided in volume 2 of the Panel's 2024 report and summarized in paragraphs 80 to 85 of document UNEP/OzL.Pro.WG.1/46/2/Add.1.

51. The representative of Canada thanked the Panel and the Methyl Bromide Technical Options Committee for their work in reviewing the Canadian nomination for a critical-use exemption in relation to the production of strawberry runners by a single grower on Prince Edward Island, where chemical alternative fumigants remained unavailable. The nomination of 2.85 tons of methyl bromide for 2025 was 26 per cent lower than the approved amount for 2024 and significantly less than the 5.3 tons that would be required to fumigate the entire acreage under a business-as-usual scenario. The reduction was based on the use of indoor soilless production for a significant portion of the operation on the way to a full transition to soilless production in 2026. In 2023, after four seasons of positive research trials, Canada had implemented a policy-based approach to the phase-out of methyl bromide that would phase out the last remaining critical-use exemption by 2026, and considered indoor soilless production to be a suitable non-chemical technical alternative to fumigation with methyl bromide for the grower's operation, despite the high capital investment required. Consequently, the nomination for 2025 would be the final one for that application. He said that he looked forward to the final recommendation on the nomination and expressed his willingness to engage in the margins of the current meeting with any parties that might have questions regarding the nomination.

52. Several other representatives, including one speaking on behalf of a group of parties, thanked the Methyl Bromide Technical Options Committee for its report and presentation. Two of them, including one speaking on behalf of a group of parties, expressed appreciation for the progress made by Canada in phasing out its use of methyl bromide for strawberry runners, with one recognizing the transition as a difficult one that entailed considerable costs for the grower. The representative speaking on behalf of a group of parties also welcomed the commitment by Canada not to submit any further nominations.

53. Some representatives took the opportunity to speak about their national situations with regard to methyl bromide. The representative speaking on behalf of a group of parties expressed concern regarding the fact that, despite the Panel's clear indication that alternatives existed for most pre-shipment uses, methyl bromide continued to be used in significant quantities for quarantine and pre-shipment purposes and for other uses. She stressed that continued action was critical, especially as any reduction of methyl bromide very quickly had an impact in the atmosphere, and said that her delegation intended to raise the point again in upcoming meetings.

54. One representative questioned the need for separate reports by the Methyl Bromide Technical Options Committee and suggested that its future updates be provided in the Panel's regular progress report.

55. [to be completed]

#### **B. Energy efficiency (decision XXXV/10)**

56. Representatives thanked the Technology and Economic Assessment Panel for its comprehensive update on energy efficiency in the progress report. All the representatives who took the floor stressed the importance of policies and measures to enhance energy efficiency in the phase-down of HFCs. Access to efficient low-GWP cooling equipment was becoming more and more important in a rapidly warming world. One representative observed that around 30 per cent of the global population was exposed to deadly heat for at least 20 days a year, yet less than 10 per cent of people

living in the hottest parts of the world had air conditioners, while millions of people lacked safe, reliable refrigeration for health supplies and food storage.

57. One representative suggested that the Technology and Economic Assessment Panel report should not focus on initiatives taken under other platforms, such as the Global Cooling Pledge, but should focus on energy efficiency opportunities during the HFC phase-down.

58. Another representative noted the Panel's conclusion that with improved energy efficiency and a faster phase-down of HFCs, up to 60 per cent of predicted emissions from the cooling sector could be avoided by 2050. With such a large potential benefit, it was crucial to seize the opportunity. He said that he was pleased to see the topic attracting growing political attention, for example through the Global Cooling Pledge adopted at the twenty-eighth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, in 2023, which at the time of the report had 70 signatories. He also welcomed the decision of the Executive Committee of the Multilateral Fund to make \$100 million available over the next three years for the operational framework of energy efficiency in the refrigeration and air-conditioning manufacturing sector, with the possibility of augmenting it. He encouraged countries with such manufacturing to include energy efficiency projects in their current and future Kigali implementation plans.

59. Another representative informed the Working Group that as part of her country's commitment to reaching net zero greenhouse gas emissions by 2050, its Kigali implementation plan included strategies for phasing down HFCs, including improved energy efficiency in key industrial sectors such as refrigeration, air conditioning and heat pumps. She recognized that different regions had adopted various approaches, policies, action plans and regulatory frameworks to achieve the common objective of increasing access to sustainable cooling, and urged the Technology and Economic Assessment Panel to continue updating its information in this regard.

60. A number of representatives of low-volume-consuming island countries drew attention to the life-threatening situation faced in those countries. Despite their efforts to provide access to cooling and strengthen cold chains, they lacked resources and technical capacity to keep up with the pace of global warming, while at the same time the increased demand for cooling was crippling their energy systems.

61. One representative expressed concern that under the pilot window for energy efficiency in the Multilateral Fund, only \$6 million of the total of \$20 million had so far been allocated, mostly for relatively small, non-investment projects. Stressing that it was now time to explore ways to enhance the quality and scope of project proposals and future support under the operational framework, she proposed a number of initiatives: considering ways to support regional centres of excellence, on the model of the Africa Centre of Excellence for Sustainable Cooling and Cold-Chain Systems; increasing synergies between HFC phase-down and energy efficiency by encouraging the inclusion of more energy efficiency strategies in Kigali implementation plans; preparing a practical manual on energy efficiency measures for use by national ozone units and implementing agencies to help guide the formulation of projects and national plans; and strengthening the institutions of the Montreal Protocol, including the Secretariat, the implementing agencies and national ozone units, with energy efficiency expertise.

62. Another representative informed the Working Group that in his country 46 per cent of electricity was used in unitary air-conditioning systems and up to 60 per cent for refrigeration and air-conditioning together; furthermore, no less than 95 per cent of the electricity generated came from petroleum-based sources such as diesel. That fact demonstrated the huge mitigation potential of the refrigeration and air-conditioning sector, especially from addressing indirect emissions, which were estimated to account for 80 per cent of the gains from energy efficiency measures. His country had already implemented a number of policies, including minimum energy performance standards for that sector. He also noted that the Technology and Economic Assessment Panel report had omitted the approach adopted by the Caribbean Community (CARICOM) through the Caribbean Regional Organization for Standards and Quality, which had developed regional standards, including minimum energy performance standards for refrigeration and air-conditioning appliances.

63. While he welcomed the new funding window in the Multilateral Fund, he regarded the sums available as grossly insufficient; furthermore, the window only addressed one sector, which was not relevant to countries like his. He expressed the hope that further decisions would be taken to allow additional funding to be made available for low-volume-consuming countries. Another representative agreed, calling for the provision of more technical and financial support for the development and implementation of energy efficiency activities.

64. One representative noted the Panel's advice that refrigeration and air-conditioning and heat pump equipment using low- and medium-GWP refrigerants with enhanced energy efficiency was now

available in all sectors but not necessarily in all countries. She called for the establishment of increasingly ambitious minimum energy performance standards and other energy efficiency policies by countries to help drive the penetration of new energy-efficient technologies. Identifying the life-cycle benefits of energy efficiency to consumers and the broader economy, as well as well-directed regulation, would also act as drivers. She observed that many ideas discussed in the reports of the Technology and Economic Assessment Panel and the 2023 workshop on energy efficiency had been acted upon. The Executive Committee now enabled low-volume-consuming countries to augment their management plans by training technicians to integrate servicing for energy efficiency. The funding window for pilot energy efficiency projects would help countries and implementing agencies to learn by doing in relation to developing, assessing, implementing and reporting on HFC phase-down projects with energy efficiency elements; she encouraged countries to submit projects under that window. She looked forward to the Executive Committee carrying out more work on the assembly sector and on non-investment elements in relation to those funding modalities.

65. One representative from a high-ambient-temperature country said that more and more countries would fall into that category as global temperatures rose; in his country the temperature had reached 54 degrees Celsius in the previous week. The situation posed particular challenges from the very high demand for cooling and from degraded performance of appliances. He noted that the Gulf Cooperation Council countries were cooperating on the issue by developing unified regulation for energy consumption and a unified energy labelling system. Other initiatives included developing seasonal minimum energy performance standards and introducing building codes with very high insulation parameters and indicators, including for glass. He called on the Technology and Economic Assessment Panel to examine the question of engagement with end users as well as consult with equipment manufacturers and suppliers to understand demand and supply.

66. Another representative drew attention to the findings of the Technology and Economic Assessment Panel report that leak prevention was of importance to maintaining energy efficiency. He said that he looked forward to receiving further information from the Panel, and pointed out that it could continue to report on the matter in its progress reports.

67. [to be completed]

### **C. Panel membership changes**

68. Introducing the sub-item, the Co-Chair drew attention to table 5 of document UNEP/OzL.Pro.WG.1/4/26/Add.1, which listed the Panel members whose terms of office would expire at the end of 2024 and whose reappointment required a decision by the Meeting of the Parties. The members of the technical options committees whose terms would expire at the end of 2024 but whose reappointment did not require a decision by the Meeting of the Parties were listed in annex III to the same document. As nominations to the technical options committees could be made at any time to the Panel and technical options committee co-chairs, the question of such nominations would not be considered by either the Working Group or the Meeting of the Parties.

69. The Co-Chair reported that no nominations for the Panel, including for the co-chairs of the technical options committees, had been received to date, but allowed that nominating parties usually waited until the Meeting of the Parties to submit their nominations, and said that the Secretariat would post the nominations on the meeting website as they were received. He encouraged interested parties to consult with each other informally and with Panel members in the margins of the current meeting, with a view to deciding on nominations at the Thirty-Sixth Meeting of the Parties.

### **D. Any other issues**

70. No other issues were raised.

## **IV. Climate-friendly alternatives for metered-dose inhalers (UNEP/OzL.Pro.35/12, para. 251)**

71. Introducing the item, the Co-Chair recalled that, at the Thirty-Fifth Meeting of the Parties, during the presentation by the assessment panels on their synthesis report of the 2022 quadrennial assessment, one representative had requested that the issue of the use of alternative substances in MDIs be added to the agenda of the current meeting of the Open-ended Working Group. Section 5.9 of the 2024 Technology and Economic Assessment Panel progress report provided updates on MDIs and other aerosols, and the key messages of the report of the Medical and Chemicals Technical Options Committee were reproduced in annex II to document UNEP/OzL.Pro.WG.1/46/2/Add.1.

72. One representative, speaking on behalf of a group of parties, expressed gratitude for the inclusion of the item on the agenda. He explained that several manufacturers in his party had announced that they would start introducing new low-GWP propellants in 2025 and would convert their entire production by 2030. The first applications to the European Medicines Agency were expected before the end of 2024. The report of the Technology and Economic Assessment Panel had indicated that low-GWP propellants were also starting to be produced in other countries, including some Article 5 parties, and the Panel had made clear, in its presentation, that at least 10 companies globally were considering or introducing the new propellants, with availability from 2026 in Article 5 parties.

73. Accordingly, the medical approval processes needed to be well prepared by the relevant authorities and companies, which was a long process, requiring coordination between the stakeholders, as well as environmental authorities, and it should be possible to facilitate the process, for example by sharing application data between countries. Some medical agencies had already started to discuss the matter, including with industry, and he stressed that it would also be important to raise awareness among policymakers on the new options. While countries were in different positions – some were manufacturers, some exporters, many only importers – patients in all countries would benefit from a smooth transition. His delegation had prepared a proposal for a draft decision that he wished to introduce it when it became available on the meeting website.

74. All the representatives who spoke agreed that it was an important and complex topic needing careful consideration. They cited the many issues that needed to be considered, with the aim of maintaining the availability of MDIs for patients and ensuring a smooth transition to alternatives, including not just developments by industry but also environmental regulation, the security of supply and cost of pharmaceutical-grade HFCs and the acceptability to patients of alternatives. Lessons could be learned from the transition away from chlorofluorocarbon (CFC) MDIs in the early years of the Montreal Protocol. They welcomed the extensive information contained in the reports of the Technology and Economic Assessment Panel and said that they would welcome further updates.

75. One representative of an Article 5 party observed that 10 per cent of his country's population suffered from asthma and needed to use MDIs. His country was currently conducting studies on possible alternative propellants, but he expected the costs of converting production lines to be significant, and he said that he would appreciate assistance from the Multilateral Fund.

76. Other representatives, however, said that the Kigali Amendment had not been prescriptive about the uses of HFCs that parties should phase down first. Given that, in most countries, the consumption of HFCs for MDIs was a very small proportion of total consumption, and also that the transition to low-GWP propellants was only in its early stages – companies were mainly considering carrying out research and development, while only a few were conducting trials – it was not clear whether the Meeting of the Parties needed to reach any particular decision at this stage, although further information on the issue would certainly be welcome. Nevertheless, they declared themselves ready to discuss the proposed draft decision when it became available.

77. Subsequently, the representative of the European Union presented a conference room paper containing a proposed draft decision prepared by his delegation. It was designed to support the introduction of low-GWP MDIs, ensure that the relevant approval processes were well prepared and encourage global coordination between environmental and medical authorities and industry to make the transition as smooth as possible.

78. In the draft decision, the work done by the Technology and Economic Assessment Panel and its Medical and Chemicals Technical Options Committee was noted with appreciation. The fact that suitable propellant-free alternatives to MDIs were already available for many patients, and that MDIs with low-GWP propellants had been developed and were expected to enter the market in some countries from 2025 onwards was also noted. Parties were encouraged to promote coordination between their national environmental and health authorities, to liaise with companies producing MDIs in their countries with a view to encouraging them to seek approval for MDIs with low-GWP propellants, and to engage with their medical agencies to reach out to their counterparts in other countries to facilitate approval processes. He concluded by stating that he would welcome the establishment of a contact group to discuss the proposal in more detail.

79. A number of representatives expressed their willingness to join such a contact group, although some wondered whether the discussion might be premature. One expressed the hope that the group could take into account other issues that had been mentioned in the Technology and Economic Assessment Panel progress report and the quadrennial assessment from the Medical and Chemicals Technical Options Committee and raised in the earlier discussion.

80. Other representatives voiced doubts about the need for a decision or a contact group. In the light of the challenges faced by Article 5 parties, in particular, in terms of the technical feasibility and economic viability of alternative propellants for MDIs, given that alternatives were only in a very early stage of development and that many parties had other priorities for phasing down HFCs, they said that a discussion on the matter at the current meeting would not be useful.
81. The Working Group agreed to establish a contact group, to be co-chaired by Idris Abdullahi Ishaka (Nigeria) and Henry Wöhrnschimmel (Switzerland), to discuss the matter further.
82. [to be completed]

## **V. Future availability of halons and their alternatives (UNEP/OzL.Pro.35/12, para. 159)**

83. Introducing the item, the Co-Chair recalled that, in 2023, during both the forty-fifth meeting of the Open-ended Working Group and the Thirty-Fifth Meeting of the Parties, a number of representatives had expressed concern about the information provided in the 2022 quadrennial assessment report and the 2022 progress report of the Fire Suppression Technical Options Committee on the long-term availability of halons and the revisions to the predicted timelines for running out of halons. Several representatives expressed the view that those issues deserved careful consideration. Owing to time constraints at the meetings, however, parties had agreed to include the item on the agenda of the current meeting. She also reminded representatives of the updates on the topic included in the 2024 progress report of the Technology and Economic Assessment Panel.
84. The representative of Canada, speaking also on behalf of Australia and the United States of America, introduced a proposal for a draft decision, set out in a conference room paper. He explained that it was clear that parties viewed the issue as an important topic in the light of the considerable uncertainty over the long-term availability of halons, as well as some new questions regarding potential sources of unknown emissions of halon-1301. Other concerns included the loss of institutional memory related to halon management, the destruction of halon banks as part of carbon credit programmes, and the linkages between feedstock uses of halon-1301 and emissions.
85. Accordingly, the proposed draft decision urged parties to refrain from any deliberate destruction of recovered and recycled halons unless they could not be returned to an acceptable purity for subsequent reuse, and to retain recovered and recycled halon for anticipated future needs. It also urged parties that restricted imports or exports of recovered halons to review their regulations with a view to facilitating the transboundary movement of recovered halons, and urged parties to raise awareness of the importance of sustainable management of halons. Finally, it requested the Secretariat to liaise with relevant international organizations about the importance of sustainable management of halons, invited parties to submit information on feedstock production, use and, if available, related emissions of halon-1301 to the Secretariat, and requested the Technology and Economic Assessment Panel to assess the information submitted. He looked forward to discussing the proposal with all interested parties.
86. The Working Group agreed to establish a contact group, to be co-chaired by Ali Tumayhi (Saudi Arabia) and Andrew Clark (United States of America), to discuss the matter further.
87. [to be completed]

## **VI. Possible compliance deferral for Article 5, group 2 parties: technology review by the Technology and Economic Assessment Panel pursuant to paragraph 5 of decision XXVIII/2**

88. Introducing the item, the Co-Chair recalled that, in paragraph 5 of decision XXVIII/2 related to the amendment phasing down hydrofluorocarbons, the Technology and Economic Assessment Panel had been requested to conduct a technology review four or five years before 2028 to consider a compliance deferral of two years from the freeze date of 2028 for Article 5, group 2, parties to address growth above a certain threshold in relevant sectors. He drew attention to the response of the Panel to that request, which was set out in chapter 8 of the Panel's 2024 progress report, and the summary of that response, set out in the note by the Secretariat on issues for discussion by and information for the attention of the Open-ended Working Group of the Parties to the Montreal Protocol at its forty-sixth meeting (UNEP/OzL.Pro.WG.1/46/2/Add.1)
89. The Open-ended Working Group heard a presentation on the response of the Technology and Economic Assessment Panel to the request in paragraph 5 of decision XXVIII/2. The presentation was

delivered by Ms. Maranion and Suely Carvalho, Co-Chairs of the Panel's working group on decision XXVIII/2, paragraph 5, and by Mr. Abdelaziz, Co-Chair of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee.

90. Responding to queries regarding the sources of information for the report, including regarding the statement that some Article 5 parties had limited accessibility to alternatives, Mr. Abdelaziz said that, as there had been limited time and commercial information available to the Panel, the Panel had applied a methodology of contacting experts in the respective parties and obtaining information directly from industry at the local level, where possible. In that regard, Ms. Maranion added that, since 2016, Article 5, group 2, parties had been proactive, including in terms of minimum energy performance standards and equipment adoption.

91. Regarding a query on the low rates of adoption of alternatives in the air-conditioning sector in some Article 5 parties, Mr. Abdelaziz noted that the Panel had included information on the topic in previous reports but said that it had not been in the remit of the Panel for the 2024 report to consider adoption limitations. The Panel had instead focused on reporting on technology that was technically feasible and available in all markets, such as propane in mini split air-conditioning units or HFC-32 in larger applications. Furthermore, he noted that, as the transport refrigeration industry was global, it had been important to ensure that the alternatives listed for Article 5, group 2, parties were those most commonly used globally, such as R-452A, although other lower-GWP alternatives were being developed.

92. Mr. Kopylov, responding to queries as to why the specific challenges facing Article 5, group 2, parties with high ambient temperatures had not been covered in the report, such as the energy efficiency of products using alternatives, said that the Panel had in fact found that the same challenges were also faced by Article 5, group 1, parties with high ambient temperatures and so the topic did not fall within the remit of the report.

93. In response to a request for clarification of some of the terms used in the report, Mr. Kopylov said that, as the Panel had not had access to comprehensive market data, it had used the broad term "growing use" to reflect the fact that there was a high level of dynamism in the market and that the Article 5, group 2, parties were all at different stages of acceptance of the technologies. With regard to the difference between the terms "availability" and "accessibility", the former referred to the situation at the global level and the latter to the situation at the national level. Mr. Abdelaziz added that the wording "technologically proven" signified that the technology existed and could work in Article 5, group 2, parties, including in countries with high ambient temperatures. He noted that equipment with a capacity of less than 5 tons that used alternative refrigerants, including those with lower GWP, was already on the market in Article 5, group 2, parties. Turning to the larger capacity systems needed in residential units in some Article 5, group 2, parties, Mr. Abdelaziz said that, while he acknowledged that there were challenges in that regard, under the new international standards IEC 6335-2-40 and ISO 5149, the use of larger charges of refrigerants categorized as A2L (mildly flammable), which previously had been considered unsuitable for countries with high ambient temperatures, were now possible, thanks to better knowledge as to how to handle such refrigerants safely, including through the design of systems ensuring safe containment and sound operation.

94. Mr. Abdelaziz responded to a query on concerns raised by implementing agencies, in the context of reviewing Kigali implementation plans, regarding the lack of suitable alternatives identified for Article 5, group 2, parties and difficulties in building capacity in training and regulation when alternatives were not already present in the marketplace. He noted that implementing agencies tended to use the opportunities provided for under those plans to investigate non-mainstream options. The technology to convert from the use of HFCs to lower-GWP alternatives did exist and could be applied within a short time frame. Responding to the explanation, one representative said that he was concerned that there seemed to be inconsistency in the way in which information related to the Kigali implementation plans was handled in the Panel's reporting.

95. In response to a request for clarification regarding the rationale behind the choice of alternatives listed, Mr. Abdelaziz confirmed that, as a comprehensive list of alternatives had already been provided by the Panel in its 2022 progress report, the focus in the 2024 report had been on listing, where applicable, the alternatives that were most commonly used in a given sector, such as propane as the refrigerant for small self-contained air-conditioning equipment, and that were also appropriate for use in group 2 parties. Consideration had also been given to factors such as energy efficiency and he noted that, although R-410A was being adopted in many high-ambient-temperature countries, alternative refrigerants with lower GWP, such as HFC-32 or R-454B, would provide suitable energy efficiency. One representative requested more details regarding the development of technology for use with the alternatives mentioned in countries with high ambient temperatures, as he had been informed

by suppliers that the maximum capacity of equipment using such alternatives would be six tons, making them unsuitable for many applications in countries with high ambient temperatures. Another representative also raised concerns that reporting was being based on a desk analysis rather than on practical experience.

96. Answering a question regarding PFAS, Mr. Abdelaziz noted that PFAS issues had not been included in the 2024 report, as the issue applied equally to Article 5, group 1, and Article 5, group 2, parties and therefore was not within the remit of the report.

97. In response to the safety concerns raised, including potential danger to life, regarding the use of flammable refrigerants for mobile air-conditioning units, Mary Koban, a member of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee, said that category A2L low-GWP refrigerant had been introduced at the global level in 2012 by some manufacturers and, by 2017, had been adopted by all manufacturers. No issues had been detected with its use in light-duty vehicles and there was no technical reason to question the suitability of its use at the global level.

98. Regarding queries about the future provision of information in relation to paragraph 5 of decision XXVIII/2, Ms. Maranion recalled that, under the decision, parties had requested updates on alternatives to HFCs, including reporting on emerging issues every five years, and the Panel's annual progress reports would also continue to include consideration of the challenges that parties continued to face during the phase-down process.

99. In the ensuing discussion, one representative, speaking on behalf of group of parties, congratulated the two Article 5, group 2, parties that had ratified the Kigali Amendment in 2024: the United Arab Emirates and Bahrain.

100. With regard to the report by the Technology and Economic Assessment Panel on decision XXVIII/2, several representatives expressed the view that the report did not address the issues that the Article 5, group 2, parties had been expecting, and needed to be reworked. One representative stressed that air conditioning in high ambient-temperature countries was not a luxury, but of vital importance. Another representative said that, although low- or lower-GWP technologies were evolving, given the rise in global temperatures, countries faced challenges in adopting appropriate technologies, particularly in larger capacity air-conditioning systems, including for household uses. High-ambient-temperature conditions placed an excessive burden on the operation of air-conditioning systems. Given climate changes, he proposed a review of the definition of high ambient temperatures that had been decided on during the negotiation of the Kigali Amendment.

101. One representative recalled that there had been clear reasons for splitting Article 5 parties into group 1 and group 2 at the time of adoption of the Kigali Amendment. Article 5, group 2, parties had not been able to adopt the alternative technologies that other countries had adopted as those technologies had not been suitable for use in their countries. Article 5, group 2, parties were still willing and ready to adopt alternative technologies, as long as they were efficient and technically proven.

102. Some representatives highlighted the imprecise language used in the Panel's report, such as "growing accessibility", and requested the Panel to use specific figures, statistics and percentages to illustrate the points that it was making.

103. One representative noted that the implications of the future European regulations on PFAS were missing from the report.

104. One representative said that it was important that the Technology and Economic Assessment Panel continue to provide updates on the low- or lower-GWP alternatives. He said that he intended to work with like-minded parties to propose a draft decision to enable the Panel to do so. Supported by other representatives, he proposed further discussion of the matter in a contact group.

105. In contrast, other representatives, including one speaking on behalf of a group of parties, noted that the Technology and Economic Assessment Panel, after looking at a broad set of criteria and analysing whether Article 5, group 2, parties were in a different position from other Article 5 parties when it came to the accessibility of alternatives to HFCs, had found that the only difference related to whether refrigerants were technically proven. As such, Article 5, group 2, parties seemed to face similar opportunities and challenges as other Article 5 parties in achieving HFC phase-down.

106. One representative expressed the view that the report provided a detailed technical review of the alternatives relevant for Article 5, group 2, parties. He said that, although the report indicated a number of potential barriers related to technically proven alternatives, he understood that they could be addressed by specific policy initiatives. Another representative, highlighting the steps taken in her own country to meet its phase-down obligations, said that parties had to be cognizant of the fact that

different countries would make different choices according to their specific transitions and time frames. She said that she did not consider the situation of Article 5, group 2, parties as an issue that required additional work by the Technology and Economic Assessment Panel in a separate report. She noted that other requests had been made for the Panel to provide information to the parties, in the annual progress reports and the quadrennial assessment reports for example, and there had been a separate request under decision XXVIII/2 for an assessment every five years on alternatives to HFCs. Although she was willing to consider a draft decision, she questioned the need to request another report from the Panel.

107. [to be completed]

## **VII. Strengthening Montreal Protocol institutions, including combating illegal trade (decision XXXV/12 and UNEP/OzL.Pro.35/12, para. 188)**

108. Introducing the item, the Co-Chair recalled that the Thirty-Fifth Meeting of the Parties had adopted decision XXXV/12, on further strengthening Montreal Protocol institutions, including measures for combating illegal trade, following discussions that had begun at the forty-fifth meeting of the Open-ended Working Group on the outcomes of a workshop held on 2 July 2023 on strengthening the effective implementation and enforcement of the Montreal Protocol. In that decision, parties were asked to inform the Secretariat of practices used by entities attempting unauthorized imports of controlled substances and the Secretariat was requested to provide, before the forty-sixth meeting of the Open-ended Working Group, and on an annual basis thereafter, a compilation of that information and information provided pursuant to decision XXXIV/8, on strengthening Montreal Protocol institutions, including for combating illegal trade. The Thirty-Fifth Meeting of the Parties had also agreed to include the matter of strengthening Montreal Protocol institutions in the agenda of the current meeting. In accordance with the request in decision XXXV/12, the Secretariat had prepared a note containing a compilation of the information provided by parties on illegal trade practices and the approaches taken by national authorities to identify and address such cases (UNEP/OzL.Pro.WG.1/46/4). Relevant information was also set out in paragraphs 34 to 37 of the note by the secretariat on issues for discussion by and information for the attention of the Open-ended Working Group of the Parties to the Montreal Protocol at its forty-sixth meeting (UNEP/OzL.Pro.WG.1/46/2) and in the note by the Secretariat on information on illegal trade in and production and consumption of controlled substances reported by parties (UNEP/OzL.Pro.WG.1/46/INF/3).

109. A representative of the Secretariat gave a presentation on document UNEP/OzL.Pro.WG.1/46/4, providing information on the number of cases reported; the substances traded and the quantities involved; methods of illegal trade; common means of detection; enforcement actions and the penalties imposed; handling and disposal of detained substances; and information on the notable approaches to addressing and combating illegal trade reported by parties.

110. Following the presentation, the representative of the European Union introduced a draft decision on the next steps for further strengthening Montreal Protocol institutions, set out in a conference room paper. Stressing that it was important to pursue discussions on strengthening Montreal Protocol institutions, he said that the draft decision comprised three elements. First was a request to the Secretariat to prepare a guidance document on the establishment and operation of licensing systems, consolidating previous guidance documents and relevant decisions of the parties. Such guidance would be very useful for parties, in particular those preparing their Kigali HFC implementation plans. Second, the Secretariat was also requested to provide, before the forty-seventh meeting of the Open-ended Working Group, an analysis of the annual compilation of information pursuant to decision XXXV/12 and of other relevant sources, identifying options for addressing cases of illegal trade, for consideration by the Thirty-Seventh Meeting of the Parties. Third, the Secretariat was further requested to convene, before the forty-seventh meeting of the Open-ended Working Group, a meeting of experts from interested parties and other persons with relevant expertise to reflect on the functioning of the compliance mechanism of the Montreal Protocol and to identify issues for review by the parties. Since the inception of the Montreal Protocol, the compliance mechanism had not been reviewed, although decisions requesting such a review had been adopted.

111. In the ensuing discussion, several representatives thanked the Secretariat for its note, along with the parties that had submitted information on illegal trade, and thanked the European Union for its proposed draft decision. One representative said that she had found the information in the compilation helpful for her own country's domestic efforts to combat illegal trade. She noted some



potential areas of common ground for moving forward towards a decision, in particular in relation to licensing systems.

112. Several representatives expressed their views on the draft decision. Some representatives questioned whether a collation of guidance prepared by the Secretariat would be the best way forward and proposed that other options also be explored. One representative expressed concern that the language in the draft decision predetermined a path forward and said that there were other elements that she wished to include in such a draft decision. Several representatives said that the nature of an expert meeting needed more clarification with regard to its purpose, length, timing, format, who would participate, the lack of definition of the term “expert” and the need to ensure regional representation. One representative said that another option could be that work was undertaken intersessionally, with online meeting sessions held to minimize the budgetary implications. Another representative said that the matter should be discussed further by the parties as opposed to by a group of experts.

113. Several representatives expressed the view that the matter of next steps on dealing with illegal trade merited further consideration in a smaller group.

114. The Working Group agreed to establish a contact group, to be co-chaired by Shontelle Wellington (Barbados) and Jana Mašíčková (Czechia), to discuss the matter further.

115. [to be completed]

### **VIII. Emissions of HFC-23: potential changes to reporting form 3 for reporting on HFC-23 (decision XXXV/7, para. 3)**

116. Introducing the item, the Co-Chair recalled that, in paragraph 3 of decision XXXV/7 on emissions of HFC-23, the Secretariat had been requested to provide options with respect to potential changes to reporting form 3, specifically concerning when HFC-23 was generated, destroyed or maintained as stocks. The options were set out in document UNEP/OzL.Pro.WG.1/46/3.

117. The representative of the Secretariat outlined the information in the document and presented the two options proposed by the Secretariat.

118. Thereafter, he responded to a number of questions regarding the ramifications of the changes for data reporting forms 3, 4 and 6, the options’ similarities and differences with the reporting frameworks for essential- and critical-use nominations, and the specific quantities of HFC23 that parties would be expected to report. He confirmed that the Secretariat had considered the ramifications for data reporting forms 3, 4 and 6, adding that in the process it had also identified a number of potential issues that parties might wish to address, including possible errors in the instructions or guidance provided. With regard to similarities and differences with the reporting frameworks for essential- and critical-use exemptions, the Secretariat had indeed borrowed the concept from those two accounting frameworks, but they were different. All the newly proposed columns for HFC-23 reporting would be additional to the reporting required under Article 7, and would probably constitute optional reporting.

119. Turning to the question of the specific quantities to be reported, the representative of the Secretariat said that the proposed data represented the Secretariat’s understanding of what parties might choose to report if they wanted to track stocks, as set out in the request to the Secretariat, by tracking quantities produced, used and remaining at year-end. He underscored that the only new data would be the quantities in the 5 new columns, as the quantity imported was already supposed to be reported in data form 1 and the quantities captured and produced were already supposed to be reported in data form 3. He cautioned that the quantity reported in data form 4 could include both new and recovered substances, whereas for the purposes of tracking stocks, the quantity destroyed should only reflect the destruction of newly produced or unused and not-recovered HFC-23, hence there would be a slight difference between the quantity destroyed reported in the new accounting process and the quantity reported in data form 4.

120. Several representatives, while thanking the Secretariat for its response to the parties’ request in decision XXXV/7, observed that the issue was complex and indicated that they would be in favour of discussing the matter further in the margins of the meeting. One representative highlighted the fact that while the decision had only referred to potential changes in data form 3, the Secretariat had confirmed that there were implications for the three relevant forms and had even identified errors that parties might wish to correct.

121. One representative suggested that the request in the decision had not been completely clear, and said that it was reasonable to understand from the guidance in the decision that the parties would want a reporting framework that would allow stocks of HFC-23 to be tracked. From that perspective,

the proposed options made sense; in his view, however, the added value of keeping track of HFC-23 stocks was not clear. In general, the quantity of HFC-23 used and emitted from year to year was small compared to the amount actually generated and then captured or destroyed. In addition, under the proposed reporting framework, information would only be received from the producing countries, yet information on emissions in countries that imported HFC-23 could also be useful. Nevertheless, his delegation was interested in further discussion, including on the links with data form 6.

122. The Working Group agreed to pursue the discussion in an informal group open to all interested parties and including the representative of the Secretariat.

123. [to be completed]

## **IX. Proposal by Cuba on additional funding to support countries seriously affected by the coronavirus disease (COVID-19) pandemic and listed in decision XXXV/16**

124. Introducing the item, the Co-Chair recalled that the Thirty-Fifth Meeting of the Parties had adopted decision XXXV/16 on addressing the impacts of the coronavirus disease (COVID-19) pandemic on HFC baseline consumption for certain parties. On 25 March 2024, the Secretariat had received a proposal for a draft decision from Cuba, with a request that the draft be considered by the Open-ended Working Group at the current meeting. The text was set out in annex I to document UNEP/OzL.Pro.WG.1/46/2/Add.2, and would also be circulated as a conference room paper at the current meeting.

125. Introducing his proposal for a draft decision, the representative of Cuba drew attention to the consumption figures for HFCs for Cuba for the period 2018–2023, as set out in document UNEP/OzL.Pro.WG.1/46/INF/6. Owing to the pandemic, Cuba had experienced a sharp drop in imports of HFCs in 2020 and 2021, which had meant that its baseline level had been set unrealistically low, as had been recognized in decision XXXV/16. Given that imports had since recovered to their pre-pandemic level, the Kigali Amendment target of a 10 per cent reduction in consumption was equivalent in reality to a 42 per cent reduction from the 2023 consumption level. Accordingly, in the draft decision, the Executive Committee of the Multilateral Fund was requested to establish a new funding window to provide sufficient additional funds, on an expedited basis, to enable countries seriously affected by the COVID-19 pandemic to meet their HFC consumption reduction targets and fulfil their commitments under the Montreal Protocol.

126. Several representatives declared their support for the proposal, given the similar circumstances they faced, and expressed the hope that financial support and other measures could be explored. They recognized that the issue could be addressed through the Kigali implementation plans, as set out in decision XXXV/16, but they faced real challenges in the lack of accessibility to and affordability of low-GWP alternatives to HFCs.

127. One representative informed the Working Group that HFC consumption in his country had grown by 250 per cent from 2022 to 2023; increasing amounts of HFC-using equipment was being installed, creating future dependence on HFC refrigerants. It was crucial not to disrupt the cooling sector in countries such as his because of the implications for economic development and healthy lifestyles. He also expressed the belief that his country should be added to the list of countries that the Executive Committee had identified for further consideration with regard to the issue, and stated that he intended to take the matter up with the Committee.

128. Another representative expressed his support for the proposal, explaining that his country had seen a severe economic recession, accompanied by unsustainable debt and a balance of payments crisis. Imports of refrigerants had been significantly affected, posing serious challenges to both HCFC phase-out and preparations for HFC phase-down. Demand for cooling had remained high, however, and local manufacturing of refrigeration equipment and MDIs had expanded. The end result was that demand for HFCs in 2024 was expected to reach nearly five times the baseline consumption level, and further growth in demand could be expected as the economy recovered. He expressed the hope that it would be possible to collaborate with the Secretariat and parties to exchange knowledge, guidance, technology and best practices.

129. Other representatives, however, while expressing sympathy for the challenges faced by those parties, pointed out that there was no cause for concern in terms of compliance, because under decision XXXV/16 the determination of compliance would be deferred until 2026 data became available, which applied to the eight parties listed in the decision, including Cuba. That decision did not prevent a party from asking the Meeting of the Parties to consider the possibility of further

deferring compliance if there continued to be a problem, or other parties from applying to be covered by the decision; they were prepared to discuss that possibility.

130. They pointed out, however, that the issue of additional funding had been considered in 2023, and it had not been agreed at that time. Furthermore, they expressed the view that reopening the agreements that had been negotiated by the Executive Committee would create a poor precedent. Levels of funding for the servicing sector had been agreed less than a year ago, after discussion of issues related to the impact of the COVID-19 pandemic, and they had included a much higher level of funding for low-volume-consuming countries than had been the case for HCFCs. Many countries were now including the servicing sector in their Kigali implementation plans as a result. Furthermore, other funding windows were available; for example, in addition to the approval of its Kigali implementation plan, Cuba would be allowed, on an exceptional basis, to submit investment projects for the refrigeration and air-conditioning sector to achieve additional HFC reductions.

131. The representatives highlighted paragraph 2 of decision XXXV/16, in which parties that had not already done so were urged to submit expeditiously their Kigali implementation plans for consideration by the Executive Committee. The solution to the problem was to move forward with HFC phase-down as fast as possible at the same time as deferring consideration of compliance. They recognized that of the eight countries listed in the decision, three had already had Kigali implementation plans approved, and four others had them in preparation. The implementation of appropriate policies, a key element of Kigali implementation plans, including import and export licensing systems, would help to constrain demand and reduce future servicing liability. Without such systems, it was not surprising that imports were increasing; the same outcome had been observed in non-Article 5 parties. Thus, while they would be happy to discuss the issues with Cuba and other parties, they did not want to reopen the agreements that had been reached over the previous year and a half to accommodate the concerns that had been raised.

132. Recognizing the different views that had been expressed, the Co-Chair encouraged parties to consult informally with each other in the margins of the meeting to try to identify a way forward. He invited Cuba to report back on those consultations in due course.

133. [to be completed]

## **X. Other matters**

### **Unwanted import of energy-inefficient products and equipment**

134. The representative of Kyrgyzstan introduced a draft decision on avoiding unwanted imports of energy-inefficient products and equipment, which he said had the support of other countries in his region. As background to the draft decision, he noted that his country had started implementing its Kigali HFC implementation plan and developing minimum energy performance standards in preparation for the introduction of energy-efficient technologies and equipment in the refrigeration sector. In addition, the European Union and the Eurasian Economic Union had recently adopted regulations setting more stringent energy-efficiency requirements, and his country had adopted a national standard prohibiting the use of products in the lower classes of energy efficiency. It was unclear, however, how parties were to inform the international community that they did not wish to import energy-inefficient products that did not meet the new technical requirements. He therefore proposed that the Secretariat establish a list of parties that did not wish to import energy-inefficient products and equipment, much like the list established pursuant to decision XXVII/8. The idea was that countries that had banned energy-inefficient products and equipment could use the list to inform exporting countries of such bans, and companies that produced or exported refrigerants could be certified as meeting the exporting country's requirements. Thus, in the draft decision, parties were invited to inform the Secretariat, on a voluntary basis, that they did not consent to the importation of such products and equipment into their territories, and the Secretariat was in turn requested to maintain a list of parties that did not wish to receive energy-inefficient products and equipment, and to circulate it to all the parties and update it annually. He stressed that the draft decision was not intended to address dumping or illegal trade in HFCs or related products or to restrict trade, but was primarily aimed at controlling the introduction of energy-inefficient technologies into national economies. His delegation was open to any suggestion for changes or additions to the draft decision.

135. During the ensuing discussion, the representatives who took the floor, including one speaking on behalf of a group of parties, thanked the representative of Kyrgyzstan for putting forward the proposal and indicated their interest in pursuing the matter. One representative, noting that the Secretariat's information on her country's regulatory domestic bans was out of date, suggested that the existing list on the Secretariat's website might be adapted to serve the need expressed, and that parties

could take advantage of the opportunity to update the Secretariat's information on their national import restrictions in general. Another representative, however, expressed a preference for a separate list, underscoring that there was no cost to establishing a list.

136. One representative, while open to further discussion and supportive of the suggestion to use an existing list, said that his delegation wished to better understand the rationale behind the proposal. He recalled decision XXXV/13, which provided for funding for the development and enforcement of policies and measures to control the importation of prohibited cooling equipment in Article 5 parties, with parties exporting such equipment urged to consider instituting measures prohibiting the export of cooling equipment relying on controlled substances that were no longer permitted to be placed on the market in the exporting parties. At the time, parties had discussed preparing a list but had not taken the idea forward.

137. One representative cautioned that energy inefficiency could mean different things to different countries, and that parties should therefore ensure that national limits for what was considered energy-efficient and energy-inefficient were clear.

138. The Working Group agreed to establish a contact group, to be co-chaired by Morane Godfrin (France) and Linda Kosgei (Kenya), to discuss the matter further,.

139. [to be completed]

## **XI. Adoption of the report of the meeting**

140. [to be completed]

## **XII. Closure of the meeting**

141. [to be completed]

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