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**Twelfth meeting of the Conference of  
the Parties to the Vienna Convention  
for the Protection of the Ozone Layer, part II**  
Online, 23–29 October 2021

**Thirty-Third Meeting of the Parties to  
the Montreal Protocol on Substances  
that Deplete the Ozone Layer**  
Online, 23–29 October 2021

## **Report of the combined twelfth meeting of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer (part II) and Thirty-Third Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer**

### **Introduction**

1. As the ongoing coronavirus disease (COVID-19) pandemic and related travel restrictions made it difficult for parties to meet in person, the Secretariat, in consultation with the Co-Chairs of the preparatory segment of the combined twelfth meeting (part II) of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer and Thirty-Third Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, some parties, and the bureaux of the twelfth meeting of the Conference of the Parties to the Vienna Convention and the Thirty-Second Meeting of the Parties to the Montreal Protocol, decided to hold the combined twelfth meeting (part II) of the Conference of the Parties to the Vienna Convention and Thirty-Third Meeting of the Parties to the Montreal Protocol online, with a reduced agenda. The decision was communicated to the parties by the Ozone Secretariat in an updated contingency plan disseminated on 28 June 2021. Accordingly, the deliberations were held online from 23 to 29 October 2021.

2. The present report reflects the deliberations under the items included on the single agenda used for the combined meeting; any references to “the current meeting” should be understood to denote the combined meeting of the two bodies.

### **Part one: preparatory segment (23–28 October 2021)**

#### **I. Opening of the preparatory segment**

3. The segment was opened by Ms. Vizmindia Osorio (Philippines), Co-Chair, at 2 p.m.<sup>1</sup> on Saturday, 23 October 2021.

4. Opening remarks were delivered by Ms. Megumi Seki, Executive Secretary of the Ozone Secretariat. In her statement, Ms. Seki said that the Secretariat was examining the possibility of a return to face-to-face meetings in 2022, starting with an extended meeting of the Open-ended Working Group of the Parties to the Montreal Protocol in July, and would continue to monitor the situation closely with a view to confirming the arrangements to the parties at an appropriate time. Regardless of

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<sup>1</sup> All times mentioned are Nairobi time (UTC + 3).

the format of meetings held in 2022, it would be an important year, as several matters had been deferred owing to the COVID-19 pandemic, including negotiations and decisions concerning the replenishment of the Multilateral Fund for the triennium 2021–2023. The terms of reference for the next study for the 2024–2026 replenishment would also be discussed in 2022. The excellent preparatory work of the previous months, for which she sincerely thanked the parties and all other stakeholders, had laid the foundations for fruitful discussions at the current meeting.

5. Noting that 15 October 2021 had marked the fifth anniversary of the adoption of the Kigali Amendment to the Montreal Protocol, she urged the 71 parties to the Protocol that had not yet ratified the Amendment to do so as soon as possible. The world was in the grip of a growing climate emergency, and greenhouse gas emissions were not yet falling at the rate needed to minimize future damage. The Protocol and the Amendment could play a key role in slowing climate change and achieving the Sustainable Development Goals.

6. Earlier in the year, in connection with the United Nations Food Systems Summit, the Secretariat had helped organize activities to promote sustainable cold chains under the Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development. A virtual exhibition on sustainable cold chains had been launched on the Secretariat's website and was currently being populated with information about relevant technologies.

## II. Organizational matters

### A. Attendance

7. The following parties to the Vienna Convention and the Montreal Protocol were represented: Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Cabo Verde, Cambodia, Cameroon, Canada, Chile, China, Colombia, Congo, Costa Rica, Croatia, Cuba, Czechia, Democratic People's Republic of Korea, Denmark, Dominica, Dominican Republic, Ecuador, Egypt, Eritrea, Estonia, Eswatini, European Union, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Grenada, Guinea, Guinea-Bissau, Holy See, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Maldives, Mauritius, Mexico, Micronesia (Federated States of), Montenegro, Morocco, Mozambique, Myanmar, Namibia, Netherlands, New Zealand, Nigeria, North Macedonia, Norway, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Saudi Arabia, Senegal, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Thailand, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Vanuatu, Viet Nam, Yemen, Zimbabwe.

8. The following United Nations bodies and specialized agencies were also represented: secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), World Bank, World Meteorological Organization. The Ozone Research Managers' Co-Chairs, the Co-Chair of the Advisory Committee of the Vienna Convention Trust Fund for Research and Systematic Observation and representatives of the Montreal Protocol assessment panels also attended the meeting.

9. The following intergovernmental, non-governmental, industry, academic and other bodies were also represented: Alliance for Responsible Atmospheric Policy; ATMosphere; Carrier Global Corporation; Daikin; Environmental Investigation Agency; EX Research Institute Ltd.; Honeywell Advanced Materials; Industrial Technology Research Institute; Institute for Governance and Sustainable Development; International Energy Agency; International Pharmaceutical Aerosol Consortium; Lawrence Berkeley National Laboratory; Kulthorn Group; MEBROM Corporation; Manito Ozone Protection Industry Association; Natural Resources Defence Council; Nolan Sherry and Associates Ltd.; Perspectives Climate Research; Petra Engineering Industries; Quimobásicos S.A.; Shaffie Law and Policy LLC; SRF Ltd.; Strathclyde Centre for Environmental Law and Governance; Trans-Mond Environment Ltd.

**B. Officers**

10. The preparatory segment was co-chaired by Ms. Vizmindia Osorio (Philippines) and Mr. Martin Sirois (Canada).

**C. Adoption of the agenda of the preparatory segment**

11. The following agenda for the preparatory segment was adopted on the basis of the provisional agenda set out in document UNEP/OzL.Conv.12(II)/1–UNEP/OzL.Pro.33/1:

1. Opening of the preparatory segment: statement by a representative of the United Nations Environment Programme.
2. Organizational matters:
  - (a) Adoption of the agenda of the preparatory segment;
  - (b) Organization of work.
3. Financial reports and budgets of the trust funds for the Vienna Convention and the Montreal Protocol.
4. Montreal Protocol issues:
  - (a) Replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the period 2021–2023;
  - (b) Unexpected emissions of trichlorofluoromethane (CFC-11);
  - (c) Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring (decision XXXI/3, para. 8);
  - (d) Nominations for methyl bromide critical-use exemptions for 2022 and 2023;
  - (e) Technology and Economic Assessment Panel membership changes;
  - (f) Compliance and reporting issues considered by the Implementation Committee;
  - (g) Energy-efficient and low-global-warming-potential technologies;
  - (h) Consideration of the membership of Montreal Protocol bodies for 2022:
    - (i) Membership of the Implementation Committee;
    - (ii) Membership of the Executive Committee of the Multilateral Fund;
    - (iii) Co-chairs of the Open-ended Working Group.
5. Vienna Convention issues:
  - (a) Report of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention;
  - (b) Status of the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention.
6. Other matters.

**D. Organization of work**

12. The parties agreed to the organization of work proposed by the Co-Chairs, namely, to establish contact and informal groups as necessary; to avoid holding contact group meetings in parallel with one another or with plenary meetings; and to avoid, to the extent possible, the holding of simultaneous meetings of various groups. Contrary to standard practice, the proposed organization of work had been circulated in advance of the meeting, on 4 October 2021, to facilitate planning and preparations by delegations. The daily preparatory segment sessions would be held from 2 to 4 p.m., with the possibility for contact groups sessions to meet from 4.15 p.m. onward if necessary, and to close by 5.30 p.m. daily. Meetings of regional groups and informal and bilateral consultations on issues on the agenda could take place at any time, even outside the window reserved for the daily sessions.

### **III. Financial reports and budgets of the trust funds for the Vienna Convention and the Montreal Protocol**

13. In considering the item, the parties had before them documents UNEP/OzL.Conv.12(II)/4 and UNEP/OzL.Pro.33/4, containing proposed revisions to the approved budgets for 2021 and to the proposed budgets for 2022 and 2023 and the triennium 2022–2024, together with activity fact sheets set out in document UNEP/OzL.Conv.12(II)/INF/1–UNEP/OzL.Pro.33/INF/1; the financial reports of the two trust funds for the fiscal year 2020, set out in document UNEP/OzL.Conv.12(II)/5–UNEP/OzL.Pro.33/5; and the updated indicative financial report for the fiscal year 2021 as at 30 September 2021, set out in document UNEP/OzL.Conv.12(II)/INF/2–UNEP/OzL.Pro.33/INF/2.

14. Introducing the item, the Co-Chair recalled that the parties reviewed the budget of the trust fund for the Montreal Protocol each year and the budget of the trust fund for the Vienna Convention every three years. The financial reports of both trust funds were reviewed annually. Given the COVID-19 pandemic, however, during the first part of the twelfth meeting of the Conference of the Parties to the Vienna Convention and Thirty-Third Meeting of the Parties to the Montreal Protocol, the parties had discussed and approved only the revised 2020 budgets of the two trust funds and the budgets for 2021. At the current meeting, the parties would consider the triennial budget for 2022–2024 for the Vienna Convention trust fund and the budgets for 2022 and 2023 for the Montreal Protocol trust fund.

15. The Co-Chair also recalled that the parties had been able to submit comments and questions to the Secretariat on the above-mentioned documents via an online forum dedicated to the issue of the budgets. Furthermore, in preparation for the current meeting, the Co-Chairs had convened informal online meetings to discuss the financial situations of the two trust funds, the funding scenarios and the budgets. All the additional information provided by the Secretariat through the forum or in response to questions raised during the informal meetings remained available for reference in the online forum.

16. The parties agreed to establish a budget committee to consider the two draft decisions on the final reports and budgets of the trust funds for the Vienna Convention and the Montreal Protocol set out in document UNEP/OzL.Conv.12(II)/3–UNEP/OzL.Pro.33/3. The committee would review the financial reports, the budgets, the funding scenarios and all other issues relevant to the budget decisions. It was later agreed that the committee would be chaired by Ms. Nicole Folliet (Canada).

17. Subsequently, the chair of the budget committee reported that the committee had reviewed and approved revised budgets for 2021 for the Vienna Convention and Montreal Protocol trust funds. In addition to approving budgets and contributions for the triennium 2022–2024 for the Vienna Convention trust fund and a budget and contributions for the year 2022 for the Montreal Protocol trust fund, the committee had approved the establishment of a permanent P-3 Information Technology Officer post to be funded by both trust funds at a ratio of 30/70, respectively, for the Vienna Convention and Montreal Protocol budgets.

18. Subsequently, the chair introduced revised versions of the two draft decisions, as set out in separate conference room papers.

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

### **IV. Montreal Protocol issues**

#### **A. Replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the period 2021–2023**

20. Introducing the sub-item, the Co-Chair noted that there were two related issues, concerning the updated report of the replenishment task force of the Technology and Economic Assessment Panel and the decision on replenishment of the Multilateral Fund. The replenishment report had been discussed during an online briefing meeting held on 18 October 2021, the report of which is set out in annex I to the present report. The second issue, relating to the replenishment of the Multilateral Fund, would be discussed at the current meeting. Three related draft decisions had been submitted for consideration at the meeting: one on contributions for 2022, proposed by Australia and the European Union (UNEP/OzL.Conv.12(II)/3/Add.6–UNEP/OzL.Pro.33/3/Add.6); another on the interim budget of the Multilateral Fund, proposed by Canada (UNEP/OzL.Conv.12(II)/3/Add.7–UNEP/OzL.Pro.33/3/Add.7); and a third on an extraordinary Meeting of the Parties, proposed by Norway (UNEP/OzL.Conv.12(II)/3/Add.8–UNEP/OzL.Pro.33/3/Add.8).

21. Representatives of the proponents then presented their submissions, which the parties then discussed. All the representatives who spoke during the discussion thanked the Secretariat for organizing and preparing for the meeting and the Co-Chairs for their extensive work in connection with the various preparatory sessions preceding the meeting. Many also thanked the proponents of the draft decisions for their submissions.

### **1. Draft decision submitted by Australia and the European Union**

22. The representative of Australia introduced a draft decision, co-sponsored by the European Union, on the 2022 contributions to the Multilateral Fund for the triennium 2021–2023. She explained that certain parties wished to make a contribution to the Multilateral Fund in 2022 but needed a decision by the parties to provide a legal basis for doing so. The proposed decision, which was modelled on decision Ex.IV/1 on 2021 contributions to the Multilateral Fund, was intended to enable those parties to make a contribution in 2022. She emphasized that the proposed contributions shown in table A of the draft decision were based on those parties' contributions for the triennium 2018–2020 and did not reflect their positions on the 2021–2023 replenishment, which would be based on many factors, including the updated information provided by the Technology and Economic Assessment Panel in 2021, and would reflect the work to be done by parties to phase out hydrochlorofluorocarbons (HCFCs) and start phasing down hydrofluorocarbons (HFCs). In addition, any contributions made by parties prior to an agreement on the replenishment for 2021–2023 would count towards their overall contribution for that period and would not be additional to it.

23. Several representatives took the floor to support the proposed decision. Two of them expressed their appreciation for the continued support provided to the Multilateral Fund and to parties operating under paragraph 1 of Article 5 of the Montreal Protocol (Article 5 parties). Another suggested that parties explore the possibility of adopting the same replenishment amount for the triennium 2021–2023 as for 2018–2020, given that contributions for 2021 and 2022 were already based on those of the previous triennium.

24. The representative of New Zealand said that her Government, too, required the decision in order to make a contribution in 2022, and asked that her country be added as a co-sponsor of the draft decision to facilitate that contribution.

25. The parties agreed to forward the draft decision, as orally amended, for further consideration and possible adoption during the high-level segment.

### **2. Draft decision submitted by Canada**

26. The representative of Canada introduced a draft decision on an updated interim budget for the Multilateral Fund for the triennium 2021–2023, recalling that the parties had taken a similar decision, decision XXXII/1, in 2020. The previous decision, which had mainly been based on the resources available from the previous triennium, required updating, both because new contributions had been received in 2021 pursuant to decision Ex.IV/1 and because the previous decision, while allocating the budget to the full triennium, had prioritized 2021. He presented the differences between the updated text and the previous decision and suggested an updated interim budget of \$400 million, nevertheless deferring to the Chief Officer of the Multilateral Fund secretariat for confirmation of the final figure.

27. The Chief Officer of the Multilateral Fund secretariat confirmed that the figure of \$400 million was appropriate and provided the underlying figures, noting that they had all been rounded to one decimal place. The updated interim budget figure was based on available resources of \$385.2 million as at 7 October 2021 and an additional \$20.9 million in funding for projects approved at the eighty-seventh meeting of the Executive Committee, less \$6.2 million in returned balances from bilateral and implementing agencies, for a total of \$399.9 million as an interim budget for the triennium 2021–2023, which could reasonably be rounded to \$400 million. He also informed parties that as at 7 October 2021, cash contributions for 2021 had stood at \$100.5 million.

28. The parties agreed to forward the draft decision, as orally amended, for further consideration and possible adoption during the high-level segment.

### **3. Draft decision submitted by Norway**

29. The representative of Norway introduced a draft decision on authorizing the Secretariat to potentially convene an extraordinary Meeting of the Parties in 2022. Noting that the wording of the draft decision was very similar to that of decision XXXII/2 on the holding of an extraordinary Meeting of the Parties in 2021, he said that it would be useful to provide for an extraordinary Meeting of the Parties in 2022 to finalize the negotiation of the 2021–2023 replenishment, given the importance of the

replenishment. In addition, parties were expected to develop and decide on the terms of reference for the 2024–2026 replenishment period at their thirty-fourth meeting, and it would be preferable to finalize the replenishment negotiations before that, a consideration that was reflected in the third preambular paragraph of the draft decision. He added that the extraordinary meeting would ideally be held back to back with the forty-fourth meeting of the Open-ended Working Group, planned for July 2022.

30. During the ensuing discussion, many representatives voiced their support for the proposal, citing the need to finalize negotiations on the 2021–2023 replenishment before the Thirty-Fourth Meeting of the Parties and to take into account the persistent uncertainty surrounding the holding of in-person meetings in 2022, even though some had already taken place. The option of holding an extraordinary meeting online was also mentioned.

31. There was strong support for holding the meeting back to back with a planned meeting in general and with the meeting of the Open-ended Working Group in particular, given the timing of that meeting. One representative, noting the many international meetings planned for 2022, particularly in the chemicals and waste sector, suggested that the decision explicitly state that the meeting would be held back to back with the meeting of the Open-ended Working Group. Another representative supported that suggestion, but two others, supported by a third, said that, given the unpredictability of the pandemic, parties should leave the arrangements to the discretion of the Secretariat, which could be relied on to make the best arrangements possible in the light of the evolving circumstances.

32. Two representatives questioned the mention of the 2024–2026 replenishment discussions in the third preambular paragraph and the implied link with the 2021–2023 replenishment negotiations. Following a brief discussion, the proponent of the draft decision said that the paragraph was not needed and agreed to delete it.

33. The parties agreed to forward the draft decision, as orally amended, for further consideration and possible adoption during the high-level segment.

## **B. Unexpected emissions of trichlorofluoromethane (CFC-11)**

34. Introducing the sub-item, the Co-Chair recalled that the Scientific Assessment Panel and the Technology and Economic Assessment Panel had produced up-to-date reports on the unexpected emissions of trichlorofluoromethane (CFC-11) for consideration by the Thirty-Second Meeting of the Parties, in 2020, but that consideration of those reports had been deferred to 2021 because of the COVID-19 pandemic. The panels had further updated their reports to reflect new information published in February 2021, and the updated reports had been considered in July 2021 at an online technical meeting organized as part of the forty-third meeting of the Open-ended Working Group (UNEP/OzL.Pro.WG.1/43/4/Add.1). The online technical meeting had focused solely on the technical aspects of the panels' reports, and parties were now being invited to discuss the associated policy issues.

35. Following the Co-Chair's introduction, participants viewed a presentation by Scientific Assessment Panel member Mr. Steve Montzka, speaking on behalf of the Panel, about recent trends in CFC-11 emissions. Mr. Montzka reported that the decline in atmospheric concentrations of CFC-11, which had accelerated after 2018 and into 2019, had continued through 2020 and the first part of 2021. In 2020, global CFC-11 emissions had been even lower than in 2019 and substantially below levels for the period 2008–2012, although it was to be noted that the magnitude of the drop from 2019 to 2020 was sensitive to 3D-modelled dynamics. The 2020 emissions were near expected levels, suggesting that much of the new use and production had stopped; however, the new CFC-11 banks that might have been created from the unexpected production could add to emissions for some time.

36. Many representatives, including one speaking on behalf of a group of countries, took the floor during the ensuing discussion. Most began by welcoming the updated information provided and thanked the Scientific Assessment Panel and the Technology and Economic Assessment Panel for their ongoing work, which was essential to parties' efforts to repair the ozone layer. Several noted that the panels were to deliver further updates in 2022 and their 2022 quadrennial reports were to be presented to the parties in 2023. Requesting the panels to provide further information through a decision would therefore not be necessary.

37. Many of those who spoke, including one representative speaking on behalf of a group of countries, said that, while the trend in CFC-11 emissions was encouraging, the parties and the scientific community would have to remain vigilant regarding CFC-11 as well as other controlled substances, including carbon tetrachloride (CTC), dichlorodifluoromethane (CFC-12) and eventually

HFCs. One representative, supported by several others, said that the situation with CFC-11 had revealed a need for compliance capacity-building and called for additional assistance in that regard.

38. Several representatives, including one speaking on behalf of a group of countries, registered their concern regarding the augmented CFC-11 banks, which would have an impact for many years to come. One urged parties to ensure that their national legislation provided for proper emissions control during the destruction of insulating foams containing CFC-11.

39. Several representatives cautioned that any additional global efforts to monitor the controlled substances in the atmosphere should not place any additional monitoring and reporting burden on Article 5 parties. They said that the issue was complex and required full discussion at an in-person meeting, a position that two other representatives supported.

40. At the end of the discussion, the Co-Chair said that the points made would be reflected in the report of the meeting.

### **C. Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring (decision XXXI/3, para. 8)**

41. Introducing the item, the Co-Chair drew attention to the information contained in paragraphs 40–43 of the note by the Secretariat on issues for discussion by and information for the attention of the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II) and the Thirty-Third Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Conv.12(II)/2–UNEP/OzL.Pro.33/2) and in section III of the annex to the note by the Secretariat on the recommendations of the Ozone Research Managers of the Parties to the Vienna Convention at their eleventh meeting (UNEP/OzL.Conv.12(II)/7). He said that in early October 2021 the European Union had submitted a draft decision on enhancing the global and regional atmospheric monitoring of CFC-11 and other substances controlled by the Montreal Protocol (UNEP/OzL.Conv.12(II)/3/Add.3–UNEP/OzL.Pro.33/3/Add.3), which had been posted in the online forum and on the meeting portal for parties' review ahead of the combined meetings. Following consultations with and receipt of input from other parties, the European Union had prepared a revised version of the draft decision (UNEP/OzL.Conv.12(II)/3/Add.3/Rev.1–UNEP/OzL.Pro.33/3/Add.3/Rev.1).

42. The representative of the European Union, introducing the revised draft decision, said that the issue of monitoring was closely linked to the unexpected emissions of CFC-11, as the atmospheric monitoring undertaken by the Scientific Assessment Panel had proved essential in detecting the problem and thus enabling it to be addressed. In preparing the draft decision, the European Union had looked at the issue of monitoring more broadly and considered it more relevant, in the future, to contain emissions of controlled substances at their source. Nonetheless, it recognized that such a topic was too broad and complex to be discussed in the current online meeting format, and it therefore requested the Secretariat to include the issue of monitoring and containment of controlled substances at source on the agenda of the first subsequent face-to-face meeting.

43. The draft decision aimed to improve the ability of the Scientific Assessment Panel to obtain data for its assessments, including by requesting parties to enhance their sharing of atmospheric monitoring data from existing measurement networks and to inform the Secretariat of any issues of relevance. It had been a conscious decision to limit the involvement of the Secretariat in the data-exchange process to avoid overburdening it. The Secretariat was, however, requested, in consultation with relevant experts, to provide a variety of information to the Open-ended Working Group, including on the identification of suitable locations for additional monitoring, efforts for which the European Union had agreed to provide funding under a pilot project. In requesting the Scientific Assessment Panel to provide advice regarding which controlled substances should be prioritized for enhanced atmospheric monitoring on a regional basis, the European Union had reflected the views expressed during its consultations with parties on the importance of considering precursor substances such as carbon tetrachloride in order to obtain a more complete overview of the situation.

44. Several of the representatives who took the floor thanked the Scientific Assessment Panel for its paper entitled “Closing the gaps in top-down regional emission quantification: needs and action plan” and the European Union for its efforts to outline the first steps in the long process of enhancing global monitoring. The draft decision was deemed a good basis for reaching agreement on decision text at the current meeting. Some speakers stressed the importance of several of the elements to be addressed in the draft decision, including efforts to establish new monitoring stations in areas where there were gaps in the network and to ensure the open sharing of existing data, highlighting the key role of parties in those endeavours. One representative emphasized the need to preserve the integrity of

scientific monitoring information and to avoid the introduction of requirements that data be endorsed or confirmed.

45. One representative said that the text of the draft decision should be modified to bring greater clarity regarding the roles and mandates of the entities concerned and the data-sharing process and to prioritize monitoring of the production of controlled substances. Another representative said that he could support the draft decision on the understanding that all the entities concerned had been consulted and had agreed to undertake the actions requested of them.

46. Appreciation was expressed for the provision of funding by the European Union.

47. In response to a question about the impact on Article 5 parties of increased information-sharing, the representative of the European Union said that the proposed text did not establish any additional reporting requirements for national ozone units; it merely aimed to encourage the exchange of information generated by existing scientific monitoring stations for other purposes, thereby enhancing synergies.

48. In response to a comment by a representative who highlighted the need for scientific and technical capacity-building to ensure that all countries could participate in global monitoring efforts, the Co-Chair recalled that capacity-building activities in developing countries and countries with economies in transition as per the recommendations of the Ozone Research Managers would be discussed under agenda item 5 (a) (report of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention). Capacity-building support had been proposed in a related draft decision submitted by Australia (UNEP/OzL.Conv.12(II)/3/Add.4–UNEP/OzL.Pro.33/3/Add.4).

49. Noting the preference of certain representatives to take a final decision on the matter only when it was possible to hold discussions in person, the parties agreed to establish a contact group, co-chaired by Mr. Samuel Paré (Burkina Faso) and Ms. Ulrika Raab (Sweden), to discuss the proposed draft decision.

50. Subsequently, the co-chair of the contact group introduced a revised draft decision on enhancing the global and regional atmospheric monitoring of substances controlled by the Montreal Protocol, as set out in a conference room paper.

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

#### **D. Nominations for methyl bromide critical-use exemptions for 2022 and 2023**

52. Introducing the sub-item, the Co-Chair said that four nominations for critical-use exemptions had been submitted in 2021: two by an Article 5 party, Argentina, for exemption in 2022, and two by parties not operating under paragraph 1 of Article 5 of the Montreal Protocol (non-Article 5 parties), Australia and Canada, for exemption in 2023 and 2022, respectively. An online forum had been opened by the Secretariat during June 2021 for discussion of the interim report by the Methyl Bromide Technical Options Committee of the Technology and Economic Assessment Panel on the evaluation of the 2021 nominations and related issues (volume 2 of the May 2021 report of the Panel). The report had been posted in the forum, and three parties had submitted comments. Subsequently, the Committee had carried out its final evaluation, and its final report had also been posted in the online forum during September 2021; comments had been received from two parties. The final report by the Committee was set out in volume 5 of the September 2021 report of the Technology and Economic Assessment Panel. A summary of the nominations and the final recommendations could be found in the addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II) and the Thirty-Third Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Conv.12(II)/2/Add.1–UNEP/OzL.Pro.33/2/Add.1).

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

54. In the ensuing discussion, the representative of Australia, thanking the Committee for its continuing hard work, said that he wished to make a correction to the information provided in the presentation regarding his country's transition plan. According to the plan, if methyl iodide was registered and available by 2023, Australia would reduce its methyl bromide use by 50 per cent in 2023 compared to the previous year and then eliminate its use entirely in 2024, which would allow time for training and the implementation of safety practices in 2022 and early 2023.



55. The representative of Canada said that his country supported the final recommendation issued to it by the Committee. Its research programme on soilless alternatives to methyl bromide in strawberry runner production would continue in 2022, building on the positive results achieved in the 2019 to 2021 growing seasons. Moreover, the grower would continue to undertake activities to identify solutions to issues encountered with soilless cultivation, such as the construction and optimization of greenhouses. Other outstanding challenges to be overcome before soilless cultivation could be implemented fully included its much higher capital and material cost, regardless of whether it was carried out indoors or outdoors, and the three-week lag in the development of soilless plants, resulting in harvests falling outside peak market windows. Canada would share additional developments and results from the research programme as they became available.

56. One representative, speaking on behalf of a group of countries, said that it was pleasing to see an overall decline in the number of nominations submitted. Nevertheless, it was clear that challenges remained. Recalling that the Methyl Bromide Technical Options Committee had identified opportunities for replacing 30 to 40 per cent of quarantine and pre-shipment uses of methyl bromide with immediately available alternatives, he requested that consideration of the issue be placed on the agenda of the next meeting of the Open-ended Working Group. The use and disclosure of stocks of methyl bromide held globally for controlled uses by Article 5 parties should also be the subject of a thorough discussion at the next meeting of the Open-ended Working Group. Lastly, it would be interesting to know why no detailed management plan had been received from Argentina.

57. Mr. Porter said that, although Argentina had not submitted a plan, it had reduced its use of methyl bromide dramatically and had indicated in its submissions to the Committee the alternatives that it was using. The Committee had therefore decided that it would be sensible to issue a recommendation despite the absence of a plan. He recalled, however, that Article 5 countries were required to submit national management plans if they wished to apply for critical-use exemptions.

58. The representative of Argentina said that she wished to thank the Committee for its final report and for acknowledging her country's efforts to reduce its methyl bromide use.

59. The representative of Canada introduced a draft decision on critical-use exemptions for 2022 and 2023, co-sponsored by Australia and set out in a conference room paper. Noting that the proponent countries had also consulted with the European Union, he expressed appreciation for that input. Further consultations would be needed to discuss some minor amendments to the draft decision proposed by the European Union. He confirmed that the amounts subject to the critical-use exemptions in the draft decision were those recommended by the Methyl Bromide Technical Options Committee.

60. The parties agreed to forward the draft decision, as revised in the light of the additional consultations mentioned by the representative of Canada, for further consideration and possible adoption during the high-level segment.

## **E. Technology and Economic Assessment Panel membership changes**

61. Introducing the sub-item, the Co-Chair drew attention to the information contained in the addendum to the note by the Secretariat on issues for discussion by and information for the attention of the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II) and the Thirty-Third Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Conv.12(II)/2/Add.1–UNEP/OzL.Pro.33/2/Add.1) and in annex 1 to volume 1 of the September 2021 report of the Technology and Economic Assessment Panel, the progress report, which was presented during an online briefing meeting held on 7 October 2021, the report of which is set out in annex III to the present report. He recalled that the terms of nine members of the Panel, including six co-chairs of technical options committees and three senior experts, would expire at the end of 2021. The Secretariat had received nine nominations so far: two from Australia, one from Brazil, one from Colombia, one from Costa Rica, one from India, one from the Russian Federation, one from the United Kingdom of Great Britain and Northern Ireland and one from the United States of America. The Secretariat had consolidated the nominations and proposed the endorsement of the appointment of the nominees in a draft decision set out in a conference room paper. A matrix of needed expertise for 2021 was set out in annex 2 to the Panel's progress report and reproduced in annex III to the addendum to the note by the Secretariat.

62. In the ensuing discussion, one representative noted that the terms of appointment for senior experts varied from one to four years. Several representatives said that senior experts should be appointed for an additional term of one year only. One representative recalled that the approach of appointing senior experts for one year had first been adopted in 2020 in response to the difficulty of agreeing on appropriate term lengths for senior experts at online meetings. Given the continued impossibility of meeting in person, it made sense to follow that precedent for the time being.

63. One representative said that it would be helpful to know whether the nominees for senior expert positions possessed the expertise highlighted in the matrix. Another asked why the nominee for the position of co-chair of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee had been put forward for an additional term of two years, whereas the nominees for the other five co-chair positions had been put forward for additional terms of four years.

64. The Co-Chair recalled that, in accordance with the terms of reference of the Technology and Economic Assessment Panel, candidates to be co-chairs of technical options committees could be nominated for a term of up to four years, meaning that a shorter term was possible. The Secretariat would amend the conference room paper to reflect the parties' preference for senior experts to be appointed for an additional term of one year only.

65. The parties agreed to forward the draft decision, as amended to reflect the discussion, for further consideration and possible adoption during the high-level segment.

## **F. Compliance and reporting issues considered by the Implementation Committee**

66. The President of the Implementation Committee, Mr. Cornelius Rhein (European Union), presented a report on the outcomes of the sixty-sixth and sixty-seventh meetings of the Committee, which had taken place online in 2021, and provided an overview of the draft decisions approved by the Committee for consideration by the Thirty-Third Meeting of the Parties.

67. The Committee had heard updates from the Ozone Secretariat on data reporting and related matters, including the reporting obligations related to HFCs under the Kigali Amendment and information on the establishment of HFC licensing systems. It had also heard reports from the secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol on relevant decisions of the Executive Committee of the Fund and on activities carried out by the implementing agencies to facilitate compliance by parties.

68. The Implementation Committee had reviewed the implementation of existing decisions on non-compliance by the Democratic People's Republic of Korea, Kazakhstan, Libya and Ukraine, which were all required to undertake a number of measures decided on at previous meetings of the Committee in order to return to compliance. The Committee had also discussed the issue of reporting on the use of controlled substances as process agents pursuant to decision XXXII/5.

69. The President drew attention to a conference room paper setting out two draft decisions for consideration by the Thirty-Third Meeting of the Parties. The first, on data and information provided by the parties in accordance with Article 7 of the Montreal Protocol, noted with appreciation that 197 of the 198 parties to the Montreal Protocol had reported data for 2020, with 181 of those parties meeting the deadline of 30 September 2021 mentioned in paragraph 3 of Article 7, and 115 of the latter group of parties reporting by 30 June 2021, as parties were encouraged to do in decision XV/15. One party, Cuba, had not yet reported its 2020 data, which placed it in a situation of non-compliance with its annual reporting obligations. With regard to parties to the Kigali Amendment, two non-Article 5 parties, the Russian Federation and San Marino, had not yet submitted baseline data on HFCs for the years 2011 to 2013, and two Article 5 parties, Cuba and Lebanon, had yet to submit HFC baseline data for 2020. Those four parties were thus also in non-compliance with their reporting obligations for HFC baseline data. The draft decision urged the four parties in non-compliance to report the required data to the Secretariat as soon as possible and requested the Implementation Committee to review the situation of those parties at its sixty-eighth meeting.

70. The second draft decision related to the status of the establishment of licensing systems for the import and export of new, used, recycled and reclaimed HFCs in accordance with paragraph 2 bis of article 4B of the Montreal Protocol. It was commendable that 101 of 127 parties to the Kigali Amendment had established such licensing systems and that 10 parties to the Montreal Protocol that had not yet ratified the Kigali Amendment had also done so, which attested to the importance of such systems. A total of 17 parties to the Kigali Amendment, however, had not reported in time on the establishment of their licensing systems in accordance with the established deadlines. The draft decision, which listed those parties in its annex, therefore urged them to establish licensing systems as a matter of urgency, and no later than 15 March 2022, for consideration by the Committee at its sixty-eighth meeting. The draft decision also underlined the role of licensing systems in data collection and verification, the monitoring of imports and exports of controlled substances, and the prevention of illegal trade, and it urged all parties to the Kigali Amendment that had not yet established a licensing system to do so and report thereon to the Secretariat. The Secretariat was requested to review periodically the status of the establishment and implementation of such licensing systems.

71. In the ensuing discussion, the representative of one of the parties in non-compliance with its baseline data reporting obligations explained that the submission was late because of the political instability in her country, which was being run by a caretaker government. The country was working with industry and other stakeholders to gather the necessary information and would soon submit the data.

72. Two representatives cited issues faced by their countries in relation to the implementation and enforcement of licensing systems, such as black-market trading and the management, including destruction, of substances and products seized from illegal trade. One of them asked whether the Implementation Committee would look into such issues, while the other highlighted the possible relevance of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

73. The President of the Implementation Committee explained that the Committee worked according to very strict rules of procedure. In his view, however, threats to the functioning of the compliance system, including issues related to enforcement of licensing systems and the management of seizures, were a topic that merited broad discussion by parties to ensure the effective implementation of the Montreal Protocol. Given the complexity of the issue, he was in favour of holding such discussions in person.

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

## **G. Energy-efficient and low-global-warming-potential technologies**

75. Introducing the sub-item, the Co-Chair recalled that, pursuant to decision XXXI/7, the Technology and Economic Assessment Panel had established a task force to prepare a report on new best practices, availability, accessibility and cost of energy-efficient technologies in the refrigeration, air-conditioning and heat-pump sectors for consideration by the Thirty-Second Meeting of the Parties. Because of the pandemic, consideration of the matter had been deferred, and the parties had considered an updated report at an online technical meeting on energy efficiency during the forty-third meeting of the Open-ended Working Group. The report on the online technical meeting (UNEP/OzL.Pro.WG.1/43/4/Add.2) was available on the website of the current meeting.

76. As the report prepared by the energy efficiency task force had already been fully discussed at the online technical meeting, the current meeting would focus on two related draft decisions that had been submitted for the parties' consideration: one on stopping environmentally harmful dumping of inefficient refrigerant and air-conditioning appliances using obsolete refrigerants, proposed by Ghana on behalf of the African States that were parties to the Montreal Protocol (UNEP/OzL.Conv.12(II)/3/Add.1–UNEP/OzL.Pro.33/3/Add.1), and the other on continued provision of information on energy-efficient and low-global-warming-potential technologies, proposed by the United Kingdom (UNEP/OzL.Conv.12(II)/3/Add.2–UNEP/OzL.Pro.33/3/Add.2).

### **1. Draft decision submitted by Ghana on behalf of the African States parties to the Montreal Protocol**

77. The representative of Ghana introduced a draft decision on stopping environmentally harmful dumping of inefficient refrigerant and air-conditioning appliances using obsolete refrigerants. The rationale for the proposal was that dumping increased the HFC baseline for Article 5 parties, increased the use of HFCs and HCFCs in servicing, and made compliance with the Kigali Amendment more difficult. It also saddled Article 5 parties with increased costs and air pollution associated with energy inefficiency and non-Article 5 parties with higher Multilateral Fund replenishment costs. Africa was warming at a faster rate than the world overall and was at risk of multiple climate disasters. The proposed decision reflected a real problem that merited the respect of other parties and their immediate attention and cooperation.

78. Many representatives, including one speaking on behalf of a group of countries, took the floor to offer their thoughts on the draft decision. All acknowledged the importance of the issues raised, with several adding that those issues were important for all Article 5 countries, not just countries in Africa. Two welcomed the opportunity to take further action on energy efficiency and thus on climate change under the Montreal Protocol. One representative drew attention to similarities with previous substantive discussions by parties on the export to Article 5 countries of products and equipment containing chlorofluorocarbons (CFCs).

79. While all those who spoke indicated their willingness to enter into further discussions, many also expressed concern about the complexity of the topic, which covered issues that extended beyond the remit of the Montreal Protocol and touched on other international conventions, notably the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

80. Specific elements of the draft decision highlighted as having potential for action included proposals for further work by the Technology and Economic Assessment Panel; enhanced use of the OzonAction Informal Prior Informed Consent (iPIC) platform; and intensification of OzonAction training and coordination efforts. A specific element that prompted concern was the proposed enforcement, including through domestic legislation, of use of the iPIC platform, particularly given that the platform was not a mechanism under the Montreal Protocol.

81. Many representatives also voiced general concerns, including about the lack of clarity regarding what constituted “obsolete” ozone-depleting substances; the lack of clarity regarding whether the target was equipment containing ozone-depleting substances or inefficient equipment; the practical difficulty of distinguishing between desirable and undesirable equipment; the difficulty of addressing trade in cooling products based on energy efficiency under the Montreal Protocol; and the need to avoid overly onerous control measures.

82. While a few representatives suggested further discussion in a contact group at the current meeting, many, including one speaking on behalf of a group of countries, questioned whether such a complex topic could be adequately addressed at an online meeting. In the end, the parties agreed to put the matter on the agenda of their next in-person meeting to allow for in-depth exploration of the challenges underlying the proposal and of actions that could be taken under the Montreal Protocol to address those challenges.

## **2. Draft decision submitted by the United Kingdom**

83. The representative of the United Kingdom introduced a draft decision, set out in document UNEP/OzL.Conv.12(II)/3/Add.2–UNEP/OzL.Pro.33/3/Add.2, on the continued provision of information on energy-efficient and low-global-warming-potential technologies. The draft decision contained two operative paragraphs. The first provided that the Technology and Economic Assessment Panel should be requested to prepare a report on energy-efficient and lower-global-warming-potential technologies and on measures to improve energy consumption in existing equipment for consideration by the Open-ended Working Group at its forty-fourth meeting. The second provided that the parties should be encouraged to review their national regulatory frameworks and take steps to prevent the importation of unwanted technologies relying on hydrochlorofluorocarbons and high-global-warming-potential hydrofluorocarbons, and to submit relevant national regulations and policies to the Secretariat.

84. In the ensuing discussion, several representatives expressed appreciation for the work done by the Technology and Economic Assessment Panel to provide information on energy-efficient and low-global-warming-potential technologies. Support was voiced for the continuation of that work, as requested in the first operative paragraph of the draft decision. Two representatives noted that issues pertaining to energy efficiency were also being addressed by the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol.

85. Several representatives raised concerns regarding the second operative paragraph of the draft decision and the corresponding preambular paragraphs. One representative said that the operative paragraph appeared to be policy-prescriptive, while another questioned its relevance to the matter of energy efficiency. A third noted that some Article 5 parties would require additional funding to implement the measures called for in the paragraph.

86. Some representatives voiced a preference for deferring consideration of the draft decision to the next in-person meeting of the parties, in view of the detailed discussion that would be required, while others expressed support for the establishment of a contact group to discuss the draft decision at the current meeting.

87. One representative, recalling that energy efficiency was not a compliance obligation to be fulfilled by the parties under the Montreal Protocol, said that, if the parties were to request the Technology and Economic Assessment Panel to prepare a report on energy-efficient and lower-global-warming-potential technologies, they should bear in mind that many Article 5 countries were launching HFC phase-down plans. Phase-down should thus be the focus, whereas action to promote energy efficiency should be undertaken strictly based on national capacities and priorities. His delegation would be happy to participate in informal consultations on the draft decision.

88. One representative said that it was important to focus on improving the energy efficiency of refrigeration and air-conditioning equipment, while another noted that the emergence of new technologies and related standards had generated a considerable need for capacity-building in Article 5 countries, which would benefit from the support of the Technology and Economic Assessment Panel in that regard.

89. Another representative, speaking on behalf of a group of countries, noted that cutting emissions from cooling appliances would become an increasingly pressing issue in a warming world. Several parts of the draft decision were of great relevance, including the request for the Technology and Economic Assessment Panel to address, in its report, some subsectors not previously covered, such as the heat-pump subsector, large commercial refrigeration, larger air-conditioning systems and foams; a reference to identifying options for improving energy consumption in existing equipment; and mention of a robust baseline assessment and verification of CO<sub>2</sub> reductions related to energy efficiency enhancements.

90. The parties agreed to establish a contact group, co-chaired by Mr. Patrick McNerney (Australia) and Mr. Leslie Smith (Grenada), to discuss the proposed draft decision.

91. Subsequently, the co-chair of the contact group introduced a revised draft decision on the continued provision of information on energy-efficient and low-global-warming-potential technologies, set out in a conference room paper.

92. The parties agreed to forward the revised draft decision for further consideration and possible adoption by the high-level segment.

## **H. Consideration of the membership of Montreal Protocol bodies for 2022**

### **1. Membership of the Implementation Committee**

93. Introducing the item, the Co-Chair said that the parties needed to decide on the membership of the Implementation Committee for 2022. A draft decision on the issue was set out in document UNEP/OzL.Conv.12(II)/3–UNEP/OzL.Pro.33/3.

94. Subsequently, the representative of the Secretariat said that, once the nominations from the regional groups had been received, the relevant draft decision would be included in the compilation of decisions for consideration and possible adoption by the parties during the high-level segment.

### **2. Membership of the Executive Committee of the Multilateral Fund**

95. Introducing the item, the Co-Chair said that the parties needed to decide on the membership of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol for 2022. A draft decision on the issue was set out in document UNEP/OzL.Conv.12(II)/3–UNEP/OzL.Pro.33/3.

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

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

97. Introducing the item, the Co-Chair said that the parties needed to decide on the co-chairs of the Open-ended Working Group for 2022. A draft decision on the issue was set out in document UNEP/OzL.Conv.12(II)/3–UNEP/OzL.Pro.33/3.

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

## **V. Vienna Convention issues**

### **A. Report of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention**

99. The Co-Chair, presenting the sub-item, recalled that the Ozone Research Managers, at their eleventh meeting, had issued recommendations (UNEP/OzL.Conv.12(II)/7) covering systematic observation, research, data archiving and stewardship, and capacity-building, as well as a fifth topic,

gaps in atmospheric monitoring, which was being discussed as a separate issue at the current meeting, under agenda item 4 (c). Parties had discussed the recommendations at an online briefing meeting held on 5 October 2021, the report of which is set out in annex IV to the present report. In addition, an online forum had been opened to allow parties to review and comment on any draft decisions proposed in relation to the recommendations. Australia had taken advantage of the online forum to post a draft decision entitled “Recommendations of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention”, which was set out in document UNEP/OzL.Conv.12(II)/3/Add.4–UNEP/OzL.Pro.33/3/Add.4 for the parties’ consideration.

100. The representative of Australia then presented the draft decision. She said that the meetings of the Ozone Research Managers were an opportunity for the Managers to discuss the status of ozone measurement and make recommendations to the parties on how to improve global ozone monitoring. For its eleventh meeting, the Ozone Research Managers had also been tasked, through decision XXXI/3, with identifying gaps in the global coverage of atmospheric monitoring of controlled substances and providing the parties with options for enhancing such monitoring. The proposed draft decision was a response to the recommendations arising from the eleventh meeting of the Ozone Research Managers. Although it might have been preferable to respond to the recommendations more comprehensively, the draft decision was based on a previous decision of the parties (decision VC XI/1), in recognition of the limitations of online meetings. She outlined the changes that had been made to the text of the previous decision to arrive at the draft decision presented for consideration. She also proposed the addition of the words “and under-monitored” in subparagraph 3 (b), in response to a recently received suggestion.

101. During the ensuing discussion, many representatives, including one speaking on behalf of a group of countries, thanked the representative of Australia for submitting the draft decision and welcomed the Ozone Research Managers’ recommendations, which several noted had been generated under particularly difficult circumstances. Except for a few representatives who requested clarifications, all those who contributed to the discussion supported the draft decision as presented, including the text added orally during the presentation.

102. Many of those who expressed support for the draft decision offered additional comments on the topic. Several emphasized the importance of building capacity for global ozone monitoring. Two stated their countries’ commitment to supporting and conducting ozone monitoring and sharing monitoring data, and a third affirmed her country’s strong support for the Ozone Research Managers and their work. One representative said that his delegation assigned particular importance to the Ozone Research Managers’ recommendations about increased funding of the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention, which linked to paragraph 3 (d) of the draft decision, and on enhanced monitoring of substances controlled under the Protocol, which also linked to agenda item 4 (c) on gaps in atmospheric monitoring and the draft decision put forward by the European Union on the matter.

103. Addressing the comments and requests for clarifications, the representative of Australia explained that the draft decision she had presented was specifically a Vienna Convention decision and an attempt to reflect, albeit in broad terms, the recommendations of the Ozone Research Managers without entering into questions of policy. Capacity-building for Article 5 parties, which a number of parties had flagged as important, was covered in operative paragraph 3 of the draft decision. Unlike the draft decision on enhancing global and regional atmospheric monitoring submitted by the European Union under agenda item 4 (c), the draft decision under the sub-item currently under consideration was an attempt to address the technical aspects of ozone layer observation and controlled substance monitoring.

104. The representative of the European Union explained that his delegation’s submission to the parties of the Montreal Protocol under agenda item 4 (c) had arisen as a late reaction to the lessons learned from the discussions on the lack of sufficient monitoring. The overlap between the two draft decisions mentioned by several representatives was to be expected given the interconnection between the Vienna Convention and the Montreal Protocol. He was convinced that there were no inconsistencies in the work proposed in the two decisions, which was why his delegation fully supported the draft decision presented by Australia.

105. On the basis of the additional information provided, the representatives who had requested clarifications indicated their support for the draft decision as presented, and the parties agreed to forward the draft decision, as orally amended, for further consideration and possible adoption during the high-level segment.

## **B. Status of the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention**

106. In considering the sub-item, the parties had before them a note by the Secretariat on the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention (UNEP/OzL.Conv.12(II)/8) and the note on issues for discussion by and information for the attention of the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II) and Thirty-Third Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Conv.12(II)/2–UNEP/OzL.Pro.33/2, paras. 73–77).

107. Introducing the sub-item, the Co-Chair recalled that the status of the Trust Fund had been presented by the Chair of the Advisory Committee of the Trust Fund during an online briefing on 5 October 2021 (see annex IV to the present report). A page in the online forum had been opened from 13 September to 4 October 2021 to enable parties to review and comment on any related draft decisions submitted by parties. During that time, Australia had posted a draft decision, which was now set out in an addendum to the note by the Secretariat on draft decisions for consideration by the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II) and the Thirty-Third Meeting of the Parties to the Montreal Protocol (UNEP/OzL.Conv.12(II)/3/Add.5–UNEP/OzL.Pro.33/3/Add.5).

108. The representative of Australia, introducing the draft decision, said that the Trust Fund was small but very important. It assisted Article 5 parties with their ozone observations and calibrations and enabled equipment to be relocated to countries interested in conducting observations, when it was considered that those observations would be useful for the scientific community. Given the difficulties inherent in negotiating in an online meeting format, the draft decision was closely based on the previous decisions taken with regard to the Trust Fund. There were, nevertheless, several notable new elements. Because of the importance of the Fund for improvement of the global ozone observation system, parties were invited to make contributions to it. The Advisory Committee of the Trust Fund was requested to pay particular attention, when implementing its long-term strategy and short-term plan of action, to facilitating the relocation of used Dobson and Brewer instruments to new observation programmes, when requested to do so and in line with global and regional observation priorities. The Committee was also requested to explore opportunities to leverage and catalyse its resources to safeguard necessary research and observation activities in line with its strategic plan; previously it had been requested to mobilize financial resources, but although it had worked hard to do so, such action was beyond its remit and its resources. No comments had been received on the draft decision after its posting in the online forum.

109. Several representatives, including one speaking on behalf of a group of countries, emphasized the importance of the Trust Fund and the support that it provided to developing countries. They noted the significant work that had been financed, such as calibration, intercomparisons of instruments, training, and the systematic exploration of new and cost-effective instrumentation for ground-based observations of column ozone. In relation to the latter research, the representative speaking on behalf of a group of countries highlighted, first, the key finding that the ability to repair instruments and the infrastructure needed to field them were limited in developing countries and, second, the possible role of the Trust Fund in the future deployment to developing countries of the robust, environmentally friendly and inexpensive instruments that were likely to emerge in the coming decade. Given the crucial nature of the Trust Fund, one representative proposed that parties be encouraged, rather than simply invited, to contribute to it. Several other representatives expressed their support for changing the text accordingly.

110. The representative speaking on behalf of a group of countries noted the Trust Fund balance and expressed concern that some 80 per cent of the total income to the Fund since its inception in February 2003 had been disbursed or allocated to approved activities over that period. She stressed the need to reflect on the long-term sustainability of the Trust Fund in order to strengthen ozone observation and address the gaps in research and monitoring. Decision VC VI/2 stated that consideration should be given to supporting other activities identified by the Ozone Research Managers for the improvement of the observation network and relevant research. The group of countries she represented was therefore ready to consider possibilities for widening the use of the Trust Fund, which would require greater financial resources. In that connection, another representative highlighted the linkages between the resources available in the Trust Fund and parties' ability to undertake efforts to identify gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring.

111. Other representatives stressed the importance of funding research and monitoring activities in Article 5 parties, especially university-level research, and ensuring that parties in all regions received funding to enhance their monitoring efforts.

112. The parties agreed to forward the draft decision, as amended to reflect the discussion, for further consideration and possible adoption during the high-level segment.

## VI. Other matters

113. No other matters had been raised at the time of the adoption of the agenda.

### Tributes to Mr. Philip Owen and Mr. Eduardo Ganem

114. Tributes were paid to Mr. Philip Owen (European Union) and Mr. Eduardo Ganem (Chief Officer of the Multilateral Fund), for whom the current meeting would be the last in those capacities.

115. Mr. Owen was moving to another position with the European Commission, focusing on climate issues. In a statement, Ms. Seki said that, since Mr. Owen had begun working on ozone issues at the thirtieth meeting of the Open-ended Working Group in June 2010, he had become an integral and much-appreciated member of the Ozone family. In addition to being knowledgeable about all issues related to the Montreal Protocol, he was a skilled negotiator with a keen sense of humour. He had played a key role during the negotiation of the Kigali Amendment and had subsequently rallied support for the Amendment's ratification among European Union member States. The Secretariat greatly appreciated his contribution to the work of the Assessment Panels and the fundamental role that he had played in the development of the pilot project to address gaps in atmospheric monitoring. His accomplishments had been numerous and his contributions plentiful. His absence would be sorely felt by everyone in the Ozone family.

116. Many representatives took the floor to thank Mr. Owen for his contribution to the success of the Montreal Protocol and the Vienna Convention. They spoke of his constructive, pragmatic approach to negotiations, his constant efforts to seek consensus, his sense of humour, which had often proved helpful in defusing tension, his support to colleagues and his willingness to share his knowledge, and wished him all the best for his future endeavours, both professionally and personally.

117. Mr. Ganem was retiring at the end of 2021. In a statement, Ms. Seki referred to Mr. Ganem as an esteemed friend of the Montreal Protocol. She had first met him in the early 1990s when he had visited Nairobi with the first Chief Officer of the Multilateral Fund. The Fund was recognized as one of the most innovative, fair and successful financial mechanisms for the protection of the global environment and a cornerstone of the success of the Montreal Protocol. Mr. Ganem had given 30 years of incredible service to the Fund. He had worked on projects and activities for Article 5 parties that had led to the phase-out of CFCs, halons, carbon tetrachloride and methyl bromide and was engaged in efforts to phase out HCFCs and phase down HFCs. The policies and guidelines document on all the decisions taken by the Executive Committee of the Multilateral Fund had been his brainchild, as had the inventory of approved projects, containing technical and cost information on all the projects approved by the Fund. Those documents continued to be of great help to the Montreal Protocol community. Mr. Ganem's leadership had been characterized by hard work, integrity and an uncompromising commitment to fairness and excellence.

118. Many representatives took the floor to wish Mr. Ganem well in his retirement and to thank him both for his contribution to the success of the Montreal Protocol and for his support on a personal level over the years. They highlighted not only his immense technical knowledge, diligence and professionalism but also his innate honesty and sense of fairness.

## Part two: high-level segment (29 October 2021)

### I. Opening of the high-level segment

119. The high-level segment was opened by Mr. Ndiaye Cheikh Sylla (Senegal), President of the twelfth meeting of the Conference of the Parties to the Vienna Convention, at 2 p.m. on Friday, 29 October 2021.

120. Opening statements were made by Ms. Inger Andersen, Executive Director of UNEP; Mr. Sylla; and Mr. Ezzat Lewis Agaiby (Egypt), Vice-President of the Thirty-Second Meeting of the Parties to the Montreal Protocol, on behalf of Mr. Paul Krajnik (Austria), President of the Thirty-Second Meeting of the Parties to the Montreal Protocol.



## **A. Statement by the Executive Secretary of the United Nations Environment Programme**

121. In her opening statement, Ms. Andersen commended the parties for remaining committed to the Montreal Protocol during the COVID-19 pandemic, which had entailed conducting complex negotiations across different time zones. She wished all delegates success in reaching positive outcomes at the meeting, including some interim decisions on the Multilateral Fund for the Implementation of the Montreal Protocol, a vital funding tool and cornerstone of the Protocol. She congratulated the parties on the swift action taken to deal with the unexpected rise in CFC-11 emissions, first detected in 2018. The issue had demonstrated the need to strengthen science and atmospheric monitoring to ensure that future unexpected emissions could be detected and dealt with even more rapidly.

122. Turning to the matter of climate change, she noted that the upcoming twenty-sixth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change was coming at the end of a year that had seen floods, heatwaves, wildfires and other climate impacts intensify across the globe. However, nations were still not doing enough to limit climate change. The lag in climate action made the Montreal Protocol and its Kigali Amendment even more important. Parties' efforts under the Protocol had made a significant contribution to slowing climate change, owing to the reduction in emissions of climate-warming refrigerant gases and the biodiversity benefits of protecting the ozone layer. She congratulated the 127 parties that had ratified the Kigali Amendment to date, but urged full ratification, which could prevent up to 0.4°C of temperature increase, while work on energy-efficient technologies in the cooling industry could potentially double the climate benefits of the HFC phase-down provided for in the Amendment. Action under the Kigali Amendment could also boost food security and vaccine delivery through adoption of environmentally friendly cooling technologies, in line with the Rome Declaration on the Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development. In conclusion, she said that if parties could build on the success of the Montreal Protocol and realize the full potential of the Kigali Amendment, that agreement would go down in history as one of the key processes that put humanity on track to a peaceful, prosperous and sustainable future.

## **B. Statement by the President of the twelfth meeting of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer**

123. In his opening statement, Mr. Sylla welcomed participants and alluded to the extraordinary circumstances that had necessitated holding the twelfth meeting of the Conference of the Parties to the Vienna Convention in two parts. He expressed solidarity with those who had been affected by the COVID-19 pandemic, and he thanked parties for their resilience in carrying on with the work of the Convention in order to achieve its objectives and implement the decisions adopted. He outlined the matters to be considered at the current meeting, including the recommendations made by the Ozone Research Managers of the Parties to the Vienna Convention at their eleventh meeting and the status of the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention, and he expressed the hope that the parties would adopt decisions on those important matters. He thanked the Ozone Research Managers for developing a set of recommendations to further promote work under the Convention and increase linkages with the work of the Scientific Assessment Panel under the Montreal Protocol, particularly with regard to the identification of gaps in the global coverage of atmospheric monitoring of controlled substances and the provision of options for ways to enhance such monitoring, pursuant to decision XXXI/3.

124. In conclusion, he said that much remained to be done to tackle new environment-related issues that might not have been contemplated at the beginning of the implementation of the Convention and the Protocol. He was encouraged by the remarkable resilience that parties had demonstrated in combating the COVID-19 pandemic and remaining resolute in protecting the environment.

## **C. Statement by the Vice-President of the Thirty-Second Meeting of the Parties to the Montreal Protocol on behalf of the President**

125. In his opening statement Mr. Agaiby, speaking on behalf of Mr. Krajnik, welcomed participants to the meeting. He said that the agenda of the Meeting of the Parties to the Montreal Protocol included several items that had not been discussed in 2020 because of constraints imposed by the ongoing COVID-19 pandemic, including financial reports and budgets, replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the period 2021–2023, the unexpected emissions of CFC-11, identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring, nominations for

methyl bromide critical-use exemptions for 2022 and 2023, changes in the membership of the Technology and Economic Assessment Panel, and energy-efficient and low-global-warming-potential technologies. Encouraging preliminary work had been undertaken earlier in the year, including the extraordinary meeting of the parties in May to decide on contributions to the Multilateral Fund for 2021, followed by the forty-third meeting of the Open-ended Working Group in May and July. In addition, prior to the opening of the preparatory segment of the current meeting, the Secretariat had organized a number of online briefings to clarify some issues on the agenda, including the progress report of the Technology and Economic Assessment Panel and the updated Multilateral Fund replenishment report.

126. Regarding the Kigali Amendment, he said that 15 October 2021 had marked the fifth anniversary of the adoption of the Amendment. He congratulated those parties that had thus far ratified the Amendment, while noting that, as in the case of the four previous amendments to the Montreal Protocol, universal ratification was required for the Amendment to have a meaningful impact on its objectives. The phase-down of HFCs, apart from its climate advantages, created the opportunity to increase the energy efficiency of cooling equipment and significantly reduce energy costs for consumers and businesses.

## II. Organizational matters

### A. Election of officers of the Thirty-Third Meeting of the Parties to the Montreal Protocol

127. In accordance with paragraph 1 of rule 21 of the rules of procedure, the following officers were elected, by acclamation, to the Bureau of the Thirty-Third Meeting of the Parties to the Montreal Protocol:

|                  |  |
|------------------|--|
| President:       | Mr. Siméon Sawadogo (Burkina Faso) (African States)                            |
| Vice-Presidents: | Ms. Noorah Mohammed Algethami (Saudi Arabia) (Asia-Pacific States)             |
|                  | Ms. Azra Rogović-Grubić (Bosnia and Herzegovina) (Eastern European States)     |
|                  | Ms. Marissa Gowrie (Trinidad and Tobago) (Latin American and Caribbean States) |
| Rapporteur:      | Ms. Mariska Wouters (New Zealand) (Western European and other States)          |

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

128. The following agenda for the high-level segment was adopted on the basis of the provisional agenda contained in document UNEP/OzL.Conv.12(II)/1–UNEP/OzL.Pro.33/1:

1. Opening of the high-level segment:
  - (a) Statement by the President of the twelfth meeting of the Conference of the Parties to the Vienna Convention;
  - (b) Statement by the President of the Thirty-Second Meeting of the Parties to the Montreal Protocol;
  - (c) Statement by a representative of the United Nations Environment Programme.
2. Organizational matters:
  - (a) Election of officers of the Thirty-Third Meeting of the Parties to the Montreal Protocol;
  - (b) Adoption of the agenda of the high-level segment;
  - (c) Organization of work;
  - (d) Credentials of representatives.
3. Presentations by the assessment panels on the status of their work.
4. Report by the Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the work of the Executive Committee.

5. Report by the co-chairs of the preparatory segment and consideration of the decisions recommended for adoption by the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II) and the Thirty-Third Meeting of the Parties to the Montreal Protocol.
6. Dates and venues for the thirteenth meeting of the Conference of the Parties to the Vienna Convention and the Thirty-Fourth Meeting of the Parties to the Montreal Protocol.
7. Other matters.
8. Adoption of decisions by the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II).
9. Adoption of decisions by the Thirty-Third Meeting of the Parties to the Montreal Protocol.
10. Adoption of the report of the twelfth meeting (part II) of the Conference of the Parties to the Vienna Convention and the Thirty-Third Meeting of the Parties to the Montreal Protocol.
11. Closure of the meeting.

### **C. Organization of work**

129. The parties agreed to follow their customary procedures.

### **D. Credentials of representatives**

130. The bureaux of the twelfth meeting of the Conference of the Parties to the Vienna Convention and the Thirty-Third Meeting of the Parties to the Montreal Protocol approved the credentials of the representatives of 68 of the 133 parties represented at the meeting. The bureaux provisionally approved the participation of 65 parties on the understanding that they would forward their credentials to the Secretariat as soon as possible. The bureaux urged all parties attending future meetings of the parties to make their best efforts to submit credentials to the Secretariat as required under rule 18 of the rules of procedure. The bureaux also recalled that the rules of procedure required that credentials be issued either by a Head of State or Government or by a minister for foreign affairs or, in the case of a regional economic integration organization, by the competent authority of that organization. The bureaux recalled that representatives of parties not presenting credentials in the correct form could be precluded from participating fully in the meetings of the parties, including with regard to the right to vote.

## **III. Presentations by the assessment panels on the status of their work**

131. Mr. John Pyle, co-chair of the Scientific Assessment Panel, speaking also on behalf of the other co-chairs of the Panel, Mr. David Fahey, Mr. Paul Newman and Mr. Bonfils Safari, gave a presentation on the Panel's scientific assessment of ozone depletion for 2022, which was being prepared in response to decision XXXI/2, the summary report on increased CFC-11 emissions that had been prepared in response to decision XXX/3 and presented at the forty-third meeting of the Open-ended Working Group, and the 2021 Antarctic ozone hole. A summary of the presentation is set out in the annex to the present report.

132. Ms. Janet Bornman, co-chair of the Environmental Effects Assessment Panel, speaking also on behalf of the other co-chairs of the Panel, Mr. Paul Barnes and Mr. Krishna Pandey, gave a presentation on the Panel's 2021 update on the environmental effects of the interaction between stratospheric ozone depletion, ultraviolet radiation and climate change. A summary of the presentation is set out in the annex to the present report.

133. Mr. Ashley Woodcock, co-chair of the Technology and Economic Assessment Panel, speaking also on behalf of the other co-chairs of the Panel, Ms. Bella Maranion and Ms. Marta Pizano, gave a presentation on the work of the Panel and its technical options committees and task forces. A summary of the presentation is set out in the annex to the present report.

134. The President, on behalf of all the parties, thanked the assessment panels for their presentations, for the key role that they played in the implementation of the Montreal Protocol and for the excellent reports that they produced annually and quadrennially to enable the parties to make informed decisions.

135. The parties took note of the information presented.

#### **IV. Report by the Chair of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol on the work of the Executive Committee**

136. The Chair of the Executive Committee of the Multilateral Fund, Mr. Alain Wilmart (Belgium), reported on the progress achieved by the Committee since the Thirty-Second Meeting of the Parties, as detailed in document UNEP/OzL.Pro.33/7. He explained that, owing to the COVID-19 pandemic, the Committee had held its eighty-fifth, eighty-sixth and eighty-seventh meetings online. The full reports of the meetings were set out in documents UNEP/OzL.Pro/ExCom/85/67, UNEP/OzL.Pro/ExCom/86/100 and UNEP/OzL.Pro/ExCom/87/58, respectively.

137. Since the Thirty-Second Meeting of the Parties, the Executive Committee had continued to manage the work of the partners of the Multilateral Fund. He gave a brief overview of the ongoing work of the implementing agencies – UNDP, UNEP, UNIDO and the World Bank – in supporting Article 5 countries in meeting their obligations under the Montreal Protocol and the Kigali Amendment thereto.

138. UNDP was providing technical support to 47 countries in meeting their HCFC phase-out targets under the Montreal Protocol and to 19 countries for ratification and early implementation of the Kigali Amendment; 13 of those countries had completed the process of ratification. Furthermore, four HFC investment projects had been completed in accordance with the schedule. During the pandemic, UNDP had organized more than 30 webinars on technical topics to enable Article 5 parties to exchange information and had provided training remotely to national ozone units and other stakeholders.

139. UNEP, through its OzonAction Compliance Assistance Programme, was supporting 104 countries in operating national ozone units, complying with their HCFC phase-out commitments and working towards the ratification of the Kigali Amendment. UNEP also continued to support the safe adoption of new technologies in the refrigeration and air-conditioning servicing sector. During the pandemic, UNEP had increased communication with the national ozone units and was assisting them in the identification of alternative work modalities, including online platforms and innovative tools provided through the clearing-house mechanism.

140. UNIDO was implementing HCFC phase-out management plans in 72 countries and institutional strengthening projects in 11 countries. It had almost completed HFC enabling activities in 31 countries, the majority of which had ratified the Kigali Amendment. In 2021, it had secured approval for two projects to destroy HFC-23 by-product emissions. Moreover, it had received approval for funding for the preparation of HFC phase-down plans for 12 countries. During the pandemic, it had held online consultations, training sessions and webinars for national ozone officers.

141. The World Bank had been supporting countries in implementing stage II of their HCFC phase out management plans, not only to achieve reductions in HCFC consumption and production in line with their obligations but also in preparation for the 2025 targets. The Bank was also providing technical assistance and advisory services for the ratification of, and initial compliance with, the Kigali Amendment. During the pandemic, the World Bank and country project management staff had been working to mitigate the challenges posed by running missions, meetings and workshops remotely.

142. In closing, he expressed his appreciation to the members of the Executive Committee, the Fund secretariat and the bilateral and implementing agencies for their continued hard work and dedication and their unwavering commitment to the implementation of the Montreal Protocol, especially in such difficult times.

#### **V. Report by the co-chairs of the preparatory segment and consideration of the decisions recommended for adoption by the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II) and the Thirty-Third Meeting of the Parties to the Montreal Protocol**

143. The co-chair of the preparatory segment reported that the work of the segment had been concluded successfully. One matter had been deferred to the next in-person meeting, owing to its complex nature, namely the proposed draft decision, submitted by Ghana on behalf of the African States parties to the Montreal Protocol, on stopping environmentally harmful dumping of inefficient refrigeration and air-conditioning appliances using obsolete refrigerants, a matter that had been

considered under agenda item 4 (g) on energy-efficient and low-global-warming-potential technologies. All other draft decisions had been approved for consideration and possible adoption during the high-level segment. She expressed gratitude to all concerned for their hard work and for the spirit of cooperation and compromise that had enabled them to reach agreement on the issues.

## **VI. Dates and venues of the thirteenth meeting of the Conference of the Parties to the Vienna Convention and the Thirty-Fourth Meeting of the Parties to the Montreal Protocol**

144. The Executive Secretary said that the Thirty-Fourth Meeting of the Parties to the Montreal Protocol was tentatively scheduled to be held in Nairobi from 31 October to 4 November 2022, while the thirteenth meeting of the Conference of the Parties to the Vienna Convention and the Thirty-Sixth Meeting of the Parties to the Montreal Protocol were tentatively scheduled to be held in Nairobi from 28 October to 1 November 2024.

145. Subsequently, the parties adopted two decisions on the matter.

## **VII. Other matters**

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

## **VIII. Adoption of decisions by the Conference of the Parties to the Vienna Convention at its twelfth meeting (part II)**

147. The Conference of the Parties to the Vienna Convention adopted the decisions approved during the preparatory segment, as set out in document UNEP/OzL.Conv.12(II)/9/Add.1–UNEP/OzL.Pro.33/8/Add.1.

## **IX. Adoption of decisions by the Thirty-Third Meeting of the Parties to the Montreal Protocol**

148. The Thirty-Third Meeting of the Parties to the Montreal Protocol adopted the decisions approved during the preparatory segment, as set out in document UNEP/OzL.Conv.12(II)/9/Add.1–UNEP/OzL.Pro.33/8/Add.1.

149. During the adoption of decision XXXIII/7, on data and information provided by the parties in accordance with Article 7 of the Montreal Protocol, the representative of the Russian Federation said that his Government had reported to the Secretariat data on HFCs for baseline years 2011–2013 and was therefore in compliance with the data reporting requirement under paragraph 2 of Article 7. He added that the matter seemed not to have been on the agenda of the sixty-seventh meeting of the Implementation Committee and had thus not been properly considered; that the Implementation Committee was the body mandated to pronounce on whether a party was in non-compliance; and that, his Government having submitted the required data, it was inappropriate to include his country in the decision being adopted.

150. The Senior Legal Officer of the Ozone Secretariat said that each year the Implementation Committee considered an agenda item on data reporting, under which the Secretariat reported the data submitted by each party and highlighted which parties had not reported their information or met the reporting requirements by 30 September of that year. The matter in question had been considered by the Implementation Committee under that standard agenda item. With respect to pronouncement of non-compliance, the Meeting of the Parties was the body that made such pronouncements; the role of the Implementation Committee was to consider the matter and forward a recommendation to the Meeting of the Parties, which it had done in the case in question.

151. The representative of the Russian Federation requested that his statement be reflected in the report of the meeting.

## **X. Adoption of the report of the combined meeting**

152. The parties adopted the present report on Friday, 29 October 2021, on the basis of the draft report which had been circulated. The Ozone Secretariat was entrusted with the finalization of the report.

## **XI. Closure of the meeting**

153. Following the customary exchange of courtesies, the meeting was declared closed at 5.50 p.m. on Friday, 29 October 2021.

## Annex I

### Report of the online briefing meeting on the updated replenishment report by the Technology and Economic Assessment Panel task force, held on 18 October 2021

#### Introduction

1. Given the continued COVID-19 pandemic and the related travel restrictions, it was decided that the combined twelfth meeting (part II) of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer and the Thirty-Third Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer would be held online with a reduced agenda, as communicated to parties by the Ozone Secretariat in its updated contingency plan on 28 June 2021.
2. As part of the preparatory work for the online combined meeting, a series of online briefing meetings was organized. Each was scheduled to last a maximum of three and a half hours, with interpretation provided in the six official languages of the United Nations.
3. The meeting reported on below was the third and final briefing meeting in that series.

#### I. Opening of the meeting

4. By agreement between the co-chairs, Ms. Vizminda Osorio (Philippines) and Mr. Martin Sirois (Canada), the briefing meeting was chaired by Mr. Sirois.
5. The meeting was opened by Mr. Sirois at 2 p.m.<sup>1</sup> on Monday, 18 October 2021.
6. The co-chair welcomed representatives to the online briefing meeting on the updated replenishment report prepared by the replenishment task force of the Technology and Economic Assessment Panel. He reminded participants that the meeting was the last of three online briefings convened as part of the preparatory work for the upcoming online combined meeting.
7. A welcoming statement was delivered by Ms. Megumi Seki, Executive Secretary of the Ozone Secretariat, who thanked the participants for their continued attention to matters pertaining to the Vienna Convention and the Montreal Protocol. Noting that a decision on the final level of the replenishment for the period 2021–2023 was still pending and might once again be postponed owing to the continuing constraints imposed by the COVID-19 pandemic, she said that, as in 2020, a series of interim decisions might be considered at the online combined meeting to ensure the smooth operation of the Multilateral Fund for the Implementation of the Montreal Protocol, including support for national preparations by parties operating under paragraph 1 of Article 5 (Article 5 parties) to meet the Kigali Amendment to the Montreal Protocol phase-down schedule. The replenishment report to be presented at the present briefing meeting would serve as the basis for a decision on the 2021–2023 replenishment.

#### II. Organizational matters

##### A. Adoption of the agenda

8. Introducing the sub-item, the co-chair recalled that, given the constraints of an online setting, the provisional agenda of the online combined meeting had been reduced to include only items prioritized for the parties' consideration. One such item was agenda item 4 (a), on the replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol for the period 2021–2023.
9. There were two matters associated with that agenda item: one concerning the updated report of the replenishment task force and another related to the decision on replenishment of the Multilateral Fund. The focus of the briefing meeting would be the replenishment report, which had been updated by the task force and made available in September 2021; the actual replenishment levels of the Multilateral Fund would not be discussed at the present meeting.
10. A presentation on the updated replenishment report would be delivered by the task force and would be followed by a question-and-answer session; general statements could also be made. No

<sup>1</sup> All times mentioned are Nairobi time (UTC + 3).

policy matters or proposed decisions would be discussed. However, as parties might have seen in the online forum, three draft decisions related to replenishment were being proposed; time permitting, the co-chair would give the proponents of those decisions an opportunity to present them at the briefing meeting for the information of the delegates.

11. The updated replenishment report was made available on the portal of the online combined meeting, as well as under a dedicated tab on replenishment on the online forum that had been open for parties' comments and questions from 13 September to 4 October 2021.

12. The following agenda for the briefing meeting was adopted on the basis of the provisional agenda:

1. Opening of the session.
2. Organizational matters:
  - (a) Adoption of the agenda;
  - (b) Organization of work.
3. The updated replenishment report by the Technology and Economic Assessment Panel task force:
  - (a) Presentation by the Technology and Economic Assessment Panel task force;
  - (b) Questions and answers, and general statements.
4. Closure of the meeting.

## **B. Organization of work**

13. The participants agreed to the organization of work proposed by the co-chairs as outlined above. The co-chair noted that a report summarizing the presentation, questions and answers, and statements made during the current meeting would be annexed to the report of the combined meeting, which was expected to be adopted at the online combined meeting. The Secretariat would also post the draft reports of all three briefing meetings held before the combined meeting on the portal of the online combined meeting (<https://ozone.unep.org/meetings/thirty-third-meeting-parties/session-documents>) to enable parties to review them before the adoption of the report of the combined meeting.<sup>2</sup>

## **III. The updated replenishment report by the Technology and Economic Assessment Panel task force**

14. Introducing the item, the co-chair recalled that following the adoption of decision XXXI/1 of the Thirty-First Meeting of the Parties to the Montreal Protocol in 2019, the Technology and Economic Assessment Panel had established a task force to prepare a replenishment report assessing the funding requirement for the Multilateral Fund for the period 2021–2023. The task force's report, dated May 2020,<sup>3</sup> had been reviewed through an online forum and at the forty-second meeting of the Open-ended Working Group of the Parties to the Montreal Protocol, with parties' comments compiled by the Co-Chairs of the Open-ended Working Group for consideration by the task force. The task force had consolidated its responses, additional information and clarifications in a document issued in October 2020.

15. During the forty-third meeting of the Open-ended Working Group, at its online session held on 22 and 24 May 2021 to consider the report on the replenishment of the Multilateral Fund, the parties had discussed the guidance to be provided to the task force on further work on the May 2020 replenishment report. Based on their discussions, as set out in section III of the report of that meeting (UNEP/OzL.Pro.WG.1/43/4), the parties requested the task force to update its report, taking into account the corrections and clarifications identified in the task force document compiling the comments received from parties and the responses of the task force, as well as the decisions, rules and

<sup>2</sup> In addition, the presentations given at the briefing meetings were made available at <https://ozone.unep.org/meetings/thirty-third-meeting-parties/presentations>.

<sup>3</sup> Report of the Technology and Economic Assessment Panel, May 2020, Volume 3: Assessment of the funding requirement for the replenishment of the Multilateral Fund for the period 2021–2023, available at: [https://ozone.unep.org/system/files/documents/TEAP\\_decision\\_XXXI-1\\_replenishment-task-force-report\\_may2020.pdf](https://ozone.unep.org/system/files/documents/TEAP_decision_XXXI-1_replenishment-task-force-report_may2020.pdf).



guidelines agreed by the Executive Committee of the Multilateral Fund before and during its eighty-seventh meeting.

16. The updated report,<sup>4</sup> finalized in September 2021, was posted both on the portal of the online combined meeting and on the online forum, as noted in section II.B above, and the background information provided by the Co-Chairs of the Open-ended Working Group was set out in documents UNEP/OzL.Conv.12(II)/2–UNEP/OzL.Pro.33/2 and UNEP/OzL.Conv.12(II)/2/Add.1–UNEP/OzL.Pro.33/2/Add.1.

## **A. Presentation by the Technology and Economic Assessment Panel task force**

17. The assessment of the funding requirement for the replenishment of the Multilateral Fund for the period 2021–2023 was presented by the three co-chairs of the task force on replenishment, Ms. Bella Maranion, Ms. Suely Carvalho and Ms. Shiqiu Zhang.

18. Ms. Maranion reviewed the terms of reference for the study on the 2021–2023 replenishment of the Multilateral Fund as set out in decision XXXI/1 of the Thirty-First Meeting of the Parties, discussed the membership of the task force, and provided an overview of the task force’s work and timelines since its establishment by the Panel in late 2019. She outlined the basis of the updates made to the report and noted some of the differences between the May 2020 version and the September 2021 update. She provided a brief overview of the Multilateral Fund and its support to Article 5 countries, recalling that in 2020, in its decision XXXII/1, the Thirty-Second Meeting of the Parties had adopted an interim budget of \$268 million for the Multilateral Fund for the triennium 2021–2023, prioritizing those funds for the year 2021 as part of that triennium, until such time as the parties adopted a final decision on replenishment. She then discussed control measures for hydrochlorofluorocarbons (HCFCs), HCFC phase-out management plans (HPMPs) and estimates of funding requirements for the HCFC consumption and production sectors.

19. Ms. Carvalho presented estimates of the 2021–2023 funding requirement for the phase-down of hydrofluorocarbons (HFCs), going over the various steps and assumptions used in the estimation process. Various Kigali Amendment ratification scenarios were presented, with the funding requirement estimated for each scenario. She also touched on the special needs of low-volume-consuming and very-low-volume-consuming countries. Ms. Zhang then outlined considerations related to the estimation of funding requirements for the HFC production sector and for HFC-23 mitigation.

20. Ms. Carvalho presented the estimated funding requirement for the HFC production sector and for HFC-23 mitigation, as well as for institutional strengthening activities. She then summarized the overall funding estimates for the triennium 2021–2023. The range in estimates in the updated report of September 2021 (\$418–\$780 million, depending on the scenario) was narrower than the range in the May 2020 report (\$377–\$809 million), in part owing to a change in ratification scenarios; as at 17 June 2021, 84 Article 5 countries had ratified the Kigali Amendment, compared to only 62 as at 12 March 2020. Ms. Carvalho also presented funding estimates for the triennia 2024–2026 (\$759–\$811 million) and 2027–2029 (\$803–\$842 million).

21. Further details are provided in the presentation available online, as noted above, as well as in the report itself and in a summary set out in annex I to document UNEP/OzL.Conv.12(II)/2/Add.1–UNEP/OzL.Pro.33/2/Add.1.

## **B. Questions and answers, and general statements**

### **Questions and answers**

22. Following their presentation, members of the task force responded to questions from participants.

23. In response to a question regarding the status of early funding, totalling \$25.5 million, received by the Multilateral Fund for Article 5 parties upon their signature of the Kigali Amendment, Ms. Maranion said that the funding had consisted of voluntary contributions from a group of donor countries to finance fast-start activities for the implementation of HFC phase-down. Those funds,

<sup>4</sup> Report of the Technology and Economic Assessment Panel, September 2021, Volume 6: Assessment of the funding requirement for the replenishment of the Multilateral Fund for the period 2021–2023, available at: <https://ozone.unep.org/system/files/documents/TEAP-Decision%20XXXI-1-replenishment-TF-report-september-2021.pdf>.

which had been made available to allow parties to start enabling activities while the HFC cost guidelines were being developed, had since been mostly disbursed.

24. One representative, noting that the task force had estimated that \$100 million would be required in 2024 for 27 projects to meet the 67.5 per cent reduction target in 2025, observed that parties needed at least two or three years to complete a project, including the time needed to request funds, have funding approved and then implement the project, and suggested that the \$100 million therefore be provided during the period 2021–2023. Ms. Maranion responded that in its May 2020 report the task force had estimated the HPMPs needed for certain Article 5 parties to reach the 67.5 per cent target by the 2025 deadline. For the updated report, however, because the adjusted consolidated business plan contained approved and planned HPMP funding estimates covering the entire triennium, the task force had based its HPMP funding estimates on the business plan.

25. The same representative observed that, in the absence of more recent information, the task force had applied the same cost-effectiveness factors in its calculations of indicative figures for the total cost of HFC phase-down as those previously used for HCFC phase-out. She cautioned that the factors used for HCFC phase-out had been based on the factors used for chlorofluorocarbons and that several projects had been unable to be implemented owing to insufficient funding from the Multilateral Fund. Responding on behalf of the task force, Ms. Helen Walter-Terrinoni confirmed that the task force had used the historical information as the best option in the absence of cost guidelines and had not been aware of those details, but appreciated and took note of the comment.

26. Another representative noted that, in its May 2020 report, the task force had estimated that 15 parties would need additional projects beyond those in the Multilateral Fund business plan to achieve a 54.5 per cent reduction in 2023, and had used a compliance-based methodology to determine the reductions and the funding requirements. Further noting that in its updated report the task force had used only the Multilateral Fund 2021–2023 business plan to estimate the funding requirements for new HPMPs, he asked whether the aforementioned 15 parties had been included in the business plan and thus in the new funding requirements. Responding on behalf of the task force, Ms. Elisa Rim explained that in the past, the last year of the business plan had not been available to the task force and that they had needed to derive estimates. Exceptionally, for the triennium 2021–2023, the task force had a full business plan available that accounted for all the HPMPs expected within the following two years, including, for instance, for the Syrian Arab Republic, a country for which the HPMP had not previously been available. In addition, the task force had considered that the business plan would more accurately reflect differences between countries' baselines and starting points for reductions, which the task force had previously had to calculate.

27. Ms. Rim also responded to two other queries from the same representative. With respect to the reason for the significant increase in the total estimated HFC consumption sector phase-down funding requirement for scenarios 2 and 3, Ms. Rim explained that the task force had taken into consideration many questions from the last few rounds of comments, its own document responding to comments<sup>5</sup> and the instructions from recent meetings of the Parties. Asked for the reason behind the increase in the range of funding requirements for institutional strengthening, she said that the figures previously provided had represented only the low end of the range, but that given the number of questions and comments received, the task force had decided to simplify its presentation by indicating the high end of the range as well.

28. One representative offered two comments for future consideration by the task force and parties. First, he suggested that it would be helpful to add a brief section to the report outlining where changes had been made to the funding estimates from the previous report and why the estimates had been changed, which, in the updated report, was not always clear. Second, he flagged a concern that his delegation intended to raise in 2022 for discussion by the parties, regarding the use of the funding in the business plan to determine the funding requirements for the triennium. In his view, basing the funding requirements exclusively on the business plan was inappropriate; previously, a compliance-based methodology had also been used to determine whether a country needed reductions beyond what was identified in the business plan and whether the allocations in the business plan were appropriate. Ideally, the task force would provide funding estimates based on its analysis of the compliance needs of all Article 5 countries, after which the parties would approve a replenishment

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<sup>5</sup> Technology and Economic Assessment Panel decision XXXI/1 replenishment task force report: assessment of the funding requirements for the replenishment of the Multilateral Fund for 2021-2023 – Technology and Economic Assessment Panel replenishment task force responses to the forty-second Open-ended Working Group Co-Chairs' compilation of comments submitted by parties, available at: [https://ozone.unep.org/system/files/documents/TEAP\\_Replenishment\\_Task\\_Force\\_Response\\_to\\_comments\\_FIN\\_AL\\_2020-10-11.pdf](https://ozone.unep.org/system/files/documents/TEAP_Replenishment_Task_Force_Response_to_comments_FIN_AL_2020-10-11.pdf).

amount based on those estimates, and the Executive Committee would allocate funding for each country in the three-year business plan based on available funds. In that way, the funding requirement would drive the business plan rather than the other way around; having the business plan driving the funding requirement led to a circular funding estimation for each triennium.

#### **General statements**

29. All representatives who spoke, including those who asked questions or made comments and one who delivered a statement on behalf of a group of countries, thanked the members of the task force warmly for their presentation, and more generally for their efforts in updating the report and responding to parties' many requests during a particularly difficult period.

30. One representative, speaking on behalf of a group of countries, said that it was important for the task force to bear in mind that the purpose of the Montreal Protocol was to ensure that countries met their obligations. The updated replenishment report was not entirely clear in terms of the assumptions used to differentiate between the various scenarios, the funding needs of different countries, and other aspects not linked to compliance. It would be important to consider the future discussions and potential decisions of the Executive Committee of the Multilateral Fund. Nevertheless, the information in the updated report was useful and would inform future discussions on the replenishment, which should be ambitious and spur on all parties to ratify the Kigali Amendment.

31. The representative of Australia presented a draft decision submitted by Australia and the European Union on the 2022 contributions to the Multilateral Fund for the triennium 2021–2023 (UNEP/OzL.Conv.12(II)/3/Add.6–UNEP/OzL.Pro.33/3/Add.6, annex). The draft decision, which replicated decision Ex.IV/1 on 2021 contributions to the Multilateral Fund, was intended to enable parties that needed to take a decision on their contribution early in the year, for internal budgeting reasons, to do so. She added that any decision on replenishment taken early enough in 2022 would override the draft decision, and offered to provide any clarifications upon request, if needed.

32. Speaking on behalf of the European Union and its member States, the representative of France added that the draft decision was important, as it allowed non-Article 5 parties to move forward with their contributions without the need to wait for a decision on replenishment.

33. The representative of Canada presented a draft decision on an updated interim budget for the Multilateral Fund for the triennium 2021–2023 (UNEP/OzL.Conv.12(II)/3/Add.7–UNEP/OzL.Pro.33/3/Add.7, annex), noting that the Thirty-Second Meeting of the Parties had taken a similar decision in 2020 (decision XXXII/1). The previous decision had been based on the assumption that replenishment would be decided in 2021, but as that had not taken place, the interim budget required updating, both because new contributions had been made in 2021 and because the previous decision had prioritized the budget for 2021 and had subsequently needed to be updated for 2022.

34. The representative of Norway said that his delegation had submitted a draft decision on an extraordinary Meeting of the Parties in 2022 (UNEP/OzL.Conv.12(II)/3/Add.8–UNEP/OzL.Pro.33/3/Add.8). Presenting the proposal, he said that, given the persistent uncertainty regarding the finalization of the negotiations for the 2021–2023 replenishment period and the need to develop and decide on the terms of reference for the 2024–2026 replenishment period, it would be useful to provide for an extraordinary Meeting of the Parties in 2022 to finalize the 2021–2023 replenishment. Such a meeting would ideally be held back-to-back with the meeting of the Open-ended Working Group currently planned for July 2022. He presented the draft decision, explaining that it was very similar to decision XXXII/2 on the extraordinary Meeting of the Parties in 2021.

## **IV. Closure of the meeting**

35. The co-chair declared the online briefing meeting on the updated replenishment report by the Technology and Economic Assessment Panel task force closed at 4.45 p.m. on Monday, 18 October 2021.

## Annex II

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

#### A. Final assessment by the Methyl Bromide Technical Options Committee of critical-use nomination exemptions for methyl bromide

1. On behalf of TEAP, the Methyl Bromide Technical Options Committee co-chairs, Marta Pizano and Ian Porter presented an overview of the trends and outcomes for the CUN nominations submitted in 2021 for use in 2022 and 2023.
2. In opening the presentation, Co-chair Ms Marta Pizano reinforced the diversity of technical skills of the MBTOC committee ranging from experts who had skills not only in all aspects of chemical and non-chemical replacements to MB but also pathogen and insect control and knowledge of trade implications and bilateral arrangements for QPS use of methyl bromide. Access to the detailed CUN final report was on the meeting portal website.
3. She explained that four CUN nominations had been submitted received this year for preplant soil use of methyl bromide, two from non A5 parties, Canada and Australia and two from an A5 party, Argentina. No submissions were received for Commodity and structural uses.
4. An overview of the stock amounts reported by three parties at the end of 2020 showed that no stocks were held by those parties. She reminded parties that MBTOC does not adjust CUE recommendations to account for stocks, if these are reported.
5. Ms Pizano then provided an overview of the CUNs submitted in 2021 compared to those with 2020 and explained that all parties had reduced nominations from 80.55 tonnes to 29.107 tonnes, however the reduction needed to take account that the Republic of South Africa had not sought any nominations in this round.
6. Ms Pizano then commenced an overview of the outcome of the final assessment for CUE recommendations for all critical uses of MB (t) for 2022 and 2023.
7. For the Australian strawberry runners the Party nominated 14.49 tonnes, a 50% reduction on the previous year, stating that they will reduce the licensed amount to 0 tonnes if methyl iodide (MI) is registered and available by 2023. MBTOC accepted that MI was the only alternative for soil treatment to produce all generations of runners and that the party would reduce MB use entirely as per their transition plan.
8. Mr. Porter then explained that for Canadian strawberry runners in 2022 the nomination had been reduced by 5% to that in the previous round to 5.017 tonnes to account for uptake of soilless production systems. This was based on MBTOC's recommendation that soilless production techniques could offset a proportion of MB use for production of G2A-stage tips.
9. MBTOC recommended the full amount of 3.70 tonnes for strawberry fruit and 5.90 tonnes for tomato applied for in the nominations from Argentina. MBTOC made this recommendation on the basis that the party had reduced its nominations by 15% over the previous year and was progressing well to phase out MB for these uses.
10. He then indicated that no submission was received from RSA due to COVID issues affecting current house sales and the need for MB fumigation in the current year, so the remaining stocks will be used in 2022.
11. Mr Porter then highlighted that since 1999, reductions in MB controlled uses (including reductions in the 18,600 tonnes to very small amounts (ie 30 t) sought for critical uses in the current round) has led to >30% reduction in the concentration of MB in the atmosphere and this is a key driver for present ozone layer recovery owing to the short shelf life of MB in the atmosphere.
12. He stressed however that further reductions in atmospheric levels of MB now rely on reduction of MB emissions from QPS uses, by adopting alternatives and use of recapture and destruction or recapture and reuse of MB, and by preventing non-compliant uses.

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

13. The timelines for submission and evaluation of CUNs in 2020 were shown, as required under Decision Dec XVI/6 1, bii.

## **B. Assessment by the Scientific Assessment Panel of ozone depletion for 2022**

14. The Scientific Assessment Panel (SAP) outlined the current status of their work. A major part of the current work is involved in preparation of the 2022 Scientific Assessment of Ozone Depletion. The chapter teams have all prepared detailed first drafts, which were sent out for review, on time, by early October. Responses from the referees are requested by mid-November, after which second drafts will be prepared. Important future milestones include a review meeting in March 2021 and final preparation of the Assessment, including of the Executive Summary, in July. The Assessment is satisfyingly on track.

15. The SAP have previously discussed the Report on Unexpected Emissions of CFC-11 (<https://ozone.unep.org/science/assessment/sap>) at OEWG 43. An update was presented based on a SAP presentation to the Quadrennial Ozone Symposium in October 2021. Analyses of data that have become available recently show that the global atmospheric concentration of CFC-11 continued to drop rapidly through 2020 and the first part of 2021. Global CFC-11 emissions, derived from the atmospheric measurements are even lower than those in 2019, are substantially below 2008-2012 values and are approaching expected levels, suggesting that much of the new use and unreported production has stopped. There remain important questions concerning the magnitudes of the present-day CFC-11 bank associated with pre-2010 production and the recent unreported emissions.

16. Finally, the Antarctic ozone hole of 2021 was discussed. The area of the hole was higher than in some recent years, but not as high as during the period of peak ODS (halogen) loading of the stratosphere in the 1995-2010 period. Temperatures within the Antarctic polar vortex have been lower than average in 2021, conducive to larger ozone depletion. This depletion is consistent with our understanding of the relative roles of meteorological processes and halogen loading in controlling ozone depletion, as has been discussed by SAP previously. The previous 2020 Antarctic hole was of longer duration than normal; there are indications that the same may apply in 2021.

## **C. 2021 update by the Environmental Effects Assessment Panel on the environmental effects of the interaction between stratospheric ozone depletion, ultraviolet radiation and climate change**

17. On behalf of EEAP, the Co-chair, Janet Bornman, presented the 2021 Update Assessment on the environmental effects of stratospheric ozone depletion, UV radiation, and interactions with climate change in accordance with the current Terms of Reference.

18. The annual EEAP Updates contribute towards the Quadrennial Assessments, providing the latest scientific information of relevance to the Parties. Janet Bornman also referred to the Panel's ongoing collaboration with WHO and WMO, as well as with TEAP and SAP. The EEAP workplan for the 2022 Quadrennial Assessment was outlined, together with the intended format that will include Summary of highlights, Executive summary, main text, and Frequently Asked Questions (FAQs).

19. Highlights of the 2021 Update Assessment included the interactive effects of UV radiation, climate change, and stratospheric ozone depletion in regard to the record duration of the 2020 Antarctic ozone hole and record high UV index. However, the trend of continuing decline in stratospheric ozone depletion during September is still evident. Over the Arctic, the increased depletion of the stratospheric ozone contributed to high spring temperatures in Asia and Europe. It was noted that human-caused (anthropogenic) climate change has the potential to partially counteract the positive effects of the Montreal Protocol on the Arctic ozone layer, according to the recent Intergovernmental Panel on Climate Change, the IPCC (2021).

20. The changes in UV radiation, climate change and stratospheric ozone have a range of adverse consequences for the environment and human health. The severity of these effects has been lessened due to the Montreal Protocol, allowing also for the beneficial effects of exposure to UV radiation – such as for certain immune diseases, including COVID-19. Incidences of skin cancer and eye diseases continue to be of concern.

21. The 2021 Update also reported on extreme climate events (ECEs), the severity and frequency of which have been associated with increased global warming from greenhouse gases. ECEs, such as wildfires and catastrophic drought, expose the terrestrial and aquatic environments to additional UV radiation. Consequences of the increased global warming overlain by the ECEs has widespread negative effects for terrestrial and aquatic ecosystems and their biodiversity. An example of a feedback process from ECEs includes increased input of terrestrial runoff (dissolved organic matter, DOM) into

water bodies, where UV radiation breaks down the DOM at the surface, leading to the release of greenhouse gases from this DOM, adding to the burden of global warming. However, scientists have warned of the expected large environmental effects from any potential geoengineering of the Earth's climate to decrease warming.

22. UV radiation also plays a role in the breakdown (degradation) of controlled substances and their alternatives. For example, trifluoroacetic acid (TFA), which is a widespread contaminant from the breakdown of HFCs, HCFCs, and HFOs, as well as having natural sources. Recently TFA was detected in surface waters, beer, tea, herbal infusions and indoor dust, but in concentrations well below those that would pose a human health risk.

23. The Montreal Protocol has stimulated innovation in a number of sectors. For instance, in the science of protecting natural and synthetic materials (e.g., wood, plastics, textiles), where their outdoor lifetimes are reduced by exposure to UV radiation and weathering. The insertion of stabilisers into materials, including compounds with absorptive or reflective properties, lessens the impact of UV radiation, although this means higher cost of these materials and release of additives into the environment. However, without the Montreal Protocol more degradation by UV radiation would have occurred, resulting in increased use of stabilisers, and concomitant higher cost of materials and greater release of additives into the environment. The breakdown of plastics and other materials by UV radiation, leading to the release of contaminants, carries potential health and environmental risks.

24. Lastly, reference was made to a modelling study further emphasising the significance of the Montreal Protocol in protecting plants as important carbon sinks, although the estimations understandably embody high uncertainties.

25. Co-Chair Janet Bornman concluded by noting the multiple benefits of the Montreal Protocol by referring to the latter's ongoing contribution to many of the Sustainable Development Goals.

#### **D. Presentation on the work of the Technology and Economic Assessment Panel and its technical options committees and task forces**

26. Professor Ashley Woodcock made the presentation on behalf of his co-chairs Bella Maranion and Marta Pizano, and the Technology and Economic Assessment Panel (TEAP) whom he thanked for their dedication and hard work.

27. Before making the presentation, he placed on record the gratitude for the heroic efforts of the Ozone Secretariat to ensure continuity of our TEAP work. He also offered thanks and congratulations to the retiring Chief Officer of the MLF Secretariat, Eduardo Ganem, whose generous support and wise guidance, have been invaluable to the TEAP for many years.

28. TEAP has 20 members, supported by 5 Technical Options Committees, with over 150 experts from around the world. During 2021, TEAP has provided its annual Progress Report, the Technical Note on the Vaccines Cold Chain, completed its preliminary and final evaluation on Critical Use Nominations for Methyl Bromide, and delivered and presented three Task Force reports

29. He outlined some of the challenges facing the TEAP in the last year. The COVID pandemic has required Montreal Protocol processes to adapt to on-line meetings. Since TEAP last met in MOP-31 in Rome in 2019, it has maintained consensus and engagement to deliver 14 reports. TEAP and TOC members are world-leading technical experts in their field. It constantly strives to maintain that level of independent technical and economic expertise for the service of parties. TEAP is also aware of the need to ensure that its membership meets the evolving needs of parties whilst ensuring continuity of its work under the Montreal Protocol. When TEAP meets face to face next year, it is planning discussions on its structure, membership and future directions to present in its 2022 Progress Report.

30. Professor Woodcock then moved to describe the sector highlights and emerging issues from the five technical options committees.

31. **FTOC (Foams)** described the continued progress in the adoption of zero- and low-GWP foam blowing agents. Ongoing issues for small and medium enterprises include the cost of HFCs and HFOs/HFCOs, and the safe use of flammable blowing agents. In addition there have been supply chain issues including insufficient capacity for low GWP options, access to raw materials, weather-related disruptions to chemical plants for both low-GWP blowing agents and polyols, and shipping disruptions

32. **HTOC (Halons)** state that although R&D continues, the certification timescales for civil aircraft are long, and it will still be at least several years before any of the fire extinguishing agents

currently being evaluated could be in service. There is increasing contamination of recovered halon 1301. To recycle halons to an acceptable level of purity requires distillation, which can introduce further losses. Recycling companies are reporting problems shipping halons across international borders including misclassifying recovered halons as hazardous waste under the Basel Convention. Ship breaking could represent a significant source of halon 1301, but the amount potentially available is still under investigation by the HTOC. Importantly, HTOC believes there is a need for awareness programs to reverse the loss of institutional knowledge on requirements for halon management.

33. There has been an unprecedented and precipitate fall in air passengers with the global pandemic, but no decline as yet in atmospheric halon 1301 levels. The decline in atmospheric halon 1301 levels appears to have flattened for the last 5 years, relative to the projected decline in halon 1301 emissions from the HTOC Bank Model.

34. **MBOC (Methyl Bromide)** reports that there is good progress with critical use nominations (CUNs) now down to less than 70 tonnes/year. However, Article 7 data suggests some parties may not be distinguishing controlled versus uncontrolled use appropriately. MB stocks now dwarf CUNs, and whilst parties *with* CUNs are mandated to report stocks (about 20 tonnes), parties *without* CUNs do not report stocks (which may be up to 1500 tonnes, and could be used for controlled uses). Parties may wish to consider the reporting rules on stocks.

35. Parties may wish to start to consider Quarantine versus Pre-shipment uses of MB separately. The use of MB for overall QPS use is estimated at 10,000 tonnes (about 150 times more than the CUNs). For pre-shipment, alternatives exist for most uses, because of the lower standard of pest control required. For uses where MB is still essential (eg quarantine), recapture and recycle technologies are now available

36. The **MCTOC (Medical and Chemical)** reports that atmospheric-derived emissions for a range of controlled substances, including e.g., CFC-113/113a, HCFC-132b, -133a, -31, are higher than expected based on reported production. They stated that a clearer understanding of the production of feedstock, intermediates, and by-products, would allow a meaningful analysis of global and regional emissions.

37. Global HFC-23 emissions were at their highest in 2018 compared with emissions expected as the by-product of HCFC-22 production. Either planned HFC-23 emissions reductions have not have been fully realized, or alternatively there may be unreported HCFC-22 production.

38. An assessment of technologies used for the destruction of controlled substances under decision XXX/6 will be included in MCTOC's 2022 Assessment Report. MCTOC will also provide an update on issues surrounding the destruction of banks of controlled substances

39. The **RTOC (Refrigeration, Air Conditioning and Heat Pumps)** reported that since the RTOC 2018 Assessment Report, 1 single-component refrigerant and 14 blends have achieved classifications. They also reported that international institutions are working to review the refrigerant charge in different applications, with appropriate safety standards, to allow the use of low GWP flammable refrigerants. The standard for commercial refrigeration was revised upwards for larger charges of flammable refrigerants and is currently being transferred to national standards. Work on the standard for air conditioning and heat pumps is on-going, aimed at increasing the charge per unit room floor area for all flammable refrigerants

40. Training in the servicing and maintenance of RACHP equipment to reduce leaks will reduce emissions of high GWP HFCs. Parties attention was drawn to the Vaccine Cold Chain Technical Note on the Ozone secretariat website.

41. Professor Woodcock the moved to summarise the key findings for the three task force reports.

42. The **TEAP Replenishment Task Force** presented its updated estimated funding requirement for the 2021-2023 triennium, narrowing the range to approximately US\$ 418-780 million from its report last year. This reflects progress on ratifications of the Kigali Amendment: 84 of 144 A5 parties have now ratified, especially the largest consuming party in Group 1. It also reflects progress at the Executive Committee on project approvals and agreements, a business plan now covering the full triennium, and new HFC project preparation cost guidelines. As requested in the decision and for the consideration of parties, RTF estimates also included support for the special needs of low- and very low-volume consuming countries, enabling activities, stand-alone projects, and cost of early activities to avoid the growth of high-GWP HFCs. TEAP sincerely appreciates the work of this two-year Task Force to support parties reaching a decision next year that supports continued, important progress of A5 parties on ODS phaseout and HFC phasedown.

43. The **TEAP Task force on Unexpected Emissions of CFC-11** found that unreported CFC-11 production and use is indicated from the comparison of inventory-estimated expected CFC-11 emissions with emissions derived from atmospheric measurements. Based on the analysis, emissions from the pre-2010 CFC-11 bank alone could not explain the derived CFC-11 emissions during 2013-2018. Also, unreported CFC-11 production and use would seem to have started in 2007. There was likely a combination of technical and economic reasons for illegal CFC-11 production and the resumption of its use in closed-cell foams.

44. The CFC-11 Task Force analysis indicated that the Cumulative unreported CFC-11 production is in the range of 320 to 700 thousand tonnes for the years 2007 to 2019. Assuming that CFC-11 was used in closed-cell foams, this amount of CFC-11 production leads to an increase in the CFC-11 bank of ~300 thousand tonnes. The opportunities to recover CFC-11 are limited to global active banks, mainly insulation foams and to a lesser extent centrifugal chillers. Management of active foam banks at the end-of-life could divert substantial amounts of CFC-11 containing foam wastes away from landfill towards destruction, mitigating emissions.

45. MCTOC stated that parties may wish to consider how to generate global data on production by market sector, which is critical to the Montreal Protocol's ability to answer future questions about emissions discrepancies, as a global check on compliance.

46. The **TEAP Task Force for the continued provision of information on Energy efficient and Low-GWP technologies (EETF)** observed that the demand for cooling is increasing rapidly, which is leading to increasing global warming from both direct and indirect emissions. The Montreal Protocol has already recognised the need to improve the energy efficiency of RACHP equipment during the phaseout of ODS and now the phase-down of high-GWP refrigerants. The EETF observed that there are many opportunities available to improve Energy efficiency while implementing the Protocol's control measures. These include facilitating the collaboration between Ozone Units and energy departments, encouraging integrated regulations for energy efficiency during HCFC phase-out and HFC phasedown, Improving access to lower GWP/high EE RACHP technologies and preventing the dumping of high GWP/low EE RACHP equipment in A5 parties, together with considering how to assist parties who wish to adopt a "fast mover" status with synergistic HCFC phase-out/HFC phase-down with progressive improvement in energy efficiency

47. Professor Woodcock introduced the Terms of Reference for the 2022 TEAP Assessment Report, described in Paragraph 6 of Decision 31/2 which states:

"That, in its 2022 report, the [TEAP] should include an assessment and evaluation of the following topics:

- (a) Technical progress in the production and consumption sectors in the transition to technically and economically feasible and sustainable alternatives and practices that minimize or eliminate the use of controlled substances in all sectors;
- (b) The status of banks and stocks of controlled substances and the options available for managing them so as to avoid emissions to the atmosphere;
- (c) Challenges facing all parties to the Montreal Protocol in implementing Montreal Protocol obligations and maintaining the phase-outs already achieved, especially those on substitutes and substitution technologies, including challenges for parties related to feedstock uses and by-production to prevent emissions, and potential technically and economically feasible options to face those challenges;
- (d) The impact of the phase-out of controlled ozone-depleting substances and the phase-down of HFCs on sustainable development;
- (e) Technical advancements in developing alternatives to HFCs suitable for usage in countries with high ambient temperatures, particularly with regard to energy efficiency and safety."

48. He ended by stating that TEAP and its TOCS have made progress with advanced planning and organisation, and that the TOCs have begun their work. TEAP is considering the gap between atmospheric-derived emissions and calculated emissions based on Article 7 data to understand the potential challenges facing parties and potential options that might address those challenges. TEAP is anticipating emerging issues for consideration in its Assessment. Finally, TEAP is coordinating with SAP and EEAP on crossover issues for the Assessments, which will then form the basis for the Synthesis Report.



## Annex III

# Report of the online briefing meeting on the Technology and Economic Assessment Panel 2021 progress report, held on 7 October 2021

## Introduction

1. Given the continued COVID-19 pandemic and the related travel restrictions, it was decided that the combined twelfth meeting (part II) of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer and Thirty-Third Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer would be held online with a reduced agenda, as was communicated to parties by the Ozone Secretariat in its updated contingency plan on 28 June 2021.
2. As part of the preparatory work for the online combined meeting, a series of online briefing meetings was organized. Each was scheduled to last a maximum of three and a half hours, with interpretation provided in the six official languages of the United Nations.
3. The meeting reported on below was the second of the online briefing meetings.

## I. Opening of the meeting

4. By agreement between the co-chairs, Ms. Vizmindia Osorio (Philippines) and Mr. Martin Sirois (Canada), the briefing meeting was chaired by Ms. Osorio.
5. The meeting was opened by Ms. Osorio at 2 p.m.<sup>1</sup> on Thursday, 7 October 2021.
6. The co-chair welcomed representatives to the online briefing meeting on the 2021 progress report of the Technology and Economic Assessment Panel. She reminded participants that the briefing meeting was an integral part of the online combined meeting and had been scheduled to precede the online combined meeting to save time and to help participants prepare for that meeting.
7. A welcoming statement was delivered by Ms. Megumi Seki, Executive Secretary of the Ozone Secretariat. She noted that only one issue from the 2021 progress report of the Panel, changes in Panel membership, was to be discussed at the Thirty-Third Meeting of the Parties to the Montreal Protocol. It was nevertheless considered important that the Panel present the highlights of its full 2021 progress report and inform parties of the status of work and progress made in various sectors, to enable parties to consider whether there were any issues that needed to be addressed at future meetings.

## II. Organizational matters

### A. Adoption of the agenda

8. The co-chair recalled that the provisional agenda of the online combined meeting was a reduced agenda. The present briefing meeting provided an opportunity for the Panel to present highlights from its full progress report and to answer questions from parties. The presentation would include an update on progress on alternatives in the sectors in which controlled substances were used, and on organizational and administrative matters. The progress report was available on the portal of the online combined meeting; it included reports on the work of the five technical options committees of the Panel, and a report, contained in an addendum, by the vaccines cold chain subcommittee established by the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee (RTOC).
9. There would be no negotiation or debate on policy matters during the briefing meeting. Apart from changes in the membership of the Panel, any other matters that the parties wished to discuss further could be taken up at a future meeting rather than at the online combined meeting in 2021.

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<sup>1</sup> All times mentioned are Nairobi time (UTC + 3).

10. The following agenda for the briefing meeting was adopted on the basis of the provisional agenda:

1. Opening of the session.
2. Organizational matters:
  - (a) Adoption of the agenda;
  - (b) Organization of work.
3. Technology and Economic Assessment Panel 2021 Progress Report:
  - (a) Presentation by the Panel;
  - (b) Questions and answers, and general statements.
4. Closure of the meeting.

## B. Organization of work

11. The participants agreed to the organization of work proposed by the co-chairs, as outlined above. The co-chair noted that a report summarizing the presentations, questions and answers, and statements made during the current meeting would be prepared and annexed to the report of the combined meeting, which was expected to be adopted at the online combined meeting.<sup>2</sup> The Secretariat would also post the draft reports of all three briefing meetings held before the combined meeting on the portal of the online combined meeting (<https://ozone.unep.org/meetings/thirty-third-meeting-parties/session-documents>) to enable parties to review them before the adoption of the report of the combined meeting.<sup>3</sup>

## III. Technology and Economic Assessment Panel 2021 progress report

### A. Presentation by the Panel

#### Introduction

12. Ms. Marta Pizano, co-chair of the Panel, said that progress reports would be presented by the five technical options committees and the vaccines cold chain subcommittee. In accordance with decision XXXI/8 of the Thirty-First Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, the Panel was requested to provide, as part of its annual progress report, a summary outlining the procedures that the Panel and its technical options committees had undertaken to ensure adherence to the Panel's terms of reference through clear and transparent procedures, including full consultations with the focal points, in line with the terms of reference, regarding: (a) nomination processes, taking into account the matrix of needed expertise and already available expertise; (b) proposed nominations and appointment decisions; (c) termination of appointments; and (d) replacements. She described in detail the responsibilities of experts and the importance of maintaining a reasonable pool size and a balance with regard to gender, geographical representation and expertise, while avoiding duplication of expertise. Each technical options committee provided an annual report, in the progress report of the Panel, on the expertise it required.

13. The COVID-19 pandemic had required the adaptation of Montreal Protocol processes; however, 14 reports had been prepared in 2020 and 2021, despite the pandemic. The Panel and the technical options committees were preparing their 2022 assessment reports, which were scheduled to be presented in 2023. Both the Panel and parties should consider the overall annual workload, the deadlines for delivery and support for technical options committees in making decisions that requested work. The Panel was planning face-to-face discussions in 2022 on its structure, membership and future direction. She recognized the exceptional commitment of members of the Panel and the technical options committees and the continued support of parties.

<sup>2</sup> In addition, the presentation by the Technology and Economic Assessment Panel on its 2021 progress report was made available at <https://ozone.unep.org/meetings/thirty-third-meeting-parties/presentations>.

<sup>3</sup> In addition, the presentations given at the briefing meetings were made available at <https://ozone.unep.org/meetings/thirty-third-meeting-parties/presentations>.

### **Flexible and Rigid Foams Technical Options Committee**

14. Ms. Helen Walter-Terrinoni, co-chair of the Flexible and Rigid Foams Technical Options Committee (FTOC), noted that good progress had been made in the transition to foam-blowing agents with low global warming potential and zero ozone depletion potential (ODP), particularly in foams in domestic appliances. Many large and multinational enterprises had converted to zero ODP alternatives, while at the same time increasing the use of insulation to reduce energy consumption and greenhouse gas emissions. The remaining challenges were related to cost, as some high-global-warming-potential hydrofluorocarbons (HFCs) were gaining a market share because of their low price; the flammability of hydrocarbons, the associated capital investment for conversion and the higher cost of HFCs and hydrofluoroolefins (HFOs) were further issues. Not all companies located in the territory of parties operating under paragraph 1 of Article 5 of the Montreal Protocol (Article 5 parties) were funded by the Multilateral Fund for the Implementation of the Montreal Protocol. Some small and medium enterprises could therefore not afford the capital investment needed for conversion to flammable hydrocarbons, and some did not have the technical resources to train employees to use flammable alternatives. Hydrocarbons were reportedly being tested as blowing agents for spray foam, and FTOC would follow up on measures being taken to address the potential risks of fire and explosion. Other alternative blowing agents were being manufactured in China and Japan. The COVID-19 pandemic was disrupting the supply chain for HFOs, hydrochlorofluoroolefins (HCFOs) and compatible polyols, for which the demand was increasing because of bans on high-global-warming-potential foam-blowing agents.

### **Halons Technical Options Committee**

15. Mr. Daniel Verdonik, co-chair of the Halons Technical Options Committee (HTOC), said that several factors were affecting the availability and quality of recovered halons from fire protection sectors and especially from the civil aviation sector, with one of those factors being significant contamination by recovered halon 1301. Some authorities prevented the cross-boundary shipment of halon 1301, complicating the shipping of prefilled components by air; furthermore, some authorities classified recovered halon as hazardous waste under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, disrupting the supply of recycled and reclaimed halon 1301. Ship breaking could be another source of halon 1301. Parties might wish to consider the open trade of recovered, recycled and/or reclaimed halons in bulk containers or in prefilled fire protection equipment to allow aircraft to fulfil requirements and to emphasize the importance of the complete recovery of halons to minimize emissions during ship breaking and recycling to other uses.

16. When the agent was removed from containers to test the integrity of cylinders, emissions and contamination were possible, whereas a new ultrasonic method obviated emptying the cylinder, which would reduce future emissions and conserve existing supplies. HTOC was concerned that some personnel who managed fire protection agents that were controlled under the Montreal Protocol had inadequate experience in their use, recovery, recycling, reclamation and banking. Although research continued, especially for civil aviation applications, certification was a lengthy process, and it would be several years before any of the fire extinguishing agents being evaluated could be used on aircraft. Parties might wish to consider conducting awareness programmes on the recovery, recycling, reclamation and banking of halons and on hydrochlorofluorocarbon (HCFC) and HFC fire protection agents addressed in the Kigali Amendment to the Montreal Protocol; they might also consider requesting that the International Civil Aviation Organization continue to liaise with HTOC.

17. An updated response to decision XXX/7 of the Thirtieth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, on the future availability of halons and their alternatives, took into account the fact that the COVID-19 pandemic had greatly affected the aviation industry, with a 60 per cent decrease in passenger numbers between 2019 and 2020 and a prediction that growth rates would not return to pre-COVID-19 levels for approximately five years. HTOC was reviewing the developments. Global emissions of halon 1301, however, did not appear to have been affected by the reduction in aviation flight hours, suggesting that those emissions were not occurring during flights. HTOC was investigating that finding with a view to reducing future emissions.

### **Methyl Bromide Technical Options Committee**

18. Mr. Ian Porter, co-chair of the Methyl Bromide Technical Options Committee (MBTOC), said that only six requests for exemption from the ban on the use of methyl bromide had been submitted in 2020 and four in 2021. The amount requested (under 30 tonnes) was 67 per cent lower than that requested in 2020, which reflected the adoption of alternatives in the vast majority of sectors in which methyl bromide had been used, both as a soil fumigant and as a post-harvest or structural treatment.

The phasing out of specific critical uses, such as for strawberry runners in Australia and Canada, and to eliminate the nematode *Nacobbus aberrans* on tomatoes in Argentina, was proving more difficult.

19. The information available to MBTOC suggested that not all parties were reporting all controlled and non-controlled uses of methyl bromide, and a review had shown that between 2005 and 2013, about 7,950 tonnes of methyl bromide production had not been reported as consumption. Parties might wish to consider how to improve reporting. Although the accounting framework indicated that none of the parties that had applied for exemptions in 2021 held any stocks, there was no requirement for parties to report stocks unless they sought an exemption; as a result total global stocks were unknown. MBTOC was concerned that stocks that had been held by Article 5 parties before 2015 (approximately 1,500 tonnes) and stocks held for use in quarantine and pre-shipment were being used for controlled uses for which alternatives might exist. MBTOC considered that the accounting framework or Article 7 reporting should provide information on all stocks held by parties.

20. Exempted quarantine and pre-shipment uses of methyl bromide (approximately 10,000 tonnes per year) greatly exceeded controlled uses and were now the major anthropogenic contributor to increased concentrations of methyl bromide in the atmosphere and resulting damage to the ozone layer. Although some parties had successfully phased out quarantine and pre-shipment use, global consumption had not changed during the past decade, as some Article 5 parties had increased consumption for that use. The adoption of several effective alternatives to methyl bromide, such as heat, irradiation, sulfuryl fluoride and ethane dinitrile, could replace an estimated 30 to 40 per cent of current quarantine and pre-shipment use. Some countries were using alternatives and/or emission reduction technologies (e.g., recapture), where possible, to offset the use of methyl bromide in quarantine and pre-shipment. As there were technical alternatives for most pre-shipment uses, parties might wish to review the current definition of quarantine and pre-shipment and determine whether pre-shipment uses could be listed for control under the Protocol.

21. MBTOC continued to collaborate with the International Plant Protection Convention on potential reductions in the use of methyl bromide within a memorandum of understanding signed with the Montreal Protocol. The 32 approved treatments and 9 phytosanitary treatments under consideration could replace methyl bromide.

22. The compound sulfuryl fluoride was a widely adopted alternative for the disinfection of structures, especially for the treatment of empty structures such as flour mills and food and feed processing premises. Concern had been growing, however, about the high global warming potential of the compound. The primary source of global sulfuryl fluoride emissions in 2019 had been structural fumigation in North America; however, the increase over the past two decades had also been caused by increased use in post-harvest treatment in many countries.

23. Since 1999, reductions in the use of methyl bromide had led to a greater than 30 per cent reduction in its concentration in the atmosphere. Further reductions would require the reduction of emissions from quarantine and pre-shipment uses, through the use of alternatives, recapture and/or reuse and the prevention of non-compliant uses.

#### **Medical and Chemicals Technical Options Committee**

24. Ms. Helen Tope, co-chair of the Medical and Chemicals Technical Options Committee (MCTOC), said that the production of intermediates in situ or in the same industrial plant complex was not typically reported as production of controlled substances for feedstock use. Reporting was required only if the intermediates were transported off-site and used as feedstock. The use of different methods for reporting production resulted in inconsistent attribution of chemical production for feedstock uses and for intermediates. HCFC-132b, HCFC-133a and HCFC-31 had been measured, which were probably emitted as intermediate by-products, and the trends in atmospheric emissions of the chlorofluorocarbons (CFCs) CFC-113 and CFC-113a were higher than expected in relation to reported feedstock production. In situ production of controlled substances as intermediates in the manufacture of chemicals should be registered for clear estimates of emissions of CFC-113 and CFC-113a and other controlled substances. Parties might wish to review CFC-113 and CFC-113a production to ensure that feedstock production was fully reported. Parties might also wish to consider, in the absence of reported data, how to account for the production of controlled substances as intermediates to permit meaningful global analysis.

25. HFC-23 was a by-product in the production of HCFC-22. A study published in 2020 indicated that global HFC-23 emissions derived from atmospheric measurements were the highest ever in 2018, while those as a by-product, primarily from reported HCFC-22 production, were much lower. The discrepancy was attributed to lower HFC-23 emissions than planned or to substantial unreported production of HCFC-22. Other HFC-23 emissions sources were its continued use as a low-temperature

refrigerant and as a fire-extinguishing agent in some countries. MCTOC would report further on potential sources of controlled substances from chemical production processes in 2022.

26. The Panel had been requested to assess destruction technologies listed by parties as not approved or not determined, and MCTOC had suggested providing guidance for parties on the relevant information to be submitted. No information had been submitted in 2021, and parties were invited to provide such data.

27. The alternatives to metered-dose inhalers containing HFCs were inhalers with lower carbon footprints, such as dry-powder or “soft-mist” inhalers for all categories of treatment. The manufacture, use and disposal of inhaler devices adversely affected the environment because of plastics and other components of the disposable devices and the high-global-warming-potential propellant gases used in pressurized inhalers. Two new propellants, HFO-1234ze(E) and HFC-152a, with 100-year global warming potentials of less than 1 and 124, respectively, were being developed.

### **Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee**

28. Mr. Roberto Peixoto, co-chair of RTOC, said that since the publication of the RTOC assessment report in 2018, one single-component refrigerant and fourteen blends had been approved, particularly with regard to flammability. IEC 60335-2-89, applicable to commercial refrigeration, had been revised to include larger charges of flammable refrigerants and was being transferred to national standards. Work was under way on IEC 60335-2-40 for use in air conditioning and heat pumps, and particularly its use to increase the charge of all flammable refrigerants per unit floor area. The importance of reducing direct and indirect carbon dioxide (CO<sub>2</sub>) emissions in the sector was gaining increasing attention, especially for the sustainable design and operation of equipment. Improving the energy efficiency of new equipment during the phasing out of HFCs was an opportunity to reduce energy demand while replacing old equipment containing high-global-warming-potential HFCs. Training in the servicing and maintenance of equipment to reduce leaks would also reduce emissions.

29. In response to the COVID-19 pandemic, RTOC had established the vaccines cold chain subcommittee in 2021 to prepare a technical note on the vaccine cold chain. The note had been finalized in mid-June 2021 and was posted on the Ozone Secretariat website.<sup>4</sup>

30. Mr. Omar Abdelaziz, RTOC co-chair, said that many medicines and vaccines required daily and year-round storage, transport and logistics. Furthermore, equitable distribution of COVID-19 vaccines depended on a viable cold chain, with reliable electricity for refrigeration equipment, including cold rooms, freezers, refrigerators, cold boxes and carriers. It was essential to map the vaccine cold chain, from manufacturers to national storage facilities, regional hospitals, health centres and mobile vaccination facilities. The required storage temperature and the permissible length of storage differed widely by type of COVID-19 vaccine, as did the energy efficiency of the refrigeration applications, which contributed indirectly to emissions with global warming potential. The global refrigeration industry had responded to the demand for ultra-low and low-temperature equipment by increasing production of vapour compression cycle equipment and/or through the direct use of dry ice.

## **B. Questions and answers, and general statements**

31. Following the presentation, the presenters for the technical options committees responded to questions and comments from participants.

### **Flexible and Rigid Foams Technical Options Committee**

32. Ms. Walter-Terrinoni, responding to a request for additional information on pandemic-related disruptions in the supply chain for HFO and HCFO blowing agents, identified HCFO-1233zd as a substance that had been particularly subject to supply chain challenges, initially related to shipping but later also to other issues, especially in the United States of America and Canada. During the same period, separate, weather-related issues had hampered the manufacturing of the polyols that enabled the use of low-global-warming-potential alternatives. Thus, the supply chain disruptions had been related to issues affecting both the blowing agents themselves and the polyols enabling the use of low-global-warming-potential alternatives.

<sup>4</sup> Report of the Technology and Economic Assessment Panel vaccines cold chain subcommittee, Addendum to the Technology and Economic Assessment Panel 2021 progress report, September 2021, available at <https://ozone.unep.org/system/files/documents/TEAP-RTOC-technical-note-vaccines-cold-chain.pdf>.

### **Halons Technical Options Committee**

33. One representative, noting that halon emissions had not decreased during the pandemic despite the decrease in flights, asked about the timeline of the investigations into the reasons for the sustained emissions. Mr. Verdonik responded that the Panel was working with the International Civil Aviation Organization and key manufacturers such as Boeing, Airbus and Embraer, as well as service companies that carried out the kind of work that could lead to emissions, to identify possible sources of the sustained emissions, and hoped to include the results in the 2022 progress report of the Panel.

34. Asked for additional information on the contamination of halon 1301, Mr. Verdonik confirmed that refrigerants were being found in halon 1301 in the civil aviation supply chain, which he characterized as curious. HCFC-22 was particularly problematic, and the Panel was working with the supply chain to determine its source, which was not thought to be proper halon cylinders from civil aviation. Methanol, which was added intentionally to low-discharge-rate cargo cylinders to prevent the gas from freezing when it came out of the nozzles at altitude, was another contaminant, and work was being done to determine how to segregate it before mixing the halon in question with other halons. Overall, contamination by typical refrigerants such as HFC-134a and HCFC-22 was being seen more generally in the halon banking and recycling community; the Panel was working to identify where in the civil aviation maintenance, repair and overhaul processes that might be occurring, including by working with recycling companies to determine whether there were “hotspots” where techniques or procedures might need to be tightened up to prevent such contamination. Another example was HFC-125 contamination in halon 1211, a significant issue that seemed to mainly originate from civil aviation, even though little HFC-125 was used in the sector. The Panel was supporting the International Civil Aviation Organization, national aviation organizations and regional organizations in attempting to understand the whole process and where contamination was occurring so that guidance could be provided. Mr. Verdonik recalled that the Halon Alternatives Research Corporation had held a side event during the forty-third meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer to raise awareness of the issue at the national level and with the companies themselves, who had a financial interest in minimizing halon loss and thus minimizing contamination.

### **Methyl Bromide Technical Options Committee**

35. One representative, speaking on behalf of a group of countries, asked for clarification regarding the relevance of the data showing that the methyl bromide production reported had exceeded the consumption reported under Article 7 for the period 2005–2013, and how it related to the exempted uses of methyl bromide for quarantine and pre-shipment purposes. Mr. Porter confirmed that reported production for the period 2005–2013 had exceeded consumption for controlled uses by some 8,000 tonnes and that the Panel did not know what the excess production had been used for; he offered to provide further explanations bilaterally if needed.

### **Medical and Chemicals Technical Options Committee**

36. One representative, saying that she understood that parties were required to report feedstock production regardless of whether it was used in situ or transported to another location, asked for clarification on the suggestion in the report that there might be situations where feedstock production was not being reported or was lacking. Ms. Tope responded that in attempting to understand recent scientific reports where emissions did not appear to match reported production, the Panel had understood that feedstock produced as an intermediate chemical for use in situ might not always be reported, and that reporting might only be required when feedstock was transported off-site for use at another facility. Overall, the Panel was not clear on the reporting requirement and would welcome further guidance; however, the question was also how parties themselves were accounting for feedstock production.

### **Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee**

37. No questions on the work of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee were posed during the meeting.

### **General statements**

38. One representative, speaking on behalf of a group of countries, warmly thanked the members of the Panel and its technical options committees for the high quality of their work, noting the particularly difficult circumstances they had faced over the preceding 18 months. He also highlighted three points emerging from the presentations that were of particular interest and merited consideration

in future meetings: the importance of having qualified and certified installation and servicing staff to avoid leaks in the halon sector, much as in the refrigeration sector; the Panel’s work on quarantine and pre-shipment uses of methyl bromide, both with respect to the alternatives available and the different approaches used for quarantine and pre-shipment; and, in the medical and chemicals arena, the valuable information provided on HFC-23 emissions.

#### **IV. Closure of the meeting**

39. The co-chair declared the online briefing meeting on the 2021 progress report of the Technical and Economic Assessment Panel closed at 4.15 p.m. on Thursday, 7 October 2021.

## Annex IV

# Report of the online briefing meeting on issues relating to the Vienna Convention for the Protection of the Ozone Layer, held on 5 October 2021

## Introduction

1. Given the continued COVID-19 pandemic and the related travel restrictions, it was decided that the combined twelfth meeting (part II) of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer and Thirty-Third Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer would be held online with a reduced agenda, as was communicated to parties by the Ozone Secretariat in its updated contingency plan on 28 June 2021.
2. As part of the preparatory work for the online combined meeting, a series of online briefing meetings was organized. Each was scheduled to last a maximum of three and a half hours, with interpretation provided in the six official languages of the United Nations.
3. The meeting reported on below was the first of the online briefing meetings.

## I. Opening of the meeting

4. The briefing meeting was co-chaired by Mr. Martin Sirois (Canada) and Ms. Vizminda Osorio (Philippines).
5. The meeting was opened by Mr. Sirois at 2 p.m.<sup>1</sup> on Tuesday, 5 October 2021.
6. The co-chair welcomed representatives to the online briefing meeting on Vienna Convention issues, namely (a) the report of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention and (b) the status of the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention.
7. He noted that the briefing meeting was part of the preparatory work for the upcoming online combined meeting and was also an integral part of that meeting.
8. A welcoming statement was delivered by Ms. Megumi Seki, Executive Secretary of the Ozone Secretariat, who also welcomed the delegates. She noted the difficulties associated with online meetings and thanked all stakeholders for their patience and cooperation. The briefing meetings had been organized to ensure that certain presentations and questions were addressed before the online combined meeting, to save time, and to help participants prepare for that meeting.

## II. Organizational matters

### A. Adoption of the agenda

9. Introducing the sub-item, the co-chair recalled that, given the constraints of the online setting, the provisional agenda of the online combined meeting had been reduced to include only items prioritized for the parties' consideration, including issues related to the Vienna Convention. The purpose of the present briefing meeting was to hear presentations on the report of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention and the status of the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention, and to have question and answer sessions to inform the discussions on those matters during the online combined meeting. General statements could also be made. No policy issues or proposed decisions were to be discussed during the briefing meeting.
10. The following agenda for the briefing meeting was adopted on the basis of the provisional agenda:
  1. Opening of the session.
  2. Organizational matters:

<sup>1</sup> All times mentioned are Nairobi time (UTC + 3).



- (a) Adoption of the agenda;
  - (b) Organization of work.
3. Vienna Convention issues:
- (a) Report of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention:
    - (i) Presentation by the co-chairs of the eleventh meeting of the Ozone Research Managers;
    - (ii) Questions and answers, and general statements;
  - (b) Status of the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention:
    - (i) Presentation by the Chair of the Advisory Committee for the Trust Fund;
    - (ii) Questions and answers, and general statements.
4. Closure of the meeting.

## **B. Organization of work**

11. The participants agreed to the organization of work proposed by the co-chairs, as outlined above. The co-chair noted that a report summarizing the presentations, questions and answers, and statements made during the present meeting would be prepared and annexed to the report of the combined meeting, which was expected to be adopted at the online combined meeting.<sup>2</sup>

## **III. Vienna Convention issues**

### **A. Report of the eleventh meeting of the Ozone Research Managers of the Parties to the Vienna Convention**

12. Introducing the sub-item, the co-chair provided some background information on the work of the Ozone Research Managers, who helped to ensure proper coordination of ozone-related research and monitoring programmes and identified gaps that needed to be addressed. They met every three years, a few months prior to the triennial meetings of the Conference of the Parties, and forwarded their recommendations to the Conference of the Parties for its consideration and for the possible adoption of relevant decisions. However, owing to the coronavirus pandemic, the eleventh meeting of the Ozone Research Managers had been delayed and had taken place in two parts: part I in October 2020, focusing only on the issue of gaps in the global coverage of atmospheric monitoring of substances controlled under the Montreal Protocol, and part II in July 2021, considering all issues on the agenda of the eleventh meeting.

13. Customarily, the recommendations of the Ozone Research Managers pertained to four areas: research needs, systematic observations, data archiving and stewardship, and capacity-building. During the eleventh meeting, an additional issue had been addressed, that of gaps in the global coverage of atmospheric monitoring of controlled substances, pursuant to decision XXXI/3 of the Thirty-First Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. In paragraph 8 of that decision, the Scientific Assessment Panel had been requested to work with the Ozone Research Managers at their eleventh meeting to identify gaps in the global coverage of the atmospheric monitoring of controlled substances, provide options on ways to enhance such monitoring, and explore options for informing the parties of preliminary information indicating unexpected emissions of controlled substances. As a basis for the discussion, the Scientific Assessment Panel, in cooperation with experts in the atmospheric monitoring of controlled substances, had prepared a white paper entitled “Closing the Gaps in Top-Down Regional Emissions Quantification: Needs and Action Plan” (UNEP/OzL/Conv.ResMgr/11/4/Rev.1, annex), which was considered by the Ozone Research Managers at their eleventh meeting.

14. The recommendations of the Ozone Research Managers of the Parties to the Vienna Convention at their eleventh meeting were set out in document UNEP/OzL.Conv.12(II)/7, and the

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<sup>2</sup> In addition, the presentations were made available at <https://ozone.unep.org/meetings/thirty-third-meeting-parties/presentations>.

associated item on the provisional agenda of the online combined meeting was briefly described in paragraphs 69–72 of document UNEP/OzL.Conv.12(II)/2–UNEP/OzL.Pro.33/2.

## **1. Presentation by the co-chairs of the eleventh meeting of the Ozone Research Managers**

15. The co-chairs of the eleventh meeting of the Ozone Research Managers were Mr. Kenneth Jucks (United States of America) and Mr. Hector R. Estévez Pérez (Mexico). Mr. Jucks first outlined the roles of the Ozone Research Managers. He then listed the areas for which recommendations had been made at the eleventh meeting: research topics; systematic observations; gaps in monitoring of ozone-depleting substances (ODS); data archiving and stewardship; and capacity-building. The issue of gaps in monitoring, often covered under systematic observations, had been addressed during the eleventh meeting as a separate issue in response to the above-mentioned request of the Meeting of the Parties.

16. With regard to research topics, the recommendations included improving the understanding of global emissions of ODS, for instance by creating better “bottom-up” emissions estimates and monitoring the contributions of short-lived substances to the atmospheric chlorine budget. Understanding the coupling of stratospheric transport and climate change was also extremely important. Another key area for research was the effects of aviation, rockets and potential climate interventions, all of which affected the amount of aerosols in the stratosphere, as did volcanic activity and wildfires.

17. With regard to systematic observations, more resources were required for long-term observation networks, including those for ozone, ultraviolet radiation, trace gases and ODS. Better monitoring was essential, especially in countries operating under paragraph 1 of Article 5 of the Montreal Protocol (Article 5 countries). Furthermore, satellite limb-viewing observations of key trace gases, which were due to end in about 5 years, should be maintained in order to measure changes in the circulation of gases. Continued development of lower-cost sensors to monitor the atmosphere was needed, with training in their use, as was the use of ground-based and balloon data.

18. Mr. Jucks highlighted key recommendations regarding gaps in the monitoring of ODS emissions. He noted that the Ozone Research Managers had endorsed the white paper on gaps discussed at their eleventh meeting and had forwarded it to the parties of the Vienna Convention and the Montreal Protocol for their consideration. He emphasized the need to address gaps in the early detection of emissions and their sources and stressed that filling in the gaps in monitoring was resource-intensive.

19. He then summarized the recommendations on data archiving and stewardship and on capacity-building. With regard to capacity-building, he noted that, although the Trust Fund was the main avenue for funding capacity-building, it currently had inadequate resources for that. Capacity could also be built through collaboration between ozone officers and bodies such as meteorological and space agencies and through fellowships.

20. He ended by commenting that the meetings of the Ozone Research Managers were useful for communicating national and international observations and activities; however, he was concerned that more work was required to ensure that the recommendations had an appropriate impact.

## **2. Questions and answers, and general statements**

21. In response to a question regarding whether there were any monitoring stations in the Caribbean, Mr. Jucks replied in the affirmative, mentioning an Advanced Global Atmospheric Gases Experiment station in eastern Barbados. He said that there were no ODS monitoring locations in South America, although there were a few ozone and other trace gas monitoring locations linked to the network for the detection of ozone atmospheric composition change, and a few ozonesonde locations.

22. The representative of Australia concurred with Mr. Jucks regarding the importance of acting on the recommendations and ensuring that they reached all relevant audiences. She noted that her Government had submitted to the online forum a draft decision on the basis of the recommendations made by the Ozone Research Managers at their eleventh meeting. The draft decision was intended to reflect the key points of the recommendations, and especially new recommendations on monitoring. She offered to collect parties’ comments and integrate them into the draft decision before submitting it to the Ozone Secretariat.

23. A representative speaking on behalf of a group of countries thanked Australia for the draft decision and said that the group looked forward to working with Australia and with others to finalize the draft decision.

24. The representative of the European Union said that the European Union would also be putting forward a draft decision on atmospheric monitoring.

25. With respect to recently reported satellite data on the ozone hole over the Antarctic, one representative, speaking on behalf of a group of countries, noted that he hoped that the satellite information was taken together with data from other atmospheric monitoring methods to ensure as complete a picture as possible of stratospheric ozone throughout the world.

## **B. Status of the General Trust Fund for Financing Activities on Research and Systematic Observations relevant to the Vienna Convention**

26. Introducing the sub-item, the co-chair recalled that the Trust Fund, established in 2002 by decision VI/2 of the Conference of the Parties, was an extrabudgetary fund primarily aimed at providing complementary support for the continued maintenance and calibration of existing World Meteorological Organization Global Atmosphere Watch ground-based stations for monitoring column ozone, ozone profiles and ultraviolet radiation in developing countries and countries with economies in transition. The Trust Fund was also intended to support other activities identified by the Ozone Research Managers for the improvement of the observation network and for relevant research. Since 2015, activities under the Trust Fund had been overseen by a small advisory committee with a mandate to develop a long-term strategy and short-term action plan for the Trust Fund and to ensure quality control for the individual project proposals developed under the Trust Fund.

27. Information on the status of the Trust Fund and on the work of the Advisory Committee was set out in document UNEP/OzL.Conv.12(II)/8, and the associated item on the provisional agenda of the online combined meeting was briefly described in paragraphs 73–77 of document UNEP/OzL.Conv.12(II)/2–UNEP/OzL.Pro.33/2.

### **1. Presentation by the Chair of the Advisory Committee for the Trust Fund**

28. The Chair of the Advisory Committee, Mr. A. R. Ravishankara (United States of America), delivered a presentation on the status of the Trust Fund. He provided a brief description of the history, mandate and goals of the Fund and an update on the recent work of the Advisory Committee, which included the preparation of a long-term vision for the Trust Fund, as well as a short-term plan and an implementation plan. Notably, given the limited funds available and the current state of ozone measurement technology, combined with the recognition of the Advisory Committee that ozone column measurements were of paramount importance, the Advisory Committee had decided to focus its implementation efforts on intercomparisons, refurbishing and shipping available Dobson instruments, and enabling ozonesondes, while also encouraging the development and validation of other instruments.

29. Reiterating that the resources of the Trust Fund were limited, and underscoring its catalytic role in starting projects, Mr. Ravishankara provided an overview of the projects supported to date, which essentially fell into two categories: ozone measurement and capacity-building. The Advisory Committee also had before it worthy projects that it had been unable to approve owing to limited resources. Current funding requests represented around ten times the funds available. In that regard, Mr. Ravishankara also drew attention to the considerable effort invested by the Committee in fundraising, with disappointing results. Because of limited resources, the Trust Fund had been obliged to limit funding to ozone measurement science and had been unable to even consider the possibility of funding the monitoring of controlled substances.

### **2. Questions and answers, and general statements**

30. Representatives who took the floor thanked Mr. Ravishankara for his presentation and the Advisory Committee for its work, including its fundraising efforts.

31. Mr. Ravishankara responded to two queries from the same representative. First, asked about the status of the Dobson no. 8 relocation project, which had been delayed several times, he indicated that there were currently several candidates willing to host the instrument and that good ozone measurements could be expected within the next year. He proposed to update the representative directly by email once a final decision on relocation had been taken.

32. With respect to the second question, on whether funding the monitoring of controlled substances, given sufficient funding, would be within the remit of the Trust Fund, he said that the Advisory Committee had discussed the question at great length and had concluded that setting up a station would cost approximately \$500,000, which far exceeded the existing resources; however, if the resources were available and the parties chose to do so, such an activity could indeed be conducted

under the Trust Fund. A white paper discussed at the eleventh meeting of the Ozone Research Managers had set out a detailed plan for such an activity. Mr. Ravishankara noted that ODS could be monitored in conjunction with other climate gases of interest, most notably methane, and drew attention to a recent paper<sup>3</sup>, published in the journal *Nature*, on the utility of measuring ODS.

33. The representative who had posed the questions said that she was pleased to hear that new project proposals were being submitted to the Trust Fund, but that it was clear that more funding was needed. She acknowledged that fundraising was a task that required special training and expressed the hope that the United Nations Environment Programme could help in that regard. She also urged parties to make voluntary contributions to the Trust Fund to ensure its ability to strengthen the parties' knowledge on the evolution of ozone in the context of a changing climate and to monitor the success of the Montreal Protocol.

34. The representative of Australia drew attention to a draft decision on the Trust Fund posted on the online forum by her Government. The draft decision was similar to an earlier decision on the matter, but included a new operative paragraph inviting parties to contribute to the Trust Fund, reflecting the importance of the funding issue raised by both Mr. Jucks and Mr. Ravishankara in their presentations. She invited comments on the draft decision, which she said would be submitted to the Secretariat within a week so that it could be issued as a conference room paper during the online combined meeting.

#### **IV. Closure of the meeting**

35. The co-chair declared the online briefing meeting on Vienna Convention issues closed at 4.15 p.m. on Tuesday, 5 October 2021.

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<sup>3</sup> Huge gaps in detection networks plague emissions monitoring: Plug gaps to measure ozone-destroying chemicals and greenhouse gases and verify compliance with Paris and Montreal treaties.  
<https://nature.com/articles/d41586-021-01967-z>.