

Summary of the 45th meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer: 2-7 July 2023

Science has been the bedrock of the Montreal Protocol on Substances that Deplete the Ozone Layer, the cornerstone of its success. From its inception, non-negotiated scientific assessments have informed decision-making that has helped to heal the Earth's ozone layer. Widely recognized as the most successful multilateral environmental agreement in the world, the Protocol has still faced recent challenges to its effective implementation.

At the 45th Meeting of Open-ended Working Group of the Parties to the Montreal Protocol (OEWG 45), delegates delved into the quadrennial reports prepared by the Scientific Assessment Panel (SAP), the Environmental Effects Assessment Panel (EEAP) and the Technology and Economic Assessment Panel (TEAP). These reports informed delegates of findings related to the twin challenges of ozone depletion and climate change, and grounded delegates' discussions on a number of issues of concern, including:

- illegal import/export of obsolete equipment;
- stratospheric aerosol injection, a proposed geoengineered solution for solar radiation management;
- adjustments to the freeze and phase-down levels established by the Protocol and its Kigali Amendment;
- emissions of hydrofluorocarbon (HFC)-23;
- gaps in the global coverage of atmospheric monitoring of controlled substances; and
- very short-lived substances with ozone depleting potential.

There was an extensive discussion on the report of the TEAP's Replenishment Task Force (RTF) on the replenishment of the Multilateral Fund (MLF) for the triennium 2024-2026. The report estimates the replenishment need at approximately USD 1 billion, which would be the highest level ever. Delegates requested the Task Force to prepare a supplementary report addressing a list of elements for additional analysis. This report, along with a number of proposals, will be considered at the 35th Meeting of the Parties (MOP 35), which is scheduled to take place at the seat of the Secretariat in Nairobi, Kenya, in October 2023.

OEWG 45 convened in Bangkok, Thailand, from 3-7 July 2023, with over 400 registered participants. The meeting was preceded by a one-day workshop on strengthening the effective implementation and enforcement of the Montreal Protocol, which took place on Sunday, 2 July 2023. At the workshop, participants shared their experiences on addressing illegal trade in controlled substances,

and had an open discussion about informal versus mandatory prior informed consent for the transboundary movement of controlled substances.

A Brief History of the Ozone Regime

Concerns that the Earth's stratospheric ozone layer could be at risk from chlorofluorocarbons (CFCs) and other anthropogenic substances first arose in the early 1970s. At that time, scientists warned that releasing these substances into the atmosphere could deplete the ozone layer, hindering its ability to prevent harmful ultraviolet (UV) rays from reaching the Earth. This would adversely

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affect ocean ecosystems, agricultural productivity, and animal populations, and harm humans through higher rates of skin cancers, cataracts, and weakened immune systems. In response, a UN Environment Programme (UNEP) conference held in March 1977 adopted a World Plan of Action on the Ozone Layer and established a Coordinating Committee to guide future international action.

Vienna Convention: Negotiations on an international agreement to protect the ozone layer were launched in 1981 under the auspices of UNEP. In March 1985, the Vienna Convention for the Protection of the Ozone Layer was adopted. It calls for cooperation on monitoring, research, and data exchange, but does not impose obligations to reduce the use of ozone-depleting substances (ODS). The Convention has 198 parties, which represents universal ratification.

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

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

Key Turning Points

London Amendment and Adjustments: At the second MOP, held in London, UK, in 1990, delegates tightened control schedules and added ten more CFCs to the list of ODS, as well as carbon tetrachloride (CTC) and methyl chloroform. MOP 2 also established the MLF, which meets the incremental costs incurred by Article 5 Parties in implementing the Protocol's control measures and finances clearinghouse functions. The Fund is replenished every three years.

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

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

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

Kigali Amendment: At MOP 28, held in Kigali, Rwanda, in 2016, delegates agreed to amend the Protocol to include HFCs as part of its ambit and to set phase-down schedules for HFCs. HFCs are produced as replacements for HCFCs and thus a result of ODS phase-out. HFCs are not a threat to the ozone layer but have

a high global warming potential (GWP). To date, 150 parties to the Montreal Protocol have ratified the Kigali Amendment, which entered into force on 1 January 2019.

Recent Meetings

COP 12/MOP 32: Due to the COVID-19 pandemic, the first part of the 12th meeting of the Conference of the Parties to the Vienna Convention (COP 12) and MOP 32 convened online from 23-27 November 2020. Delegates addressed only those issues deemed essential, including the replenishment of the MLF for 2021-2023. Parties authorized the Secretariat to arrange an extraordinary MOP in 2021 to take a decision on the final programme and budget for 2021-23. MOP 32 also addressed: critical-use exemptions for methyl bromide for 2021-2022; compliance and data reporting issues; and membership of the Montreal Protocol bodies and Assessment Panels.

ExMOP 4 and OEWG 43: The Fourth Extraordinary MOP to the Montreal Protocol (ExMOP 4) and OEWG 43, held on 21, 22 and 24 May 2021, convened online due to the COVID-19 pandemic. ExMOP 4 agreed to facilitate payments to the MLF to ensure its continued functioning during 2021. Parties agreed that any contributions made in advance of the 2021-2023 replenishment decision should count toward future contributions and should not affect the overall level of the replenishment or the agreed level of contributions by parties. OEWG 43 discussed the scope and content of guidance to the TEAP RTF on further work on its replenishment report. Parties agreed on an updated report, rather than a more comprehensive supplemental report.

COP 12/MOP 33: This combined meeting convened virtually from 23-29 October 2021, with a high-level segment on the last day. The meeting took key decisions related to monitoring of controlled substances and energy efficiency, as delegates requested the Assessment Panels to work out what would be needed to increase the monitoring capacities in regions where capacity is limited or altogether absent.

Delegates also continued work on low-GWP and energy-efficient technologies. The meeting considered two draft decisions, which addressed: trading of soon-to-be obsolete technologies that could be a threat to the future implementation of the Kigali Amendment and broadening the list of sectors required to implement more energy-efficient technologies. The meeting also adopted 18 decisions on administrative and technical matters, including: replenishment of the MLF; financial reports and budgets of the trust funds for the Vienna Convention and Montreal Protocol; compliance and reporting; membership of Montreal Protocol bodies; and recommendations of the Ozone Research Managers of the Vienna Convention.

ExMOP 5 and OEWG 44: The Fifth Extraordinary MOP to the Montreal Protocol (ExMOP 5) and OEWG 44 convened in Bangkok, Thailand, from 11-16 July 2022. ExMOP 5 adopted decisions on the replenishment of the MLF for the triennium 2021-2023 and extension of the fixed-exchange-rate mechanism to the 2021-2023 replenishment. OEWG 44 addressed issues including terms of reference for a study of MLF replenishment needs in the 2024-2026 triennium; energy efficiency; ongoing emissions of CTC; potential restructuring of the TEAP's Technical Options Committees (TOCs); and a proposal from African states to address the dumping of inefficient refrigeration and air-conditioning appliances.

MOP 34: At this meeting, held in Montreal, Canada from 31 October – 4 November 2022, delegates discussed and adopted a host of decisions related to, among others: illegal import of certain refrigeration, air-conditioning, and heat pump products

and equipment; identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring; collecting data to understand potential impacts of the COVID-19 pandemic on HFC consumption in developing countries; strengthening institutional processes with respect to information on HFC-23 by-product emissions; and strengthening the Protocol's institutions, including for combatting illegal trade. At this meeting, delegates also adopted the terms of reference for the study on the MLF replenishment for 2024-2026, opening the door for the TEAP to establish the RTF to prepare for the replenishment negotiations at MOP 35.

Workshop on Strengthening the Effective Implementation and Enforcement of the Montreal Protocol

On Sunday, 2 July 2023, participants gathered for a pre-meeting workshop dedicated to discussions on strengthening the effective implementation and enforcement of the Montreal Protocol.

In her opening remarks, Megumi Seki, Executive Secretary, Ozone Secretariat, noted the work of the Montreal Protocol is not yet done, and a higher level of ambition will be required to exploit its maximal potential to obtain benefits for the ozone layer, environment, and climate.

Maria Socorro Manguiat, Deputy Executive Secretary, Ozone Secretariat, explained the structure of the session, noting that the outcome of the workshop would feed into OEWG 45 discussions.

Combating Illegal Trade

Facilitator Anderson Alves, Regional Coordinator for Asia-Pacific, UN Development Programme (UNDP), shared expectations to foster discussions on key considerations and exchange experiences and lessons learned to combat illegal trade. The rapporteur for this session was Mary Ellen Foley, World Bank, who provided a summary of discussions during the concluding session.

Liazzat Rabbiosi, Programme Officer, Ozone Secretariat, gave a summary of illegal trade practices reported as well as approaches taken by national authorities to identify and address such cases. Noting that data reported may not be representative of the true scale of the problem due to limited geographical coverage, she presented 559 reported cases over a period of 20 years, estimating a total quantity of illegal traded substances equal to 1,780 metric tonnes of controlled substances. She also noted that they could not identify exactly how illegal trade occurs, highlighting, among others, smuggling and trade in disposable cylinders, which are banned in some countries. She further presented the common means of detection, emphasizing customs inspections; enforcement actions and penalties, including temporary and permanent seizure of goods; and the disposal methods of seized substances, including destruction and re-export to the country of origin.

Cindy Newberg, US, spoke about national practices to enforce the US HFC licensing and quota system through an inter-agency task force. She underscored the value of their whole-of-government approach to deter, detract, and disrupt any attempts at illegal trade, as well as information and data sharing at the entry points. She noted administrative actions that can be applied to importers without allowances.

Alisi A. Kamaiwaqa, Fiji, presented on the licensing of foreign-flagged fishing vessels in relation to controlled substances. She explained how foreign vessels coming into Fiji's exclusive economic zone need to issue declarations to the Customs Office, including on

any controlled substances on board. The Customs Office can conduct physical inspections and coordinates with other relevant agencies including biosecurity, fisheries, and health.

Anna Ewa Kobylecka, World Customs Organization (WCO), introduced participants to the Advance Cargo Information (ACI) procedure and reflected on Free Zones. She explained how ACI, with its agreed format, helps categorize and mitigate security risks before shipments arrive. She underlined that data exchange and risk management was also key for trade in Free Zones, which can attract illicit activities due to reduced regulation.

Pipat Poopeerasupong, OzonAction, presented on the voluntary informal Prior Informed Consent (iPIC) mechanism that facilitates information exchange between focal points in over 100 registered countries on intended trade in controlled substances. He noted that the iPIC online platform helps reduce discrepancies between import and export data, and combat illegal trade, and urged countries to make use of the platform.

In the ensuing discussion, participants considered, among others:

- differences in enforcement measures related to illegal use and trade in controlled substances;
- how to ensure inter-agency cooperation to address illegal trade;
- the need for training of customs personnel to address illegal trade;
- the ease of conducting post-clearance audits by customs officials; and
- whether customs checks on foreign-flagged vessels are mandatory in Fiji.

They also considered: assessing licenses for trade in refrigerants for third-party foreign-flagged vessels; how best to reflect cases of rejected licenses; and direct engagement between national ozone offices and the WCO. Noting the time constraints within the customs processes, they discussed the need to strengthen parties' licensing and enforcement systems, including through confiscation, re-export, auctions, destruction, and storage. Participants discussed how best to familiarize customs officials with the identification of controlled substances and vessels transporting illegal shipments through trade data. Participants acknowledged that Free Zones are still subject to customs surveillance and the implementation of trade measures. They also heard suggestions to improve the iPIC mechanism, with a call for extending the licensing application duration from five to 10 days.

Licensing and Quota Systems

Facilitator Tatiana Terekhova, Secretariat of the Basel, Rotterdam and Stockholm (BRS) Conventions, recalled that parties are working hard to develop licensing systems and highlighted the dual gains for the ozone layer and climate in the implementation of the Montreal Protocol through effective licensing systems. The rapporteur for this session was Fukuya Iino, UN Industrial Development Organization (UNIDO), who provided a summary of discussions during the concluding session.

Maud Barcelo Martinez, Ozone Secretariat, presented an overview of common features of licensing systems. She noted there is no uniform policy framework for such systems and highlighted: background documents; the requirements of the Protocol, including the role of licensing systems contained in Article 4(b) on establishing and implementing licensing systems; good practices identified in national regulations and other documents; previous recommendations from parties; common features of licensing

systems, including a quota allocation system and regular mandatory reporting by importers and exporters; and areas where gaps were identified.

Xiaolin Guo, China, presented China's licensing/quota system and use of iPIC. She highlighted the: regulatory and policy system of China on import and export of controlled substances under the Montreal Protocol, noting a 2021 update to include HFCs; review and approval of import and export licenses for controlled substances; and administration of import and export quotas, highlighting the issuance system for import and export licenses for controlled substances as well as their key review indicators. She also discussed the process for the implementation of the iPIC mechanism, and shared that since joining the iPIC mechanism in 2010, China has prevented the potential illegal trade of approximately 8,000 metric tonnes of controlled substances.

Cornelius Rhein, EU, presented the region's licensing system for ODS and HFCs, including: the quota system as the main policy driver for HFC phase-down, explaining that companies importing or producing HFCs are issued a quota every year; and the HFC phase-down under the revised EU fluorinated-gas (F-gas) regulation, potentially reducing HFCs supplied to the EU market by 98% between 2015 and 2050. He also addressed licensing for ODS, noting that the information is accessible for customs offices and other competent authorities within the EU; the implementation of the HFC-quota system; and the future system for licensing trade in HFCs and ODS, with simplified licensing for ODS.

Yaqoub Almatouq, Kuwait, shared his country's experience with its quota system for HFCs based on lessons learned from CFC and HCFC phase-out procedures. He referred to unique challenges in that carbon dioxide (CO₂) emission-based controls must not lead to unintended increases in HFCs, and that quotas need to provide flexibility for blends and account for recovered, recycled, or reclaimed HFCs. He highlighted the need for carefully designed processes to minimize the burden on stakeholders and national ozone units.

Emmanuel Osaë-Quansah, Environmental Protection Agency, Ghana, explained how quotas for controlled substances in his country are reduced by the same reduction margins as agreed under the Montreal Protocol, and that no additional quota beneficiaries are licensed. He highlighted how Ghana monitors substances at all entry points including ports and markets with an Integrated Customs Management System to prevent illegal trade.

In the ensuing discussion, participants considered: the challenges of setting up licensing systems, noting the need for these systems to be fit-for-purpose and easy to use by customs offices; the need to link market surveillance, environment, and customs officials to enhance cohesive implementation; and how to address new quota applications, considering quotas allocated to historical importers. They also addressed:

- how to ensure a high level of refrigerant quality for imported products;
- how to ensure that controlled substances are not exported to Article 5 parties;
- whether the Protocol requires quota systems for the import of refrigeration and air conditioning equipment;
- the scope of coverage of the new EU single-window system related to ODS and HFC components; and
- the need to involve technicians in decision making to enhance licensing requirements.

In response to questions, panelists highlighted that:

- reference thresholds for refrigerant purity in Ghana have been set at 98%;
- shipments between EU member states are not subject to customs controls;
- some EU member states have already begun the application of the single-window system;
- a clearance, permit and licensing database, and an ODS management system have been established in China;
- there is a need to adequately understand the various regional licensing systems; and
- there are no quota requirements under the Protocol.

Participants also underlined the need for careful monitoring of quotas for controlled substances and heard that the EU's single-window system automatically prevents export of controlled substances.

Implementation and Enforcement of the Protocol, including in relation to Illegal Production and Consumption

This session, which was split into two parts, was moderated by Jim Curlin, Head of OzonAction, UNEP. The rapporteur for this session was Viraj Vithoontien, Independent Consultant, who provided a brief summary of discussions during the concluding session.

Tina Birmpili, Chief Officer of the MLF Secretariat, encouraged participants to think "outside the box" to strengthen the effectiveness of the Protocol so that situations like the unexpected increase in global CFC-11 emissions detected in 2018 are avoided. In particular, she referred to new technologies including blockchain and artificial intelligence that may help strengthen existing mechanisms. She stressed that we don't need to first agree on a definition of illegal production in order to start acting on it, and pointed to atmospheric monitoring as the single most important tool to strengthen the enforcement of the Protocol.

Renée Gift, Law Division, UNEP, illustrated key strategies to strengthen domestic implementation and enforcement of the Protocol. She stressed that enforcement measures need to include a broad combination of legal tools and be appropriate to the given circumstances. She referred to fairness/equity and effectiveness as the two overarching considerations for designing and determining appropriate enforcement measures.

Ioana Cotutiu, Programme Coordinator, Unwaste, UN Office on Drugs and Crime (UNODC), presented the UNODC-WCO Container Control Programme, focusing on capacity-building tools that are being employed on a project focused on waste flows between the EU and four of the largest Association of Southeast Asian Nations (ASEAN) country importers of waste. She highlighted: research and policy, such as monitoring of trade and data trends and analysis of national legislative frameworks; interagency cooperation through national advisory committees; and a focus on plastic trade through technical assessments and workshops.

Clare Perry, Head of Climate Campaign, Environmental Investigation Agency, presented on new challenges relating to HFC phase-down and reporting, focusing on:

- the challenges for implementation, such as simultaneous HCFC phase-out and HFC phase-down control within a growing global and complex refrigerant market, which makes reporting difficult and critical;

- enforcement challenges, including a lack of Harmonized System codes for most HFC blends, and the creation of highly valuable refrigerants for smuggling;
- detecting illegal sources through atmospheric monitoring; and
- noting that enhanced atmospheric monitoring is critical but must be combined with monitoring and enforcement on the ground in order to prevent illegal activities.

Shontelle Wellington, Ministry of Environment and National Beautification, Barbados, presented on capacity building and training of national officers, attesting to the positive impact in enhancing awareness and capabilities. She presented their approach to capacity building, noting that it has to be flexible and creative in order to face several challenges, such as lack of financing and rotating personnel. She recommended building relationships between individuals and organizations, domestic interagency cooperation, gathering information, and the importance of having a national ozone unit.

Kevin Fay, Executive Director, Alliance for Responsible Atmospheric Policy, discussed the role of industry in creating a culture of compliance, stressing that it takes a small number of illegal activities to disrupt the environment, and in preventing those who intentionally try to use illegal activities. He recommended continued communication between government and the private sector, such as cooperating through task forces; introducing deterring penalties for illegal activities; and strengthening the Ozone Secretariat and the MLF.

Gene Smilansky, President of the ImpCom, gave an overview of the role of compliance for the sustained implementation of phase-out/phase-down obligations. He shared key functions of the ImpCom in facilitating implementation at domestic and international levels.

Samuel Paré, Burkina Faso, highlighted the need to engage key stakeholders in implementing the Protocol, including ministries in charge of regulating trade and other economic activities as well as key bodies from the refrigeration and air conditioning sector. He noted that practical questions, such as how to prevent fires from low-GWP but highly flammable alternative substances, need to be addressed.

Aditya Narayan Singh, Ministry of Environment, Forest and Climate Change, India, referred to the importance of registering relevant businesses trading in controlled substances to facilitate reporting, and of reconciling data between government agencies through a standing committee.

Arno Kaschl, EU, recalled the dual challenge of maintaining the successful phase-out of ODS and finding new ways to phase down HFCs, and hinted about opportunities through digitization and more comprehensive market insights. He advocated for involving the ImpCom more closely, considering minimum requirements for licensing, and sharing best practices.

Annie Gabriel, Australia, stressed how important it is to build a good relationship with regulated importers, not only to enhance their capacity, but also to obtain intelligence about unregulated actors illegally competing in their market. She added that insights from regular estimates for atmospheric concentrations of controlled substances from national research agencies can help complete the picture.

In the ensuing discussion, participants considered: how the information on pricing substances and refrigerants is transferred to the MOP, as well as to industry, noting that this information is

provided through voluntary reporting and is publicly available. They also addressed the sources, destinations, and types of waste covered by the Container Programmes as well as the need to enhance relations between governments and Protocol bodies to enable compliance assistance; and discussed comparisons between Article 5 and non-Article 5 parties in establishing licensing systems. Participants shared views on ways the Protocol can support the establishment of domestic laws and regulations, and discussed discrepancies between import and export data. It was noted that the most-often recorded method of smuggling is misdeclaration, and one observer queried how the Protocol can support the participation of refrigeration and air conditioning technicians. Participants also discussed ways to provide support to combat illegal trade, noting that the MLF is the interface between international discussions and national implementation.

Other Considerations

During this session, facilitated by Bernhard Siegele, Germany, participants addressed additional issues necessary to enhance implementation and enforcement of the Protocol, including related to detection and verification of unexplained emissions of controlled substances, trade in equipment, environmentally sound management of ODS banks, uses excluded from the calculation of production and consumption under the Protocol, and “exemptions.” The rapporteur for this session was Federico San Martini, MLF Secretariat, who provided a brief summary of discussions during the concluding session.

Patrick McNerney, Australia, further introduced the session by looking at what lies ahead for the Protocol after the phase-out of ODS. He referred to growing emissions from feedstock, uncontrolled chemicals and banks, and hinted to voluntary and market-based action that could complement regulation.

Stephen Montzka, National Oceanic and Atmospheric Administration, US, explained that we need to have both well-quantified emissions and well-defined expectations to ensure effective action under the Protocol. This again needs atmospheric measurement networks both at global and regional scales, he illustrated. He concluded that we have the capability to close gaps in these networks if we make the necessary resources available.

Tatiana Terekhova, BRS Secretariat, explained the PIC procedures for hazardous wastes and chemicals under the Basel and Rotterdam Conventions, and drew parallels to how similar challenges related to the transboundary movement of waste or controlled substances could be resolved under the Montreal Protocol. She reminded participants that methyl bromide has been recommended for listing under Annex III of the Rotterdam Convention and will be considered by the COP for the 12th time in 2025.

Bella A. Maranion, TEAP Co-Chair, spoke about the implementation of end-of-life ODS/HFC management, asking what to do with ODS banks. She noted that the Protocol provides very few provisions for end-of-life management, and that effective banks management maximizes recovery, recycling, reclamation, reuse, and destruction after all other options have been exhausted. She called for increasing attention to removing barriers that prevent effective implementation to facilitate and prioritize the environmentally sound management for the disposal of banks, stressing that the cheapest way of disposal is to avoid them.

Jianxin Hu, China, presented on various “exemptions” under the Montreal Protocol and opportunities for reducing emissions, asking

the question if emissions from fluorochemical production processes matter. To answer this, he presented a comparison between the 2006 Guidelines for National Greenhouse Gas Inventories by the Intergovernmental Panel on Climate Change (IPCC) and their 2019 refinement, noting that these show an increase from emissions from chemical production processes from 8.5-68 million metric tonnes of CO₂-equivalent.

In the ensuing discussion, participants considered how to correctly assess emission levels in certain countries including Mozambique; the importance of capacity building for developing countries for treating obsolete equipment; and how to address precious metals that are also waste. They also addressed:

- the differences in notification procedures and effectiveness between iPIC and the PIC Procedure under the Basel Convention;
- whether obsolete equipment under the Montreal Protocol could be considered under the listed elements of the Basel Convention;
- the need to focus on longer-term challenges to the Protocol including emissions from feedstocks, ozone solutions for climate benefits, and atmospheric monitoring; and
- the costs for establishing and maintaining intensive monitoring stations.

Others called for more information on the listing of methyl bromide under the Rotterdam Convention, with participants also pointing to the need for synergies with relevant multilateral environmental agreements including the BRS, Minamata, and Biodiversity Conventions and the future plastic pollution treaty. Others called for regional recycling centers in Africa, while several called for more discussions on the circular economy as it relates to almost end-of-life equipment. One participant proposed that parties consider converting the iPIC into a mandatory PIC procedure, as under the Basel Convention.

Responding to questions, panelists highlighted the need to consider inventory-based assessments towards atmospheric measurements of emissions and the importance of dismantling and recycling electronic waste as far as possible to recover precious metals, and relevant information available under the Basel Convention to address this, including guides for customs officials. McInerney noted that, since its inception, iPIC has been implemented as a “light touch” approach, but called on delegations to consider formalizing a Basel Convention-like PIC procedure under the Montreal Protocol to enhance compliance. Terekhova informed delegates of a new proposal to digitize the PIC procedure under the Basel Convention, and noted that the procedure under the Rotterdam Convention differs in that it does not contain enforcement measures. She also noted that, in relation to illegal traffic under the Basel Convention, parties are responsible for reporting cases of non-compliance and shared that there have been cases of re-export of hazardous waste as well as the application of fees and cases of imprisonment due to illegal traffic. She stressed that listing methyl bromide under the Rotterdam Convention does not constitute a ban, but listing it under the Basel Convention would ban its transboundary movement. Montzka noted that the costs of setting up monitoring stations range from USD 25,000 to 500,000, depending on various factors.

Wrap Up and Closing

After summaries by the session rapporteurs, Manguiat closed the session at 6:30 pm, noting that the session summaries would be presented to OEWG 45.

OEWG 45 Report

On Monday, OEWG 45 Co-Chair Ralph Brieskorn (Netherlands), opened the meeting expressing his gratitude for the hospitality shown by the people and Government of Thailand, welcoming the opportunity to be able to meet in person in Bangkok. Dechen Tsering, Regional Director, UNEP Regional Office for Asia-Pacific, reminded delegates of how the Montreal Protocol is instrumental in addressing each element of the triple planetary crisis of climate change, biodiversity loss and pollution, and looked ahead to COP 28 to the UN Framework Convention on Climate Change (UNFCCC) where UNEP will lead a “Cool Coalition” with the development of a Global Cooling Pledge to promote sustainable approaches to cooling.

Megumi Seki, Executive Secretary, Ozone Secretariat, led delegations in a moment of silence to remember Daniel Albritton, an acclaimed atmospheric scientist and one of the first SAP Co-Chairs, who passed away on 1 April 2023. Urging delegations to work in the “usual spirit of cooperation,” Seki highlighted some of the key agenda items, including strengthening the Protocol’s institutions, the MLF replenishment, the illegal import of inefficient cooling equipment, and revisiting HFC baselines due to the COVID-19 pandemic.

UKRAINE condemned the irreversible humanitarian and environmental consequences of the Russian invasion, supported by the US, also on behalf of Australia, Canada, Israel, Japan, Norway, Switzerland, and the UK; Spain, for the EU; and GEORGIA. In a lengthy statement, the RUSSIAN FEDERATION urged delegations not to engage in political discussions at this meeting. Co-Chair Brieskorn stated that these interventions would be recorded in the meeting report.

Adoption of the Agenda and Organization of Work

On Monday, delegates adopted the agenda ([UNEP/OzL.Pro.WG.1/45/1/Rev.2](#) and [Add.1](#)) with amendments relating to any other issues regarding the 2022 quadrennial assessment of the Montreal Protocol. Delegates agreed to add very short-lived substances (VSLs), destruction technologies, HFC-23, feedstock, and lifecycle refrigerant management to this item.

Co-Chair Brieskorn outlined the organization of work, taking into account a request by CUBA to allocate enough time to discuss the item related to the proposed adjustments to HFC baselines for Article 5 parties. Delegates approved the organization of work.

Delegates were guided in their work by a Secretariat note on issues for discussion by and information for the attention of OEWG 45 ([UNEP/OzL.Pro.WG.1/45/2](#), [Add.1](#) and [2](#)), addressing all the substantive parts of the agenda.

2022 Quadrennial Assessment of the Protocol (decision XXXI/2)

Issues arising from the 2022 quadrennial assessment and synthesis reports of the SAP, the EEAP and the TEAP: On Monday, delegates spent the day addressing this agenda item. OEWG Co-Chair Vidémé Amèh Djossou (Togo) introduced this item, and also pointed to the synthesis of the 2022 quadrennial assessment reports by SAP, EEAP, and TEAP ([UNEP/OzL.Pro.WG.1/45/3](#)). He highlighted that the Panels are an important pillar of the Protocol and provide a solid basis for taking informed decisions.

SAP Co-Chairs David Fahey, Paul A. Newman, John Pyle, and Bonfils Safari presented the [2022 Scientific Assessment of Ozone Depletion](#). They discussed key findings noting that, *inter alia*:

HFC-23 global emissions derived from atmospheric observations increased since the 2018 Assessment, inconsistent with new information suggesting a substantial rise in abatement independent of Kigali Amendment controls. On ozone recovery, they stated that actions taken under the Montreal Protocol continue to contribute to ozone recovery but noted that, for the future, there is heightened concern about how climate change will impact levels of tropical total column ozone. They noted that HFC-23 global emissions derived from atmospheric observations increased since the 2018 Assessment, stating that this was inconsistent with new information suggesting a substantial rise in abatement independent of Kigali Amendment controls.

Significantly, the Co-Chairs also noted that recent identification of unexpected CFC-11 emissions had driven scientific investigations and policy responses, highlighting that the source of a significant number of these emissions had been identified, spurring emissions reductions. They also shared that several space-borne instruments were due to be retired, highlighting that if not replaced, the ability to monitor and explain future changes in the stratospheric ozone layer could be impeded. The Co-Chairs discussed the effects of the eruption of the Hunga Tonga-Hunga Ha'apai volcano, noting that water and aerosols from the eruption reached the Antarctic vortex in 2023 and will likely lead to an enhanced ozone hole in October 2023.

Finally, they highlighted the publication of the sixth edition of the [20 Questions & Answers About the Ozone Layer](#), a publication that aims to make complex issues around the Montreal Protocol accessible for non-specialists.

In the subsequent discussion, BURKINA FASO asked whether the collective effort under the Protocol is enough to reach its objectives. The SAP highlighted both the accomplishments under the Protocol and the need for vigilance and consideration of further controls. BENIN reiterated the need for access to sophisticated monitoring technologies, with the SAP concurring that research on ODS banks was only possible with purpose-built, very sensitive instruments. INDIA asked about the impact on tropospheric chlorine from VLS and unexplained CFC-11 and HFC-23 emissions. SAP acknowledged a need for further research and comparison between bottom-up and top-down estimates, and the TEAP added that MOP 35 will be furnished with a further report on such estimates.

FEDERATED STATES OF MICRONESIA (FSM) and the EU raised concerns about stratospheric aerosol injections (SAI), a potential method to reduce climate warming by increasing sunlight reflection, which has been determined to have unintended consequences affecting stratospheric temperatures, circulation and ozone production and destruction rates, and transport. SAP stated that SAI would have a rapid effect on solar radiation and stratospheric ozone, and that further scientific research was urgently needed to inform a potential legal framework for SAI. Responding to a statement by LIBERIA, the SAP explained that a recovery to natural levels of stratospheric ozone is expected by around 2066.

Regarding a US question on the implications of the loss of space-borne elements for scientific observation, the SAP noted that there are several satellites that are approaching end of life, and future satellites may be approved in 2030 at the earliest, which will create a gap in monitoring capability. The SAP also clarified the source of information stating that HFC-23 global emissions derived from atmospheric observations increased since the 2018 Assessment.

EGYPT asked about the gaps in equitable geographical distribution of assessment networks. They also wanted to know if the 20 Questions & Answers About the Ozone Layer will be published in all UN languages. The SAP agreed about the imbalance of network distribution in regions and noted these stations are very difficult to build. They responded that translating the publication into other UN languages might be considered by the Secretariat.

CANADA requested clarification about assigning ozone depleting potential (ODP) to VLS and about the range of run-out date for halons. The SAP clarified that ODP for VLS is difficult to calculate since the measurement depends on the latitude of emissions. They clarified that uncertainties on the run-out dates for halons come from their different uses, since sometimes they are tied to more enduring systems, including in military applications, power plants, and oil and gas, noting the need for more information on this.

The SAP clarified a question from ETHIOPIA about annual variations of methyl bromide abundances in 2016-2020. SAP also clarified a question from SOUTH AFRICA about the uncertainty on quantities and origins of CFC-11 emissions, stating that they are continuing to improve methodologies to make better observations.

EEAP Co-Chairs Janet F. Bornman, Paul Barnes, and Krishna Pandey presented the [2022 quadrennial assessment on environmental effects of stratospheric ozone depletion, UV radiation, and interactions with climate change](#). They described key findings on the effects from changes in the ozone layer and UV radiation, and their interaction with the climate system, as well as the effects of breakdown products of controlled substances and their alternatives on: the biosphere, biodiversity, and ecosystem health, including on biogeochemical processes and global cycles; human health; and ecosystem services, agriculture, and materials, including for construction, transport, photovoltaic use, and microplastics.

The Co-Chairs noted that increasing warming will lead to more ice melt and increased exposure of ecosystems to UV radiation in affected areas. They also highlighted that, currently, there is a lack of quantitative data on how changes in UV radiation in combination with climate change will affect food security, plant and animal migrations, and biodiversity. They shared the beneficial health effects of the implementation of the Montreal Protocol, including for, *inter alia*, Vitamin D production and decreased short-sightedness from moderate exposure to sunlight, but also noted that exposure to UV radiation causes or worsens inflammatory skin disorders. The Co-Chairs also noted that, *inter alia*: increased sea-surface temperatures of 1°C to 2°C can cause coral bleaching, worsened by high UV radiation; and there have been increases in incidence of melanoma over the past 50 years.

The EU requested clarification about the accumulation of trifluoroacetic acid (TFA) in plants, smaller water bodies, and drinking water. The EEAP stated very few studies have been carried out so far, but initial evidence seems to suggest that TFA is only toxic at very high concentrations, given it is water soluble and does not bioaccumulate. On a question by MOZAMBIQUE and KENYA, the EEAP clarified that men from Australia and New Zealand have the highest global incidence of melanoma.

Responding to questions from SOUTH AFRICA on collaboration or linkages between the Assessment Panels and the process towards an instrument on plastic pollution, the EEAP clarified that there is no relationship established with that process. They also stated that the inability to quantify the changes in UV radiation leads to a lack

of basic knowledge on the effects of UV radiation on biodiversity, since doing models on natural systems is more complicated than on agricultural systems.

TEAP Co-Chairs Bella A. Marañon, Marta Pizano, and Ashley Woodcock presented the [2019-2022 Quadrennial Assessment Report of the TEAP](#), discussing key messages on ODS, HFCs, and per- and polyfluoroalkyl substances (PFAS). They highlighted actions under the Montreal Protocol support continued progress in consumer, commercial, industrial, agricultural, medical, and military sectors, with ODS no longer used in many applications worldwide. They also noted the planned HFC phase-down under the Kigali Amendment, as well as national and regional regulations, are driving industry towards lower-GWP HFC alternatives or not-in-kind technologies, particularly in the refrigeration, air-conditioning and heat pump sector and foam applications.

Additionally, delegations also heard reports from the TEAP's TOCs, including on: Flexible and Rigid Foams ([FTOC](#)); Fire Suppression ([FSTOC](#)); Methyl Bromide ([MBTOC](#)); Medical and Chemicals ([MCTOC](#)); and Refrigeration, Air Conditioning and Heat Pumps ([RTOC](#)).

In response to a query from CHINA, TEAP highlighted ammonia alternatives available for high temperature heat pump water heaters, and asked parties to share data on HFC conversion and recovery rates in semiconductor manufacturing. In response to NIGERIA's concern about illegal dumping of obsolete and inefficient equipment, TEAP agreed that parties should use synergies between various multilateral environmental agreements to avoid the inappropriate transboundary movement of ODS and HFCs, and address barriers to the safe destruction of HFCs. SENEGAL asked for several clarifications about the performance of technologies in high ambient temperature countries. TEAP pointed to respective references in their reports, and cited the example of chillers that need to be air-cooled rather than water-cooled in high temperatures.

The TEAP shared that several companies had reported an increase in supply of HFCs, in response to questions from ARGENTINA and CHILE about stockpiling challenges for alternatives to HCFC-141b.

KUWAIT asked about the technology needed to reduce greenhouse gas emissions in the refrigeration, air conditioning, and heat pumps sector. The TEAP noted that the overall climate impact can be reduced by addressing both direct and indirect emissions, underlining the need to reduce the cooling demand, and bridge the differences in access to efficient technology between countries.

CUBA drew attention to studies warning about some countries' inability to fulfil the goals of the Kigali Amendment and, stressing financing issues, asked if there were alternatives to facilitate compliance. The TEAP noted a dual responsibility between importing and exporting countries, and underscored the importance for funding to follow the Kigali phase-down schedule.

Co-Chair Djossou lauded the presenters, stating that these reports help to better gauge current emissions. Delegates expressed gratitude to the Assessment Panels for their reports.

In general statements on this issue, MYANMAR informed delegations of the country's use of methyl bromide for QPS uses.

NORWAY noted the take-home message was early action to transition away from controlled substances has co-benefits for global warming; expressed concern over unexpected emissions of controlled substances; and looked forward to discussions on enhancing global coverage of atmospheric monitoring. For TFA, which is a breakdown product of controlled substances, she noted

the need for risk assessments to fully consider the effects of these substances. She expressed concern about, among others, the use of PFAS or PFAS-containing substances, which has adverse effects on human health and the environment, as alternatives to substances controlled under the Protocol.

AUSTRALIA welcomed the good news in the evidence of ozone recovery and the work done to arrest the unexpected emissions of CFC-11. She noted the potential for negative effects that SAI may have on the ozone layer.

On Friday morning, AUSTRALIA introduced a proposal on SAI and protection of the ozone layer (UNEP/OzL.Pro.WG.1/45/CRP.5), submitted jointly with Canada, noting that there was limited scientific information available on the risks of SAI. She noted the proposal, among others:

- invites the global scientific community to address risks and uncertainties for the ozone layer in any scientific studies or assessments undertaken in relation to SAI; and
 - requests the SAP to engage with the global scientific community regarding, and to continue to bring to the attention of the parties, any important developments with respect to SAI, including the inclusion of updated or new scenarios or modelling to assist with understanding of the potential impacts of SAI on the ozone layer.
- Delegates agreed to take up this proposal at MOP 35.

Consumption and production of HFCs not listed in Annex F: On Tuesday, OEWG Co-Chair Djossou noted parties requested that the quadrennial reports provide information on the consumption and production of HFCs not listed in Annex F of the Protocol that have GWP. He noted that this was addressed by the MCTOC.

SWITZERLAND expressed interest in learning about replacements for solvent uses and information on fluorinated gases that contribute to climate change. INDIA asked about the implications for funding the HFC phase-down by Article 5 parties.

NORWAY expressed concerns about the GWP of a number of substances that appear to be in commercial use. The EU also enumerated a number of substances that are beyond the control of the Protocol but relevant for the climate and the environment, and are covered by domestic regulations. SENEGAL asked about information on asthma inhalers.

Closing this item, Co-Chair Djossou invited the MCTOC to address the questions raised and provide additional information, as necessary.

Availability of HCFCs: On Tuesday, OEWG Co-Chair Djossou introduced this item, recalling [decision XXX/2](#) requesting TEAP to provide information on the availability of HCFCs in its quadrennial report.

INDIA asked about HCFCs destined for firefighting and medical purposes recovered from recycling. MCTOC clarified that recycling is generally not a barrier for fire protection uses as long as required specifications are met.

Co-Chair Djossou closed this agenda item, inviting the MCTOC to provide further information to parties, if needed.

Update to the report of the TEAP working group on information on HFC alternatives: On Tuesday, OEWG Co-Chair Djossou introduced this item, also pointing to the September 2022 TEAP report on [information on alternatives to HFCs](#). He highlighted that the TEAP had been requested to conduct periodic reviews of HFC alternatives in 2022 and every five years thereafter, and to provide technological and economic assessments of the latest available and emerging alternatives to HFCs. He also noted

that at MOP 34, parties had discussed the issue of aligning the periodic review of alternatives to HFCs with the preparation of the quadrennial assessment reports. He requested comments on the periodicity of reviews, among others. The US urged the working group to ensure that any recommendation on the periodicity of reviews adhere to [decision XXVIII/2](#).

SENEGAL called attention to the flammability of propane, one of the proposed alternatives. CAMEROON noted challenges related to propane as an ODS alternative, including its prohibitive cost, and the need for more training to manage its use.

INDIA stressed that the issue of low-GWP alternatives is more significant for halons, and supported alignment along the lines of decision XXVIII/2.

CANADA, with the EU and AUSTRALIA, called for a better indication on the penetration of alternatives in both Article 5 and non-Article 5 countries; and supported the alignment of the report with the 2026 quadrennial assessment, noting, with AUSTRALIA, this could be discussed in the contact group on the terms of reference.

The EU welcomed the report on HFC alternatives and supported a future report discussing the market penetration of alternatives. He queried the finding that for heating-only heat pumps, the use of propane in the EU is restricted to outdoor applications, and supported further discussion on the reporting alignments.

COLOMBIA highlighted concerns about the issues countries face in transitioning to HFC alternatives, noting toxicity and flammability of the alternatives presented in the refrigeration and air conditioning sector. She also drew attention to the scarcity of alternatives for many products, with many countries seeking extensions for use of high-GWP products.

TRINIDAD AND TOBAGO noted limitations of low-GWP alternatives in the fire sector, noting, among others, that some substances contain PFAS, making them unsuitable for use.

Delegates agreed to continue discussions in the contact group on the terms of reference for the next quadrennial assessment. On Friday, OEWG Co-Chair Brieskorn informed delegates that this issue would be further discussed at MOP 35.

Potential areas of focus for the 2026 quadrennial assessment: On Tuesday, OEWG Co-Chair Brieskorn introduced this agenda item. The EU then introduced their proposal on this topic and outlined elements from the draft terms of reference for the three Panels under the Montreal Protocol. He highlighted that the timeline for the Panels' work should follow the usual pattern, which means submission of reports to the Secretariat by 31 December 2026, and submission of the synthesis report by 30 April 2027, with the caveat that the Panels should inform parties in a timely manner in the case of any substantial new developments.

CUBA and the DOMINICAN REPUBLIC echoed earlier interventions urging parties to make the necessary resources available for the implementation of the Kigali Amendment. INDIA, supported by BRAZIL, urged that the Panels' terms of reference stay focused on the remit of the Montreal Protocol and are not diversified. CHINA suggested alternative technologies and compliance in certain sectors as key elements for the next quadrennial assessment. AUSTRALIA noted that overlaps with other agenda items should be managed, and CANADA cautioned against too prescriptive terms of reference given the comprehensive character of the Panels' reports. The US identified his priorities for the Panels' next assessment including solar radiation management,

global skin cancer rates, atmospheric concentrations of controlled substances, and impacts from rockets and supersonic flights. OEWG 45 established a contact group, co-chaired by Cindy Newberg (US) and Leslie Smith (Grenada), which based its work on the proposal by the EU.

On Wednesday, Co-Chair Newberg reported on progress in the contact group, noting that it had been an opportunity for delegates to make first observations on the conference room paper (CRP), and to request further information. She noted that more time was needed for discussions. On Thursday, Co-Chair Smith reported very good progress by the contact group in making amendments to the CRP.

On Friday morning, Co-Chair Newberg noted that the group had discussed the direction to the SAP, but more time was needed to discuss direction to the TEAP as well as to decide on the intersessional work required. OEWG Co-Chair Brieskorn noted that there would be no additional time at OEWG 45, stating that additional work would be conducted "towards the MOP."

Future availability of halons and their alternatives: On Tuesday, Co-Chair Brieskorn introduced the item with reference to the report by FSTOC. The US expressed concern about the new estimates of run-out dates for halons and the availability of halon alternatives for certain high-level applications. AUSTRALIA deplored that the transboundary movement of halons for essential uses was made unnecessarily difficult by regulations of certain countries, while BURUNDI referred to high transport and substitution costs for halons. The EU announced that the destruction of halons is now prohibited in the EU to avoid potential shortages in the future. CANADA called for cooperation with the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). CHINA expressed concern about the feasibility and high ODP of trifluoromethyl iodide (CF₃I) as an alternative to halons, with FSTOC clarifying that the issue is still under consideration by ICAO. Co-Chair Brieskorn invited informal consultations on this issue. On Friday, he noted the need for further discussion of this issue at MOP 35.

Any other issues: HFC-23 Emissions: On Tuesday, OEWG Co-Chair Brieskorn introduced this item. The US introduced their proposal (UNEP/OzL.Pro.WG.1/45/CRP.1), co-sponsored by Australia, Canada, and Norway, requesting the SAP and TEAP to produce additional reports for the MOP in 2024. INDIA asked for clarifications on several issues, including how HFC-23 emissions have been identified.

In response to INDIA, the SAP noted that there are processes that may generate HFC-23 emissions as a by-product. Co-Chair Brieskorn proposed, and delegates agreed, to establish a contact group on HFC-23 emissions, co-chaired by Shontelle Wellington (Barbados) and Heidi Stockhaus (Germany). On Wednesday, Stockhaus reported on progress in the contact group, noting that delegates thought it was premature to talk about the CRP ahead of the MOP, but agreed to review its content with the understanding that nothing is agreed until everything is agreed. On Friday, Wellington noted that the group had completed an initial consideration of the proposal. Delegates agreed to continue discussions at MOP 35.

Very Short-Lived Substances (VSLs): On Tuesday, CANADA introduced a proposal on VSLs, including dichloromethane (UNEP/OzL.Pro.WG.1/45/CRP.4), co-sponsored by Australia, Switzerland, and the US, requesting the TEAP to discuss alternatives and

potential emissions reductions for dichloromethane and other VSLS in its 2024 progress report.

On Wednesday, INDIA noted that they do not support going forward with this CRP, citing: the need for better understanding of and how such substances have ODP; these substances are covered under other processes, such as the UNFCCC and Paris Agreement; and VSLS do not fall under the mandate of the Montreal Protocol. This position was supported by KUWAIT, BAHRAIN, CHINA, ARGENTINA, and CUBA. SWITZERLAND noted that the CRP encourages parties to avoid emissions where possible, even if these are not controlled by the Protocol.

CANADA, as the proponent of the CRP, responded to the interventions underscoring that dichloromethane is an ODS, and that many issues discussed by the OEWG go beyond substances controlled by the Protocol, such as lifecycle refrigerant management. He conceded that it is important to focus on compliance obligations, but asked parties not to ignore issues that are important to promote the application of alternative substances to reduce ODS and HFC emissions.

The US agreed that all VSLS have ODP and thus have an impact on the ozone layer, supporting more information from the SAP, and reminded parties of previous requests for the Assessment Panels to provide information on substances of interest. The EU noted that action on VSLS is the single biggest area where progress can be made relating to ozone. AUSTRALIA welcomed the suggestions in the proposal, welcoming further discussions at MOP 35.

Reflecting on the discussion, the SAP noted that their report provides a hypothetical scenario whereby if all emissions from VSLS, including dichloromethane, were reduced beginning in 2023, stratospheric ozone would increase by 0.3%.

KUWAIT then requested clarification on the urgency of discussing this issue at this time, given the heavy agenda. The RUSSIAN FEDERATION opined that the proposal does not pertain to the mandate of the Montreal Protocol, and noted that VSLS can be unilaterally controlled at the national level.

OEWG Co-Chair Brieskorn concluded the discussion by calling on delegations to engage in informal consultations on the margins of the meeting, noting that this item may have to be taken up at MOP 35. On Thursday, CANADA reported from informal consultations undertaken so far with other parties. INDIA supported a further informal exchange of views, albeit not based on the CRP.

OEWG Co-Chair Brieskorn suggested, and delegates agreed, to continue informal discussions, co-facilitated by Liana Ghahramanyan (Armenia) and Jana Mašíčková (Czech Republic).

On Friday evening, Mašíčková reported that informal discussions focused on, among others, the rationale and historical background of the issue. She said the SAP had addressed some questions, but some issues remained open. Co-Chair Brieskorn informed that discussions will continue intersessionally, and that the proposal related to VSLS, including dichloromethane, would be forwarded to the MOP.

Destruction technologies for controlled substances: On Tuesday, the EU introduced a proposal (UNEP/OzL.Pro.WG.1/45/CRP.2) to update and consolidate the list of approved destruction technologies, and for the TEAP to assess further destruction technologies previously listed as not approved or not determined. The US and AUSTRALIA called for ensuring that instructions to TEAP are clear and consistent with previous decisions. EGYPT and SENEGAL expressed concerns that the destruction of HFC-23 by cement kilns could impact the quality of cement, while CANADA, supported by

PAKISTAN, expressed its expectation that the MCTOC consider further technologies to destroy diluted sources of HFC and ODS. CAMEROON and SENEGAL called for regional destruction centers in Africa, with KENYA and BENIN stating that destruction technologies need to allow sustainable solutions for Africa including for small quantities of controlled substances. Co-Chair Djossou concluded that this issue would be revisited later in the week after informal discussions on the margins.

On Friday evening, OEWG Co-Chair Brieskorn informed delegates that this item would be taken up by the MOP.

Feedstocks for production of other substances: In an oral proposal on Tuesday, AUSTRALIA noted numerous concerns in different assessment reports and presentations over production of ODS for feedstock uses, which increase atmospheric emissions. Warning about a larger systemic issue related to feedstocks, she reminded delegations that the use of controlled substances as feedstocks had been approved with the understanding that their emissions are negligible, but that new information suggests this is no longer the case. She called for views to find a way forward to include this in formal discussions. CANADA, with SWITZERLAND, NORWAY, and the EU, agreed that this issue merits more discussion.

On Friday morning, AUSTRALIA introduced a proposal on feedstock uses (UNEP/OzL.Pro.WG.1/45/CRP.7). She said that it builds on [decision IV/12](#) taken nearly 30 years ago for parties to take steps to minimize ODS emissions from feedstocks, and noted that the MCTOC had registered concern over the reporting of certain intermediates. She also noted that the CRP, among others, proposes to:

- urge relevant parties, in accordance with decision IV/12, to take steps to minimize emissions of controlled ODS produced or used as feedstock, including such steps as avoidance of the creation of such emissions and reduction of emissions using practicable control technologies or process changes, containment, or destruction; and
- request the TEAP to prepare a report for consideration by OEWG 46 that includes: information on alternative chemicals and processes that can be used or implemented to reduce the need for feedstock production or use of controlled ODS, and estimates of annual global emissions of ODS by species from feedstock production, by-product emissions, and use, based on bottom-up calculations and estimates made by the SAP arising from atmospheric observations.

INDIA noted the Protocol's definition of controlled substances excludes those used in a manufactured product, but recalled that parties report annually on feedstocks, as stipulated under the Protocol. She noted that parties have national processes for managing feedstocks, and requested time to consult with capital on this issue. AUSTRALIA welcomed the observations, noted that the TEAP had provided information on the increase of feedstock production and use emissions, and highlighted the need to address these emissions.

CANADA, with the EU, supported the proposal, and noted links with the proposal on CTC by Switzerland. He suggested considering the two proposals together.

CHINA thanked Australia for the proposal and called for more time to consider it. She noted decision IV/12 concluded that these substances are not controlled under the Protocol; and highlighted

that previous decisions of the Protocol do not need to be reiterated. She stressed the need to consult with industry players.

OEWG Co-Chair Djossou proposed, and delegates agreed, to discuss this issue at MOP 35.

Lifecycle refrigerant management: On Tuesday, Co-Chair Brieskorn invited FSM to explain their proposal. FSM underlined that reclamation, recycling, and reuse, as well as destruction technologies aimed at refrigerants, are not being employed in some countries, and underlined that timely efforts to manage end-of-life management to prevent emissions would have a significant impact in ensuring compliance with the Kigali Amendment, and also provide economic, environmental, and social benefits. She offered to engage with parties and to prepare a draft CRP or discuss this under an existing agenda item. GRENADA, SAMOA, ECUADOR, US, NIGERIA, and TRINIDAD AND TOBAGO expressed support to continue discussions on this proposal. Delegates engaged in informal discussions and, on Friday, agreed to revisit this issue at MOP 35.

TEAP Report on MLF Replenishment for 2024-2026 (decision XXXIV/2)

On Tuesday, Co-Chair Brieskorn introduced the [TEAP report on the replenishment of the MLF for the period 2024-2026](#) and the TEAP Report of May 2023, Volume 3: [Assessment of the Funding Requirement for the Replenishment of the MLF for the Period 2024-2026](#).

TEAP RTF Co-Chairs Shiqiu Zhang and Bella A. Maranion presented the report. They reported that the RTF considered the total estimated funding requirement range for the MLF replenishment for the 2024-2026 triennium, including support costs, to be between USD 975 million and 1.018 billion, depending on the number of Kigali Amendment ratifications.

Many delegations expressed their support, in principle, for the RTF's assessment of the funding requirement. BRAZIL noted that gender mainstreaming and energy efficiency should be funded *via* the MLF rather than other avenues. Spain, for the EU, called for further discussions in a contact group to address, *inter alia*, the methodology and scenarios adopted by the RTF. SENEGAL suggested establishing regional centers to collectively manage stockpiles of HCFCs. KUWAIT requested that inflation be more specifically addressed by the RTF, and questioned the inclusion of external experts from implementing agencies in the RTF. The RTF clarified that the experts were included solely on the basis of their expertise, with affiliations and potential conflicts of interest appropriately managed. The US noted that the range of estimates had been done differently from the past, and underlined the importance of frontloading financial resources, especially to support countries that intend to phase down HFCs faster than called for by the Kigali Amendment.

INDIA recommended an analysis on realistic funding needs for servicing and installation of energy efficiency-related components in small and medium enterprises and, with KUWAIT, asked about specific funding for new HCFC Production Phase-out Management Plans.

The TEAP welcomed the guidance and advice from parties on further analysis, and responded to a question by NIGERIA stating that, since they currently do not have cost guidelines, they bridge the data gaps by using any available historical information.

CANADA noted a discrepancy in information on HFC targets provided in the Executive Summary and the introduction, and

the rest of the report. TEAP noted that they looked at the current triennium and future triennia, stating that they welcome guidance from parties on how to better address this in the report. TEAP responded to questions from BURKINA FASO and TUNISIA, noting that the Panel did not consider the issue of flammability of refrigerants for funding.

Delegates established a contact group to further consider the report of the RTF, co-chaired by Sergio Merino (Mexico) and Alain Wilmart (Belgium).

Reporting back to plenary on Wednesday, Wilmart reported on progress in the contact group, noting that, while discussions did not enter into substance, delegates were able to raise questions to the TEAP about some aspects of the report. He noted that more time was needed for discussions. On Thursday, Merino reported good progress in the contact group, which managed to compile a list of questions, ideas, and suggestions to explore, and requested additional time to conclude discussions.

On Friday morning, Wilmart called for more time "to parse out the key elements from the science fiction," but noted that the group had begun the examination of the new elements to be considered by the RTF. In the evening, he reported the group had finalized its work, drawing attention to a document containing a list of suggestions for additional analysis in a supplementary report on MLF replenishment for 2024-2026. He noted various sections dedicated to, among others, HCFCs, HFCs, energy efficiency, and end of life. He said this would ensure the RTF could provide all the information requested in time for MOP 35.

OEWG Co-Chair Brieskorn noted that the list would be annexed to the meeting report.

Strengthening Montreal Protocol Institutions, including for Combating Illegal Trade

Outcomes of the workshop on strengthening the effective implementation and enforcement of the Montreal Protocol and comments on background documents: This issue was addressed on Tuesday and Wednesday. Co-Chair Brieskorn noted the availability of the outcomes of the workshop ([UNEP/OzL.Pro/Workshop.11/3](#) and [UNEP/OzL.Pro.WG.1/45/6](#)), and invited comments on these outcomes as well as the relevant documents prepared by the Secretariat. These documents include a background information paper on strengthening the effective implementation and enforcement of the Montreal Protocol ([UNEP/OzL.Pro/Workshop.11/2](#)), a summary of practices of illegal trade and the approaches taken by national authorities to identify and address such cases, and a summary of common features of licensing systems. Delegations congratulated the Secretariat for organizing a successful workshop, noting the rich lessons shared during the one-day event.

MALAYSIA reported that through iPIC, they had halted the illegal import of certain ODS into the country, and called for a future workshop to include experiences from port agencies in addressing illegal trade.

INDIA noted that most countries have a mechanism for addressing feedstocks, but stated that these mechanisms could be strengthened. SENEGAL underlined the link between customs at points of entry and monitoring stocks of controlled substances, underscoring the need for interagency cooperation to address illegal trade.

On the background documents, the US noted that there was a call to share information on illegal trade practices, highlighted that the Secretariat was in the process of finding ways to share this

information with parties, and, with NORWAY, called for a more detailed discussion in an informal group setting. NORWAY also expressed hope that the workshop outcomes could strengthen the implementation and enforcement of the Protocol.

CANADA supported discussions on enhancing specific actions on monitoring and reporting to strengthen the institutional processes for the implementation and enforcement of the Protocol, focusing on those practices that, *inter alia*, deter and/or detect illegal practices.

The EU called for focused discussions on emissions from feedstocks, banks, and atmospheric monitoring. He noted interest in the development of a CRP at MOP 35, prioritizing, among others, illegal trade and domestic licensing and quotas. He called for a discussion on expanding the role of the ImpCom, including tasking it with providing guidance and recommendations to parties; and recalled earlier discussions on the inclusion of new substances without amending the Protocol, calling on the Secretariat to update parties on the status of those discussions. He shared that his delegation may prepare a proposal on this, for consideration at either OEWG 45 or MOP 35.

On Wednesday, CHILE underscored the need for specific actions to strengthen the Protocol's institutions to address the gaps between import and export reporting, and noted this could assist in monitoring, reporting, and verification of ODS stocks. He called for the documents to be translated into all official UN languages to ensure equitable participation.

MALDIVES supported more discussions on actions to combat illegal trade to strengthen the implementation of the Protocol.

TANZANIA highlighted illegal trade of controlled substances is a growing concern that has attracted international traders who circumvent national processes. He noted these traders target countries with weak requirements for labelling and other measures, and operate by falsifying customs documents that are overlooked by poorly trained officials. He called on the international community to be more vigilant and assist countries that require additional capacity and technology to address illegal trade.

SENEGAL highlighted the need to also address the issue of clearing and forwarding agents, and underlined the importance of information sharing to address illegal trade. He also highlighted the importance of monitoring Free Zones, where illegal operations may occur, calling for technical discussions on this issue.

Co-Chair Brieskorn proposed informal group consultations, co-facilitated by Miruza Mohamed (Maldives) and Martin Alex Bjørnholst (Denmark).

On Friday morning, Mohamed reported that some parties called for a CRP to be prepared, and the informal group agreed to continue intersessional discussions on this issue, noting agreement on a list of possible elements to be addressed. She highlighted the list of potential elements to be addressed related to, *inter alia*:

- preventing illegal trade;
- licensing and quota systems;
- implementation and enforcement systems;
- reporting system/practices under Article 7 (reporting of data), and information needed outside the Article 7 scope; and
- assessment of elements to strengthen the Protocol.

Thanking the facilitators and the group, OEWG Co-Chair Brieskorn noted that the list of potential elements would be annexed to the meeting report and forwarded to the MOP.

Energy-efficient and Low- or Zero-global-warming-potential Technologies

TEAP progress report: On Wednesday, OEWG Co-Chair Djossou introduced this issue.

TEAP Co-Chairs Ashley Woodcock and Omar Abdelaziz presented the report of the [TEAP Working Group on Energy Efficiency](#). Highlighting their conclusions, the Co-Chairs noted that, among others:

- a systems approach is required for building both cooling and cold chains;
- the energy efficiency co-benefit of HFC phase-down is not yet being achieved in many Article 5 parties with major growth in refrigeration, air conditioning, and heat pumps; and
- synergies between energy efficiency improvement and transition from high-GWP refrigerants would result in the greatest climate benefit at the lowest cost.

They also concluded that, by 2050, respective energy savings could be worth up to USD 3 trillion and avoid the building of 1,500 new power plants, and that an incentive-linked funding approach could maximize climate co-benefits.

In the discussion, CAMEROON noted that a lack of intersectoral coordination is a challenge for Article 5 countries in implementing policies that promote energy efficiency. TEAP agreed that there is a need for financing capacity building towards regulatory frameworks to support energy efficiency.

KUWAIT questioned the alleged increase of cooling demand driven by wealth. TEAP responded that cooling is generally taken up when wealth surpasses a certain threshold, signaling studies confirming this for different countries.

LESOTHO asked why African countries lack Minimum Energy Efficiency Performance Standards (MEPS) for the commercial sector. TEAP confirmed that regulation for MEPS is lagging, but referred to UNEP working with regions towards the adoption of harmonized MEPS for domestic, but not yet commercial refrigeration.

The US underscored the “enormous opportunity” identified by TEAP, and advocated for greater cooperation within and between governments, and funding from the MLF to promote energy efficiency under the Protocol. The EU concurred with the US and enumerated several EU policy measures advancing energy efficiency in the building sector.

EGYPT noted the need for financial support to promote energy efficient buildings, supported by SENEGAL who also raised concerns about the performance and safety of alternatives to HFCs, and the necessary skills to handle them. TEAP acknowledged the complexity of developing and implementing MEPS, and referred to the need for support to the entire local supply chain including researchers, technology developers, financiers, and manufacturers.

CANADA suggested further information be provided on the incentive-linked approach outlined by TEAP where the highest ratio in incentives would be paid to those beneficiaries with the lowest capability and product-line energy efficiency. TEAP suggested that examples from one industry could be transferred to other industries.

FSM, supported by the UK, called for a move from knowledge to action in enhancing energy efficiency in the refrigeration, air conditioning, and heat pump sector, and suggested further discussions during this meeting. TEAP mentioned a specific workshop on energy efficiency will be held at MOP 35.

OEWG Co-Chair Djossou closed the discussion and suggested interested parties continue to engage informally on this topic on the margins of the meeting. On Friday, delegates agreed to further discussions at MOP 35.

Illegal import of certain refrigeration, air-conditioning, and heat pump products and equipment: OEWG Co-Chair Djossou introduced the item and noted that information according to [decision XXXIV/4](#) had been submitted by Ghana, Nigeria, Zimbabwe, the EU, and the US.

Objecting to the title of the agenda item, GHANA underlined that African countries have “never been concerned with illegal imports” but rather dumping of obsolete technology and equipment, noting that this threatens compliance with the Convention. He noted that exporting countries send almost-end-of-life equipment to his country and lamented that this is deemed appropriate under the Protocol. He noted that at the 1995 MOP, one representative had noted that the dumping of obsolete technologies in Article 5 countries was on the increase, and lamented that 28 years later members of the OEWG are still discussing this issue. He called for a contact group on how best to address the dumping of obsolete refrigeration and air conditioning equipment in Article 5 countries.

UNION OF ASSOCIATIONS OF AFRICAN ACTORS IN REFRIGERATION AND AIR CONDITIONING expressed concern with the dumping of obsolete technology on African countries, highlighting that dumping these products is “nothing less than throwing rubbish into your neighbor’s compound.”

FSM expressed confusion and concern, noting that both new and used technologies with high-GWP are being exported to Article 5 countries, underscoring that this is not an optimal situation given obligations under the Kigali Amendment. She noted that the trade in these products could be on the rise, and underlined that this is not a question of “illegal importing.” She suggested that this trade is neither wanted nor sustainable given the potential impact on climate and the ozone layer. She expressed trust in the ability to find a solution that is good for Parties and the planet.

Supporting the establishment of a contact group on this issue, NIGERIA called for a sustainable solution to ending the unsustainable dumping of obsolete equipment in Africa and lamented that the onus is placed on importing countries, rather than the manufacturers or exporters of these waste products.

SENEGAL emphasized dumping of obsolete equipment leads to high energy use in developing countries, and highlighted challenges with monitoring borders to ensure that dumping does not occur.

SIERRA LEONE underscored that illegal dumping threatens the existence of future generations, suggesting that used equipment is popular because it is affordable, but has severe effects on human health and the environment. Likening the situation to driving a car without all its tires, MOZAMBIQUE underlined the need to balance actions to reduce emissions with actions to address obsolete equipment, noting that the onus should not be on importing countries.

TUNISIA stressed that dumping in Article 5 countries prevents them from moving towards newer technologies containing less hazardous materials. GRENADA, supporting the establishment of a contact group, noted that dumping has implications for energy resources, cost of power, and associated emissions.

The EU stated that the equipment exported from the region would not contain substances controlled by the Montreal Protocol, and opined that there was no need for a formal contact group. With the

US, they expressed that the responsibility lies with the importing country to ban the imports of these products. The US stated they were open to have discussions on this topic if these are based on decision XXXIV/4.

NEPAL suggested shifting the responsibility to the illegal exporters. GHANA recalled that, at MOP 34, delegates did not discuss this issue, and emphasized that all issues should be treated equally. ANGOLA stressed that most African countries are a dumping ground for unwanted equipment and supported the establishment of a contact group on this issue.

LIBERIA urged not to politicize the problem of dumping in Africa, stating it was an environmental problem affecting all parties. He called out certain countries for taking advantage of the Protocol’s regulations to send their unwanted equipment to poorer countries. SOUTH AFRICA, in support of Ghana, offered to develop a CRP for consideration at this meeting.

Underscoring the importance of a contact group on this issue, SENEGAL noted a high number of rural dwellers in Africa were forced to buy obsolete equipment, pointing out countries that prefer to send old equipment to poorer countries instead of dismantling it at a higher cost.

OEWG Co-Chair Djossou proposed, and delegates agreed, to establish an informal group, co-facilitated by Andrew Clark (US) and Tumau Herowanna Neru (Samoa). On Friday morning, Neru reported that the group had met and considered a draft proposal submitted by Ghana, on behalf of African states, titled Shared Responsibility to Stop Dumping of Inefficient Cooling Equipment Containing Obsolete Refrigerants (UNEP/OzL.Pro.WG.1/45/CRP.8). She noted that parties had provided general comments and the group had received constructive inputs. GHANA introduced the draft proposal, highlighting that it:

- requests parties that manufacture and exporting cooling equipment consider instituting measures involving shared responsibility to stop exporting cooling appliances with obsolete refrigerants and encourage the supply of next-generation cooling equipment; and
- further requests the TEAP to provide a preliminary report to MOP 35, and to update this report for discussion at OEWG 46, providing examples of technically and economically feasible measures of shared responsibility where cooling equipment that is prohibited from use in a domestic market is also prohibited from export.

OEWG Co-Chair Djossou proposed, and delegates agreed, to continue informal discussions on this issue, and noted that the proposal would be annexed to the meeting report.

Identification of Gaps in the Global Coverage of Atmospheric Monitoring of Controlled Substances and Options for Enhancing Such Monitoring

Secretariat Report: On Wednesday, the Secretariat introduced the presentation on information on enhancing the global and regional atmospheric monitoring of substances controlled by the Montreal Protocol in response to [decision XXXIII/4](#), and noted that they had worked with the SAP on this issue. SAP Co-Chair Newman presented the approaches for estimating emissions, noting two approaches: global and regional, but adding there is not enough sampling in the world. He stated that emissions estimates are dependent on observation quality, the lifetime, and the ability to measure global average values. He highlighted global emissions can be estimated from long-lived CFCs because they are well-

mixed across the globe, stating it is clear the Protocol has been effective as atmospheric emissions overall have decreased in both the northern and southern hemispheres. He noted monitoring from satellites is not quite possible for all ODS under the Protocol, with most measurements conducted from onsite observation stations. He shared there is a need for regional data for decision making, noting regional monitoring requires a suitable location, scientific expertise, highly sophisticated instruments, and a monitoring tower, among others, to ensure precision and accuracy. He noted there are various regions that require new stations, and described the efforts made through an EU-funded pilot project on evaluating potential sites for Montreal Protocol gas monitoring.

In the discussion, THE GAMBIA called for clarity on the functioning of Africa's one monitoring station. The SAP responded that this is a fully funded and operational station, located at an altitude of 3000m, which has the equipment necessary to measure controlled substances. NORWAY welcomed the pilot project and called for further discussions on how to address gaps in atmospheric monitoring at the MOP. The RUSSIAN FEDERATION pointed to the Global Atmospheric Watch (GAW) under the WMO, with the SAP noting that the GAW enhances emissions monitoring under the Protocol.

The US welcomed the EU-funded pilot project and called for clarity on: the identification of priority sites where there is high production and consumption, and whether there will be lessons learned from the pilot project. The US, with EGYPT, called for further discussion on how to pay for the work required, pointing to the Vienna Convention Trust Fund in this regard, and noting that an informal group could discuss this issue. The SAP noted the need for monitoring centers in northern and southern Africa, and shared that lessons learned will be compiled.

TUNISIA requested clarification on calculating the reduction of HCFCs, and on the reduction of emissions, with the SAP noting that the instruments are extremely accurate due to their sophistication.

AUSTRALIA welcomed the update, noted that the requirements set out, including on funding and the provision of data, will be challenging. She requested clarification on the next steps for the EU-funded project, welcoming further discussions. The Secretariat noted that this was the final update requested by the parties, and noted that the project will finish at the end of July 2024.

OEWG Co-Chair Brieskorn suggested that an informal group could further discuss this issue, co-facilitated by Ana Maria Kleymeyer (FSM) and Sandrine Benard (Norway).

On Friday, Kleymeyer reported that the group had discussed the EU-funded pilot project, but that questions remain about the wider issue. OEWG Co-Chair Brieskorn noted his issue would be taken up by the MOP.

TEAP Report: On Thursday, the TEAP presented the report of the MCTOC in response to [decision XXXIV/5](#) on emissions from chemical pathways. In particular, they noted three exceptions where chemical pathways are likely able to produce substantial emissions of unwanted by-products, including:

- HFC-23 by-production from chloroform to HCFC-22 chemical pathway;
- CTC by-production from methyl chloride to dichloromethane to chloroform chemical pathway; and
- CFC-115 by-production from perchloroethylene to HFC-125 chemical pathway.

The TEAP pointed to available best practices to control emissions, and noted remaining gaps in the understanding of the sources of emissions.

INDIA stated emissions from chemical pathways will likely decrease with the implementation of the Kigali Amendment, requested further information on the TEAP's methodology, and, with KENYA, called for further capacity building for Article 5 parties. The EU acknowledged the usefulness of the report for a range of current agenda items, supported by CANADA who added there was no standalone item needed on this issue, agreeing with India that further support is needed from the MLF.

The TEAP referred to the appendix of their report and explained the use of bands for global production tonnages and emissions to keep the underlying data confidential. They confirmed that MCTOC considered a reasonable threshold for "substantial emissions" to be global emissions greater than 1,000 metric tonnes of controlled substance per year from a chemical pathway.

TEAP 2023 Progress Report

On Thursday, the TEAP and its TOCs presented their [2023 progress report](#). They noted that methyl bromide had been recommended for listing under the Rotterdam Convention, with certain commodities and uses also being listed in the EU fluorinated-gas (F-gas) regulation, due to its high GWP. The TEAP highlighted the continued research on and registration for methyl bromide alternatives for many QPS uses. They reported that the only critical-use application for methyl bromide was submitted by Canada for use in strawberry runners.

Addressing [decision XXXIV/10](#) on stocks and other QPS uses, the MBTOC shared that, by the time they finalized the progress report, only Australia had submitted data on methyl bromide uses and needs for pests and commodity combinations, and accessible data on the volumes of pre-phase-out stocks of methyl bromide at the country level. They highlighted their findings that confusion exists in reporting either QPS uses of methyl bromide, providing examples for each of those uses, and noting alternatives that exist for methyl bromide uses in pest control, including under the International Plant Protection Convention (IPPC).

The FTOC explained that the low-GWP foam-blowing agent supply has increased, and its cost decreased, but noted there is insufficient capacity to meet regulated needs for low-GWP foam-blowing agents.

The FSTOC raised concern over the rapid progression towards the run-out date of halon-1301 used in aircraft; and, noting unexplained deviations in halon-1301 emissions, requested additional information on feedstock production.

The MCTOC discussed challenges that could emerge in the transition from high- to low-GWP propellants in pressurized metered-dose inhalers (pMDIs). They noted that these challenges point to the importance of a well-managed transition to low-GWP propellants to ensure patients face neither shortages nor price increases that could threaten the affordability of pMDIs. The MCTOC warned that there will be incremental costs for pMDI manufacturers in developing countries in the transition until the related pharmaceutical-grade HFC is more widely available.

The RTOC provided a brief report on its membership, noted that the TEAP had established an Energy Efficiency Working Group (EEWG) to provide information to parties on energy efficiency during HFC phase-down in response to [decision XXXIV/3](#).

The TEAP noted ongoing subnational, national, and regional efforts related to PFAS, their substitutes, and breakdown products, including TFA, are creating uncertainty for industry regarding the long-term availability of certain alternatives to ODS and HFCs. They added this uncertainty could delay the phase-out of ODS and phase-down of high-GWP HFCs, since PFAS is present in every industry due to its wide-ranging uses.

On its configuration, the TEAP proposed to maintain the structure of its current five TOCs aligned with the Montreal Protocol sectors, suggesting an additional Co-Chair for the RTOC, which would continue functioning as one unit, but would address cold chain issues separately from those issues related to space heating and cooling. They also pointed to a need for additional senior experts and TOC members.

SENEGAL asked about the limitations of installing large systems using HFC alternatives given their potential flammability. The TEAP noted this issue is included in their assessment report, including instructions on how large systems can use HFCs. The TEAP noted committee membership is voluntary, and they try not to overload their work, in response to a question posed by NORWAY about the potential options for future configuration of committees.

TUNISIA asked about alternatives to high-GWP propellants for pMDIs. The TEAP, also answering similar questions from the US and CUBA, noted there are alternatives, but not all of them are suited for all types of patients, and the costs for transition are expected to be higher than previously estimated. The EU expressed appreciation for the TEAP report on pMDIs, noting that in the region companies have begun to provide information on the transition to low-GWP propellants for pMDIs. He informed delegates that he would consult with others on this issue.

On a question posed by CHINA about considering the effectiveness of policy frameworks in their report, TEAP stated this would go beyond their mandate.

ARGENTINA stated concerns about difficulties in finding feasible alternatives to HCFCs, citing market scarcity and higher prices than funds allowed for, and asked about implementation measures for Article 5 countries. TEAP noted concerns have eased as new plans from companies to produce alternative substances have been made public.

LESOTHO asked if it can be claimed that there is significant progress in phasing out HCFCs if they cannot access alternatives to some substances. They also asked about ways to balance safety, economic, and environmental concerns when discussing ODS replacements. TEAP noted there is no clear choice for each application, since several parameters must be balanced, and, citing civil aviation as an example, noted the use of halon-1301 is necessary for providing safety, even if environmental concerns are affected.

The EU asked how the stocks of methyl bromide are estimated. TEAP said they used the number of stocks sold globally in their report, but, since reporting on this is voluntary, this amount is becoming less certain. The US asked about how destroying halon-1301 is impacting the run-out date. TEAP noted all uses of this substance rely on recycling and reclaiming, and there is a finite amount of halons left in the world, stressing the substance is essential for civil aviation.

BRAZIL asked about the GWP of alternatives to methyl bromide. TEAP informed delegates that most alternatives to this substance do not have a GWP of concern.

Nomination for critical-use exemption for methyl bromide for 2024: OEWG Co-Chair Djossou briefly opened this item on Thursday, noting the evaluation by MCTOC and that its final report will be available for discussion and decision at MOP 35. CANADA explained the rationale for its nomination in relation to the treatment of strawberry runners on Prince Edward Island, noted the challenges encountered with alternative fumigants, and committed to continue to reduce its use of methyl bromide and cease its use in 2026. The EU expressed satisfaction over this phase-out and the absence of further nominations for 2024.

Ongoing emissions of CTC: OEWG Co-Chair Brieskorn introduced this item on Thursday, highlighting the voluntary submission on CTC by five parties and the summary in the TEAP Progress Report (section 5.4). SWITZERLAND expressed hope that the report will help to tackle CTC emissions and finally resolve discrepancies between bottom-up and top-down CTC emission estimates. He announced the imminent submission of a CRP to address the issue, which was welcomed by CANADA, NORWAY, AUSTRALIA, and the EU. CANADA further suggested that sharing best practice guidance would help reduce CTC emissions. CHINA emphasized the importance of lifecycle management of CTC and respective monitoring, reporting, and verification systems.

On Friday morning, SWITZERLAND introduced their proposal on abating emissions of CTC (UNEP/OzL.Pro.WG.1/45/CRP.6). He noted that the proposal requests the TEAP to:

- compile a list of best practices and technologies, by process and by geographical region, for minimizing CTC emissions and emission rates, based on the information provided by the parties addressed in [decision XXXIV/6](#) and further information; and
- indicate, by process and by geographical region, the minimum CTC emission rates that have been achieved, based on the information provided by parties and further information.

INDIA called for more information on the proposal.

SWITZERLAND noted the TEAP had provided a generic list of processes, but underlined that more information is required for better understanding on CTC, in particular for parties to chart the way forward in addressing CTC emissions.

OEWG Co-Chair Brieskorn suggested, and delegates agreed, to forward this proposal to the MOP.

QPS uses of methyl bromide for which alternatives are available: OEWG Co-Chair Djossou introduced this item on Thursday, referring to the voluntary submission by three parties and the summary in the TEAP Progress Report (section 4.2). BRAZIL noted the relatively stable methyl bromide emissions over the last six years and, supported by AUSTRALIA and the US, advocated against further restrictions or obligations relating to methyl bromide. The EU observed that alternatives for QPS uses have become available, and suggested to tackle methyl bromide emissions via workstreams focusing on enhanced categorization, reporting, stocktaking, and an accelerated adoption of alternatives. NORWAY, in support of the EU, highlighted the MBTOC's assessment that the elimination of methyl bromide emissions from QPS uses is considered the single largest short-term gain that could be made to further reduce stratospheric chlorine. SENEGAL and KENYA asked about biological alternatives and their availability, accessibility, cost, and implications for importing countries. Delegates agreed that this issue will be further discussed at MOP 35.

Existing challenges and potential options for the future configuration and function of Panel TOCs: OEWG Co-Chair Brieskorn reminded delegates that the MOP had requested the TEAP to provide more information on this item, which is contained in the Panel's progress report. The TEAP proposed a modified approach to the structure of the RTOC by establishing two sub-groups to address cold chains, and space heating and cooling.

The EU suggested allowing experts to take part in both sub-groups and, with NORWAY, suggested maintaining a single RTOC. The US, supported by AUSTRALIA and KUWAIT, noted that some of the suggested changes might not be consistent with the existing terms of reference, and suggested dividing the work of RTOC into different TOCs.

SENEGAL underscored the importance of a stable cold chain, since this covers several sectors, including health, agriculture, tourism, and fisheries.

Co-Chair Brieskorn proposed to keep this agenda item open to allow parties to consult in the margins. On Friday, he suggested that delegates take up these discussions at MOP 35.

Panel membership changes: On Thursday, OEWG Co-Chair Brieskorn noted that one nomination for RTOC Co-Chair had been received and called on parties to continue the nomination process during the intersessional period.

Methyl Bromide Stocks

OEWG Co-Chair Djossou briefly opened this item on Thursday, referring to the voluntary submission by three parties and the summary in the TEAP Progress Report (section 4.2). The EU deplored that estimates of methyl bromide stocks held globally were becoming less certain and urged more parties to submit data. ETHIOPIA confirmed they would have data to submit. CAMEROON referred to earlier coordination challenges between ministries relating to the import of methyl bromide.

Delegates took note of this discussion.

Potential Impacts of the COVID-19 Pandemic on HFC Consumption in Article 5 Parties

HFC consumption data reported by Article 5 Parties: On Wednesday, the Secretariat introduced the document ([UNEP/OzL.Pro.WG.1/45/4](#)), noting it was prepared in response to [decision XXXIV/13](#) on collecting data to understand potential impacts of the COVID-19 pandemic on HFC consumption from Article 5 parties. He noted, among others, 118 parties submitted data from 2018-2022, with 44 parties submitting data for all the years, 21 parties raising concerns about their baseline during the COVID-19 years, and 12 parties noting they did not have concerns related to meeting the consumption freeze.

CUBA expressed satisfaction with the provision of data and observed that other countries were in the same position as Cuba. The RUSSIAN FEDERATION supported the proposal and called for a flexible approach to baselines. Delegates took note of the information.

Proposed adjustments to the Montreal Protocol: On Wednesday, the Secretariat introduced the document ([UNEP/OzL.Pro.WG.1/45/7](#)). CUBA explained the rationale behind their proposal, calling for flexibility regarding the HFC consumption baselines of countries whose consumption levels were significantly affected by the COVID-19 pandemic. SAINT LUCIA, MOZAMBIQUE, DOMINICAN REPUBLIC, NICARAGUA, LESOTHO, KUWAIT, COSTA RICA, MALAYSIA, and

ARGENTINA supported Cuba's proposal, noting the need for flexibility and cooperation with countries at risk of not meeting their obligations under the Kigali Amendment.

The RUSSIAN FEDERATION, GRENADA, TRINIDAD AND TOBAGO, CHILE, the US, ETHIOPIA, NIGERIA, the EU, and CHINA noted legitimate concerns by some countries with baselines affected by the COVID-19 pandemic and supported the establishment of a contact group to discuss paths to identify and assist concerned countries. CANADA and AUSTRALIA supported the establishment of a contact group but noted disagreement about adjusting the Protocol to support affected countries.

OEWG Co-Chair Djossou concluded that a contact group would be established, co-chaired by Patrick McNerney (Australia) and Juan José Galeano (Argentina), with a mandate to consider the proposal by Cuba as well as the discussions in plenary. On Thursday, Co-Chair Galeano reported good progress by the contact group in understanding each other's points of view and indicated that scenarios for a potential adjustment of baselines will need to be further considered.

On Friday morning, Co-Chair McNerney reported that the group had discussed countries experiencing challenges meeting the freeze and phase-out targets and had focused on working out which particular countries were experiencing these problems. He noted that a number of countries who had previously indicated they may not be able to meet the targets had reported that they were now no longer facing those challenges. He called on more parties to notify the Secretariat on whether or not they were experiencing difficulties in meeting the targets, urging parties to attend the contact group meeting, and requesting additional time to complete discussions. OEWG Co-Chair Djossou noted the progress of the group on getting more information but agreed the group could continue working during the day.

In the evening, McNerney noted that discussions would continue at MOP 35.

Closing Plenary

On Friday evening, delegates adopted the report of the meeting (UNEP/OzL.Pro.WG.1/45/L.1 and Add.1), with editorial amendments, including a new annex addressing the discussion on the war in Ukraine during the opening plenary.

Thanking delegates for their hard work throughout the meeting, OEWG Co-Chair Djossou closed the meeting at 8:51 pm.

A Brief Analysis of OEWG 45

As they returned once again to the familiar halls of the UN Conference Centre in Bangkok, many delegates appreciated the warm welcome they received from the people of Thailand, and how at ease they felt in the capital city. Indeed, the Thai serenity seemed to translate into the conference rooms of the 45th Meeting of the Open-ended Working Group (OEWG 45) of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. Discussions were held in a respectful and tolerant spirit, distinguishing the Montreal Protocol as a process where everyone feels comfortable and familiar, like a well-tailored suit.

Yet the positive atmosphere and familiar surroundings could not completely hide the serious nature of the meeting and how the Montreal Protocol is so essential to the fate of the planet. With this in mind, this brief analysis will consider the science, scope, implementation, and financial issues discussed during the meeting.

Measuring Bodies

There is little doubt that the science-based approach of the Montreal Protocol has contributed to the success in reversing stratospheric ozone depletion over the past 35 years. This fact alone contributed to the sense of serenity in Bangkok.

Science was very much at the core of the meeting, with multiple presentations by the three Panels of the Montreal Protocol—the Scientific Assessment Panel (SAP), the Environmental Effects Assessment Panel (EEAP), and the Technology and Economic Assessment Panel (TEAP)—and lively engagement by delegates. Coming into this meeting, expectations for the Assessment Panels’ reports were high given the many research questions they had been tasked with, but they managed to deliver, giving detailed snapshots on the state of the ozone layer and recommending actions to limit global temperature increases due to hydrofluorocarbons (HFCs).

The success of the Montreal Protocol was again highlighted and further specified by the SAP: stratospheric ozone is on the way to full recovery, expected by around 2040 for the near-global average, around 2045 in the Arctic, and around 2066 in the Antarctic. At the same time, the decline in ozone depleting substance (ODS) emissions due to compliance with the Protocol is set to avoid global warming by about 0.5–1°C by 2050, compared to an uncontrolled increase in ODS. Another 0.3–0.5°C of avoided warming by 2100 is estimated due to the phase-down of HFCs, the ozone-friendly but climate-warming greenhouse gases controlled under the Kigali Amendment to the Montreal Protocol.

The EEAP reported that avoided solar ultraviolet (UV) radiation has prevented harm to human health (avoided skin cancer and cataracts), ecosystems, and infrastructure. The TEAP reported that alternatives to ODS are now available for refrigeration, air conditioning, and heat pumps; for aerosol propellants; in sterilization; and for almost all foam-blowing agents. The TEAP also noted the planned HFC phase-down is driving industry towards alternatives with lower global warming potential (GWP).

However, the Montreal Protocol still has work to do. In their reports, the Assessment Panels identified remaining challenges, which have the potential to slow down the recovery of the ozone layer and contribute to global warming. These include:

- unexpected and, to some extent, unexplained emissions of some ODS (especially chlorofluorocarbons (CFCs), also other than CFC-11) and HFCs (specifically HFC-23);
- uncertainties in remaining stocks of ODS (especially methyl bromide) and in emissions from banks of ODS contained in aging equipment and products;
- fugitive and other emissions from ODS and HFCs produced or used as feedstock, which is not included in the calculated level of substances controlled by the Protocol;
- emissions from very short-lived substances (VSLS) as lower impact ODS not controlled by the Protocol (VSLS or their remains stay in the stratosphere for months rather than decades like other ODS);
- gaps in the observation network, exacerbated by aging monitoring instruments;
- the feasibility of alternatives to ODS and HFCs, which may have unintended effects such as high GWP, flammability, toxicity, availability, and affordability; and
- impacts from extraordinary wildfires, volcanic eruptions, increasing rocket launches, and supersonic aircraft.

These technical discussions formed only a part of the agenda before the OEWG 45, with delegations drawing different conclusions on how to address these and other challenges from a policy perspective.

Refitting the Scope

Confident in the success of the Montreal Protocol, and aware of the possibility that actions taken by parties to the Protocol can have significant benefits for the ozone layer and the global climate, OEWG 45 also focused on issues that could potentially expand the scope of the Protocol. Scope has been a point of discussion ever since the discovery that ozone-friendly HFCs, which had replaced ozone-depleting hydrochlorofluorocarbons (HCFCs), contribute to climate change. This led to the adoption of the Kigali Amendment in 2016 and the inclusion of HFCs under the purview of the Protocol. But should the Protocol’s scope be expanded even further?

For example, Australia, Canada, Switzerland, and the US proposed requesting the TEAP to provide further information on alternatives to VSLS, especially dichloromethane, with the view to encourage parties to reduce their use. The SAP’s 2022 Assessment Report states that emissions of anthropogenic very short-lived chlorine substances, dominated by dichloromethane, continue to grow and contribute to ozone depletion. Other countries objected to the proposed request to TEAP, stating that dichloromethane and other VSLS are, or should be, covered under other processes, such as the United Nations Framework Convention on Climate Change.

Similarly, parties discussed how to address emissions of ODS produced or used as feedstock for the manufacture of other chemicals, a process currently excluded from the calculated level of controlled substances under the Protocol. Contributions to ozone depletion from non-controlled substances and processes may appear small compared to the ODS abatement the Protocol has already achieved. However, some noted that tackling such emissions can still make a noticeable difference to the protection of the ozone layer.

Another issue of relevance to the scope of the Protocol is the potential large-scale stratospheric aerosol injection (SAI), a proposed geoengineered solution for solar radiation management, and its effects on the ozone layer. The SAP’s 2022 report addressed the new and emerging issue of SAI in a separate chapter, for the first time. This is an issue that has been percolating in academic circles for some time, and many delegates lauded the Panel for putting it on the Protocol’s agenda. At this meeting, Australia and Canada submitted a proposal that, if adopted by the Meeting of the Parties (MOP), would invite the global scientific community, alongside the SAP, to address risks and uncertainties for the ozone layer in any scientific studies or assessments undertaken in relation to SAI. Observers concluded that such a climate intervention would need to be considered by other fora, possibly including the Intergovernmental Panel on Climate Change (IPCC).

The dumping of obsolete equipment could not be ignored by the OEWG, as it could potentially redraw the lines around the Protocol’s scope. Phrased in the agenda as the “illegal import” of certain equipment, the item resulted in the sternest discussion of the week. One African country noted that this issue, first raised 28 years ago, has been continuously ignored, wondering whether developed countries, using this multilateral forum to “pursue their own economic interests, were taking away the beauty of this process.”

Led by Ghana and with support from a cross-section of developing countries, African states provided data highlighting that equipment containing ODS and with high GWP is still being exported from some European countries and is entering African countries through both legal and illegal pathways. The EU objected to these allegations, referring to its strict regulations that prohibit the export of equipment containing ODS, and opining that this issue does not fall under the scope of the Protocol.

Notwithstanding the possible ODS content, many agreed that the equipment being shipped to African countries is less energy efficient, and thus has a higher GWP. This creates a burden to businesses and households by elevating the consumption and costs of energy for refrigeration and raises greenhouse gas emissions, an issue that the Kigali Amendment has brought under the scope of the Montreal Protocol, at least for HFCs.

African states requested parties manufacturing and exporting cooling equipment to consider instituting measures involving shared responsibility to stop the export of appliances with obsolete refrigerants. Some delegations also noted the potential for synergies with other processes to address this issue, pointing to the Basel Convention, which deals with transboundary movements of hazardous waste.

A Tight Fit

At OEWG 45, the Latin American and Caribbean Group raised another thorny issue. They drew attention to challenges in obtaining alternatives to HFCs in the refrigeration sector, as required under the Kigali Amendment. These parties noted the lack of availability of alternatives, and their high costs when they are available. Some lamented that the costs of acquiring these alternatives are significantly higher than the funds allocated for national implementation projects, forcing them to cancel these projects and risk non-compliance with the Kigali Amendment.

Although the concerned parties were assured of the sufficient stock of these alternatives, they remained unconvinced, sharing that the situation on the ground paints a different picture. Some suggested the TEAP should recognize the lack of availability of alternatives, which could serve as a nudge to producing companies and distributing points. They also requested some flexibility to allow them to overcome this obstacle in implementing the Protocol, specifically its Kigali Amendment.

The COVID-19 pandemic also had an unforeseen impact on the implementation of the Kigali Amendment. Cuba, bringing forward a discussion from previous sessions, noted that the pandemic created an economic contraction that reduced the imports of refrigerant gases (HFCs) compared with pre-pandemic years. He explained that this impacted the baseline for the HFC phase-down, with expected increases in HFC consumption in the immediate post-pandemic period. This situation makes it unfeasible to calculate the HFC consumption baseline using data from 2020-2022. He stressed that a consumption baseline calculation using data from that period could lead to unintentional non-compliance with the Protocol by Article 5 countries (developing countries) and proposed to amend the Protocol to adjust for this issue.

But adjusting the Protocol is no mean feat. While many parties empathized with affected countries, and expressed their willingness and flexibility to work with them to tailor solutions, they were hesitant to go further by “tinkering” with the Protocol. For some, however, this issue points to a broader need for flexibility as parties strive to fulfil their formal obligations under the Protocol, while

navigating unforeseen and complex global circumstances that could stand in the way of successful implementation. Others noted that, in the future, parties will need to weigh the benefits of avoiding further emissions of controlled substances against the practicability and affordability of transitioning to alternative substances.

Negotiating the Cost

Firmly linked to implementation of the Protocol, parties discussed the replenishment of the Multilateral Fund (MLF) for the 2024-2026 triennium, based on a report they had requested from the TEAP, which established a Replenishment Task Force (RTF) for this purpose. Due to the initial phase-down of HFCs in developing countries, the RTF estimated the future funding requirements for implementing the Montreal Protocol as roughly double compared to any of the previous budget triennia. The proposed USD 975 million to 1.018 billion over three years is expected to fund the management plans to phase out HCFCs and phase down HFCs, including aspects of energy efficiency and gender mainstreaming.

Delegates demonstrated general understanding for the proposed significant increase of the MLF budget due to the incremental costs for the phase-down of HFCs. They asked questions on whether additional differentiation between low-end and high-end scenarios, other than those based on the assumed number of ratifications of the Kigali Amendment, should be undertaken. They also discussed whether the RTF had based its report on the right assumptions, and requested the TEAP to further analyze a long list of additional elements. The TEAP will present its analysis to MOP 35 to inform the replenishment negotiations. Many delegates interpreted this constructive discussion as a positive sign that parties will follow through on their 2016 commitment to provide “sufficient additional financial resources” to developing countries to offset costs arising out of Kigali Amendment obligations, and agree to a significant MLF budget increase.

Ready to Make an Impression in Nairobi

With science, scope, implementation, and finance all on the agenda, MOP 35 will have plenty of issues to consider in Nairobi. It may take a combination of Thai serenity and Kenyan endurance to make progress on these key aspects of the agenda. Several delegations leaving the conference hall on Friday night agreed the debates in Bangkok demonstrated that the Montreal Protocol is worthy of all the accolades it receives. While the Protocol still faces challenges, it has the potential to further inspire others on how global diplomacy is done, ensuring this world stays a wonderful place to live for generations to come.

Upcoming Meetings

HLPF 2023: The 2023 meeting of the High-level Political Forum on Sustainable Development (HLPF), under the auspices of UN Economic and Social Council (ECOSOC), will convene under the theme “Accelerating the recovery from the coronavirus disease (COVID-19) and the full implementation of the 2030 Agenda for Sustainable Development at all levels.” The 2023 meeting will hold in-depth reviews of five SDGs: 6 (clean water and sanitation), 7 (affordable and clean energy), 9 (industry, innovation and infrastructure), 11 (sustainable cities and communities), and 17 (partnerships for the Goals). It will also support the midterm review of the implementation of the SDGs and preparations for the 2023 SDG Summit. **dates:** 10-19 July 2023 **location:** UN Headquarters, New York **www:** hlpf.un.org/2023

Fourth Global Climate and Sustainable Development Goal (SDG) Synergy Conference: This event will take place under the theme, “Delivering a Just Transition through Climate and SDG Synergies.” **date:** 16 July 2023 **location:** UN Headquarters, New York **www:** sdgs.un.org/events/fourth-global-conference-strengthening-synergies-between-paris-agreement-and-2030-agenda

Africa Climate Week (ACW) 2023: ACW 2023 is a regional collaboration platform to provide region-focused contributions on: energy systems and industry; cities, urban and rural settlements, infrastructure, and transport; land, ocean, food, and water; societies, health, and livelihoods; and economies. Regional discussions on these topics will inform the first global stocktake, which will conclude at the 2023 UN Climate Change Conference (COP 28) in November. **dates:** 4-8 September 2023 **location:** Nairobi, Kenya **www:** unfccc.int/ACW2023

Africa Climate Summit 2023: Africa Climate Summit 2023 will focus on the theme, “Driving Green Growth and Climate Finance Solutions for Africa and the World.” The Summit will convene during Africa Climate Week. **dates:** 4-6 September 2023 **location:** Nairobi, Kenya **www:** africaclimatesummit.org

SDG Summit: The Summit is the quadrennial meeting of the HLPF under the auspices of the UN General Assembly. The 2023 Summit will be the second since the adoption of the SDGs and will take place at the midpoint of implementation of the 2030 Agenda. **dates:** 18-19 September 2023 **location:** UN Headquarters, New York **www:** hlpf.un.org/sdg-summit

CRC 19: The Rotterdam Convention’s Chemical Review Committee (CRC) will review notifications of final regulatory action and proposals for severely hazardous pesticide formulations for potential inclusion in the Rotterdam Convention. **dates:** 3-6 October 2023 **location:** Rome, Italy **www:** pic.int

POPRC 19: The Stockholm Convention’s Persistent Organic Pollutants Review Committee (POPRC) is due to consider the draft risk profile for chlorpyrifos and the draft risk management evaluation for medium-chain chlorinated paraffins and long-chain perfluorocarboxylic acids, their salts and related compounds. **dates:** 9-13 October 2023 **location:** Rome, Italy **www:** pops.int

Middle East and North Africa Climate Week (MENACW) 2023: MENACW 2023 is a regional collaboration platform to provide region-focused contributions on: energy systems and industry; cities, urban and rural settlements, infrastructure, and transport; land, ocean, food, and water; societies, health, and livelihoods; and economies. Regional discussions on these topics will inform the first global stocktake under the Paris Agreement. **dates:** 9-12 October 2023 **location:** Riyadh, Saudi Arabia **www:** unfccc.int/MENACW2023

Latin America and Caribbean Climate Week (LACCW) 2023: LACCW 2023 is a regional collaboration platform to provide region-focused contributions on: energy systems and industry; cities, urban and rural settlements, infrastructure, and transport; land, ocean, food, and water; societies, health, and livelihoods; and economies. Regional discussions on these topics will inform the first global stocktake under the Paris Agreement. **dates:** 23-27 October 2023 **location:** Panama City, Panama **www:** unfccc.int/event/latin-america-and-caribbean-climate-week-laccw-2023

35th Meeting of the Parties to the Montreal Protocol: The MOP will discuss issues related to the implementation of the Montreal Protocol. **dates:** 23-27 October 2023 **location:** Nairobi, Kenya **www:** ozone.unep.org/meetings/thirty-fifth-meeting-parties

Asia-Pacific Climate Week (APCW) 2023: APCW 2023 is a regional collaboration platform to provide region-focused contributions on: energy systems and industry; cities, urban and rural settlements, infrastructure, and transport; land, ocean, food, and water; societies, health, and livelihoods; and economies. Regional discussions on these topics will inform the first global stocktake under the Paris Agreement. **dates:** 6-10 November 2023 (TBC) **location:** Johor Baharu, Malaysia **www:** unfccc.int/APCW2023

UNFCCC COP 28: The 28th session of the Conference of the Parties (COP 28), the 18th meeting of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP 18), and the fifth meeting of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA 5) will convene to complete the first global stocktake, among other matters. **dates:** 30 November – 12 December 2023 **location:** Dubai, United Arab Emirates **www:** unfccc.int/cop28

For additional upcoming events, see sdg.iisd.org

Glossary

BRS	Basel, Rotterdam and Stockholm Conventions
CFCs	Chlorofluorocarbons
CFC-11	Trichlorofluoromethane
COP	Conference of the Parties
CTC	Carbon Tetrachloride
CRP	Conference room paper
EEAP	Environmental Effects Assessment Panel
FSM	Federated States of Micronesia
FSTOC	Fire Suppression Technical Options Committee
FTOC	Flexible and Rigid Foams Technical Options Committee
GWP	Global warming potential
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
ImpCom	Implementation Committee
iPIC	Informal Prior Informed Consent
MBTOC	Methyl Bromide Technical Options Committee
MCTOC	Medical and Chemical Technical Options Committee
MLF	Multilateral Fund
MOP	Meeting of the Parties
ODP	Ozone depleting potential
ODS	Ozone depleting substances
OEWG	Open-ended Working Group
PFAS	Per- and polyfluoroalkyl substances
pMDI	Pressurized metered-dose inhaler
QPS	Quarantine and pre-shipment
RTF	Replenishment Task Force
RTOC	Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee
SAI	Stratospheric aerosol injection
SAP	Scientific Assessment Panel
TEAP	Technology and Economic Assessment Panel
TFA	Trifluoroacetic acid
TOC	Technical Options Committee
UNEP	United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
VSLs	Very short-lived substances
WCO	World Customs Organization