

## Summary of the 40th Meeting of the Open-Ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer: 9-14 July 2018

The fortieth meeting of the Open-ended Working Group to the Montreal Protocol on Substances that Deplete the Ozone Layer (OEWG 40) convened at the United Nations Office in Vienna, Austria, from 11-14 July 2018. It was preceded by a workshop on energy efficiency opportunities while phasing down hydrofluorocarbons (HFCs) held on 9-10 July 2018. The workshop was mandated by the twenty-ninth Meeting of the Parties to the Montreal Protocol (MOP 29), held in Montreal, Canada, in November 2017.

During OEWG 40, delegates considered the outcomes of this workshop and the report by the Technology and Economic Assessment Panel (TEAP) on energy efficiency in the refrigeration, air-conditioning and heat pump sectors, and how to take up energy efficiency opportunities while phasing down HFCs under the Protocol in the future. Much of OEWG 40 focused on addressing appropriate action in response to an unexpected increase in trichlorofluoromethane (CFC-11) emissions. Parties also discussed several issues, including data reporting modalities, in view of gaining clarity for the implementation of the Kigali Amendment to the Protocol to phase down HFCs, which will enter into force on 1 January 2019.

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

### Key Turning Points

**Vienna Convention:** Negotiations on an international agreement to protect the ozone layer were launched in 1981 under the auspices of UNEP. In March 1985, the Vienna Convention for the Protection of the Ozone Layer was adopted. It called for cooperation on monitoring, research, and data

exchange, but it did not impose obligations to reduce ozone depleting substances (ODS) usage. The Convention now has 197 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 and all amendments except its newest, the Kigali Amendment, have been ratified by 197 parties, constituting universal ratification.

Since 1987, several amendments and adjustments have been adopted, adding new obligations and additional ODS and adjusting existing control schedules. Amendments require

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ratification by a certain number of parties before they enter into force; adjustments enter into force automatically.

**London Amendment and Adjustments:** At MOP 2, held in London, UK, in 1990, delegates tightened control schedules and added ten more CFCs to the list of ODS, as well as carbon tetrachloride and methyl chloroform. MOP 2 also established the Multilateral Fund, 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 to examine possible non-compliance and make recommendations to the MOP aimed at securing full compliance.

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

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

**Kigali Amendment:** At MOP 28, held in Kigali, Rwanda, in 2016, delegates agreed to amend the Protocol to include HFCs as part of its ambit and to set phase down schedules for HFCs. HFCs are produced as replacements for CFCs and thus a result of ODS phase out. HFCs are not a threat to the ozone layer but have a high global warming potential (GWP). To date, 39 parties to the Montreal Protocol have ratified the Kigali Amendment, which will enter into force on 1 January 2019.

### **Report of the Workshop on Energy Efficiency Opportunities while Phasing Down HFCs**

Ozone Secretariat Executive Secretary Tina Birmpili opened the workshop on Monday, 9 July, underscoring that the issue of energy efficiency is at the heart of many of the challenges that the modern world faces. Energy efficiency, she said, is new to this process and it is up to parties to decide how to take this issue forward.

The workshop was divided into three parts: Part A provided a general overview of energy efficiency in the context of the refrigeration, air-conditioning and heat pump (RACHP) sector; Part B introduced the technical opportunities for improving RACHP energy efficiency; and Part C addressed the investment, financial and policy measures that can be adopted to encourage improved cooling efficiency and the potential connections between energy efficiency policies and the Kigali Amendment to the Montreal Protocol.

The Ozone Secretariat had prepared three briefing notes to support Parts A, B and C of the workshop. The first document addressed the importance of energy efficiency in the RACHP sector; the second note examined the potential to improve the energy efficiency of RACHP; and the third note looked at how policy, financing and investment can deliver more efficient RACHP.

### **Session I: Background to RACHP Energy Efficiency**

Facilitator Kevin Fay, Alliance for Responsible Atmospheric Policy, noted the importance of approaching the issue of energy efficiency holistically and to consider the contributions of different technologies.

Brian Motherway, International Energy Agency (IEA), emphasized the role of policy in encouraging the use of energy efficient technology. Recognizing progress, he noted that countries are using 13% less energy than they otherwise would have due to government policies in place since the early 1990s and efforts in the private sector. Motherway added that progress has been slowing in the last couple of years due to policy challenges. He said that consumers are aware that they should be buying more energy efficiency technology, but may require policies, such as incentives, that can help "make the choice easier" by reducing upfront costs. Motherway said energy efficient technology could help achieve the Sustainable Development Goals (SDGs) but this would require firm policy interventions.

Ajay Mathur, The Energy and Resources Institute, India, addressed social and economic benefits of improving cooling efficiency. He stressed that the climate benefits of simultaneously enhancing energy efficiency along with the HFC transition are more than quadrupled than if either action is taken in isolation. He suggested financial policy incentives to get at a price at which consumers are willing and able to pay for high-efficiency products.

Ray Gluckman, Gluckman Consulting, provided a technical view on cooling efficiency. He emphasized the use of a structured approach to improve efficiency, including in areas of: minimized cooling load, operation and servicing, equipment and control, and refrigerant selection.

Archana Walia, Collaborative Labeling and Appliance Standards Program, shared India's experience in energy efficiency policies for cooling appliances, including the evolution of standard and labeling programmes, and their impact on markets. She suggested that the costs of improving efficiency are not as high as perceived by industry, and that national standards could provide the necessary confidence for manufacturers.

In response to a question on how to influence consumer behavior that realizes that the initially higher upfront costs of energy efficient products can be recovered over time by energy cost savings, panelists highlighted the need for financial incentives, such as grants or low interest loans, so that energy efficient products become an attractive rational choice for consumers that they are willing and able to pay. Saying that we are "nowhere near" the point of diminishing marginal gains from energy efficiency, all panelists underscored the considerable opportunities to improve energy efficiency with existing and future technology.

### **Session II: Improving the Energy Efficiency of New RACHP Systems while Phasing Down HFCs**

Nihar Shah, Lawrence Berkeley National Laboratory, facilitated the session.

Peter Holzer, Institute of Building Research and Innovation, provided key messages on ventilative cooling from the 2017 Annual Report by the International Energy Agency Energy in Buildings and Communities Programme. He noted the report identifies issues on ventilative cooling including how to fight thermal performance limitation, safety and security aspects, and comfort issues such as noise, dust, and humidity. Holzer emphasized further development and application of low-energy

and low-carbon cooling solutions on a large scale are required to meet international climate goals.

David Schalenbourg, Delhaize, Belgium, presented on his company's efforts as a sustainable retailer, seeking to promote healthier eating, reduce food waste, and create healthy and inclusive workplaces. Schalenbourg demonstrated how Delhaize has achieved this by introducing transcritical refrigeration systems using CO<sub>2</sub> to supermarkets, warehouses, and trailers that has led to a reduction of space by 30% and also a reduction in energy usage.

Jonathan Li, Midea Group, China presented on opportunities to reduce energy consumption in in-room air conditioning while phasing down HFCs, including through the use of: variable speed compressors/motors; the latest evaporator and condenser technologies; and optimization of structural design for airflow. To better disseminate information on such available options, he suggested that manufacturers cooperate with other organizations and set up demonstration projects, noting examples in China, Seychelles, and Ghana.

Raul Simonetti, Carel, Italy discussed three steps for optimizing efficiency through design for good controllability under a wide range of conditions. Under a product level approach, he showed that ecodesign policies should save about 16% of the European Union's (EU) primary energy consumption by 2020 compared to use in 2010. As a second step at the system level, he showed how combining energy efficiency measures with coordinating products and devices can lead to significant energy savings.

Mohammed F. Alarwan, Saudi Energy Efficiency Centre (SEEC) and Hakam A. Zummo, Saudi Energy Efficiency Program (SEEP), shared experiences on energy efficiency programmes in high ambient temperature (HAT) environments using both equipment and building design. They presented Saudi Arabia's energy journey from 1980, highlighting 5% annual increases in energy consumption. They reported that as a result, SEEP established energy efficiency regulation initiatives, such as energy efficiency standards for the building sector.

During discussions, there were several questions related to the use of natural refrigerants. Schalenbourg highlighted that the uptake of natural refrigerants in the retail sector depends on national context, including the profit margins in the market, investment costs to switch cooling systems, and available maintenance expertise. Others on the panel noted available studies on risks and safe handling options for flammable natural refrigerants.

Discussions also highlighted: inherent trade-offs between water availability and energy efficiency when using evaporative cooling; seasonal conversion factors; and potential limitations to using alternatives, especially in areas with HAT.

### ***Session III: Improving Efficiency of Existing RACHP Systems***

Stephan Sicars, UN Industrial Development Organization, (UNIDO) introduced the session and provided guiding questions to the panelists:

- what are the crucial steps to improve energy efficiency in existing cooling equipment;
- whether existing technologies have energy efficiency attributes;
- whether to recommend looking at existing equipment only; and,
- whether RACHP maintenance technicians are sufficiently trained to optimize energy efficiency.

Tadafumi Mikoshi, Daikin Industries, presented his company's technology for air conditioners. He described typical challenges

that users encounter in operating air conditioners and noted theoretical design and performance of air conditioners is not sufficient. He suggested testing needs to be done on the actual performance of air conditioners to account for various conditions within which the cooling technologies function.

Kevin Schlemmer, CoolCheck, presented the company's work on refrigeration energy efficiency and the technology it produces. In the context of tomato farmers in South Africa, he explained technological challenges in chiller plants for tomato cultivation and detailed different methodologies for energy efficient cooling technologies.

Jane Gartshore, Cool Concerns, presented how technician training and refrigerant leak reduction can improve energy efficiency. She outlined increased energy uses from leaking systems are due to lesser cooling capacity, greater temperature lift, and longer running times.

Maher Mousa, International Consultant, Saudi Arabia, presented on improving efficiency of RACHP equipment for high ambient temperature countries, citing the evolution of Montreal Protocol governance from HCFCs to HFCs. He noted that products with HFCs are well established, while low-GWP alternatives are still being introduced, raising costs of alternatives due to reduced economies of scale. He also cited the challenges of capacity building and technology transfer.

Stefan Thie, European Partnership for Energy and the Environment, provided examples of RACHP efficiency opportunities through improving operation and maintenance. He reported that even a small increase in the temperature lift can significantly increase the amount of energy used by the system, reducing energy efficiency. He noted that these findings are independent of the refrigerant used.

Several panelists underscored the value of maintenance practices and well-trained technicians. In response to audience questions, they stressed the need to measure energy efficiency and recommended the involvement of end users and the implementation of policies that promote moving beyond business as usual.

### ***Session IV: Panel Discussion on Investment and Financing Opportunities***

This session was facilitated by Daniel Magallon, Basel Agency for Sustainable Energy. He noted US\$500 billion of climate finance is spent annually, but said that the majority of this funding is raised within each country and only 3% comes from international funding. He asked panelists to identify barriers for attaining energy efficient technologies and what types of financial measures are needed to tackle these.

Santiago Creuheras Diaz, Energy Efficiency and Sustainability, Mexico, presented on the energy reform programme in Mexico, with a long-term goal of reducing energy consumption by 42%. To achieve this goal, he explained multilateral development banks need to be approached for support projects, such as in support energy efficiency improvements in households, small- and medium-sized enterprises (SMEs), and municipalities.

Hoang Nguyen Thi My, Vietnam, presented on the different financial schemes in place in Vietnam related to energy efficiency. She highlighted that the replacement of older cooling systems piloted in businesses to install more energy efficient technologies has eliminated approximately 250kg of HCFC-22.

Bafoday Sanyang, The Gambia, detailed the challenges in his country in realizing energy efficient improvements. He said that there is a lack of awareness of energy consumption and the benefits to putting in place more energy efficient practices. Sanyang suggested it is worth looking at the challenges SMEs

face in engaging financial institutions, and addressing the information gap within financial institutions' understanding of energy efficient projects.

Sabin Basnyat, Green Climate Fund (GCF), said that the GCF is looking for proposals where the climate rationale is clear and the potential for replication is high. He noted that the GCF provides the ability to access incremental capital, which he said could be especially useful for retrofits.

On investment schemes to drive energy efficiency, Jigar Shah, International Finance Corporation, said its main work focuses on design support programmes. He highlighted the Excellence in Design for Greater Efficiencies programme and investments with manufacturers to install higher efficiency equipment. He cited considerable potential in buildings and in agricultural cold chains.

Gunter Fischer, Global Energy Efficiency and Renewable Energy Fund, European Investment Bank Group, highlighted its energy efficiency focused fund, and cited as an example a fund established in Latin America that provides equity and structures investments. He noted challenges, including the small scale of investment in projects, which increases effort per investment, and the specialized nature of energy efficiency funds.

Zhao Ming, Energy Management Company Association, China, underlined the role of energy service companies (ESCOs) in providing technical and financial solutions for energy efficiency projects, from energy auditing to operation of equipment. She said there are between 5000 to 6000 ESCOs in China.

Dan Hamza-Goodacre, Kigali Cooling Efficiency Program, explained that climate philanthropy fulfils different roles in achieving energy efficiency improvements more quickly. He cited: ambition, speed and collaboration; sharing experiences from programmes with the larger community; and work with a variety of actors towards high-impact investments. He explained how the philanthropy sector can fill gaps, for example by covering a project's "soft costs" to bring it to the attention of financial institutions that traditionally are more inclined to cover capital costs.

Ensuing discussions focused on barriers for energy efficiency projects. The problem of high perceptions of risks, Ian Crosby, Sustainable Energy for All, suggested, could be addressed through training for bankers. The lack of visibility, they suggested, could be addressed through framing energy efficiency differently, such as focusing on its benefits. Responding to questions, panelists discussed ways to scale-up energy efficiency in cooling systems taking into account equity and sustainability. They suggested seeking capacity-building and technical assistance and linking up with international financial institutions.

### ***Session V: Policies Applicable to New Small RACHP Appliances***

Melanie Slade, IEA, facilitated the session. She welcomed panelists and went over the main questions to be answered during the session: asking panelists whether their countries have Minimum Energy Performance Standards (MEPS) for RACHP; what barriers exist to the implementation of MEPS; and which incentives are used by the presenters' respective countries for high energy efficient products.

Kofi Agyarko, Energy Commission, Ghana, presented on his country's efforts to implement MEPS for RACHP. He noted that, prior to the concerted effort from the government to implement energy efficient standards, the most popular brands of refrigeration and air conditioning products purchased in Ghana were also the most energy inefficient. He identified the implementation of clear labeling policies as an effective way to

change consumer habits and demonstrated how this helped Ghana recover 1,500kg of CFCs.

Cheng Jianhong, National Institute of Standardisation, China, discussed how China phased out less energy efficient products. Some strategies that he cited were: MEPS revision every four to five years; strict market inspection of products; clear certification labeling; and strong incentive policies to encourage consumers to purchase more energy efficient technologies. Among export challenges, Jianhong identified differences in MEPS and suggested: promoting harmonization in labels, developing comparable testing protocols, and establishing a technical working group to address remaining challenges that countries face in the implementation of MEPS.

Maria Vargas, ENERGY STAR, USA, provided lessons learned from ENERGY STAR's work to raise awareness of energy efficient technologies in the US market. She stated ENERGY STAR has worked because it is an effective partnership with industry and builds upon the interests and engagement of industry, consumers, and government. She explained that ENERGY STAR employs a binary label so either a product has a star to indicate it is energy efficient technology or does not; this simplifies the purchasing process for the consumer since ENERGY STAR has found that the more complex the information offered on the energy efficiency of a product, the less likely a consumer will buy one.

Chris Dunstan, Institute for Sustainable Futures, Australia, stressed the role of a demand response strategy in air conditioning to reduce carbon emissions. He explained what tools can be used to accomplish this goal, focusing on: smart control and monitoring; time-varying electricity prices; engagement with power suppliers; and energy efficient buildings and equipment.

Veerle Beelaerts, Directorate General for Energy, the EU, presented an overview of EU ecodesign policies to increase energy efficiency of RACHP equipment, including labeling. She noted that attention is given to the needs of SMEs to ensure that HFC phase down and energy efficiency investments are feasible.

Several questions asked about the relative benefits and draw backs of voluntary and mandatory initiatives. Panelists underscored the complementarities, including that voluntary programmes are useful to learn about a market, which can later inform mandatory approaches. Some noted that voluntary standards can be introduced more quickly than mandatory standards and can help "get to know the market," which can be helpful for designing mandatory approaches. Mandatory approaches, they noted, can be more effective for some products, and can underpin voluntary approaches by creating a minimum standard for energy efficiency in the market. Some panelists noted that they continue to work on developing methodologies, or are awaiting updated standards, that will address issues such as HFC reduction, HCFC emissions, upgradability, and recyclability.

Responding to a question on regional harmonization of standards, panelists underscored the potential of regional approaches to reduce trade issues and the re-introduction of products that do not meet a country's standards into its markets. On lessons learned to build institutional capacity, panelists highlighted the importance of international collaboration to share knowledge and of learning by doing.

### ***Session VI: Policies for Improving the Energy Efficiency of RACHP Systems in Commercial Buildings, Industry, and Urban Environments***

Gabrielle Dreyfus, Kigali Cooling Efficiency Programme, facilitated this session. She explained that the session would look

at the bigger picture and focus on which RACHP systems and programmes have been effective in promoting energy efficiency.

Toby Peters, University of Birmingham, focused on the linkages between efficient cold chains, food preservation, and the SDGs. Cold chains, Peters noted, are an integrated, seamless, and resilient network of refrigerated and temperature-controlled storage to maintain the quality and quantity of food. He pointed out that an energy efficient cold chain could help address global malnutrition, diseases, and poverty and in turn help realize many of the SDGs.

Howard Geller, Southwest Energy Efficiency Project, US, presented on energy efficiency policies and programmes deployed in six US states. Some of these state policies, Geller said, include: effective standards or goals; convenient cost recovery mechanisms; decoupling of utility sales and revenues; and performance-based shareholder financial incentives. He noted these policies have resulted in approximately US\$7.5 billion in net economic benefits for households and businesses and avoided 80 million tons of CO<sub>2</sub> emissions.

Richard Lord, United Technologies, US, provided an overview of the minimum standards and higher tier standards for energy efficiency in light industrial and commercial buildings in the US. To improve efficiency, he suggested: doing a building inspection audit; recommissioning buildings; investing in system enhancements; and replacing equipment.

Saurabh Kumar, Energy Efficiency Services Limited (EESL), India, relayed its experiences, including its Pay As You Save (PAYS) model, in which EESL makes the investment and recovers the investment through the saving accrued through better energy efficiency over time. He said that aggregating demand and supply in the market can achieve the economies of scale that will help reduce costs and encourage industry participation.

Afif Harhara, Tabreed, United Arab Emirates, explained that district cooling involved producing chilled water at a centralized location and then distributing it to customers through an underground network. He reported that Tabreed had 69 plants in the UAE, Saudi Arabia, Oman, and Bahrain. Among the challenges to deploying district cooling, he cited the high number of involved stakeholders, each with their own needs.

During the discussion, panelists underscored the importance of benchmarking performance against other, similar, actors, and baselining performance at a systems level to understand the various opportunities and costs and to demonstrate the efficacy of technologies and processes.

On policies that could facilitate new technologies, panelists highlighted policies that could facilitate early retirement of equipment, such as tax systems that allow depreciation costs to be paid off earlier, and programmes for turning in old appliances. Some cited building codes as policies that could incentive energy efficient practices, particularly if buildings are considered as complete systems. Peters underscored that current policies tend to ignore cold chains, because they focus on the technologies and not the logistical systems.

### **Concluding Remarks**

Mark Radka, UNEP, facilitated the session, asking each rapporteur to summarize key messages.

Session I rapporteur, Clare Perry, Environmental Investigation Agency, underscored the technical potential to improve efficiency as well as the lack of uptake by consumers. She explained the existing initial “price hump” can be overcome with help from the private sector and financial institutions, and uptake could be addressed through consumer outreach.

Session II rapporteur, Bassam Elassaad, independent consultant, Lebanon, highlighted monitoring energy consumption and leaks, and training maintenance and service professionals as important. He said energy management systems can forecast future energy demand and energy efficiency opportunities in control application at all levels, including the product level, system level, or building level.

Session III rapporteur, Helen Walter-Terrinoni, Chemours, reiterated that design and maintenance practices are critical for improving energy efficiency. She highlighted that the use of control systems can detect and prevent problems. She also noted a need for MEPS and energy standards for HAT countries.

Session IV rapporteur, Ian Crosby, Sustainable Energy for All, explained that getting attention from financial institutions for energy efficiency is challenging because they look at risks or, in the case of multilateral development banks, they do not see enough demand for energy efficiency from their clients.

Session V rapporteur, Helene Rochat, Topten, stressed the need for harmonizing measurement methods, so that data on energy efficiency can be collected and compared.

Session VI rapporteur Milina Battaglini, World Bank, observed that phasing down HFCs could prompt an entire system redesign. She noted as a promising approach that policies are moving away from prescriptiveness to more dynamic system transition ideas that can spark innovation.

Mark Radka thanked the rapporteurs and expressed the hope that the workshop allowed the Montreal Protocol community to gain a deeper appreciation of improving energy efficiency and provided energy experts with information on how they could build on national and regional institutions. He closed the workshop at 1:34 pm on Tuesday, 10 July.

### **OEWG 40 Report**

On Wednesday morning, 11 July, OEWG 40 Co-Chair Yaqoub Al-Matouq (Kuwait) opened the meeting. Josef Plank, Secretary General of the Austrian Ministry of Sustainability and Tourism welcomed participants to Vienna, noting it gave its name to the Vienna Convention more than 30 years ago. He recognized that meeting as the beginning of the journey of the Montreal Protocol towards a sustainable future, but expressed concern over recent findings of a significant rise in CFC-11, saying it necessitated swift and appropriate action.

“We have an obligation to use the institutions of the regime we have created” said Ozone Secretariat Executive Secretary Tina Birmpili with reference to the unexpected emissions increase of CFC-11, despite a global phase out of its production since 2010. She called on parties to address the issue, and urged parties to adopt new ideas and use their combined expertise to inform discussions on this matter.

### **Organizational Matters**

**Adoption of the agenda:** Co-Chair Al-Matouq introduced the agenda (UNEP/OzL.Pro.WG.1/40/1/Rev.1 and Add.1).

Saudi Arabia, supported by Rwanda, India, and Bahrain, proposed a new agenda item on the composition and balance of the Technology and Economic Assessment Panel (TEAP) and other assessment panels, citing the need for expertise on HFCs and for balanced composition between Article and non-Article 5 parties and among geographic regions.

The United Arab Emirates, supported by Iraq, Indonesia, Tunisia, and Jordan, proposed an agenda item on its ability to access the Multilateral Fund (MLF). The US supported the proposal, but underlined that it should be more broadly framed as eligibility criteria for financial support from the MLF.

The EU, supported by the US, China, India, Nigeria, and Tunisia, proposed an agenda item on CFC-11. The EU asked that the item be taken up early in the session to allow time for discussion and finding a way forward, with the US and India suggesting a scientific study by the Scientific Assessment Panel.

Co-Chair Al-Matouq said that all three items would be added to the agenda. The OEWG adopted the agenda as amended.

**Organization of work:** Co-Chair Cindy Newberg (US) outlined the organization of work, which was adopted with minor changes regarding when agenda items would be taken up.

### ***Kigali Amendment to the Montreal Protocol to Phase Down HFCs***

**Data reporting under Article 7 and related issues:** On Wednesday, Co-Chair Newberg introduced this item (UNEP/OzL.Pro.WG.1/40/2 and 3). The OEWG agreed to re-establish a contact group that had considered the issue at OEWG 39 and MOP 29. Co-chaired by Martin Sirois (Canada) and Zhong Zhifeng (China), the contact group was given the mandate to focus on: the timeline for reporting of baseline data for HFCs by Article 5 parties (developing countries); GWP values for HCFC-141 and HCFC-142; and revised data reporting forms and associated instructions, including reporting of HFC mixtures and blends.

In the contact group, the Secretariat introduced the revised instructions and data reporting forms. The Secretariat explained how it tried to address concerns raised by parties at MOP 29, including separating mandatory reporting obligations from voluntary reporting options, which were relocated into an annex to the document.

On the form on data on quantity of emissions of HFC-23 from manufacturing facilities, one party underscored difficulties in reporting emissions and cautioned against “guessing amounts emitted from leaks.” Others pointed to relevant text in Protocol Article 3, referring to emissions including amounts emitted from equipment leaks, process vents, and destruction devices, but excluding amounts captured for use, destruction or storage. They cautioned that agreement reached in Kigali on mandatory reporting of facility emissions should not be reopened. The Contact Group Co-Chairs invited interested parties to continue bilateral discussions.

On the distinction between voluntary and mandatory reporting, some parties preferred only mandatory reporting be included. Others welcomed room in an annex for countries that wish to submit voluntary information to facilitate the work of the TEAP.

On GWP values for HCFC-141 and HCFC-142, parties generally agreed that quantities reported as HCFC-141 and HCFC-142 would be considered as HCFC-141b and HCFC-142b, respectively, for the purpose of calculating HCFC baselines.

On the issue of the timeline for reporting of baseline data for HFCs by Article 5 parties, for which the Kigali Amendment stipulates that Article 5 parties that have ratified the Amendment could be required to report some or all of their respective baseline data, the group “reinforced agreement,” that providing real baseline data rather than best estimates would be the most pragmatic approach. They recognized that Article 5 parties that already ratified the Amendment would not have actual data to report, which could create a compliance issue if they seem to report later than the Amendment stipulates.

Parties discussed how to address this potential “non-compliance” issue. They agreed that some parties could engage in drafting text in preparation for MOP 30 that will provide guidance to the Implementation Committee.

On data reporting forms and associated instructions, including the reporting of mixtures and blends, parties asked the Secretariat to revise the forms according to the discussions in the contact group.

OEWG 40 Co-Chair Newberg stated that work on this item will continue at MOP 30.

**Destruction technologies for controlled substances (Decision XXIX/4):** On Wednesday, Co-Chair Al-Matouq introduced this item (UNEP/OzL.Pro.WG.1/40/2, paras. 8-15 and UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 4-7 and Annexes I and II). The TEAP Task Force on destruction technologies for controlled substances presented highlights of their April and supplemental May report, including information provided in parties’ submissions. TEAP Task Force Co-Chairs Helen Tope and Helen Walter-Terrinoni explained that the 2002 TEAP technical performance criteria for assessment of destruction technologies were used and that costs and economic feasibility were not considered. They also clarified that the assessment criteria are not intended to imply a level of standards for pollutants emitted from destruction facilities, noting these as matters for operators and governments within national regulatory frameworks.

Bahrain asked whether the study focused on the list of substances controlled under the Kigali Amendment or whether it included blends. The Task Force Co-Chairs responded blends were considered under the same criteria.

India asked about the process by which data received by parties was compared. TEAP responded it followed an objective process requesting data from parties to confirm whether or not the destruction technologies met the criteria or not. Tunisia raised the question of cement kilns, which it asserted is an inexpensive technology that many Article 5 parties can readily use. The Co-Chairs said the report did list cement kilns as destruction technologies previously used, but explained that for the purposes of their report, data was not available regarding HFC destruction by cement kilns. Australia, the EU, and Canada supported focusing on the destruction, removal, and efficiency (DRE) criteria, because regulations related to other criteria, such as emissions of particulates or carbon monoxide, vary among countries. The EU requested more information on the distinction between those technologies that are recommended for approval and those characterized as having high potential.

Canada suggested that technologies that are recommended for approval should be adopted in a straightforward manner. For technologies in the “high potential” category, Canada maintained that they should be approved in principle because they can destroy ODS and meet the technical performance criteria. Saudi Arabia underscored that there is limited information on some of the technologies deemed of “high potential” in the report. He added that some of the technologies lead to high emissions of other pollutants despite their potential for HFC destruction.

Bahrain and Tunisia raised the issue of blends and underscored the difficulties that Article 5 parties face implementing new technologies.

The US suggested that some technologies available in Article 5 parties, such as cement kilns, should be approved based on the TEAP assessment that thermal technologies that can destroy ODS should be able to destroy HFCs.

The OEWG established a contact group, co-chaired by Bitul Zulhasni (Indonesia) and Ralph Brieskorn (Netherlands), which met on Thursday and Friday.

In the contact group, parties first discussed the technologies categorized as having high potential to destroy HFCs with TEAP experts, particularly cement kilns and some plasma technologies.

Some non-Article 5 parties urged focus on the DRE criteria, underscoring that domestic regulatory frameworks exist for air quality pollutants such as carbon monoxide, dioxins, and furans, which countries can take into account when considering the appropriate technologies for HFC destruction. Other non-Article 5 parties pointed to argon plasma arcs, which is a technology that the MOP has not approved for ODS destruction, noting that the report says it meets the DRE criteria, and urged its approval. An Article 5 party said it would provide information on CO<sub>2</sub> plasma arcs and suggested that this technology could meet the criteria.

Two Article 5 parties called for further information with one suggesting a MOP decision that mandates further work by the TEAP on this issue, with a broader scope. One noted the facility-specific issues affecting the ability of cement kilns to destroy HFCs and meet the criteria, such as with feed infrastructure and air pollution control technology, and called for more information on these issues.

On Saturday in plenary, contact group Co-Chair Zulhasni reported that the group had agreed to encourage bilateral discussions on this issue before the MOP.

The OEWG concluded its consideration of this matter until MOP 30.

### **TEAP 2018 Report**

On Wednesday, OEWG 40 Co-Chair Al-Matouq introduced this item, saying that the discussion will focus on the TEAP 2018 interim report, Volume 4 and TEAP 2018 report, Volume 3. The TEAP presented: progress reports of the Flexible and Rigid Foams Technical Options Committee (FTOC), the Halons Technical Options Committee (HTOC), Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee (RTOC), the Medical and Chemicals Technical Options Committee (MCTOC), and the Methyl Bromide Technical Options Committee (MBTOC); the Critical-use Nominations interim report; and a report on TEAP organizational matters, including continuing challenges.

FTOC Co-Chairs Paulo Altoe and Helen Walter-Terrinoni reported a 4% increase per year in foam production. They highlighted that, in Article 5 parties, HCFC Phase Out Management Plans continue to drive the transition in foams, but said that in some countries HCFCs are about one-third less expensive than alternatives, which presents a challenge and may delay the transition away from HCFC-containing foams.

HTOC Co-Chairs Adam Chattaway, Sergey Kopylov, and Dan Verdonik noted that research continues on potential new fire protection agents, but the complexities of the research and development timescale and regulatory approval will delay the process by another 5 to 10 years.

RTOC Co-Chairs Roberto Peixoto and Fabio Polonara said that the phase down of high-GWP HFCs is underway in all RACHP sectors. They highlighted energy as an important consideration in the sector and notes that over 90% of the energy efficiency improvements are due to improvements in the equipment, while 5-10% are due to the working fluid itself. They stated that the risk of flammable refrigerants is specific to different applications and in different regions, which should be considered when assessing risk. On mobile air conditioners, they noted that nearly all light vehicles in some developed countries use HFO-1234yf, but noted that counterfeit refrigerants are likely to remain a major issue because HFO-1234f is more expensive.

MCTOC Co-Chair Keiichi Ohnishi, Helen Tope, and Jianjun Zhang reported that the global transition away from CFC metered dose inhalers is complete.

MBTOC Co-Chairs Marta Pizano and Ian Porter highlighted that the methyl bromide phase out for reported controlled uses is almost complete, but underlined that MBTOC estimates that up to 15,000 to 20,000 tonnes may still be used annually, but is not reported. They also said the phase out for the remaining methyl bromide critical uses will be greatly influenced by the registration of sulfuryl fluoride, methyl iodide, and other chemicals, and the use of soil-less culture and other non-chemical options.

The Critical-use Nominations interim report discussed the nominations of Canada, Australia, Argentina, and South Africa for methyl bromide.

On organizational matters, TEAP reported that seven TEAP members will reach the end of their appointment, which can potentially reduce the cross-cutting expertise available. Parties were asked to consider support for TEAP, deadlines for delivery, and overall annual workload, given the voluntary nature of its work.

In discussions, countries raised a number of questions related to the presentation given by TEAP. Bahrain asked for clarification of the usage of HFO-1234yf, a substitute refrigerant for automobile air conditioners, used by new vehicles. He asked if the findings are limited to use in Europe and the United States. TEAP responded that the report specifies Europe and the United States as HFO-1234yf is commonly used in these regions.

Kenya asked TEAP to clarify if there is a mandatory maximum quantity for quarantine and pre-shipment (QPS) applications of methyl bromide so that countries are aware if they exceed this allowable quantity. TEAP responded that QPS usage is exempted by the Protocol therefore there is no cap.

Australia asked TEAP to elaborate on the purpose of a proposed Memorandum of Understanding (MoU) with the International Maritime Organization (IMO). TEAP clarified that this MoU would address halon recovered during ship breaking activities.

Nigeria noted that the latest global estimates on halon stocks are not contained in this report. TEAP said the International Civil Aviation Organization (ICAO) has asked parties to provide this information on a number of occasions but the response has been "very thin."

Argentina raised its concerns about the costs of HCFCs and the lack of availability of alternatives in Latin American countries and, likely, other Article 5 parties, and suggested the report reflect this. Grenada requested TEAP to provide more information on the degradation of HFO-1234f and its possible impact on human health.

Samoa asked about alternatives in the fishing sector for cascade refrigeration systems, noting that 70% of vessels are using HCFC-22. TEAP noted a previous report produced in 2016 assessed costs from different options, and found that for new vessels dropping in ammonia and CO<sub>2</sub> was an appropriate choice.

China asked about ICAO's approval of halon replacement agents and, with Tunisia, inquired about Halon 1301 waste or reuse. TEAP explained that regional or country aviation authorities handle the approval and certification of halon replacement agents and that ICAO prohibits the use of ODS after a given date. On halon recycling, TEAP responded that halon can be recycled, cleaned to a standard, and reused. He said that most of the Halon 1301 is reused, and characterized it as a useful fire protection asset.

In response to a question from Ghana on the cost of alternative refrigerants, TEAP stated that this relates to market conditions, and suggested that clear rules on refrigerants in the short- and long-term can help send a signal to the market.

**Nominations for critical-use exemptions for methyl bromide for 2019 and 2020:** On Wednesday, OEWG 40 Co-Chair Al-Matouq introduced this item (UNEP/OzL.Pro.WG.1/40/2, paras. 20 and 2; UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 9 and 10), noting that two non-Article 5 parties, Canada and Australia, and two Article 5 parties, Argentina and South Africa, had submitted nominations for critical-use exemptions for methyl bromide. He clarified that the MOP will approve the final report and asked parties for comments on the interim report of the MBTOC.

The EU noted that the MBTOC report highlights a discrepancy of 15,000-20,000 tonnes of methyl bromide possibly due to unreported controlled use, illegal trade, or QPS applications, which he recalled are exempted. He urged parties to address the discrepancy between emissions and amounts exempted and reported, and to address stocks. The US observed that the MBTOC does not monitor emissions and underlined the need to hear from bodies that monitor and measure emissions to ensure all the relevant information is available.

Australia and Canada expressed concern with several aspects of the MBTOC report as it relates to their nominations for critical-use exemptions, saying that the recommendations veer into policy recommendations, which are beyond the technical and economic assessment mandate of the MBTOC. Both cited, among their concerns, that the recommendation of a 10% reduction of their allowed use is based on adopting a soil-less system, which they underlined is not economically feasible.

Canada further noted that one Canadian province, Prince Edward Island, allows no other fumigant, based on a policy decision that protects human health, and cited a research programme on soil-less systems that so far had “discouraging results.” The US underlined the need for the MBTOC to respect domestic policy decisions and, with Australia, objected to MBTOC characterizing some countries as “complacent” for requesting critical-use exemptions.

Argentina said that the recommendation to use barrier films was not economically feasible and is not viable for use in large-scale production.

South Africa also said that some of the recommendations were not economically viable in its context. He reported that, in the last year, South Africa registered some alternatives that are currently under study, but said that it seemed MBTOC assumed that these alternatives were already available for use. Citing the recommended 90% reduction in the allowed use for mills, he said further explanation is required to understand the technical basis for the recommended reduction.

OEWG 40 Co-Chair Al-Matouq encouraged discussions with MBTOC to clarify concerns and said that a conference room paper (CRP) could be submitted to the MOP, which is expected to discuss and adopt the MBTOC report and recommendations. He concluded this item until MOP 30.

**Progress in the implementation of Decision XXIX/8 on future availability of halons and their alternatives:** On Friday, OEWG 40 Co-Chair Newberg introduced the item (UNEP/OzL.Pro.WG.1/40/2, paras. 22 and 23; UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 11-14), noting that ICAO has agreed to conduct a survey and report to MOP 30 and the ICAO Assembly in 2020. The EU and Canada stressed that the ICAO survey will be important to inform the MOP.

Australia supported the suggestion to change the name of the Halons Technical Options Committee to better reflect that its work is on the fire protection sector more broadly, not only related to halons. She and the US also queried the added value

of an MoU with the IMO. On Saturday, the US reported that bilateral discussions were ongoing. The item was concluded until MOP 30.

**Development and availability of laboratory and analytical procedures that can be performed without using controlled substances under the Protocol (Decision XXVI/5):** On Wednesday, OEWG 40 Co-Chair Al-Matouq introduced the item (UNEP/OzL.Pro.WG.1/40/2, para. 24; UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 15-18), and the TEAP presented its report.

The EU recognized the challenges by the MCTOC regarding lack of available information and urged other parties to provide up-to-date information. Co-Chair Al-Matouq concluded this item until MOP 30.

**Process agents (Decision XVII/6):** On Wednesday, OEWG 40 Co-Chair Al-Matouq introduced this item (UNEP/OzL.Pro.WG.1/40/2, paras. 25–28; UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 19–25) and the MCTOC Co-Chairs Keiichi Ohnishi, Helen Tope, and Jianjun Zhang presented the report.

The MCTOC noted that investigations into analytical procedures are proving challenging, and expressed the need for parties to provide the MCTOC with available information. On next steps, the MCTOC said that parties may wish to remove from the list of controlled substances: the use of CFC-113 in the preparation of perfluoropolyether diols with high functionality; and, for the EU, for chlorine recovery by tail gas absorption in chlor-alkali production. They also highlighted that parties may wish to reduce the quantities of “make-up or consumption and maximum emissions levels” in the limits for process agents, taking into account the currently reported process agent uses and emissions.

**Organizational and other matters:** On Friday, OEWG 40 Co-Chair Newberg introduced the item (UNEP/OzL.Pro.WG.1/40/2, paras. 29 and 30; UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 26-41, Annex III and Annex IV) on organizational and administrative matters relating to the work of the TEAP raised in its report, including challenges in the operation of the Panel. On nominations of expert members, delegates agreed that interested parties consult informally with the Technical Options Committees (TOCs) and TEAP, mindful of the identified areas of expertise needed for the TOCs and TEAP to address parties’ requests.

On challenges in the operation of the Panel, parties discussed the increasing workload of TEAP members. Australia pointed out that TEAP members work on a voluntary basis and asked parties to carefully consider the work demands and timelines for the submission of requested reports. She suggested a thorough review of TEAP requirements to see if anything can be removed or amended so that a more disciplined approach to requests is adopted. Australia, supported by India and Canada, added that TEAP should also be forthcoming in communicating to parties its existing pressures and capabilities.

Brazil wished to acknowledge the passing of Raquel Ghini, a member of MBTOC from 2009 to 2016. She said Ghini was a strong supporter and implementer of the Montreal Protocol and delegates expressed thanks for her contributions to the MBTOC.

### *Linkages Between HCFCs and HFCs in Transitioning to Low-GWP Alternatives*

On Wednesday, recalling that MOP 29 agreed to Saudi Arabia’s proposal to consider this issue at OEWG 40, OEWG 40 Co-Chair Al-Matouq introduced this item (UNEP/OzL.Conv.11/7–UNEP/OzL.Pro.29/8; UNEP/OzL.Pro.WG.1/40/2, paras. 31-33; and UNEP/OzL.Conv.11/7–UNEP/OzL.Pro.29/8, paras. 155-162). Saudi Arabia highlighted the links between the HCFC phase-out

schedule and HFC phase-down schedule, drawing attention to the need to avoid introducing equipment that uses HFCs in an effort to phase out HCFCs on schedule. He suggested establishing a contact group on the issue, which was supported by Bahrain, Micronesia, Oman, Iraq, Senegal, India, Nigeria, and Burkina Faso.

Bahrain cited his country's high usage of air conditioners and growth in imports of equipment using HFCs, which, he said, means that at the current rate, Bahrain will be in non-compliance by 2025 and therefore requires a clear solution.

The Federated States of Micronesia (FSM) stated that the conversion to new refrigerants would produce economic, energy, and social benefits to countries that make a faster transition, but said that the costs incurred to achieve this should be supplied by the Multilateral Fund.

In the contact group, co-chaired by Obed Baloyi (South Africa) and Philippe Chemouy (Canada), several parties underscored the benefits of avoiding a transition from HCFCs to HFCs, for environmental and economic reasons. One party stated that the focus of this agenda item is to define how flexibilities will be applied, as envisioned in paragraph 6 of Decision XXVIII/2 (linkage between HCFC and HFC schedules, and flexibilities if no other technically-proven and economically-feasible alternatives are available). Some of the ideas suggested were: HAT countries could use HCFCs through 2025 and 2026 using a deferral for specified air conditioning sectors, with possible extension; extending the deferral approach for other refrigeration and air conditioning subsectors if there is a similar problem; and considering working toward an adjustment to the HCFC schedule.

Some suggested proposing a list of questions to HAT countries to learn about the specific needs for flexibility in more detail, while another suggested that Article 5 parties may want to discuss and share experiences, identify problems, and possible flexibility measures. Some expressed interest in submitting proposals to the MOP.

On Saturday, the OEWG agreed to conclude their consideration of this item until MOP 30.

### ***Issues Related to Energy Efficiency while Phasing Down HFCs (Decision XXIX/10)***

**Report by the TEAP on energy efficiency in the RACHP sectors:** On Thursday, TEAP Co-Chairs Suely Carvalho, Bella Maranion, and Fabio Polonara presented the TEAP report (UNEP/OzL.Pro.WG.1/40/2, paras. 34-37; UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 42-56 and Annex V; TEAP 2018 report, Volume 5; UNEP/OzL.Pro.WG.1/40/2, paras. 38-40; and UNEP/OzL.Pro/WG.1/40/6/Rev.1). They recalled the mandate for their report, to assess: technology options and requirements, including challenges for their update, long-term sustainable performance and viability, environmental benefits, and capacity building and servicing sector requirements; and related costs including capital and operating costs.

On opportunities, they reported that technologies for improving energy efficiency for high GWP refrigerants are also applicable to low-GWP, and said opportunities include: ensuring minimization of cooling and heating pads; selecting the appropriate refrigerant based on applications; and designing features that will support servicing and maintenance.

On uptake challenges, they identified financial, market, informational, institutional and regulatory, technical, and service competency challenges.

On environmental benefits, they noted that the impact of improved system efficiency on total global warming depends on the type of equipment, hours of operation, time of operation,

and emissions associated with power generation, which vary by country

On costs, they outlined the estimated improvement and the additional manufacturing cost for: improved compressors; variable speed compressors; variable speed drives for both fans and compressors; heat exchanger equipment; and expansion values. They noted there is limited data on capital and operating costs, and that retail prices vary widely for similar equipment.

On financial institutions, they highlighted the large scale of the task to map all climate finance and said that the institutions in the report include the Global Environment Facility, Green Climate Fund, and the World Bank.

Following the presentation, delegates discussed both the TEAP report and the workshop outcomes.

Many thanked the TEAP for preparing the report on a short timeline. Several Article 5 parties underscored the need for capacity building and financial support.

The Federated States of Micronesia suggested further elaboration of existing capacity-building opportunities that exist. On the financing section, she suggested the TEAP may require further expertise, and said information on the role of the private sector was needed.

The EU suggested further focus on MEPS, maintenance and servicing, and heat pumps. He suggested, supported by the US, that the Secretariat prepare a concise summary of current financial opportunities for energy efficiency.

Senegal stressed the need for technology transfer to overcome the constraints faced by Article 5 parties. He proposed a table on the inventory of new technologies in the RACHP sector, the refrigerants used, their performance, and the management of the substances. The Gambia noted concerns with flammability and cost issues associated with some new technologies. Colombia called for further analysis of the costs involved with undertaking energy efficiency measures in Article 5 parties, including the implications for the manufacturing sector.

India expressed doubt that the TEAP was able to fulfill the mandate provided by Decision XXIX/10, saying that it did not take into account the relative performance of refrigerant alternatives with regard to energy efficiency, among other elements. He called for the TEAP to address, *inter alia*, challenges for uptake, capacity building, servicing equipment, and related incremental capital and operating costs. He suggested that a contact group or informal group continue discussions.

Saying the TEAP did a "good job hitting the elements of its mandate," the US urged parties to avoid duplication with other organizations currently working on energy efficiency and domestic ministries with jurisdiction over energy efficiency. He cited maintenance to improve energy efficiency while decreasing refrigerant emissions as an area where Montreal Protocol institutions and expertise could be most relevant in the energy efficiency area.

Burkina Faso underscored as a key takeaway from the workshop that effective monitoring systems are essential, and suggested work on gaining more insights on systems transformation, including transitions in technology and markets, to determine capacity-building needs.

Algeria called for a review of MEPS in the context of the Kigali Amendment.

Argentina highlighted the importance of capacity building and training of technicians that maintain air conditioning equipment. She noted that much of the energy efficiency activities, including technology transitions, require finance, and called for co-financing opportunities with multilateral development banks.

OEWG 40 established a contact group, co-chaired by Patrick McInerney (Australia) and Leslie Smith (Grenada), which met Friday and Saturday, to provide guidance on how the TEAP can further refine the report and to discuss other matters brought forward by parties. OEWG 40 Co-Chair Newberg said that the Secretariat would respond to the call for tabular information concerning financial mechanisms.

On Friday in plenary, Rwanda, for the African Group, presented a CRP on energy efficient technologies in the RACHP sectors. She outlined that the CRP contains a draft decision that asks for: financial support for Article 5 parties for the development and enforcement of policies/regulations to avoid the assembling and manufacturing of energy-inefficient RACHP; parties to approve a window for funding demonstration projects in Article 5 parties that can provide information on costs and cost-effectiveness of maintaining energy efficiency in the servicing sector; the MLF Executive Committee (ExComm) to develop guidelines for bulk procurement processes that will allow aggregation of demands for equipment with high energy efficiency and lower GWP at affordable prices; the TEAP to include in its annual reports updates on the cost and availability of lower GWP refrigerants and energy efficient equipment; and for implementing agencies to facilitate the provision of targeted training on certification, safety and standards, awareness raising, and capacity building that will assist Article 5 parties in maintaining and enhancing the energy efficiency of RACHP equipment.

The Federated States of Micronesia supported the CRP. The EU stated that this CRP raises many ideas, which should be discussed in the contact group.

In the contact group, views diverged on the need for support, as outlined in the CRP. Article 5 parties stressed the costs of new technologies, while non-Article 5 parties said some of this work is underway by the MLF ExComm. Parties also provided guidance to the TEAP to revise the report.

On Saturday, OEWG 40 agreed to continue discussions on energy efficiency at MOP 30.

**Outcome of the workshop on energy efficiency opportunities while phasing down HFCs:** On Wednesday, Mark Radka, UNEP, outlined the workshop's main messages. On general background, he reported the "good news" that there is significant potential to reduce energy consumption in the cooling sector, and the "bad news" that consumers have a systemic bias towards purchasing less efficient equipment. He also reported that many noted the wealth of experience that exists on policy to increase energy efficiency, meaning that no country has to do this alone.

For increasing energy efficiency for new products, he highlighted new equipment types that: reduce cooling demand, improve thermodynamic performance of some refrigerants, improve system components, and improve control systems. For existing products, he reported that many underscored the importance of maintenance, monitoring, and training service technicians.

On policies, he reported that discussions highlighted that MEPS are the most effective way to remove low-efficiency products from the market, while energy labels can encourage the purchase of products exceeding minimum standards.

Saudi Arabia, India, and Bahrain expressed concern that the information presented was general in nature to energy efficiency, without focusing on phasing down HFCs or its alternatives. They suggested that the workshop may not have fulfilled its mandate.

Radka said that many presentations included elements relevant to HFCs, citing the example of the relative thermodynamic efficiency of different refrigerants, for which he said the message was that refrigerant choice matters, but is not the dominant feature determining energy efficiency in RACHP equipment.

### ***Requirements for HCFCs for 2020 to 2030 for Non-Article 5 Parties (Decision XXIX/9)***

**Report by the TEAP on HCFCs and Decision XXVII/5:** On Thursday, OEWG 40 Co-Chair Newberg introduced this item (UNEP/OzL.Pro.WG.1/40/2, paras. 41-44 and Annex III and UNEP/OzL.Pro.WG.1/40/2/Add.1, para. 57) and TEAP presented Volume 1 and parts of Volume 3 of its 2018 Report.

The US and EU asked for clarification on difference in the use of the terms "fire suppression" and "fire protection." TEAP explained the former relates to active fire extinguishing activities, the latter to more passive preventive activities such as employing sprinklers or fire alarms.

**Proposed adjustments to the Montreal Protocol:** On Thursday, OEWG 40 Co-Chair Newberg introduced this item (UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 58-60), explaining that there were two proposals for adjustments put forward by the US, and jointly by Canada and Australia. Australia presented the Australian and Canadian joint adjustment proposal to the Montreal Protocol, (UNEP/OzL.Pro.WG.1/40/5, Annexes I and II). Referring to the TEAP's findings that a small amount of HCFC may be required to service fire protection equipment, she characterized the adjustment as a "housekeeping exercise" that, and as stressed by Canada, would not have an additional environmental impact. Canada reminded this could be best achieved through an adjustment rather than an amendment.

The US said the proposal (UNEP/OzL.Pro.WG.1/40/4, Annexes I and II) relates to the servicing tail only and that would be, in this regard, identical to the proposal from Australia and Canada. He explained that this issue is based on the fact that it is uneconomical to replace long-lasting equipment that is still functioning and replace it at great expense. He underscored the proposal is narrow, relating to the servicing of fire extinguishing equipment furnished prior to 2020 and that this would be met under the 0.5% limit allowed under the Protocol. Canada added this would not cause any environmental concern, because the 0.5% cap would remain the same.

On Friday during plenary, Russia explained its use of HCFC-113 is necessary for the launching of rockets into space. He maintained that there are no adequate alternatives for HCFC and exemptions should be allowed for the aerospace industry or the medical sector where the usage of HCFC substances is crucial for the protection of people's lives. Russia asked parties to consider this and respect the indivisible right of parties to preserve its national priorities in using HCFCs.

Discussions continued in a contact group, co-chaired by Laura Beron (Argentina) and Davinder Lail (UK), which met on Friday and Saturday. The proposing parties, and others, shared information on possible continuing needs for servicing equipment with long lifespans. Some countries suggested that they may also need to add some sectors under their servicing tails. Parties discussed whether there should be one adjustment for both Article 5 and non-Article 5 parties. Some noted that proposals for adjustments for Article 5 parties are not due until 2030 by which time the needs for a servicing tail may be different. Parties generally agreed to bring the information into one document, without specifying which countries provided the information, to aid discussions at the MOP.

On Saturday, OEWG 40 agreed to conclude their consideration until MOP 30.

### ***Consideration of Senior Expert Nominations from Parties to the TEAP (Decision XXIX/20)***

On Friday, OEWG 40 Co-Chair Newberg introduced the item (UNEP/OzL.Pro.WG.1/40/2, paras. 45-47; UNEP/OzL.Pro.WG.1/40/2/Add.1, paras. 29 and 30; TEAP report Volume 3, Annex 2) asking parties to consider the “Matrix of Needed Expertise” posted on the Ozone Secretariat website and to consult other parties and TEAP on the margins of this meeting regarding nominations. The Co-Chair directed parties to submit nominations to the Ozone Secretariat and reminded parties to strive for geographical and gender balance in their nominations.

The US, supported by Canada, raised the importance of following the established framework to define how nominations are made and adhere to the number of experts needed. Colombia noted the importance of TEAP’s role especially given the work ahead of parties related to the Kigali Amendment.

On Saturday, Colombia encouraged parties to focus on the expertise needs of the TEAP, considering the increasing workload and new tasks related to the implementation of the Kigali Amendment and other issues raised at OEWG 40. Saudi Arabia requested more time to examine CVs of experts in order to make informed decisions.

OEWG 40 concluded its consideration of this item until MOP 30.

### ***Other Matters***

**Global emissions of CFC-11:** On Thursday, the Scientific Assessment Panel (SAP) and TEAP presented information related to the unexpected emissions of CFC-11.

The SAP explained that if emissions continue at the 2014, 2015, and 2016 levels, it would delay global ozone recovery by nine years and recovery to the Antarctic ozone hole by 30 years. SAP added, in response to Argentina’s concerns about how these emissions will eventually impact the Southern Hemisphere, that the lifetime of CFC-11 is about 100 years.

The TEAP recalled that the uses of CFC-11 were primarily as a foam-blowing agent for flexible and polyurethane insulating foams and as a refrigerant. She noted that there are alternative chemicals or products available as replacements. She also reported that TEAP has been aware that CFC-11 was advertised on at least one internet trading website for sale and distribution in Chinese and Middle Eastern markets for foam blowing, but underlined that TEAP is unaware whether these listings for sale are legitimate offers or whether any purchases were made.

Several parties asked whether it could be determined with more precision which industries are still using CFC-11, and the atmospheric impact of these emissions. The EU asked whether there were any associated chemicals or molecules that could indicate the source of the CFC-11 emissions. The SAP clarified that the chemical footprint could not yet be attributed to a particular sector, but that it was following up on this to see if a method can be developed.

On Friday, the US presented a CRP on unexpected emissions of CFC-11, noting that 60 parties associated themselves with this CRP but, due to time constraints, he was unable to consult other parties. He summarized the draft decision explaining it seeks the following: that the SAP and TEAP provide parties with information on the unexpected increase and potential sources of CFC-11 emissions; parties provide the Secretariat with any relevant scientific or technical information that may

help the SAP or TEAP; parties take appropriate measures to ensure that the phase out of CFC-11 is effectively implemented and sustained and inform the Secretariat about any potential deviations from compliance; parties support scientific efforts, including atmospheric measurements; and relevant scientific and atmospheric organizations and institutions to further study and elaborate the current findings.

The EU, supported by Canada, asked the SAP to provide a concise report on these emissions to be presented in a way that can be effectively communicated to parties’ leaders and colleagues in their capitals, reiterating that this is a significant issue on which the Montreal Protocol is taking prompt action.

Australia called for further study to quantify the sources and amount of emissions. Canada suggested TEAP provide information on the impact and magnitude of these new emissions and investigate the possibility of these emissions also coming from the use of old equipment or existing banks.

Burkina Faso, supported by the Federated States of Micronesia and Argentina, asked parties to communicate to TEAP, informally or formally, an estimate of existing banks of CFC-11 so that this can be taken into account.

Grenada urged parties to focus on a long-term, sustainable approach to this issue to avoid this problem from recurring. He further asked parties to provide support to Article 5 parties with the necessary monitoring support to maintain phase-out or phase-down efforts with respect to this substance. Nigeria called for a thorough, transparent, and unbiased investigation and suggested that there is a need for mechanisms to prevent this type of incident in the future.

Samoa pointed out if high-volume producing countries are not complying, “all of the efforts of the small island developing states will be wasted.” She asked the Montreal Protocol to address this complex issue as it has addressed other challenging issues in the past.

Noting that some research on sources and emissions from banks is available, the US observed that the evidence identifies the source is in East Asia and encouraged parties with monitoring data, particularly Japan, South Korea, and China, to share this data. He urged parties to provide more detailed responses with respect to possible use and online sale of CFC-11-containing polyurethane foam.

Japan observed it may be difficult to continue to support the MLF at its current level if there is ongoing production in Article 5 parties as a matter of accountability.

Norway called for examination of the underlying causes, including technical and socio-economic drivers.

The Federated States of Micronesia stressed the need for urgent action, calling for investigation on the ground and remedial action.

Saudi Arabia rejected the suggestion that the Middle East is producing or using CFC-11 and underlined the challenges of controlling online sales.

The Environmental Investigation Agency (EIA) reported that their research identified 18 companies using CFC-11-containing polyurethane foam in building construction and that these companies reported that this is common practice. She urged parties not to treat this as an isolated issue, citing that the users identified the availability of cheap CFC-11 and its efficacy in polyurethane foam as the underlying reasons for its use.

The OEWG established a contact group on the issue, co-chaired by Annie Gabriel (Australia) and Agustín Sánchez Guevara (Mexico), which met Friday and Saturday.

In the contact group, parties reviewed, and ultimately finalized, the CRP that had been submitted earlier. Parties also suggested actions that could be taken in advance of MOP 30. These ideas included: encouraging parties, institutions, and scientists to share information; requesting the Secretariat to prepare a summary of scientific and technical information, including possible information submitted to it by parties; and asking the SAP and TEAP, within the scope of their respective mandates, to consider providing in their report more information on the unexpected increases in CFC-11 emissions.

On Saturday in plenary, China expressed disappointment about the EIA report on illegal production and use of banned CFC-11 in China's polyurethane insulation and foam sector. He reported how China followed up with immediate actions, including onsite inspections, sample collections, testing, and interviews. The preliminary findings, he said, did not support the claims made in the EIA report. He stressed that China would not tolerate such accusations based on "weak data" and expressed appreciation for the "pragmatic and constructive approach" taken by the SAP and TEAP and encouraged further work on collecting evidence on, and identifying the reasons for, the unexpected increases in CFC-11 emissions.

The US appreciated the report provided by China on its immediate actions. He stressed that the unexpected CFC-11 emissions increase is a broad issue, relevant to all parties, and said he would further engage with China to learn more about addressing the issue in a comprehensive approach.

On Saturday evening, Contact Group Co-Chair Gabriel introduced the revised CRP, which constitutes a draft decision for the MOP. As presented, the MOP would decide, *inter alia*, to:

- request the SAP to provide a summary report on the unexpected increase of CFC-11 emissions, including additional information regarding atmospheric monitoring and modelling, including underlying assumptions, with respect to such emissions. A preliminary summary report should be provided to OEWG 41, a further update to MOP 31, and a final report to MOP 32;
- request the TEAP to provide information on potential sources of emissions of CFC-11 and related controlled substances from potential production and uses, as well as from banks, that may have resulted in emissions of CFC-11 in unexpected quantities in the relevant regions. A preliminary report should be provided to OEWG 41 and a final report to MOP 31;
- request parties with any relevant scientific and technical information that may help inform the SAP and TEAP reports to provide that information to the Secretariat by 1 March 2019;
- encourage parties, as appropriate and as feasible, to support scientific efforts, including for atmospheric measurements, to further study the unexpected emissions of CFC-11 in recent years;
- encourage relevant scientific and atmospheric organizations and institutions to further study and elaborate the current findings related to CFC-11 emissions as relevant and appropriate to their mandate, with a view to contributing to the SAP assessment;
- request the Secretariat, in consultation with the MLF Secretariat, to provide parties with an overview outlining the procedures under the Protocol and the Fund with reference to controlled substances by which the parties review and ensure continuing compliance with Protocol obligations and with the terms of agreements under the Fund, including with regard to monitoring, reporting, and verification; to provide a report to the OEWG 41 and a final report to MOP 31; and

- request all parties to take appropriate measures to ensure that the phase out of CFC-11 is effectively sustained and enforced in accordance with obligations under the Protocol, and to inform the Secretariat about any potential deviations from compliance that could contribute to the unexpected increase in CFC-11 emissions.

During the discussion, the Federated States of Micronesia called on parties to continue to strengthen monitoring, reporting, and verification as well as capacity-building efforts to ensure compliance with the Protocol. Brazil lauded the OEWG for swiftly reacting to the unforeseen issue by agreeing on a CRP and actions until MOP 30. Japan announced it would share information from its monitoring, and suggested considering developing a regional and eventually global monitoring system utilizing parties' existing sites.

OEWG 40 agreed to conclude their consideration of this item until MOP 30.

**Eligibility for financial and technical assistance:** On Friday, OEWG 40 Co-Chair Newberg introduced this item. The United Arab Emirates (UAE) explained that it has met its obligations related to ODS thus far without support, but that support will be required to meet its obligations on the phase out of HCFCs and phase down of HFCs. Egypt, Bahrain, and Sudan supported the UAE. Bahrain and Saudi Arabia highlighted that the UAE agreed to forgo financial support for the Montreal Protocol and actions related to ODS, which is different from the Kigali Amendment and actions to phase down HFCs.

Brazil asked if the focus of this agenda item is on issues related only to the UAE. Brazil recalled that OEWG 39 had deferred its consideration of the UAE's eligibility to access financial support and queried if this agenda item stemmed from this previous agenda. OEWG 40 Co-Chair Newberg confirmed that is the case. The US asked that the meeting report also reflect his country's interpretation of this agenda item to be a general discussion of eligibility. Co-Chair Newberg confirmed the report would reflect these interventions under this agenda item and under the adoption of the agenda.

The EU said there are clear criteria for eligibility and that this system is currently working. He noted that there are ongoing discussions under the MLF ExComm. Japan stated that this issue should be addressed more broadly. Saudi Arabia called for informal consultations to further discuss this issue.

OEWG 40 Co-Chair Newberg suggested, and parties agreed, that informal, bilateral consultations convene and that this issue be next taken up by the MOP.

**Composition and balance of the TEAP:** On Friday, OEWG 40 Co-Chair Newberg opened this item, asking Saudi Arabia to introduce this matter. Saudi Arabia clarified the intent is to ask for a review of the terms of references (ToR) relating to the composition and balance of the assessment panels. He emphasized that there is a geographical and regional imbalance in TEAP, which he said is "99% composed of Article 2 countries." He stated that without proper balance in TEAP, the different concerns and conditions of HAT countries will not be taken into account and further suggested that a homogenous representation could lead to a conflict of interest.

On Saturday, Saudi Arabia, with India, Bahrain, Kuwait, Jordan, Iraq, Oman, Egypt, Tunisia, and Rwanda, introduced a draft decision on Review of the ToR, composition and balance as well as fields of expertise required of the Assessment Panels and their subsidiary bodies, to be considered at MOP 30. As presented, the CRP outlines that the MOP would decide, *inter alia*, to: request the Ozone Secretariat to prepare a document, for OEWG 41, on the Assessment Panels and their subsidiary

bodies in view of changing circumstances including the Kigali Amendment, including the ToR, composition, geographical, Article 5 and non-Article 5 representations, and gender balance; and fields of expertise required for the upcoming challenges related to implementation of the Kigali Amendment, such as energy efficiency, climate benefits, and renewable energy. Further, the CRP invites parties to provide their inputs to the Secretariat in order to prepare the document for the consideration of the OEWG 41 to arrive at a decision at MOP 31.

### ***Adoption of the Report and Closure of the Meeting***

On Saturday evening, OEWG 40 Co-Chair Al-Matouq presented the draft OEWG 40 report (UNEP/OzL.Pro.WG.1/40/L.1). After lengthy discussions, concerning the reflection of views expressed by the US and Brazil on the scope of the agenda item on eligibility for financial and technical assistance, OEWG 40 adopted the report.

OEWG 40 Co-Chairs Newberg and Al-Matouq gavelled the meeting to a close at 10:40 pm.

### **A Brief Analysis of OEWG 40**

An effective treaty translates commitments into outcomes, safeguards those gains, and leverages its experience and institutions to take on new challenges. The ozone layer shows signs of repair, owing to the reduction of ozone depleting substances (ODS) accomplished through the Montreal Protocol. The Kigali Amendment leverages the institutions that brought about this achievement to phase down hydrofluorocarbons (HFCs), a greenhouse gas that is not an ODS. Such success is unique among environmental treaties, a sign that the Protocol deserves praise, but also protection to uphold this track record.

At the fortieth meeting of the Open-ended Working Group (OEWG 40), parties found themselves challenged to both defend the Protocol's previous successes in reducing ODS and move forward to help implement the phase down of HFCs. Just seven months after NASA confirmed the recovery of the ozone layer, and the world hailed the Montreal Protocol's success, delegates arrived at OEWG 40 facing evidence of unexpected, and as yet untraced, emissions of CFC-11 that could set that recovery back decades. At the same time, they had to look ahead, toward the rapidly approaching entry into force of the Kigali Amendment on 1 January 2019.

This brief analysis assesses how the OEWG advanced the issues related to the Kigali Amendment, while addressing its more traditional issues related to ODS.

### ***Safeguarding Success: Unexpected ODS Emissions***

OEWG 40 had several issues related to its traditional, ODS-related work, such as nominations of critical-use exemptions for methyl bromide, requirements for hydrochlorofluorocarbons (HCFCs) to service some equipment between 2020 and 2030, and Technical and Economic Assessment Panel (TEAP) reports. For each of these issues, the OEWG did what it does best, shared information and worked toward a common understanding of the issues among parties, and between parties and members of the TEAP and its Technical Options Committees. Despite this full agenda, discussions of unexpected emissions of CFC-11 dominated OEWG 40, because, to many, this surprising development threatened the integrity of the Protocol itself.

In May 2018, an article in the journal *Nature* raised the alarm. The study, based on monitoring data in Hawai'i, verified the decline of concentrations of CFC-11 in the atmosphere, but found that the rate of that decline slowed by 50% after 2010.

In the article, the authors attributed this to increased emissions from unreported production in the East Asian region. Members of the TEAP and the Scientific Assessment Panel (SAP) quickly mobilized, producing Panel reports to provide parties with additional information on emissions and potential sources of CFC-11. More controversially, the Environmental Investigation Agency, a UK-based non-governmental organization, released a report pointing at production and use of CFC-11 for polyurethane foam at 18 companies in China. In response, China swiftly undertook site inspections of these companies and found no CFC-11 production or use and confirmed that there was no large-scale production of CFC-11 in China. Parties were left with more questions than answers, on the location, source, and use of CFC-11—vital information to address the unexpected spike in emissions.

The Federated States of Micronesia's plea to "act with the urgency of someone who discovered their house is on fire" resonated with many. Some questioned why this evidence was only coming forward now, six years after the first year of increased emissions were detected. Scientists needed, they said, to be sure that their findings were not due to atmospheric flares or other anomalies, before bringing such startling revelations to the body. To be believed by parties, one said, they had to be sure their case was air tight.

Parties' response, as outlined in a MOP draft decision proposed by over 60 parties, leverages the strong scientific and technical institutions of the Montreal Protocol. The SAP and the TEAP will undertake further work, including monitoring and modelling, and information gathering on other potential sources of production, in addition to their usual assessments. Parties will examine their own compliance and will share monitoring data, and one delegate even suggested moving toward a global programme for aggregating monitoring data.

This response skirts any temptation to single out a party or parties. For several developed countries, frustrated that their early efforts to phase out CFCs, and provision of financial and technical assistance, could be undermined by the actions of a few, compliance and enforcement were at the heart of this issue. Many felt it would be inappropriate to focus on a single party, noting that there may be systemic issues, such as the cheap availability of CFC-11 and black market trade. Safeguarding the system, therefore, meant a general response was in order. The call for the Secretariat and Multilateral Fund to work with developing countries to clarify and identify any potential compliance issues related to CFC-11 could identify the extent of such systemic concerns. While the Assessment Panels research this mystery, parties and the financial arm of the Montreal Protocol will try to find ways to address the problem more immediately, and, hopefully, ensure that it does not happen again.

### ***Laying the Groundwork for the Kigali Amendment***

The rapid entry into force of the Kigali Amendment, only adopted in 2016, left parties little time to complete various details that will help ensure the smooth implementation of the phase down of HFCs. With entry into force looming, OEWG advanced two issues that the MOP will need to approve: data reporting and destruction technologies.

Data reporting had previously been referred to as a mere "housekeeping issue." Yet determining "what" and "when" countries will report provides information not only on parties' efforts and results, it is integral to calculating the baseline from which parties will phase down HFCs. A new version of the form that includes expected emissions, those known to be tied to production and use, and unexpected emissions, related to

leaks or unintentional production through industrial processes, could present an agreeable way forward on how the “what” will be reported. Some parties thought that at the close of OEWG 40 there was also a better understanding of “when” developing countries will report their baseline years, which is to be an average of 2024, 2025, and 2026 HFC production and consumption. There was general agreement to wait before reporting, until actual numbers, not estimates, are available, and to provide direction to the implementation committee that real numbers are worth the wait, even if it seems like these countries are not meeting their reporting obligations. At OEWG 40, some parties developed a text for consultation before and during MOP 30 that several felt held promise to solve these remaining reporting questions.

On destruction technologies, parties welcomed the TEAP’s supplementary report assessing the ability of technologies, some already approved for ODS destruction, to destroy or remove HFCs. Views diverged on how heavily to weigh the potential emissions of air pollutants such as particulates, dioxins, and furans against the destruction and removal efficiency potential of the technologies. There are some questions outstanding, due to a lack of data on some technologies. Still, several felt confident that the MOP would be in a position to approve a list of technologies that parties could use to destroy HFCs.

### ***Leveraging Progress for Future Success***

Other HFC-related issues, particularly linkages between HCFC and HFC reduction timelines and targets (the “schedules”) and energy efficiency, do not require decisions before the Kigali Amendment’s entry into force, but are important to implement the Protocol’s HFC-related work. The linkages issue presents a difficult truth, that previous agreement on HCFC phase out can complicate efforts to phase down HFCs. Countries do not want to undergo two technological transitions, first, away from equipment that uses HCFCs, in line with their agreed HCFC phase out schedule, and then replacing some of the same equipment just a few years later to phase down HFCs, as agreed under the Kigali Amendment. Such a “double transition” is not beneficial for countries’ economies or for the environment. Yet, “leapfrogging” directly to a post-HFC world is expensive.

The Kigali Amendment recognizes this, particularly that countries with high-ambient temperature (HAT) may need flexibility. The linkages discussion was new, after Saudi Arabia raised this issue at the MOP in 2017, where parties agreed to add it to the agenda for OEWG 40. While some expected frustrating negotiations, several left quietly satisfied with the progress made. Nothing concrete at this early stage, but a list of ideas on how to operationalize the flexibility started to percolate as a first step, including adjusting the HCFC schedule or allowing HAT countries to defer their phase out of HCFCs for some sectors for a limited time, could be a useful start. A few developing countries wondered if this agenda item could be interpreted more broadly, to discuss guidance encouraging the Multilateral Fund to support leapfrogging to cleaner technology, a more expensive option today, but cheaper than supporting a double transition.

Energy efficiency, a concern introduced during the Kigali negotiations, has proven to be an area of growing focus for Article 5 parties; one that is likely to remain on the agenda for some time, because the issue is potentially divisive, relatively new (to the Montreal Protocol), and linked to ongoing efforts under the climate change regime. The MOP requested the TEAP produce a report on technology options and requirements for energy efficiency while phasing down HFCs, including challenges to their uptake, long-term sustainable performance and

viability, environmental benefits, capacity-building requirements, and related costs. Prior to OEWG 40, delegates took part in a workshop to discuss the opportunities to improve energy efficiency while phasing down HFCs. With this information, Article 5 and non-Article 5 parties found ammunition to develop their arguments, signaling the possible fault lines in the Protocol’s future.

Article 5 parties underlined their need for technology transfer; namely, the absence of funds and of a roadmap for capacity building to support end users and train local technicians. Some highlighted specific and unique challenges faced by developing countries, including the turnover of (often foreign) technicians, and incompatibility of some refrigeration, air conditioning, and heating equipment with their grids, particularly for HAT countries. Other fundamental challenges identified by several Article 5 parties were the complexities of establishing effective policies and regulations to support the transition to more energy-efficient equipment. Without proper mechanisms in place, many countries forewarned of the likelihood of transboundary movement of less energy-efficient equipment. Given the many concerns highlighted, some developing countries hoped that discussions would progress to specifics, and address the “on the ground realities.”

Non-Article 5 parties sought a narrower definition of the issue, focused on carving a niche for the Montreal Protocol among the many climate change-focused institutions already addressing energy efficiency. Several maintained there are already existing financial support mechanisms. Pointing to messages from the workshop that refrigerant choice has a marginal influence on energy efficiency, and on the efficacy of technician training for servicing existing equipment, some non-Article 5 parties suggested that only a few activities could lie within the purview of the Protocol’s Multilateral Fund while other funds and bodies were better placed to address countries’ energy efficiency needs.

OEWG 40 served as a launching pad for issues that will remain important for the Montreal Protocol’s work on HFCs in the future, but also draw upon the Protocol’s existing institutions. By starting to generate ideas on HCFC and HFC linkages, parties began to think about how existing rules such as adjustments to the phase-down schedules, or compliance deferrals could help parties to meet their obligations. The role of the Multilateral Fund, and how to use that institution, was a common theme as parties collectively grapple to envision the future of the Protocol as it phases down HFCs and contributes to addressing climate change, as well as repairing the ozone layer.

### ***Leveraging Commitment***

As a body designed to engage with the scientific and technical experts it relies upon for advice, and to share views on financial issues, parties left OEWG 40 with a wealth of information. Some of these reports and exchanges were expected and will position the MOP to adopt the decisions on data reporting and destruction technologies before the Kigali Amendment enters into force. For energy efficiency and linkages, the discussions further delineated technical and political challenges that parties will continue to face as the Protocol tries to successfully phase down HFCs.

Unexpectedly, evidence that the gains made in phasing out CFC-11 may be in jeopardy, prompted delegates to act quickly, demonstrating both flexibility and resolve. These characteristics will both be required heading to MOP 30, and soon, to the implementation of the Kigali Amendment, to safeguard both past and future success.

## Upcoming Meetings

### Climate Action Pacific Partnership (CAPP) Conference II:

The conference is organized by the Fijian Presidency of the 23rd session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). Its aim is to help mobilize the partnerships and investment needed to accelerate climate action in the Pacific, in support of the more ambitious target of keeping the global temperature increase to within 1.5°C and to achieve net-zero emissions as soon as possible. The meeting will seek to: showcase and discuss the various opportunities and challenges in the Pacific in accelerating climate action; present Pacific issues, including high-level messages from participating Pacific leaders, to the UNFCCC Talanoa Dialogue; and firm up the Pacific climate action plans for the thematic areas. **dates:** 25-27 July 2018 **location:** Suva, Fiji **contact:** CAPP **email:** capp@cop23.com.fj **phone:** +679-321-6761 **www:** <https://cop23.com.fj/capp-2018/>

### Latin American and Caribbean Climate Week:

Latin American and Caribbean Climate Week (LACCW2018) is designed to advance regional climate action. The aim of LACCW2018 is to support implementation of countries' Nationally Determined Contributions under the Paris Agreement on climate change and action to deliver on the SDGs. LACCW2018 will focus on market-based approaches, economic instruments and climate-aligned finance to drive investment in climate action. Other events include: high-level sessions with the Champions of the Marrakech Partnership; a high-level ministerial; a low emissions development strategy workshop; a regional technology meeting on industrial energy efficiency; and the LAC Talanoa Dialogue. **dates:** 20-23 August 2018 **location:** Montevideo, Uruguay **contact:** Nairobi Framework Partnership <https://nfpartnership.org/contact/> **www:** <https://nfpartnership.org/latin-american-caribbean-climate-week/>

### Eleventh Meeting of the OEWG of the Basel Convention:

The OEWG is expected to discuss, *inter alia*: the Convention's strategic framework, technical guidelines, the review of annexes, the Basel Convention Partnership Programme, and new agenda items on marine plastic litter and micro-plastics and waste containing nanomaterials. **dates:** 3-6 September 2018 **location:** Geneva, Switzerland **contact:** BRS Secretariat **phone:** +41-22-917-8271 **fax:** +4-22-917-8098 **email:** [brs@brsmeas.org](mailto:brs@brsmeas.org) **www:** <http://www.basel.int>

### Bangkok Climate Change Conference:

This conference will resume the work of the issues related to the Paris Agreement Work Programme. **dates:** 4-9 September 2018 **location:** Bangkok, Thailand **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** [secretariat@unfccc.int](mailto:secretariat@unfccc.int) **www:** <http://unfccc.int/>

### Fourteenth Meeting of the Rotterdam Convention

**Chemical Review Committee:** The Chemical Review Committee (CRC13) will review chemicals and pesticide formulations for possible listing under Annex III of the Rotterdam Convention. **dates:** 11-14 September 2018 **location:** Rome, Italy **contact:** BRS Secretariat **phone:** +41-22-917-8218 **fax:** +41-22-917-8098 **email:** [brs@brsmeas.org](mailto:brs@brsmeas.org) **www:** <http://www.pic.int>

**Global Climate Action Summit:** Convened by California Governor Jerry Brown and the US State of California, the Global Climate Action Summit will bring leaders from government, business, and the global community to inspire greater global ambition to act on climate change. **dates:** 12-14 September 2018 **location:** San Francisco, California, US **email:** <http://globalclimateactions summit.org/contact-us/> **www:** <https://globalclimateactions summit.org/2018>

### Fourteenth Meeting of the Persistent Organic Pollutants

**Review Committee:** The Persistent Organic Pollutants Review Committee (POPRC-14) will review the possible listing of hazardous chemicals under the various annexes of the Stockholm Convention. **dates:** 17-21 September 2018 **location:** Rome, Italy **contact:** BRS Secretariat **phone:** +41-22-917-8729 **fax:** +41-22-917-8098 **email:** [brs@brsmeas.org](mailto:brs@brsmeas.org) **www:** <http://www.pops.int>

**48th Session of the IPCC:** The IPCC's 48th session will meet to approve the Special Report on Global Warming of 1.5 °C.

**dates:** 1-5 October 2018 **location:** Incheon, Republic of Korea **contact:** IPCC Secretariat **phone:** +41-22-730-8208/54/84 **fax:** +41-22-730-8025/13 **email:** [IPCC-Sec@wmo.int](mailto:IPCC-Sec@wmo.int) **www:** <http://www.ipcc.ch>

### 30th Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer:

The 30th Meeting of the Parties will consider a number of issues, including entry into force of the Kigali Amendment. **dates:** 5-9 November 2018 **location:** Quito, Ecuador **contact:** Ozone Secretariat **phone:** +254-20-762-3851 **fax:** +254-20-762-0335 **email:** [ozone.info@un.org](mailto:ozone.info@un.org) **www:** <http://ozone.unep.org/en/meetings>

### 82nd Meeting of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol:

The Multilateral Fund (MLF) Executive Committee will continue to look at reports with specific reporting requirements and status of contributions and disbursements. **dates:** 3-7 December, 2018 **location:** Montreal, Canada **contact:** MLF Secretariat **phone:** +1-514-282-1122 **fax:** +1-514-282-0068 **email:** [secretariat@unmfs.org](mailto:secretariat@unmfs.org) **www:** <http://www.multilateralfund.org/>

For additional upcoming events, see <http://sdg.iisd.org/>

## Glossary

CFCs	Chlorofluorocarbons
CFC-11	Trichlorofluoromethane
CRP	Conference Room Paper
DRE	Destruction, removal, and efficiency
ExComm	Executive Committee (MLF)
GWP	Global Warming Potential
HAT	High ambient temperatures
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
HTOC	Halons Technical Options Committee
ICAO	International Civil Aviation Organization
IEA	International Energy Agency
IMO	International Maritime Organization
MBTOC	Methyl Bromide Technical Options Committee
MCTOC	Medical and Chemicals Technical Options Committee
MEPS	Minimum Energy Performance Standard
MLF	Multilateral Fund
MOP	Meeting of the Parties
MoU	Memorandum of understanding
ODS	Ozone depleting substances
OEWG	Open-ended Working Group
QPS	Quarantine and pre-shipment
RACHP	Refrigeration, air-conditioning and heat-pump
SAP	Scientific Assessment Panel
SDGs	Sustainable Development Goals
SMEs	Small- and medium-sized enterprises
TEAP	Technology and Economic Assessment Panel
TOC	Technical Options Committee
UNEP	United Nations Environment Programme