

Brief Summary of Workshop on the Future of the Montreal Protocol

(Helsinki, October 2019)

Updated 21.2.2023

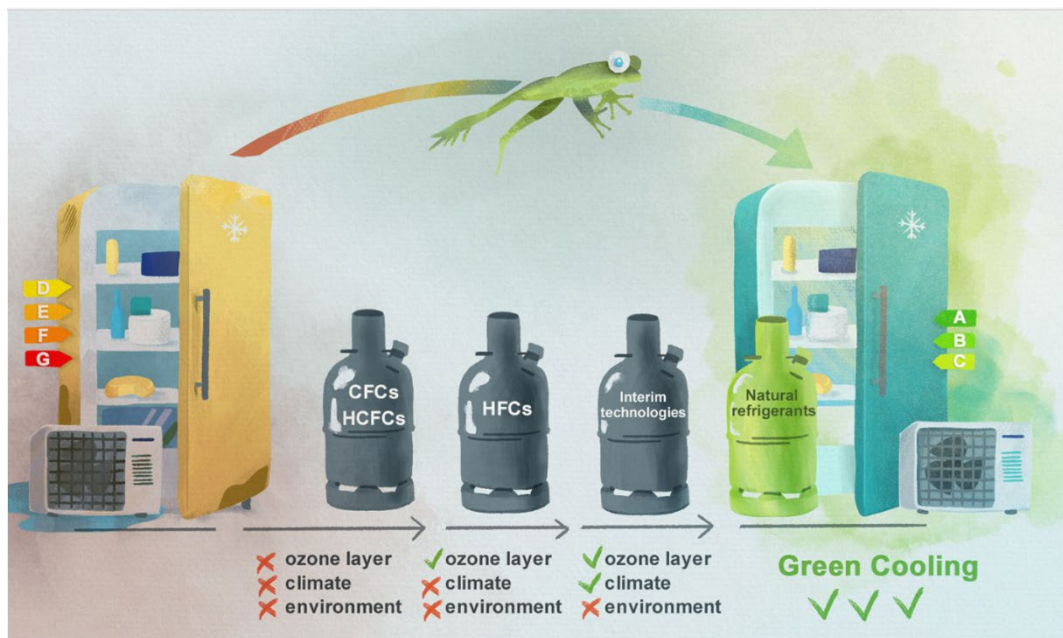
Foreword

This summary is updated from a version, which was sent to NEM before the MOP34. The purpose of this summary is to serve as an information package for the upcoming EU's Future of the Montreal Protocol workshop. It includes information from results of the MOP34 (November 2022), ExCOM91 (December 2022), SAP's Quadrennial Assessment 2022 (published in January 2023) and other scientific literature.

The summary presents only those environmental goals, which were prioritized in the Future of the Montreal Protocol -workshop of 2019 in Helsinki. Since then, **some new threats to the ozone layer have emerged**. Some of them are man-made direct threats, such as emissions of new CFC-species reported by SAP, while others are indirect, caused by global warming, like pyrocumulonimbus fires in Australia and Western coast of USA. Some of the threats are caused by natural phenomena, like the eruption of under ocean surface volcano Hunga-Tonga Hunga Ha'apai¹ in the Pacific, both sending incredible masses of particles (and the latter, water vapour) to the stratosphere.

In this point of time, it should be clear for all Parties of the Montreal Protocol (MP) that there are **significant linkages between ozone depletion and global warming**, but the mind-blowing manifoldness of these linkages may not be as clear. Luckily, we do get constantly excellent information and advice from our scientific and expert organizations (SAP, EEAP and TEAP as well as ORM) and we in the EU as decision makers also value them very highly (according to results of our questionnaire for the Helsinki workshop the most important success factor for MP was: *"Science based decision making (conveyance of scientific information to the decision making by ORM-meetings, assessment panels and mandating of panels by MOP's)"*).

The MP widened its scope with the Kigali amendment as it started purposely to target HFCs due to their high global warming potential (GWP) even though they are not ozone depleting gases. While doing so, MP became **both an ozone and a climate treaty** – a Multilateral Environmental Agreement (MEA) with a mandate to tackle both of these global scale atmospheric environmental problems. While doing so, the MP will be able to avoid an additional 0,4 C of global warming (in addition to the even larger earlier climate impacts as side effects of phasing-out ODS's). Now as the Kigali implementation plans are flowing into the MLF secretariat for ExCom decisions, it is timely to think about what are the next steps in the MP- does MP need to widen its scope again and set new targets for implementation in order not to create new problems? See picture 1.



Picture 1. Implementation of the Kigali amendment is ongoing in A2-countries and will start in 2024 in A5-countries. Kigali Implementation Plans (KIPs) are flowing in to MLF for ExCom decision making during 2023. At the same time, a growing concern of accumulation of break down product trifluoroacetic acid (TFA, $\text{CF}_3\text{CO}_2\text{H}$) to ground waters of Europe, emanating from interim solutions, mainly HFO's has entered into EU decision making in the form of the REACH- restriction proposal on PFAS, as TFA is considered a short chain PFAS. Also, the currently ongoing energy transition means a vast global phase-in of heat pumps, to ten-fold from the current installed capacity of 180 million heat pumps to 1800 million, by 2050 (IEA 2022) – therefore it matters, which substances are used in equipment and how energy efficient they are.

The Director general of UNEP, Inger XXXXXXXXXX, praised the achievements of the Montreal protocol and its funding mechanism, the Multilateral Fund, and urged us to tell about the achievements and mechanisms to decision makers internationally and in our countries in order to impact other MEA's. That is certainly useful, but the MP is not perfect either, as we have seen during the CFC-11 crises and as several other ongoing emission problems from chemical industries related to the production or feedstock use and by-products of these. We may also like to learn from good practices of other MEA's and/or to join forces with them and their funding mechanisms in order to gain cost-effective and larger scale ozone, climate and environmental benefits.

The CFC-11 -crisis sparked internal discussions within the MP community on the performance of MP institutions and need to enhance performance of institutions and procedures. In the report of the Helsinki – workshop, institutional issues were also discussed (for details, see workshop report). Since then, several important **decisions to enhance performance of some functions, like monitoring and institutions and procedures within the MP have advanced**, for example:

- Decision XXXIII/4: Enhancing the global and regional atmospheric monitoring of substances controlled by the Montreal Protocol,
- Decision XXXIV/5: Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring,
- Decision XXXIV/8: Strengthening Montreal Protocol institutions, including for combatting illegal trade
- Decision XXXIV/11: Composition, balance and workload of the Technology and Economic Assessment Panel and its technical options committees

The world evolves around us, new challenges arise, luckily also some of the older threats are solved and institutions to tackle new problems are established. In the sphere of Multilateral Environmental Agreements, a mandate to negotiate a Plastic Treaty under UN framework was decided in March 2022 and negotiations on establishing a legally binding treaty to prevent plastic pollution is underway. This may sound far fetched from the scope and point of view of the Montreal Protocol, but surprisingly many linkages are there as many of the plastics and their raw materials use refrigerants as feedstock, which was brought up in an article of some veterans of the Montreal protocol (Anderssen, et. al. 2021)^[i].

The informal workshop in Stockholm is a continuation of earlier strategic workshops. It gives us an opportunity to stop and think about the world on a little longer perspective than in busy day-to-day working life. In Helsinki, our goal setting was on a mid-term perspective of 15 years ahead. If we apply the same time perspective, it would mean a timeframe from 2023-2038, which allows us to think “out-of-the box” and not to limit us too much with arguments related to anticipations on what some countries are willing to accept currently, or limitations on what we have done before, or arguments related to current financial resources. These realities come later in the process.

Part I: Summary

A workshop on the Future of the Montreal Protocol was organized in Helsinki during the Finnish presidency in October 2019 in order to provide us with the possibility to discuss in an informal setting, not presenting official country positions, but to discuss as experts on how we can keep up with our high ambition, and what are the issues we would like to focus on in the timeframe of the next 10-15 years.

We need to stay vigilant to safeguard earlier achievements, as the “unexpected and persistent increase in global emissions of ozone-depleting CFC-11” showed us. Unfortunately, since then also other new large emission problems have emerged, which indicates that the CFC-11 -problem might have not been an isolated case, but a symptom of a larger systemic problem. The Montreal Protocol has been praised as the most successful Multilateral Environmental Agreement (MEA), but in order to stay such, its institutions may need to be further developed.

In the workshop, both future goals, from the point of view of environmental benefits, and needs for institutional development, were discussed in order to prepare ourselves better for the surprising challenges of the future and keep the initiative in our hands. This is a very brief summary of the discussion. Participants from Austria, Belgium, Croatia, Czech Republic, Estonia, Finland, France, Germany, the Netherlands, Poland, Sweden, the United Kingdom, and the EU commission attended the two-day workshop. The workshop report (**meant for EU internal use**) was shared with the EU National Experts. Please let us know if you would like to get a copy of the workshop report, which includes summaries of discussion, background information on different topics under the Montreal Protocol and the responses to a pre-questionnaire on the performance of the Montreal Protocol and its institutions, which was sent out to the Member States National Experts group on 10.10.2019.

Priorities for the future work of the Montreal Protocol

The result of the prioritization, from an environmental point of view, of areas to be emphasized in the work of the EU under the Montreal Protocol in next 10-15 years was the following, **in order of priority**:

1. HFC leap-frogging
2. CFC-11 and other ODS incl. halons
3. Energy efficiency
4. CTC (feedstock, by-production, process agent use)
5. Other GHGs (e.g. N₂O, SF₆, NF₃, PFCs)
6. Banks (ODS and F-gas)
7. MeBr and other exempted uses

8. New non-controlled ODS substances (incl. VSLS)
9. Halon stocks
10. Solar radiation management and supersonic flights

After prioritization, draft road maps to reach goals within the six most highly prioritized areas were prepared in small groups and presented to the rest of the group. Possible ways forward that came up in the discussions for each theme were (note: based on the situation in 2019):

HFC leap-frogging

A possible way forward could be to aim to set up a policy framework and guidelines for early movers to allow them to leapfrog over HFC's to more environmentally friendly alternatives with the help of MLF funding. A starting point could be a Conference Room Paper (CRP) on that matter.

This framework would also include a set of best practices of non-A5 Parties (industrialized countries), like actions to promote uptake of alternatives through several measures like training of the service sector, supporting drafting, harmonizing, and implementing safety standards as well as sharing best practices, like Green Public Procurement criteria, eco-labelling and support to changes to national procurement legislation to enable usage of GPP-criteria and labeling in procurement.

CFC-11 and other ODS

The first step would be to see what comes up in the SAP follow-up report on CFC-11 at the next MOP and make further conclusions on necessary actions based on that. Especially identification of gaps in atmospheric monitoring is expected in that report. The EU could establish a strategy on how to enhance global monitoring and communicate these goals with key parties. In parallel, at the next OEWG a Conference room paper (CRP) on the new emissions of HFC-23 could be made. In that TEAP and SAP could be requested to look further into the issue. Also, co-operation with Paris agreement institutions on HFC-23 emissions should be established and exchange of information started/strengthened. On prevention of illegal trade, it was suggested that better information exchange would be established between countries and that iPIC, a system of informing of and getting approval from recipient country on attempt to export hazardous substances prior to shipment, would be made mandatory for controlled substances of the MP. It was also suggested that compliance procedures of the MP should be revised.

Energy efficiency

Several decisions have been made in MOP's and at the ExCom so far. Energy efficiency work at this stage is largely evolving in the ExCom, especially in connection with the development of HFC cost guidelines. To what extent EE improvements will be taken into account in the HFC cost guidelines as criteria for funding, is a crucial question and constituencies consisting of EU member states should coordinate their efforts at the ExCom on criteria development.

At the MOP level efforts could be made to prevent dumping of energy inefficient technologies to A5 Parties. Also the Ozone Secretariat and ExCom Secretariat should be encouraged to start cooperation with Climate Funding Institutions, especially those which concentrate on EE, to form suitable mechanisms for co-funding of projects.

Also decisions on further support to develop national energy efficiency standards and legislation, building management, maintenance of equipment and technical development of more "intelligent" equipment could be useful.

CTC and emissions of CTC

It would be important to find a common understanding within the MP community on the necessity of enhancing regional atmospheric monitoring of CTC emissions near those locations which have chloromethane and/or CTC production plants. It would be equally important to gather and share data on emission factors of different processes and even individual plants as well as tracking the routes, fate/next point of usage/end use of CTC. Any ongoing and future negotiations should target at least those aspects.

Other greenhouse gases under the Montreal Protocol

The way forward could be started through attaining more information on the monitoring of these substances as well as costs of production of suitable alternatives. These could be formulated first as requests for ORM, SAP and TEAP, followed by discussions within the MP negotiations on possible amendment to the Protocol targeting to universal ratification of the amendment.

Banks

A way forward could be starting discussions with the Ozone Secretariat on possibilities for the MP to join hands with other MEA's. The Ozone Secretariat could start discussions with other secretariats (Basel, Stockholm, Rotterdam and Minamata as well as climate). In parallel, the TEAP could be requested to make an assessment on recovery and destruction of banks; technical options for collection, costs, and cost sharing of different phases, especially collection of ODS/F-gas banks together with other hazardous substances, estimates of enabling activities needed by A5 Parties.

Institutional strengthening of the Montreal Protocol

When asked to name factors that have contributed to the **success** of the Montreal Protocol, the **funding mechanism (MLF)** and **compliance-related support to developing countries** as well as **science-based policy making** were the two most important factors. Also, the **urgency of the environmental problem** and **high political commitment and support** were mentioned several times.

There were many suggestions for improvement of support and synergy of the institutions to the Montreal Protocol, related e.g., to technical and scientific advisory bodies, Ozone Research Managers, the Implementation Committee, the MLF ExCom and Secretariat, the Ozone Secretariat, the MOPs and the multilateral implementing agencies. Suggestions for improvement of procedures, processes and mechanisms were related e.g., to licensing and trade, control of HFCs, the funding mechanism and reporting and data collection.

It was highlighted that the word “monitoring” can be understood in several different ways. e.g. monitoring of the state of the ozone layer; monitoring of concentrations (abundances of gases, mole fractions) in the atmosphere in global and regional levels; measuring of emissions of gases; reporting and verifying of consumption and production; reporting and verifying of exports and imports or auditing of the results of the MLF-funded projects and programmes.

Other points from the discussions related to institutions were ensuring that TEAP has enough expertise on the new tasks related to the phase-down of HFCs and not-in-kind technologies, being prepared for the discussion on reconsideration of A5 status and consideration on frequency of the meetings.

Time and a possibility to continue discussions on the institutional issues seems to be needed in the future.

Part II: State of the play since 2019

Please find below a very rough preliminary notes (for you to complement), on where and how far we have advanced with our priorities and what has happened in the areas of prioritized issues from October 2019 until today:

1. HFC leapfrogging

Much of this discussion has moved to ExCom, where leapfrogging has started by funding of enabling activities. Now cost guidelines are under preparation. Kigali Implementation Plans of countries (KIP's) have started to flow into the secretariat for consideration of Executive Committee.

COM has done great work on the goal of “harmonizing and implementing safety standards” by organizing a side event on that in 2019 (MOP31). Current situation is that some standards have been renewed, allowing larger fill of natural flammable refrigerants in significantly wider range of equipment than earlier and creating a conducive environment for further uptake of natural refrigerants.

Green Public Procurement criteria have been published by Nordic Council of Ministers (as a result of a project commissioned by Nordic ozone and f-gas group. This has been presented in side-event of OEWG (or MOP) in 2021. See criteria report here: <https://www.norden.org/en/publication/nordic-criteria-green-public-procurement-gpp-alternatives-high-gwp-hfcs-rac-products>

Most importantly: In the EU-level COM has drafted a new F-gas regulation, which aims for leapfrogging (=accelerating from Kigali targets).

Some of the remaining questions/issues:

- The consumption trends of HFC's in several A5 -countries seem to be higher than expected, which may lead to difficulties in meeting their first HFC phase-down compliance goal (freeze in year 2024 for Group 1 Article 5 Parties. [A Study on the Impacts of HFC Consumption Trends in Article 5 Countries | Climate & Clean Air Coalition \(ccacoalition.org\)](#)
- How to promote and incentivize transition to natural refrigerants in leap-frogging?
- We may need to re-define what is leap-frogging – a fast-tracking to low GWP-refrigerants in general or only to natural refrigerants or only to non TFA-producing refrigerants

2. CFC-11 and other ODS incl. halons

EU made a CRP on emissions of CFC-11. It was later joined with the similar CRP from the US and it resulted to:

- o Decision XXX/3: Unexpected emissions of trichlorofluoromethane (CFC-11)
- o Decision XXXI/3: Unexpected emissions of CFC-11 and institutional processes to be enhanced to strengthen the effective implementation and enforcement of the Montreal Protocol

Through these decisions and decisions in the ExCom and negotiations in corridors with Chinese colleagues Montreal protocol institutions made great progress to help China to get unexpected emissions in control.

As a result, China has made more than 1300 environmental inspections on illegal production sites, punished the culprits and committed to keep the emission in control.

Scientists have reported that CFC-11 -emissions in the 2 North-East regions of China have ceased or reduced significantly. Scientists have also reported that CFC-11 -emissions globally have come down to pre-crisis reduction path.

Some of the remaining questions/issues:

- How can Montreal protocol institutions ensure that CFC-11 emissions stay in control?
There are some important advancements since 2019:
 - o Decision (see above) on global and regional monitoring, which was negotiated during covid -isolation in on-line MOP and in MOP34
 - o UNEP pilot project, funded by the EU Commission
- How to enhance monitoring of controlled and non-controlled substances also in the vicinity of chemical industrial plants, which produce and use substances for feedstock uses. We may like to plan preliminary ideas for next steps following from *Decision XXXIV/ 5: Identification of gaps in the global coverage of atmospheric monitoring of controlled substances and options for enhancing such monitoring, and TEAP report in next OEWG*
 - o Decision SAP has reported that there are unexpected emissions of also other CFC's and CTC (as could have been expected 😞)
- How to tackle the unexplained new emissions of CFC-species (CFC-13, 112a, 113a, 114a, 115) which SAP reported having increasing concentrations in atmosphere (SAP 2022). China answered to our questions in production sector sub-group of ExCom91 on monitoring that they have started to monitor also these species and will make the data available for us. We might like to make CRP on these emissions in some stage?

3. Energy efficiency

The world is in dire straits with energy; current fossil fuel based energy production is main reason for global warming. Emissions of methane and CO₂ are still rising despite ongoing intensive negotiations under Paris agreement.

Despite the unsuccessful outcome of negotiations under UNFCCC/Paris agreement, green energy transition is underway in many parts of the world, especially in the EU. The war in Ukraine has created a gap between supply and demand on energy globally, which is elevating the prices of energy. Simultaneously a transformation from fuels to electricity takes place as costs of renewable electricity production, such as solar and wind power, are coming down significantly. In European perspective energy efficiency and renewable energy production as well as new technologies to store energy are necessary means for resiliency during the process of reducing consumption of fossil energy.

In many developing countries energy efficiency is a crucially important way to reduce unnecessary demand and reliance on imported fossil fuels. In many A5-countries, e.g. India and many African countries a growing number of new urban inhabitants (In India 500 million by 2050) need cold chain and room cooling for decent life. For these countries EE of applications become increasingly important.

All this leads to massive amount of heat pumps entering to the market (according to IEA, from 180 million installed capacity to 1800 million globally, by 2050). The world cannot afford phase in of energy inefficient technologies, which use harmful refrigerants.

There are several decisions on the EE approved by the parties since Kigali. The discussion on EE has largely moved to the ExCom, where criteria for pilot projects were recently discussed, based on decision XXVIII/. Some EE-requirements have been traditionally part of the MLF-projects, but there has not been separate funding for EE-activities.

ExCom91 decided to establish a funding window for pilot projects in the amount of US \$20 million with the possibility of augmenting that funding window at a future meeting to maintain and/or enhance energy efficiency in the context of HFC phase-down as specified in decision XXVIII/2 (Decision 91/65).

Some seeds, ideas/discussion points for mid term-long term thinking on how to handle EE-issues:

- Most of the implementation of EE-measures are still to come. What kind of combination of measures would be needed?
- What would a funding window for EE mean and how much it could cost and which sectors and activities it should cover?
- What is the role of other bigger climate funding institutions? How could they cooperate better with MLF? (See the related ExCom documents)
- How to stop exports and import of Energy inefficient technologies to A5-countries?
- Would we need to rethink what is included in compliance? Could compliance be divided in various nested spheres, like core compliance, complementary compliance (like enabling activities, disposal, EE) and maybe even collective compliance to cover measures to ensure that the whole MP system is in compliance. This applies to many other goals, like illegal production and consumption, observed by enhanced monitoring, for example.

4. CTC (feedstock, by-production, process agent use)

Switzerland submitted a CRP in 2018 on CTC originally targeting in narrowing down discrepancies between observed atmospheric concentrations of CTC (and modelled emissions) and what has been estimated through bottom-up reporting.

A new EU CRP was submitted before OEWG in July 2022, aiming to get better control on wider variety of emissions from production of controlled substances also from feedstock production, process agent use and from by-products, especially HFC-23. In the OEWG it was moved to the same contact group than Swiss CTC CRP even though it was presented under “global and regional monitoring”. Additionally Australian CRP on by-product HFC-23 was presented under “institutional development” agenda point.

After heavy negotiations all three CRP’s went through and related decisions were made – not in optimal form, but they opened a possibility to advance further once relevant information, requested in decisions, is received.

In 2021, MP veterans published an article on [“Narrowing the exemptions of feedstock uses”](#), where they suggest that the MP mechanisms could be used to tackle also production of feedstock-derived plastics, which would complement downstream efforts to mitigate plastic pollution through reduction, recycling, and clean-up programs and would provide a further economic incentive for innovation to find substitutes for plastic.

Some of the remaining questions/issues:

- How can we advance monitoring of emissions from feedstock production? Obviously emissions are higher than estimated and the amount of total chlorine in the atmosphere comes down slowly
- How can we enhance control of other chloromethanes as CTC is not the starting point of many, even majority of feedstock uses, as for example HCFC-22, which is product of chloroform as a feedstock (NOT CTC) and leads to production of tens of MP-controlled substances and blends as well as raw materials for plastic production and even raw materials of products like Teflon-pans and medicines?
- How to spread best practices and Best Available Techniques in controlling emissions from feedstock production of CTC and other controlled and maybe also some uncontrolled but important substances?

5. Other GHGs (e.g. N₂O, SF₆, NF₃, PFCs)

Dr. [REDACTED], a former SAP co-chair published a paper in Nature (2011), in which he stated that emissions of Nitrous oxides (N₂O) are the most important emissions, which cause ozone depletion in this

century. N₂O is stipulated in Paris agreement, but no special emphasize is given currently to mitigation measures of such substances, which cause more than one environmental problems (N₂O actually causes global warming, ozone depletion, eutrophication and acidification)

SF₆, used in electronic switchgear to alter the voltage levels from production consumers via distribution networks. Global emissions are in rise, but feasible alternatives to SF₆ have recently been introduced. These developments will be reflected in the new F-gas regulation.

The global mole fractions of many non-ODS, non-HFC, highly fluorinated substances have continued to grow (e.g., sulfur hexafluoride (SF₆), carbon tetrafluoride (CF₄), hexafluoroethane (C₂F₆), sulfuryl fluoride (SO₂F₂), and nitrogen trifluoride (NF₃). These species contributed 0.014 W m⁻² to anthropogenic radiative forcing in 2020 (SAP 2022).

In the upcoming renewed EU F-gas regulation it is expected that restriction on SF₆ will be introduced as alternatives are nowadays found in the market.

Some of the remaining questions/issues:

- In MOP34 a side event was held on N₂O, in which inclusion of that gas to MP was suggested
- In the discussion and decision making on mitigation measures of climate gases, should emissions of N₂O be emphasized somehow?
- Should SF₆, NF₃ and/or PFC's be included in the MP?

6. Banks (ODS and F-gas)

ODS Banks have not been stipulated by the MP, but there are several decisions on ODS-banks, most of which never obligated parties for serious implementation. That may be one of the biggest remaining “low hanging fruits” to attain more ozone and climate benefits (see picture 2), GIZ has estimated the emissions from ODS-banks only are around 1,5 gigatonnes per year. On top of that comes currently accumulating HFC-banks (and other F-gas banks)

The most important of those earlier decisions was Decision xx, which requested ExCom to fund pilot projects, which also happened. MLF/ExCom funded several pilot projects on the collection and disposal of ozone banks. An overview of the pilot ODS disposal projects were published as Annex I of document UNEP/OzL.Pro/ExCom/89/9.). Some of the projects were assessed not to be successful, but that has been done by applying to somewhat arbitrary threshold levels related only to ODP-values. In current understanding many of the projects can be considered as “successful” if avoided emissions are calculated with GWP-values. A general opinion of the Executive committee was that lessons should be learned from earlier pilot projects and new ones should be established only after proper inventory and plan for the collection, transport and disposal

In Kigali a decision XXVIII/2 MOP decided “To request the Executive Committee to consider funding the cost-effective management of stockpiles of used or unwanted controlled substances, including destruction. A discussion on banks, based on that MOP decision started in 78th ExCom and eventually resulted in ExCom90 in June 2022 ((DECISION 90/49(C))to make criteria for pilot projects on disposal. Finally the ExCom91 decided to establish a funding window for the preparation of national inventories of banks of used or unwanted controlled substances and a plan for the collection, transport and disposal of such substances, including consideration of recycling, reclamation and cost-effective destruction;

In the commission's **documentation related to the renewal of ODS-and F-gas regulations** the role of ODS - banks mitigation was emphasizedⁱⁱ. See Commission staff working document:

According to SAP currently 50% of the banks consist about CFC' and HCFC's and 50 % on HFC's

Some of the remaining questions/issues:

- Within EU: requirements of handling of ODS banks to be included in the ozone regulation and F-gas regulation Could F-gas banks be collected, regenerated/destroyed in the same time through same mechanism?
- What kind of obligations to the parties could be required to manage ODS- and F-gas banks properly?
- Should a funding window be established for the disposal of ODS and F-gas banks, not only on inventory and plan?
- What is the role of ODSF-banks in the whole picture of refrigeration management?

7. MeBr and other exempted uses

Methyl bromide is used mainly for totally different purposes than other ODS's, namely, to kill pests in the fields and crops (so called essential uses) and in wood based products shipped abroad in containers (Quarantine and pre-shipment uses (QPS), which are exempted from controls (reduction measures), but not from reporting)

EU does not use MeBr for either of these uses and has encouraged first and later insisted other countries to follow suit as obviously alternatives exist

Emissions from QPS uses are currently exceeding emissions from other uses. EU drafted a CRP to establish controls on QPS uses and reporting on MeBr stocks.

SAP states that stopping QPS uses of MeBr would speed up the recovery of the ozone layer by 2 years.

The EU drafted a CRP to establish controls on QPS uses and reporting on MeBr stocks and based on it and negotiations in the contact group, MOP34 made decision Decision XXXIV/10: Stocks and quarantine and pre-shipment uses of methyl bromide. In the decision, MOP 34 invites parties to submit to the Ozone Secretariat, on a voluntary basis, by 1 June 2023:

- a list of the pest and commodity combinations in which methyl bromide is needed or used in their respective countries; and
- accessible data on the volumes of pre-phase-out methyl bromide stocks at the country level to the Ozone Secretariat by 1 June 2023.
- MOP 34 also:
 - includes the issue of methyl bromide stocks on the agenda of OEWG-45;
 - requests the TEAP and its MBTOC, in consultation with the Secretariat of the International Plant Protection Convention, to provide updated information, as part of its progress report to OEWG 45, on current quarantine and pre-shipment uses for which alternatives are available; and
 - invites parties to take into account the standards and guidelines under the International Plant Protection Convention in their national processes and to consider the potential for uptake of practices to minimize the use of methyl bromide
- SAP states that stopping QPS uses of MeBr would speed up the recovery of the ozone layer by 2 years.
- In 2021, MP veterans published an article on “Narrowing the exemptions of feedstock uses”, where they suggest that the MP mechanisms could be used to tackle also production of feedstock-derived plastics, which would complement downstream efforts to mitigate plastic pollution through reduction, recycling, and clean-up programs and would provide a further economic incentive for innovation to find substitutes for plastic.

Some of the remaining questions/issues:

- Remaining essential use nominations are very small, but symbolic. How to end these exemptions finally?
- How to get control on MeBr stocks?
- How to end QPS uses of MeBr?
- What to think about the article of veterans – using MP amendments and adjustments as tools to limit production of plastics? What are the possible links between the new [plastic pollution treaty](#) and the MP?

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- What are the possible links between the new plastic treaty and the MP?

8. New non-controlled ODS substances (incl. VSLS)

- Specially dichloromethane emissions have significance
- In the summary of SAP assessment report 2022, it is stated that controlling dichloromethane would speed up the recovery of the ozone layer by 2 (or 4 years)
- in a recent study significant emissions of bromoform are suggested to emanate from cow fodder supplement, which is aimed to reduce methane emissions from ruminants

Some of the remaining questions/issues:

- How to control emissions of dichloromethane?
- Do we need to ask more information from SAP on risks of potential bromoform emissions from cow food supplement (to avoid methane emissions from ruminants)? Would we need to use DNSH -principle in this or related approaches?

9. Halon stocks

The idea is to avoid starting of new production of halons as they are super ODS's, the most impactful ozone depleting gases. The problem is mainly in aviation industry (cargo compartments and engine nozzles), elsewhere alternatives exist already. New alternatives discussed recently in ICAO Assembly based on report delivered also to HTOC by FI.

In the MOP34 this item (UNEP/OzL.Pro.34/2) was introduced again, noting the May 2022 TEAP report on halon availability. The document was considered helpful in guiding domestic action to manage halon stocks. Consideration of the item was closed.

10. Solar radiation management and supersonic flights

In the fear of runaway climate change, which could accelerate and get out of hands of humankind and cause a large scale catastrophe, radiation management has been suggested by injecting reflective substances to stratosphere in order to inhibit solar radiation to enter the troposphere.

Solar radiation management have been discussed in some international for a, like UNEA in recent years, but never been discussed the MP before. Now in the summary of the recent SAP assessment a whole chapter was dedicated to solar radiation management under title “Stratospheric Aerosol Injection (SAI) and potential impacts on ozone”. SAP also organized a side event on SAI during the MOP34. SAI was introduced as means to cut the peak warming before climate actions start to have expected impact. A term “peak shaving” was used for that purpose.

Some companies/institutions are willing to have pilot tests to measure how it would work (see e.g. go.nature.com/3xvcb) and some parties might like to discuss the topic up in the upcoming OEWG and MOP or later.

Some remarks:

- Discussed in SAP summary, side-event in MOP: https://ozone.unep.org/meetings/thirty-fourth-meeting-parties/side-events?arg_1=2022-11-02
- Science and modelling ok, practical tests- are they needed? Are they harmful for ozone layer? What are the risks?
- There are “nature’s own” tests going on because of Hunga-Tonga Hunga Ha’apai eruption and unseen pyromulonimbus cloud forming fires in Australia and western coast of USA
- What kind of international regulation would be needed to avoid “wild experimenting”
- Some articles:
 - o [Solar geoengineering is scary — that’s why we should research it \(nature.com\)](https://www.nature.com/articles/d41586-022-00000-0)
 - o [Could solar geoengineering cool the planet? U.S. gets serious about finding out | Science | AAAS](https://www.sciencemag.org/news/2022/11/could-solar-geoengineering-cool-the-planet-u-s-gets-serious-about-finding-out)
 - o [Can geoengineering fix the climate? Hundreds of scientists say not so fast | Geoengineering | The Guardian](https://www.theguardian.com/environment/2022/nov/02/can-geoengineering-fix-the-climate-hundreds-of-scientists-say-not-so-fast)
 - o [A Dangerous Disruption - Legal Planet \(legal-planet.org\)](https://www.legalplanet.org/2022/11/02/a-dangerous-disruption-legal-planet/)
 - o [A startup says it’s begun releasing particles in the atmosphere, in an effort to tweak the climate | MIT Technology Review](https://www.technologyreview.com/2022/11/02/a-startup-says-its-begun-releasing-particles-in-the-atmosphere-in-an-effort-to-tweak-the-climate)

Part III: Possible way forward?

While reading this you may have noticed that we, as the EU, and as members representing various constituencies in the ExCom, have actually worked towards our earlier priorities - in many cases quite successfully, even during pandemic. Some priorities are still waiting in the pipeline and some need to be refined and some may be considered not to be so important anymore. Also new environmental priorities may need to be established.

We hope that this summary can serve us as background material and inspiration in Future of the Montreal protocol workshop during Sweden’s presidency and beyond.

On behalf of Finnish and Swedish Team

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ⁱ [Volcanic eruption in Tonga will contribute to global cooling \(freewestmedia.com\)](https://www.freewestmedia.com)

ⁱⁱ [REDACTED], et.al 2021. Narrowing feedstock exemptions under the Montreal Protocol has multiple environmental benefits. PNAS 2021 Vol. 118 No. 49 e2022668118 <https://doi.org/10.1073/pnas.2022668118> j

ⁱⁱⁱ Impact assessment report Strasbourg, 5.4.2022 SWD(2022) 99 final and Final impact assessment report for European Commission DG Climate Action - 40201/2019/815261/ETU/CLIMA.A.2 ED 13118 | Issue number 4 | Date 10/05/2021