

Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer's contribution towards the 2030 Agenda for Sustainable Development and the Sustainable Development Goals

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Introduction

The Executive Secretary of the Secretariat for the Vienna Convention for the Protection of the Ozone Layer (Vienna Convention) and for the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) in full consultation with the Presidents of the Thirty-First Meeting of the Parties to the Montreal Protocol (MOP) – Hon. Martin Alvin Da Breo, Minister of Climate Resilience, the Environment, Forestry, Fisheries, Disaster Management and Information of Grenada - and the eleventh meeting of the Conference of the Parties to the Vienna Convention (COP) – Mr. Marc D'Iorio, Director General, Environment and Climate Change Canada – submits this report to the 2020 High Level Political Forum on Sustainable Development (HLPF), in response to the invitation from the President of the United Nations Economic and Social Council, H.E. Ms. Mona Juul.

The report is structured around the annexes to the invitation letter and attempts to provide a focused input on how best to accelerate action and achieve transformative pathways so as to realise the decade of action and delivery for achieving the 2030 Agenda for Sustainable Development. The input focuses on one of the core areas of responsibility of the COP and the MOP, namely protection of the atmosphere. It also provides some information on the Sustainable Development Goals (SDGs) to which the ozone treaties contribute and proposes some action points for consideration by the HLPF.

1. Key policies and measures to ensure “accelerated action and transformative pathways” for realizing the decade of action and delivery for sustainable development

Thanks to the implementation of the Vienna Convention and the Montreal Protocol, to date more than 99% of the historic peak levels of consumption and production of controlled ozone depleting substances have been phased out, and the ozone layer is healing. At projected rates, the ozone layer depletion in the Northern Hemisphere and mid-latitude will return to pre-1980 levels by the 2030s, while those in the Southern Hemisphere mid-latitudes and the Antarctic will do so in the 2050s and by 2060, respectively.¹

In working towards this remarkable achievement, the parties and institutions of the ozone treaties have contributed to a number of key SDGs. Two of the most relevant and urgent goals at present to which they contribute are **SDG12**: Ensure sustainable consumption and production patterns and **SDG13**: Take urgent action to combat climate change and its impacts.

With respect to SDG12, the phase-out of controlled ozone-depleting substances has resulted in changes to production and consumption patterns across the global economy and stimulated more efficient production processes, as well as innovative redesign of products and equipment to use chemicals that neither deplete the ozone layer and nor emit powerful greenhouse gases. The reductions in production and consumption of substances controlled under the Protocol are achieved through phase-down and phaseout schedules, coupled with requirements for licensing of imports and exports of controlled substances and bans on trade with non-parties to the Protocol and its respective Amendments. Sustainability of the shift to more environmentally friendly alternatives is ensured in part by

¹ World Meteorological Organization (WMO), Executive Summary: Scientific Assessment of Ozone Depletion: 2018, World Meteorological Organization, Global Ozone Research and Monitoring Project – Report No. 58, 67 pp., Geneva, Switzerland, 2018. Page 27

implementation support provided to developing countries through the Multilateral Fund for the Implementation of the Montreal Protocol and the Global Environment Facility for countries with economies in transition. The Protocol's compliance mechanism emphasises a facilitative rather than a punitive approach, with high levels of compliance with data reporting requirements and control measures over the years.

With respect to SDG13, the implementation of the ozone treaties has a significant impact on climate change, in two ways. Since controlled ozone-depleting substances, including chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), are also powerful greenhouse gases, their phase-out under the Montreal Protocol has already avoided an estimated 135 billion tonnes of CO₂ equivalent emissions between 1990 and 2010² - a significant contribution to mitigating climate change. The impacts are already being felt, for example, as noted in the Executive Summary of the 2018 assessment report of the Montreal Protocol's Scientific Assessment Panel:

“New studies since the 2014 Ozone Assessment have identified that future global sea level rise of at least several centimetres has been avoided as a result of the Montreal Protocol. This would have arisen from thermal expansion of the oceans associated with additional global warming from unregulated ozone depleted substances emissions.”³

Looking to the coming decade, the ozone treaties' proven impact on climate change and sustainable consumption and production will increase as the phaseout of the remaining controlled ozone-depleting substances (primarily HCFCs) is completed: developed countries were required to phase out their consumption and production of HCFCs by 1 January 2020, while developing countries will follow suit ten years later. By 2030, therefore, the parties will have achieved a global phaseout of all controlled ozone-depleting substances⁴.

Building on that achievement, the implementation of the Protocol's Kigali Amendment, which entered into force on 1 January 2019, is expected to avoid up to 0.4° Celsius warming by 2100, making a further significant contribution to climate change mitigation. The amendment introduced control measures for 18 hydrofluorocarbons (HFCs), which are not ozone-depleting, but which have high global-warming-potential. One of the key sectors in which HFCs are used is cooling, which is experiencing significant growth in demand as the effects of climate change are increasingly felt and economic development continues to gain momentum in developing countries.

The Amendment provides for the phase-down of the controlled HFCs by more than 80 per cent over the next 30 years. The first group of developed countries that have ratified, accepted or approved the Kigali Amendment were required to implement the first phase-down step, a reduction of 10% of their baseline consumption and production levels, on 1 January 2019. Their next reduction steps that will take place in the coming decade are 40% by 2024 and 70% by 2029⁵. All developed countries are expected to achieve their final reduction step of 85% by 2036. Most developing countries that ratify the Kigali Amendment will implement a 10% reduction on 1 January 2029, with further steps leading to the final

² Molina, M., Zaelke, D., Sarma, K.M., Andersen, S.O., Ramanathan, V., and Kaniaru, D. (2009): Reducing abrupt climate change risk using the Montreal Protocol and other regulatory actions to complement cuts in CO₂ emissions, P. Natl. Acad. Sci. USA, 106(49), 20616–20621, doi: [10.1073/pnas.0902568106](https://doi.org/10.1073/pnas.0902568106).

³ World Meteorological Organization (WMO), Executive Summary: Scientific Assessment of Ozone Depletion: 2018, World Meteorological Organization, Global Ozone Research and Monitoring Project – Report No. 58, 67 pp., Geneva, Switzerland, 2018.

⁴ With the exception of small quantities that may be required for specified and essential or critical uses, uncontrolled uses e.g. as feedstocks or for quarantine and pre-shipment, ozone depleting substances in banks (e.g. equipment, insulation foams, chemical stockpiles) and stocks of recovered, reclaimed and recycled ozone depleting substances

⁵ See Article 2J read with Annex F of the Montreal Protocol on Substances that Deplete the Ozone Layer, as adjusted and amended.

reduction step of 80% in 2045. A second, smaller group of developing countries will start the phasedown slightly later in 2032, culminating in a reduction of 85% by 2047.

In summary, by 2030 the phaseout of controlled uses of controlled ozone-depleting substances will be complete, and the phase-down of controlled HFCs will be well under way. The benefits of these actions will increase over time, for decades to come.

a. Critical gaps in implementing the 2030 Agenda within the areas of responsibility of the COP and MOP

The issue of the unexpected increase in emissions of CFC-11, a substance that had been phased out globally in 2010, made headlines in 2018 and 2019. The parties to the Montreal Protocol took immediate steps towards identifying and addressing the problem, with discussions continuing into 2020. Investigations pointed to probable illegal production of the controlled substance between 2012 and 2017. A preliminary report presented to the Meeting of the Parties in November 2019 indicated that the emissions had started to decrease again, although more work is required to confirm this.

This unexpected challenge to the historical success of the ozone treaties has prompted the parties to start discussions on whether the ozone treaties' existing infrastructure and institutions require strengthening to ensure their continued effectiveness. As part of this, and drawing from the experience with CFC-11, the parties have highlighted the importance of sharing information, including on illegal trade in controlled substances and on significant cases of illegal production, consumption, imports and exports of controlled substances and their causes.

With reference to SDG9 on infrastructure, the projected shortage of halons, ozone-depleting substances that were phased out in 2010, continues to be monitored by the parties to the Montreal Protocol. Stocks of recovered, reclaimed and recycled halons are still used for fire suppression in ships and in civil aviation while suitable alternatives are being developed, but there is concern that existing stocks may be insufficient beyond the early 2030s for aircraft that are manufactured today. The Protocol's Technology and Economic Assessment Panel is working to identify needs for halons and possible sources of recoverable halons, in consultation with the International Maritime Organization and the International Civil Aviation Organization.

While we are approaching the global phaseout of the remaining controlled uses of controlled ozone-depleting substances, not all ozone-depleting substances are controlled under the Protocol. Very short-lived substances (VSLs) are not controlled owing to their relatively short atmospheric lifetime (i.e. less than 6 months). These substances are generally destroyed in the lower atmosphere. In general, only small fractions of VSL emissions reach the stratosphere where they contribute to bromine and chlorine levels and lead to increased ozone depletion.

Other substances with relatively low ozone-depleting potential are also not currently controlled under the Montreal Protocol. In addition, not all uses of controlled substances are controlled, for example, feedstock uses or quarantine and pre-shipment uses of specific controlled substances. Furthermore, significant amounts of ozone-depleting substances remain in "banks" (i.e. in equipment, insulation foams, and as chemical stocks) which need to be managed to avoid emissions.

b. Priority measures to accelerate action and ensure transformative pathways

In addition to the issues mentioned above, the Meeting of the Parties in 2020 will continue to explore opportunities to enhance the energy efficiency of appliances, equipment and systems in the move away

from HFCs in order to maximise the climate benefits of the HFC phasedown⁶. Another key topic under discussion in 2020, which has important implications for implementation in developing countries, is the replenishment of the Multilateral Fund, on which a decision is expected to be made this year.

Other priority areas identified by the Meeting of the Parties for consideration by the Protocol's Assessment Panels in their next quadrennial reports, due by 31 December 2022, include⁷:

- The effect from changes in the ozone layer and ultraviolet radiation and their interaction with the climate system on the biosphere, biodiversity and ecosystem health, human health and ecosystem services, agriculture and materials.
 - The state of the ozone layer and its future evolution; trends in the atmosphere of relevant trace gases; the interaction between changes in stratospheric ozone and the climate system; information on solar radiation management and its impacts on ozone layer; relevant information on any newly detected substances that are relevant for the Montreal Protocol.
 - Progress in the transition to technically and economically feasible and sustainable alternatives and practices that minimize or eliminate the use of controlled substances including in countries with high ambient temperatures; the status of banks and stocks of controlled substances; implementation challenges in fulfilling the obligations and maintaining the phase-outs achieved; and impact of the phase-out of controlled ozone-depleting substances and the phase-down of HFCs on sustainable development.
- 2. Contributions of the COP and the MOP to accelerated action and transformative pathways and realizing the decade of action and delivery for achieving the 2030 Agenda within their areas of responsibility (including cooperation with the ECOSOC and other intergovernmental bodies)**

The Vienna Convention and the Montreal Protocol are universally ratified and have established a framework that emphasises engagement with all stakeholders including governments, scientists, industry and civil society, while providing financial and technical support where it is needed. The implementation of the ozone treaties has had a number of significant impacts including the following (see table 1):

- It is estimated that by 2030, up to 2 million cases of skin cancer may be prevented globally each year along with millions of incidences of eye cataracts.^{8 9 10}
- An estimated US\$460 billion in global benefits have been ensured between 1987 and 2060 due to avoided damages to agriculture, fisheries and materials such as plastic and wood.¹¹

⁶ The Scientific Assessment Panel's 2018 Executive Summary indicates (op cit, page 31) that enhanced energy efficiency of refrigeration and air conditioning equipment could "potentially double the climate benefits of the HFC phasedown."

⁷ As specified in decision XXXI/2 of the Meeting of the Parties

⁸ The Montreal Protocol's Environmental Effects Assessment Panel reported to the 29th Meeting of the Parties in November 2017 that estimates are that by the end of the century, in the USA alone, between 275 million and 300 million cases of skin cancer would be prevented for people born between 1980 and 2100.

⁹ van Dijk, A., Slaper, H., den Outer, P.N., Morgenstern, O., Braesicke, P., Pyle, J.A., Garny, H., Stenke, A., Dameris, M., Kazantzidis, A., Tourpali, K., and Bais, A.F. (2013): Skin Cancer Risks Avoided by the Montreal Protocol—Worldwide Modeling Integrating Coupled Climate-Chemistry Models with a Risk Model for UV: <https://www.ncbi.nlm.nih.gov/pubmed/22924540>.

¹⁰ US EPA report (27 Feb 2015): Updating ozone calculations and emissions profiles for use in the atmospheric and health effects framework model: https://www.epa.gov/sites/production/files/2015-11/documents/ahf_2015_update_report-final_508.pdf.

¹¹ Markandya, A. and Dale, N. (2012): "The Montreal Protocol and the Green Economy: Assessing the Contributions and Co-Benefits of a Multilateral Environmental Agreement," Contribution to the Green

- As at December 2019, the contributions received by the Multilateral Fund amounted to over US \$4.07 billion, which has been used to implement over 8,700 projects and activities to achieve the phase-out of 490,770 ODP¹² tonnes of controlled substances under the Montreal Protocol. These projects aim at assisting Article 5 parties (developing countries) through technology transfer projects, institutional strengthening and capacity building, leading to sustained implementation and economic benefits.
In addition, contributions amounting to US \$ 27 million were voluntarily received for fast-start support for HFC phase-down to facilitate ratification of the Kigali Amendment.
- Disruption of plant species' growth and damage to ecosystems and agriculture have been mitigated.
- Damage has been avoided to many aquatic organisms, especially phytoplankton, fish larvae and small fish, with resulting benefits for economies that rely on those resources.

Table 1: Contribution of the ozone treaties to the sustainable development goals

MONTREAL PROTOCOL CONTRIBUTIONS TO THE GOALS	SUSTAINABLE DEVELOPMENT GOALS													
	1	2	3	7	8	9	10	11	12	13	14	15	17	
Universal ratification of the ozone treaties							√						√	
Engagement with all stakeholders													√	
Allocation of funds to developing countries	√				√	√	√		√	√			√	
Technology transfer	√				√	√	√		√	√			√	
Institutional strengthening and capacity building	√					√	√		√				√	
Promote food security and greener economy		√						√	√			√		
Avoid damage to crops, fisheries and materials		√						√	√		√	√		
Possible energy efficiency enhancements				√				√	√					
Protection from UV radiation			√					√			√	√		
Climate change mitigation								√	√	√				
Avoided skin cancers			√											
Avoided eye cataracts			√											
Increased investment in green alternatives						√			√					
Promote the use of greener, safer chemicals						√			√					

Goal 1: End poverty in all its forms everywhere; Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture; Goal 3: Ensure healthy lives and promote well-being for all at all ages; Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all; Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Goal 10: Reduce inequality within and among countries; Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable; Goal 12: Ensure sustainable consumption and production patterns; Goal 13: Take urgent action to combat climate

Economy Initiative, United Nations Environment Programme, OzonAction Branch and Economics and Trade Branch, accessible at <http://www.unep.org/ozonaction/Portals/105/documents/publications/green-economy-report.pdf>, Pages 45 & 50.

¹² ODP: Ozone Depleting Potential

change and its impacts; Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development; Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss; Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Partnership and cooperation among stakeholders form a cornerstone of the success of the ozone treaties and will be strengthened, as required, to enhance future action. The Montreal Protocol institutions engage as needed with relevant intergovernmental bodies in performing their functions and in implementing decisions taken by the COP and the MOP to advance the objectives of the Convention and the Protocol. For instance: the United Nations Environment Programme, the United Nations Industrial Development Organization, the United Nations Development Programme and the World Bank are implementing agencies under the Multilateral Fund. The World Meteorological Organization is a close partner in matters to do with stratospheric ozone observation. The Ozone Secretariat engages regularly with the World Customs Organization on issues such as harmonised systems codes and related matters. The Protocol's assessment panels interact as needed with the International Civil Aviation Organization and the International Maritime Organization on issues relevant to them.

The Ozone Secretariat also interacts on issues of common concern with the secretariats of other multilateral environmental agreements including the Climate Convention and with standardization bodies such as the International Standards Organization on safety standards for alternative substances.

3. Selected recommendations for accelerating progress and moving on transformative pathways for realizing the decade of action, for possible use in drafting the HLPF declaration

The parties to the Vienna Convention and the Montreal Protocol have at the moment two key overarching priorities: to complete and ensure the continued effectiveness of the phase-out of ozone depleting substances, and to implement the phase-down of HFCs. Since the adoption of the Kigali Amendment in October 2016, the momentum towards its ratification has been accelerating, with a total of 93 ratifications as at February 2020. The Meeting of the Parties regularly reviews the ratification status and adopts decisions encouraging parties to ratify.

The ozone treaties have entered their accountability phase as the end date for global phaseout of all controlled ozone depleting substances is in sight. Parties may evaluate the existing infrastructure and institutions of the ozone treaties to ensure that the gains achieved so painstakingly over 32 years are maintained and enhanced. Other stakeholders will be investing in alternative refrigerants and energy efficient technologies that are also technically and economically viable to meet the increasing needs for cooling. The ozone treaties' progress to date demonstrates that the combination of science, policy and financial support where it is needed can succeed. The ongoing high levels of commitment by the parties and other stakeholders will ensure that it does succeed.

Recommendations:

1. Continued support from the HLPF to promote ratification of the Kigali Amendment and the continued implementation of the Montreal Protocol. Since the amendment is built on the Montreal Protocol's existing infrastructure, it provides a feasible, achievable and measurable means to protect the global climate and can be implemented relatively quickly, with minimal incremental administrative costs.
2. Promoting the science-policy interface and the engagement of all stakeholders. These are fundamental requirements in tackling problems such as ozone depletion and climate change.
3. Confirming that the level of emissions from substances that have been phased out is in agreement with the expected scientific projections.

4. Bolstering rates of compliance by providing support to those parties who need it, which is an investment in the future of us all.