

Forum: Environmental Commission

Topic: Addressing Future Challenges in Atmospheric Protection Through Strengthening the Montreal Protocol

President

Introduction

The theme for this year's Amman Model United Nations is moderating morality. A concept that helps drive the idea that our global actions and decisions must be tied to our human ethics. Balancing basic human needs with the long-term sustainability we strive for. The Montreal Protocol of 1987 is deemed one of the world's most successful agreements, which helps moderate the use of ozone-depleting substances, prioritising our future. It's now time for the global community to apply our ethics and moral deliberation in order to climb the challenges global warming has brought without disrupting our growth or livelihood while also safeguarding our environment. Our ozone layer as of today is suffering, and over generations, scientists have confirmed and cemented its importance in our day-to-day lives. And as countries continue to exploit and look for loopholes where they can maximise personal gain. The environment is struggling. All of this today calls for the evolution of the Montreal Protocol by moderating decisions through human morals to ensure that we properly carry the responsibility we owe to future generations.

The Montreal Protocol, ever since its agreement, has proven to be one of the most successful environmental agreements of its time, as in 1987 it achieved universal ratification and was put into action by 1989. It has been vital in phasing out almost 99% of all Ozone-depleting substances (ODS) and helping steer the ozone layer into a phase of full recovery. However, as of today, different complex and evolving challenges are threatening to undermine the environmental benefits this protocol was able to instil. The Montreal Protocol has been able to address the primary causes of ozone depletion; however, due to the industrial shift to new alternatives being hydrofluorocarbons (HFC's), which are dangerous greenhouse gases (GHGs), further international action was required, which was reached through the Kigali Amendment. A legally binding agreement which was made to phase down the production of HFC's. It also had bigger goals of averting up to 0.5 Celsius of global warming by the year 2100. And despite this well-constructed plan and amendment to an already promising agreement, new potential complications have emerged. Firstly, the rise of illegal trade through the black market in less developed countries is increasing, leading to a steady production rate despite these substances being banned. Furthermore, the "feedstock" loopholes are opening up for new gaps of exploitation that companies are taking

advantage of. This loophole works by using banned chemicals and repurposing them in chemical manufacturing, which is resulting in higher rates of emissions than what scientists expected, as companies exploit the lack of surveillance and monitoring. Furthermore, developing nations are finding it difficult to obtain reliable, energy-efficient, and environmentally friendly cooling solutions; this is heavily affecting the quality in many developing nations, especially countries where the climate could be unforgiving, where temperatures reach about 40-50 degrees Celsius. Moreover, countries are now explicitly combining and manufacturing harmful chemicals through unbanned products, creating dangerous and environmentally damaging substances. This is affecting most of the progress already made by this agreement and is very much testing the agreement's frameworks. As tests already show, countries are clearly underestimating their use of these banned products, and this is creating dangerous threats to the ozone's health. And so, the damage done to our ozone is either permanent or takes a long time to reverse, as seen in the past. This means that different solutions need to be put in place, which include strengthening enforcement, providing technological support for different countries, especially developing nations and closing loopholes being exploited by nations. All of this, while keeping the environment as one of, if not the top, priorities through these methods while also maintaining a high quality of life and creating everlasting sustainability. It is clear that the agreement is well-agreed-on and appreciated, and the values it carries are significant to battling climate change. And so the global community must continue to build on what it already started and help evolve the Montreal Protocol to maintain environmental sustainability and limit global warming and its effects.

Definition of Key Terms

Hydrofluorocarbons (HFC)

Also referred to as HFCs, hydrofluorocarbons were introduced as a replacement for ozone-depleting substances because they do not harm the ozone layer. Despite this, it was later found that these substances are extremely potent greenhouse gases which significantly contribute to global warming.

Greenhouse gases (GHG)

GHGs absorb and re-emit infrared radiation, which creates global warming because it increases the heat in the atmosphere. They are primarily emitted by fossil fuels but can be emitted by other forms, such as the use of HFCs.

The Technology and Economic Assessment Panel (TEAP)

The TEAP, as it's also known, is an expert body that provides technical advice for parties in the Montreal Agreement to make certain decisions when there is disagreement. It is crucial for assessing complex issues like feedstock loopholes where data is limited and unclear.

Ultraviolet Radiation (UV)

Ultraviolet Radiation or UV radiation, is harmful radiation from the sun, which is shielded away from the Earth by the ozone layer. An excessive amount of UV radiation could cause health issues like skin cancer.

Feedstock loophole

A critical gap in the Montreal Protocol where companies start using raw materials derived from ODS/HFC chemicals to create safer end products. Despite the end product being safer than these chemicals, the environmental effects that these processes bring have been underestimated as they've had significant environmental drawbacks without being mentioned in the Montreal Protocol.

Multilateral fund

A mechanism created to ensure that developing nations can also contribute to the Montreal Protocol's goals despite their level of development so that the effort is universal rather than one-sided.

Ratification

This is when a treaty is made, such as the Montreal Protocol; countries are required to ratify the treaty so that it is enforced. The Montreal Protocol was universally ratified, which means that all parties ratified the treaty.

General Overview

The Montreal Protocol on substances that deplete the ozone layer became effective in 1989. Its primary objective is to protect the ozone layer, which is responsible for shielding the Earth from the sun's harmful ultraviolet rays, also known as ultraviolet radiation (UV) radiation. The ozone phases and layers out these UV rays and releases single oxygen atoms and diatomic oxygen atoms into the Earth. This limits any risk factor these UV rays possess. This process, however, is majorly disrupted as ODS a man-made chemical, is disrupting the ozone's safe process. On the ground, ODS substances are deemed harmless and are stable at ground level, which allows them to drift up into the stratosphere. Their presence releases dangerous atoms, which affect the ozone's entire process. And so, the Montreal Protocol aimed to decrease the use of these harmful substances and was able to phase out almost 98% of all of these substances compared to 1990. The Montreal Protocol also achieved universal ratification as all of 197 members signed and ratified this agreement. Furthermore, scientists' assessments indicate that the ozone layer, despite all of the relevant damage done to it, is on its way to a full recovery. Projected studies state that its values could return to the same values it was in 1980 by 2066. Furthermore, the Agreement provided much more in climate benefits, as these ODS are potent GHGs, and it is estimated that almost 1 degree Celsius of global warming. The Kigali Amendment, which came into force in 2016, further strengthened the agreement by including different harmful ozone-depleting substances like hydrofluorocarbons, which were introduced as alternative options to ODS. Despite the agreement already showing promise, it was clear that these substances had high environmental risk. And despite efforts by the agreement to try and limit the use of these products, there is still clear evidence of these substances being used mostly in cooling solutions, which are fundamental, especially in countries were temperature can exceed 40 degrees Celsius. The multilateral fund provides technical assistance to developing nations. However, their explicit use and trade is still not being monitored properly, and this issue is clearly being undermined. And without effective monitoring and cooperation, the path to return the ozone to its values in 19080 by 2066 is looking even more challenging by the day. As the protocol, despite its success over the past years, is still subject to things like illegal trade and weak enforcement mechanisms that are slowing down the process. Moreover, the most prominent challenge this agreement has faced is the feedstock loophole, where companies today are combining chemicals to create environmentally safe substances. Despite this sounding like a step towards progress. These processes are emitting dangerous ODS substances into the atmosphere, and it's clear that their environmental risk has been severely underestimated. And so, this calls on the evolution of the Montreal Protocol to instil

sustainable frameworks which help safeguard the ozone layer and prioritise it, to maintain a sustainable future for the next generation.

Subtopic 1: Addressing the Kigali Amendment

The Kigali Amendment, adopted in 2016 in Rwanda and became effective on January 1, 2019, is a legally binding international agreement designed to phase down the production and use of HFC's. At first, it was seen that HFCs weren't dangerous or harmful to the ozone, until it was found that they are extremely potent GHG which exceed the global warming concerns brought by carbon dioxide. By including HFCs on the list of controlled substances, the amendment helped expand the treaty's scope into climate change mitigation and reduction. Critically contributing to the Paris Agreement's objectives. Developed nations started their phase-down process in 2019, while developing countries follow with later dates and restrictions more lenient. Despite this, many concerns come with this amendment, as despite the crucial steps it took to limit and control HFCs, manufacturing is still at the helm, and its usage is still relatively high. Explicit rage still exists in developing countries and on the black market, as it is still renowned as one of the cheapest, energy-efficient options for cooling systems. It is up to the global community to ramp up all monitoring systems to ensure that these substances aren't being manufactured or used to further strengthen this protocol's values.

Subtopic 2: Strengthening Compliance and Enhancing Monitoring

The Montreal Protocol, since its creation in 1987, has proven to be influential in limiting ODS. However, as time moved on and nations started to look for alternatives, especially for cooling systems, many new substances came into the way of the protocol's progress and path. Especially HFCs. GHG which are extremely harmful to the environment, yet they created energy-efficient and cheap solutions for cooling systems. Despite the protocol, many nations, including developing nations, are still using these substances without any urgency for change, due to the extended deadlines requiring countries to use different substances. Many explicit trades are still prominent on the black market. And with relaxed monitoring and surveillance, developing nations seem to continue to use them in their cooling systems. And so, to strengthen compliance. The global community set up many multilateral frameworks to try and help these countries use different substances. Moreover, looking at the "feedstock" loophole, where countries are further exploiting this privilege by creating what is known as environmentally safe substances for these cooling

systems using processes which release harmful ODS during production, which is disrupting the ozone layer's process of absorbing harmful UV rays. Moreover, self-reporting isn't prominent at all, as countries are not resorting to this method and are instead fine with the usage of these dangerous substances. This definitely reflects the lack of priority countries have towards this issue, despite its relevance to major global concerns like global warming and even future concerns like the ozone's values in the following decades.

Subtopic 3: Addressing And Closing Chemical Feedstock Loopholes

The "feedstock" loophole presents a clear gap within the Montreal Protocol, as despite many restrictions and bans being put together to prevent the excretion of harmful gases into our environment, the substances that are being used aren't included in the Montreal Protocol, and so this means that even though the production of environmentally friendly cooling solutions is extremely relevant and important. The process of creation is excreting harmful gases more than anticipated; this is creating major global concern, as now these feedstocks are still affecting the plans and goals of this protocol without even being properly addressed. All of these process which are creating things like lithium-ion batteries and fluoropolymers. And so all of these products clearly hinder the healing process of the ozone, as they leak many different harmful gases straight into the atmosphere. Scientists warn that if these high leakage rates continue, the recovery of the ozone layer could be pushed back almost 7 years from its original healing date, which is extremely dangerous for the protocol's goal. And so with that, it is up to the Protocol to ensure that this feedstock loophole is closed and that other prospects are also denied of affecting the ozone's healing. This protocol definitely needs transparent communication, stricter guidelines and enforcing different monitoring levels and strengthening compliance levels by providing nations with cheaper and efficient sources to go with.

Major Parties Involved

The European Union:

The European Union often hosts meetings and is key in providing the quantitative and qualitative data this protocol needs in order to remain sustainable and improve; better yet, they

contribute to 50% of the multilateral fun which helps developing nations in their industrial transitions from these harmful substances.

Pakistan

Pakistan faces unique challenges regarding high ambient temperatures. Temperatures which can reach up to 40 to 50 degrees Celsius. Therefore, this drives an immense need for cooling. It relies heavily on the multilateral fund to manage its HFC consumption. Its compliance in the treaty is critical, especially when considering its high population and its potential HFC consumption in attempts to try and satisfy its population's needs.

The Technology and Economic Assessment Panel:

TEAP is a body which provides technological and technical advice and advantages to make decisions on loopholes and is key to the Protocol's needs, regardless of their economic situation, putting this issue at top importance for everyone.

India:

India is starting to phase down its use of HFCs, and its production of HFC's has been heavily decreased. This is crucial considering the role India holds as one of the biggest regional and worldwide producers; their compliance is urgent and extremely relevant.

China:

Extremely similar to India, China is a regional and worldwide hub for production. According to UNEP Ozone Secretariat database, China accounts for almost 83% of all of the global total in ODS consumption, and despite its efforts in depleting these numbers, without total compliance the agreement could face major issues.

Federated States of Micronesia:

Federated States of Micronesia FSM are highly relevant to the protocol, especially the amendment, as they were one of the first to propose an amendment for the phase-down of HFC's under the Montreal Protocol. Furthermore, as a small island nation, they face clear harmful effects of climate change as rising water levels are creating major threats to their existence and sustainability.

Rwanda:

The country that hosted the historic 28th meeting between the parties in October 2016, where the amendment which transformed the Montreal Protocol into an even more powerful tool for climate change mitigation by including the phase-down of HFCs was adopted. The Kigali Amendment, which was named after the country's capital, was crucial in making sure that HFCs were included in the phase-down of ODS. Providing diplomatic environments and bridging between political gaps, Rwanda was crucial for the creation of this amendment. Rwanda also demonstrates how developing nations can bridge political gaps to prioritise environmental benefit, mainly by hosting the 28th meeting of parties.

United States of America:

The United States of America (USA) has contributed to the creation of the Kigali Amendment at the 28th meeting held in Rwanda. Partnering with major economies like India and the EU, as well as island states, most prominently the FSA. The USA's contribution was critical for the amendment's creation, and its compliance and efforts in future steps are key to limit the harmful ODS usage.

Timelines of Events

Date	**Event**
May 16, 1985	The discovery of the Ozone Hole. British scientists discovered and published their findings and studies which confirmed significant springtime ozone depletion over Antarctica.

September 16, 1987	The Montreal Protocol was officially signed and created over in Montreal Canada, in order to limit and decrease the overall ODS consumption globally, in attempts to try and reverse damage done to the ozone.
January 1, 1989	The Montreal Protocol entered into force and was universally ratified by all 197 states. And soon entered into force, in order to deplete the use of ODS.
May 2-5, 1989	The First Meeting of the Parties took place in Helsinki Finland. In attempts to initiate the protocols implementation.
June 29, 1990	in the second meeting of parties which took place in London, the interim multilateral fund was the start to supporting developing nations in order for them to partake in the Protocol's requirements.
October 15, 2016	In Kigali Rwanda the Kigali Amendment was adopted in the 28th meeting of the parties. Where parties agreed to include the phase down of HFC's in the Montreal Protocol along with the phase down of ODS.
January 1, 2019	The Kigali Amendment entered into force and took effect for ratifying parties, despite some monitoring and compliance challenges still unresolved.

Attempts to Solve the Issue

"37th Meeting of the Parties" (Date: 2025/11/3) (MOP 37)

Parties discussed the feedstock oversight, but the final decision was ultimately postponed. As members couldn't reach a final agreement. Therefore, the TEAP was referred to as of know to look

back at the data to try and come up with feasible assessments, considering it is deemed as the most relevant expert body.

“Non-compliance procedure” (Date: 1992/11/23) (MOP4)

Article 8 or the non-compliance procedure outlined the non-compliance procedure. It demanded that parties start establishing procedures and mechanisms to help determine whether or not countries are meeting their obligations or not, as well as deciding on how to treat parties found to be in non-compliance. However, due to the article relying heavily on a managerial cooperative approach which preferred assistance over punishment, its lack of strict enforcement led to the non-compliance procedure being ineffective at times.

Possible Solutions

Subtopic 1:

The Kigali Amendment was crucial in maintaining environmental sustainability throughout the Montreal Protocol, as the protocol already placed restrictions on ODS and has proven to be extremely successful. With the arrival of HFCs, it was clear that this protocol needed some adjustments. And so the Kigali Amendment, which was created in Kigali, Rwanda, aimed to try and include HFCs in the already placed bans on ODS. However, different surveillance and compliance issues came up, and to maximise the amendment’s full potential, the following solutions could take place. Firstly, creating phase-down schedules which are balanced and fair to include both developed and developing nations. Considering that developing nations are receiving aid from the multilateral fund for the implementation of the Montreal Protocol, this means that deadlines can be sharp and phase-down deadlines can be relatively similar for all. The schedule could be discussed in the next meeting of parties to ensure that they are fair and effective. Also, making the transition to low global warming potential substances or natural refrigerants like ammonia is crucial. While also prohibiting dumping harmful energy-inefficient appliances in developing nations. Moreover, instilling and making sure different unbiased officers in several nations ensure that harmful ODS and HFC aren’t being used at all. Also moving away from the soft diplomacy that the Montreal Protocol often abides by could be a bold yet rather important decision.

If compliance isn't reached even after offering support and training, several trading sanctions could be in place. Considering that the protocol is ratified.

Subtopic 2:

As mentioned earlier, the Montreal Protocol suffers from its safe diplomacy at times, and so this can lead to many countries exploiting this privilege. Therefore, moving to a different approach could be the right option. Despite sanctions being harsh, if soft diplomacy keeps on failing, then the correct answer is well and truly in sanctioning. Since the treaty was ratified, this means that countries can abide by its guidelines. And so, sanctions could become critical for most of the community, as with sanctions, many different aspects are at risk. Furthermore, looking to the multilateral fund, which aims to try and help developing nations abide by the treaty's values. This fund could shift to offering other modes of assistance, focusing on training to ensure independence and to also share data, technology and even equipment. Bridging the gaps between developed and developing nations rather than just keeping them with basic assistance. As this multilateral fund should focus solely on the Montreal Protocol, specialising the assistance could be crucial. Looking to an expert body like the TEAP, countries can create plans and goals to limit consumption of harmful substances. Focusing on local training in developing countries is crucial to better ensure that safe and environmentally friendly substances are common among industries and are easy to acquire. Also looking at developing countries again since explicit trading of these products is common in most of these nations. Providing cooling systems that are energy efficient, meaning they cost less as they operate over time, through the multilateral fund. Things like CO2 or ammonia could be beneficial. And if these substances are available for all countries, then countries can start relying on them rather than short-life-cycle substances that are harmful to the environment.

Subtopic 3:

To address the feedstock loopholes were using the raw materials of dangerous substances like HFC and ODS to create safe, environmentally friendly materials, which is having severe effects on ozone health. Several solutions can be in order. Firstly, a phase-out duration can be agreed to ensure that these raw materials are being cut out and that their consumption is decreasing. This can be done through ozone officers who can analyse data and inspect factories. Furthermore, as mentioned before, guiding industries to non ODS/HFC substitutes is important and driving them

to that in terms of availability, cost and practicality is a must, since the black market is tough to control and stop, especially in developing nations. Combining this with the surveillance and monitoring as well as transparent communication discussed earlier, these loopholes can be closed. Also, the protocol could go beyond self-reporting and have organisations like the model of the Organisation for the Prohibition of Chemical Weapons, which is considered a gold standard for inspections, and an organisation like that, despite potential risks, could be beneficial in making sure these environmentally hazardous substances aren't being used.

Guiding Questions

1. What does your country do in attempts to limit the use of hydrofluorocarbons and ozone-depleting substances?
2. Who are the biggest consumers of ozone-depleting substances and hydrofluorocarbons?
3. Is your country in favour of enhanced monitoring in factories, and if not, why?
4. How do countries ensure that their data is accurate and transparent?
5. How did the Kigali amendment evolve?
6. How can countries effectively narrow feedstock exemptions without disrupting industrial sectors?
7. What defines essential feedstock use in 2026?
8. What different services and technologies are relevant to cut out feedstock use?
9. How can soft diplomatic approaches be used to ensure peace and cooperation, while also ensuring compliance?
10. What is the timeline in which countries should completely phase down the use of hydrofluorocarbons?
11. How can technology effectively and efficiently transfer from developed partners to local industries?

Appendix

- Ozone secretariat https://ozone.unep.org/resources

- Kigali Amendment UNDP https://www.undp.org/chemicals-waste/conventions/kigali-amendment
- Montreal Protocol UNDP https://www.undp.org/chemicals-waste/montreal-protocol
- The NOAA Ozone Depleting Gas Index: Guiding Recovery of the Ozone Layer https://gml.noaa.gov/odgi/
- United Nations report: Ozone layer recovery on track https://www.noaa.gov/news-release/montreal-protocol-emerges-as-powerful-climate-treaty
- Repairing the ozone may take longer than expected https://eos.org/articles/repairing-the-ozone-layer-may-take-longer-than-expected
- Learning from the Montreal Protocol to improve the global governance of antimicrobial resistance https://gh.bmj.com/content/9/10/e015690
- International regulation of Ozone and climate under the Montreal Protocol https://eia-international.org/climate/international-regulation-of-ozone-and-climate-under-the-montreal-protocol/

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