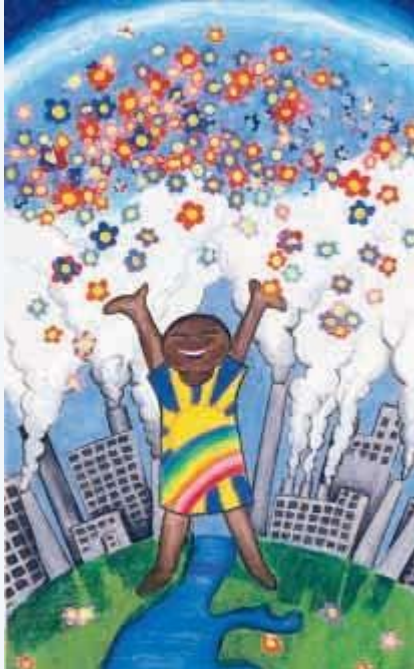


OzoNews

A fortnightly electronic news update on ozone and climate protection and the implementation of the Montreal Protocol brought to you by OzonAction

Volume XXIV | 15 January 2024



OzoNews archive is available from [OzonAction](#) website

OzoNews Turns 24!

In January 2000 UNEP OzonAction launched its e-news service: 'OzoNews'. Twenty-four years later, almost to the day. We are proud to provide the most recent edition of this bi-monthly information service to celebrate its uninterrupted and continuous dissemination since.

OzoNews brings you current information and updates related to the Montreal Protocol and ozone and climate protection, Science and technological advances, News stories, Montreal Protocol and Multilateral Fund updates, UNEP and other Implementing Agencies meetings and activities, Upcoming events, and much more ...

OzonAction is delighted to bring you the OzoNews 24th anniversary edition.

Thank you for your continued interest, feedback, and invaluable support throughout the years.

We wish all our readers a successful and productive year 2024.

In this issue:

1. Kigali Amendment latest ratifications
2. Greening the Blue Report 2023 - Facts and figures on the Ozone Secretariat's emissions impact from meetings, and accelerating UN efforts on environmental governance and training
3. Cold storage and refrigeration
4. The social costs of hydrofluorocarbons and the benefits from their expedited phase-down
5. Approval of the first-ever Kigali Implementation Plan for Cameroon by the Multilateral Fund
6. Cuba shows progress in ozone layer protection
7. Australia and UNEP train 12 Pacific Island Countries on good servicing practices in RAC sector
8. Rules tightened to better guard ozone layer
9. Washington State Sets Stricter GWP Limits for Refrigerants in New Commercial and Industrial Refrigeration Systems
10. Romania Chilled: 50 Tonnes of Illegal Refrigerant Seized at Constanta Port

11. AREA: Women in cooling video competition- 2nd edition!

GLOBAL



1. Kigali Amendment latest ratifications

Congratulations to the latest countries which have ratified the Kigali Amendment:

Guatemala, 11 January 2024
Belize, 3 October 2023

At the Twenty-Eighth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, held in Kigali from 10 to 15 October 2016, the Parties adopted, in accordance with the procedure laid down in paragraph 4 of article

9 of the 1985 Vienna Convention for the Protection of the Ozone Layer, a further amendment to the Montreal Protocol as set out in Annex I to the report of the Twenty-Eighth Meeting of the Parties (Decision XXVIII/1).

Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Status of Ratification 15 October 2016 to [date](#).

[United Nations Treaty Collection](#)

Image: UN Treaty Collection website

2. Greening the Blue Report 2023 - Facts and figures on the Ozone Secretariat's emissions impact from meetings and accelerating UN efforts on environmental governance and training.

The United Nations' system launched its latest environmental sustainability report on 21 December 2023. The [Greening the Blue Report 2023](#) shows UN entities' progress on environmental sustainability during 2022.

In alignment with the [Strategy for Sustainability Management in the United Nations 2020-2030, Phase I: Environmental Sustainability in the Area of Management](#), the report provides UN system-wide and entity-level data for 2022 on environmental impact areas: greenhouse gas (GHG) emissions, climate neutrality, waste, air pollution, water and wastewater and biodiversity. As well as management functions: environmental governance, procurement, and human resources.

For the Montreal Protocol Ozone Secretariat specifically, it has been estimated that our operations and facilities emitted **522 tonnes CO₂eq in total in 2022**. If we breakdown our emissions by source, 97 per cent came from air travel funded by the Secretariat for meetings, with the remaining 3 per cent from other travel and facilities.



We are also pleased to announce that we are once again carbon neutral for 2022. Meaning that we offset **100 per cent** of our greenhouse gas emissions from our meetings and operations for the **9th year in a row!**

The Secretariat's complete data is available online under [Greening our Meetings](#)

By way of comparison, in 2022, the UN's operations and facilities emitted ~1.4 million tonnes of CO₂eq in total. While this is an increase of 12 per cent of UN system-wide greenhouse gas emissions compared to 2021, this is still lower than pre-COVID-19 and likely due to transitioning from COVID-19 working modalities.

7 UN entities, including the Montreal Protocol Ozone Secretariat, met or exceeded the criteria for implementing an **environmental management system**, well ahead of the 2025 target date set for EMS implementation. The Secretariat developed its EMS in 2021 and started implementing it during 2022. For further information click [here](#)

For any questions or more information, please contact our Environmental Sustainability Focal Point, [Stephanie Haysmith](#)

[UN Environment Programme, Ozone Secretariat, December 2023](#)

Image: UNEP Ozone Secretariat

See also [>>> UNEP OZONE 2023 End of Year Review](#) - Video

3. Cold storage and refrigeration

In this demanding era of efficient supply chains, requirements for well managed cold storages are increasing rapidly. With that backdrop, this article presents an overview of the measures required to handle the ever-growing complications of operations in this field...

Refrigeration refers to the process of cooling or lowering the temperature of an enclosed space or a substance to preserve and extend its shelf life. It involves removing heat from the space or substance to reduce its temperature. Refrigeration is used in various applications, including food preservation, medical storage, industrial processes, and air conditioning.



Cold storage, on the other hand, is a specific type of refrigeration system designed for the purpose of storing perishable items, such as food, pharmaceuticals, and other temperature-sensitive products, at a controlled low temperature. Cold storage facilities are equipped with refrigeration units and insulated walls to maintain a consistently cold environment, typically ranging from below freezing to a few degrees above freezing, depending on the specific requirements of the items being stored.

Cold storage facilities are essential for preserving the quality and safety of perishable goods by slowing down or inhibiting the growth of bacteria, yeast, and other microorganisms that cause spoilage. They are commonly used in the food industry to store fresh produce, dairy products, meats, seafood, and frozen foods. In the pharmaceutical industry, cold storage is crucial for storing vaccines, drugs, and other temperature-sensitive medical supplies.

Overall, refrigeration and cold storage play a vital role in preventing the deterioration of perishable items, extending their shelf life, and ensuring they remain safe for consumption or use.

How do refrigeration units in cold storage facilities work?

Refrigeration units in cold storage facilities work on the principle of the refrigeration cycle, which involves the compression, condensation, expansion, and evaporation of a refrigerant. Here's a simplified explanation of how these units maintain a consistently cold environment:

- **Compression:** The refrigeration cycle begins with a compressor. The compressor pressurizes the refrigerant gas, which causes its temperature to rise. This high-pressure, high-temperature gas is then sent to the condenser.
- **Condensation:** In the condenser, the hot refrigerant gas releases heat to the surrounding environment, typically through a series of fins and tubes. As a result, the refrigerant condenses into a high-pressure liquid state.
- **Expansion:** The high-pressure liquid refrigerant then passes through an expansion valve or a throttling device. This valve reduces the pressure of the refrigerant, causing it to expand rapidly. The expansion process leads to a drop in temperature and a partial change of the liquid refrigerant into a low-pressure mixture of liquid and vapour.
- **Evaporation:** The low-pressure refrigerant mixture enters the evaporator, which is located inside the cold storage area. As the refrigerant absorbs heat from the surrounding environment (including the items stored in the cold storage), it evaporates into a low-pressure vapour state. This process cools down the evaporator and the surrounding space.
- **Compression (again):** The low-pressure vapour refrigerant is then drawn back into the compressor, where the cycle starts again. The compressor increases the pressure and temperature of the vapour, repeating the refrigeration cycle.

By continuously circulating the refrigerant through this cycle, the refrigeration unit removes heat from the cold storage area and maintains a consistently cold environment. The refrigerant absorbs heat in the evaporator, releases it in the condenser, and repeats the process to sustain the desired low temperature in the cold storage facility.

The refrigeration system also includes components such as fans, filters, and controls to regulate the airflow, ensure proper filtration, and maintain the desired temperature and humidity levels within the cold storage facility.

What are some common types of refrigerants used?

Several types of refrigerants have been used in cold storage facilities over the years. However, due to environmental concerns and regulations aimed at reducing ozone depletion and greenhouse gas emissions, the use of certain refrigerants has been phased out or restricted. Here are some common types of refrigerants used in cold storage facilities:

- **Freon (chlorofluorocarbons, CFCs):** CFCs, such as R-12 (dichlorodifluoromethane), were commonly used as refrigerants in the past. However, they have been largely phased out due to their harmful impact on the ozone layer.
 - **HCFCs (hydrochlorofluorocarbons):** HCFCs, such as R-22 (chlorodifluoromethane), were introduced as alternatives to CFCs. However, HCFCs also have ozone-depleting potential, and their production is being phased out under international agreements.
 - **HFCs (hydrofluorocarbons):** HFCs have become widely used as replacements for CFCs and HCFCs due to their lower ozone-depleting potential. Common HFC refrigerants include R-134a, R-404A, R-407C, and R-410A. However, HFCs have a high global warming potential (GWP), contributing to climate change, so their use is also being phased down.
 - **Natural refrigerants:** Natural refrigerants are gaining popularity as environmentally friendly alternatives. These include:
 1. **Ammonia (R-717):** Ammonia is an efficient and widely used natural refrigerant in industrial refrigeration systems, including large cold storage facilities. It has excellent thermodynamic properties but requires careful handling due to its toxicity.
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2. **Carbon dioxide (R-744):** Carbon dioxide is another natural refrigerant gaining attention. It has a low environmental impact, zero ozone depletion potential, and a relatively low GWP. CO₂ refrigeration systems are used in some cold storage applications.
3. **Hydrocarbons (propane – R-290, isobutane – R-600a):** Hydrocarbon refrigerants are also being used in smaller cold storage units. They have low GWPs and zero ozone depletion potential. However, their flammability requires proper safety precautions.

It's important to note that the choice of refrigerant depends on factors such as the size of the cold storage facility, the desired temperature range, safety considerations, energy efficiency, and compliance with regulations and standards. Cold storage facilities are transitioning towards more sustainable refrigerants, with an emphasis on natural refrigerants and alternatives with lower GWP to minimize environmental impact.

What are the safety precautions required for handling ammonia?

Handling ammonia as a refrigerant requires strict adherence to safety precautions due to its toxic nature. Ammonia is a colourless gas with a pungent odour, and exposure to high concentrations can be hazardous to human health. Here are some safety precautions that should be followed when handling ammonia:

- **Training and knowledge:** Only trained and qualified personnel should handle ammonia refrigeration systems. They should have a thorough understanding of the properties, hazards, and safe handling procedures related to ammonia.
- **Personal Protective Equipment (PPE):** Individuals working with or around ammonia should wear appropriate PPE, including safety goggles, face shields, gloves, and protective clothing. The PPE should be chemical-resistant and provide adequate ventilation.
- **Ventilation:** Ammonia refrigeration systems must be installed in well-ventilated areas to prevent the accumulation of ammonia gas. Adequate ventilation helps maintain safe working conditions and prevents the buildup of potentially hazardous concentrations.
- **Leak detection and alarms:** Ammonia refrigeration systems should be equipped with leak detection sensors and alarms to promptly detect and alert personnel in the event of a leak. Regular maintenance and testing of these systems are crucial for their effectiveness.
- **Emergency response planning:** Facilities using ammonia refrigeration should have a comprehensive emergency response plan in place. This plan should include procedures for evacuating personnel, notifying emergency services, containing leaks, and providing medical assistance if needed.
- **Storage and handling:** Ammonia should be stored in designated, well-ventilated areas away from incompatible substances. Containers and piping systems should be properly labeled and maintained. When handling ammonia, it should be done in a controlled manner, avoiding spills and releases.
- **Monitoring and maintenance:** Regular monitoring and maintenance of ammonia refrigeration systems are essential to ensure their proper functioning and detect any potential issues. This includes inspecting equipment, checking for leaks, and verifying the integrity of valves and fittings.
- **Training for emergency response:** All personnel working with ammonia should receive training on emergency response procedures, including how to identify a leak, evacuate the area, and provide assistance to affected individuals.

It's important to consult and comply with local regulations, codes, and guidelines regarding the safe handling of ammonia as a refrigerant, as requirements may vary depending on the jurisdiction.

An overview of the cold supply chain sectors

The cold supply chain refers to the transportation, storage, and distribution of temperature-sensitive products in a controlled and refrigerated environment. It encompasses various sectors and industries

that play a crucial role in ensuring the integrity and safety of perishable goods throughout the supply chain. Here are some key sectors within the cold supply chain:

- **Food industry:** The food industry is one of the primary sectors within the cold supply chain. It includes agricultural producers, food processors, distributors, and retailers. Cold storage facilities are used to store and preserve a wide range of perishable food items, including fruits, vegetables, dairy products, meat, poultry, seafood, and frozen foods. The cold supply chain ensures that these products are transported and stored under controlled temperatures to maintain their freshness, quality, and safety.
- **Pharmaceuticals and healthcare:** The pharmaceutical industry relies on a cold supply chain to transport and store temperature-sensitive medicines, vaccines, biologics, and other healthcare products. Maintaining the required temperature conditions is vital to preserve the efficacy and stability of these products. Cold storage facilities, specialized containers, and temperature-controlled logistics are used to ensure the integrity of pharmaceuticals throughout their journey from manufacturing to distribution and ultimately to healthcare facilities and patients.
- **Biotechnology and life sciences:** The biotechnology and life sciences sectors involve the transportation and storage of biological samples, specimens, and research materials that require controlled temperatures. This includes samples for research, clinical trials, diagnostics, and genetic material. Cold supply chain solutions are critical to maintaining the viability and integrity of these sensitive materials.
- **Floral industry:** The floral industry relies on the cold supply chain to transport and store cut flowers, potted plants, and other ornamental plants. Cold storage facilities help preserve the freshness and extend the shelf life of flowers and plants, ensuring they reach customers in optimal condition. Temperature control is essential to prevent wilting and maintain the aesthetics and quality of floral products.
- **Chemical and industrial products:** Certain chemicals and industrial products, such as paints, adhesives, and certain raw materials, may require temperature-controlled storage and transportation to maintain their stability and quality. The cold supply chain ensures that these products are handled under appropriate temperature conditions to prevent degradation or alteration of their properties.
- **E-commerce and grocery delivery:** With the growth of e-commerce and online grocery delivery, the cold supply chain has become increasingly important. Companies in this sector rely on temperature-controlled logistics to deliver perishable food items and other temperature-sensitive products directly to consumers' doorsteps. This involves maintaining the cold chain during transportation and last-mile delivery to ensure product freshness and safety.

Overall, the cold supply chain sectors encompass a wide range of industries that rely on refrigeration, cold storage facilities, specialized transportation, and temperature monitoring systems to ensure the quality, safety, and integrity of temperature-sensitive products throughout the supply chain.

How do temperature-controlled logistics ensure freshness and safety?

Temperature-controlled logistics play a crucial role in ensuring the freshness and safety of perishable products during last-mile delivery, which refers to the final stage of delivery from a distribution center or retailer to the end consumer. Here are some key aspects of temperature-controlled logistics that help maintain the integrity of perishable products:

- **Insulated packaging:** Perishable products are packaged in insulated containers or packaging materials designed to maintain the desired temperature during transportation. These containers are often made of materials with good thermal insulation properties, such as Expanded Polystyrene (EPS) or Vacuum-Insulated Panels (VIPs). Insulated packaging helps to minimize temperature fluctuations and protect products from external temperature influences.
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- **Cold chain monitoring:** Temperature monitoring devices, such as data loggers or temperature sensors, are used to track and record the temperature conditions of the perishable products throughout the delivery process. These devices provide real-time data on temperature variations, allowing logistics providers to identify any deviations from the required temperature range. If a temperature excursion occurs, appropriate actions can be taken to mitigate the impact on product quality.
- **Refrigerated vehicles:** Temperature-sensitive products are transported in refrigerated vehicles, commonly known as 'reefers'. These vehicles are equipped with refrigeration units that maintain a controlled temperature environment during transit. Reefer trucks or vans are designed to provide insulation, airflow, and temperature control to ensure that perishable products remain within the desired temperature range throughout the delivery process.
- **Cold storage facilities at distribution centers:** Distribution centers that handle perishable products often have dedicated cold storage facilities. These facilities serve as intermediate storage points between the distribution center and the last-mile delivery vehicles. Products can be stored in these facilities under controlled temperature conditions until they are ready for loading onto refrigerated vehicles for final delivery.
- **Efficient routing and delivery scheduling:** Efficient route planning and delivery scheduling are essential in temperature-controlled logistics. These processes aim to minimize transit time and optimize delivery routes to ensure that perishable products spend as little time as possible outside the desired temperature range. By minimizing delays and keeping delivery times efficient, the freshness and safety of perishable products are preserved.
- **Trained personnel:** Delivery personnel involved in last-mile delivery of perishable products are often trained in proper handling procedures, including the importance of maintaining temperature control. They understand the significance of handling packages with care, avoiding exposure to extreme temperatures, and following specific instructions provided by the sender to ensure product integrity.

By integrating these elements into last-mile delivery operations, temperature-controlled logistics help maintain the freshness, quality, and safety of perishable products until they reach the end consumer. This ensures that consumers receive products that meet their quality standards and comply with safety regulations.

Are there any specific regulations or guidelines?

Yes, there are specific regulations and guidelines that govern temperature-controlled logistics for perishable products to ensure the safety and quality of these products throughout the supply chain. Here are some examples:

- **Good Distribution Practice (GDP):** GDP guidelines provide standards for the storage and distribution of pharmaceutical products, including temperature-sensitive medicines. These guidelines outline the requirements for maintaining the integrity of pharmaceutical products during transportation, storage, and last-mile delivery. They cover aspects such as temperature control, monitoring, documentation, personnel training, and quality management systems.
 - **Hazard Analysis and Critical Control Points (HACCP):** HACCP is a systematic approach to identify, evaluate, and control food safety hazards. HACCP principles are applied to temperature-controlled logistics in the food industry. They involve assessing the critical control points related to temperature control, implementing measures to prevent or address temperature deviations, and ensuring proper documentation and monitoring throughout the supply chain.
 - **International Safe Transit Association (ISTA):** ISTA provides guidelines for packaging and transportation testing of temperature-sensitive products. These guidelines define standards for packaging materials, testing protocols, and performance criteria to ensure that packaged products can withstand the rigors of transportation and maintain the desired temperature range.
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- **National and international regulations:** Various national and international regulations govern temperature-controlled logistics for perishable products. For example, the United States Food and Drug Administration (FDA) has regulations in place, such as the Food Safety Modernization Act (FSMA), which includes provisions for the safe transportation of food, including temperature control. Similarly, the European Union has regulations like the EU Good Distribution Practice (EU GDP) guidelines that apply to the pharmaceutical industry.
- **Industry standards:** Industry organizations and associations often develop standards and guidelines specific to temperature-controlled logistics. For instance, the International Air Transport Association (IATA) publishes the Perishable Cargo Regulations (PCR) that provide guidance on handling and transporting perishable goods by air, including temperature control requirements.

It's crucial for organizations involved in temperature-controlled logistics to be familiar with and comply with these regulations and guidelines to ensure the safety, quality, and integrity of perishable products. Compliance helps mitigate risks, maintain product efficacy, and meet customer expectations while adhering to legal and industry requirements.

An overview of warehousing

Warehousing is an essential component of the supply chain that involves the storage, management, and distribution of goods. It refers to the physical facilities and infrastructure where products are stored, organized, and prepared for further transportation or fulfillment. Warehousing plays a crucial role in ensuring efficient inventory management, order fulfillment, and overall logistics operations. Here are some key aspects of warehousing:

- **Storage and inventory management:** Warehouses provide secure and organized storage spaces for goods. They are designed with different types of storage systems, such as pallet racks, shelving units, bins, or specialized storage facilities for specific products. Warehouses facilitate inventory management by receiving, inspecting, labeling, and cataloging incoming products. They also enable efficient stock rotation to ensure proper inventory turnover and minimize obsolescence.
 - **Order fulfillment:** Warehouses serve as the central hub for order processing and fulfillment. They receive orders, pick the required items from the inventory, pack the products, and prepare them for shipping. Warehouses often incorporate automated systems, such as conveyors, sorters, and barcode scanners, to streamline the order fulfillment process and improve efficiency.
 - **Cross-docking:** Cross-docking is a warehousing technique where products are received, sorted, and immediately transferred to outbound transportation without long-term storage. This method minimizes the time products spend in the warehouse, allowing for faster order processing and reduced inventory holding costs. Cross-docking is commonly used for perishable products or products with high demand and quick turnover.
 - **Value-added services:** Warehouses often provide value-added services to enhance customer satisfaction and meet specific requirements. These services may include labeling, kitting, assembly, customization, product inspection, or repackaging. Value-added services are particularly important for industries like e-commerce, where additional processing is often required before products are shipped to customers.
 - **Inventory tracking and technology:** Warehouses employ various technologies to track and manage inventory effectively. This includes barcode or RFID (Radio Frequency Identification) systems for accurate product identification and tracking. Warehouse Management Systems (WMS) or inventory management software are used to monitor inventory levels, track stock movements, and optimize warehouse operations.
 - **Security and safety:** Warehouses prioritize security measures to protect stored goods from theft, damage, or unauthorized access. This includes security systems, restricted access areas, surveillance cameras, and inventory control measures. Safety protocols are also implemented to ensure a safe working environment for warehouse personnel, including
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proper training, equipment maintenance, and adherence to occupational health and safety regulations.

- **Location and distribution network:** Warehouse location is a critical consideration in supply chain design. Warehouses are strategically placed to optimize transportation routes, reduce delivery times, and minimize transportation costs. They are often part of a larger distribution network, with multiple warehouses strategically located to provide regional coverage and support efficient order fulfillment to different customer locations.
- **Reverse logistics:** Warehouses also handle reverse logistics, which involves processing returns, repairs, or product recalls. Reverse logistics in warehousing includes inspecting returned products, determining the disposition (e.g., resale, refurbishment, disposal), and managing associated documentation and inventory adjustments.

Efficient warehousing operations contribute to a smooth and effective supply chain by ensuring timely product availability, accurate order fulfillment, and streamlined logistics processes. The design and management of warehouses are optimized to meet customer demands, maximize storage capacity, minimize costs, and maintain the quality and integrity of stored goods.

What are some common challenges in warehouse management?

Warehouse management involves numerous challenges that can impact the efficiency and effectiveness of operations. Some common challenges faced in warehouse management include:

- **Space utilization:** Optimizing warehouse space is a significant challenge. Balancing the need for storing a diverse range of products while maximizing storage capacity requires effective space utilization strategies, such as efficient layout design, proper slotting, and dynamic storage solutions. Limited space availability can lead to congestion, inefficient picking routes, and difficulties in accommodating inventory fluctuations.
 - **Inventory accuracy:** Maintaining accurate inventory records is crucial for efficient warehouse management. Challenges such as discrepancies between physical stock and system records, inaccurate product labeling, or errors in data entry can lead to inventory inaccuracies. These discrepancies can result in stockouts, order fulfillment delays, or excess inventory, affecting customer satisfaction and operational efficiency.
 - **Order picking and fulfillment:** The process of order picking, where items are selected and assembled for customer orders, can be complex and time-consuming. Challenges in optimizing order picking routes, managing different order priorities, and balancing order volumes can impact productivity and order fulfillment speed. Efficient order picking methodologies, such as batch picking or zone picking, are essential to overcome these challenges.
 - **Workforce management:** Workforce management is critical in warehouse operations. Challenges include labour shortages, seasonal fluctuations in demand, and ensuring proper training and skill development for warehouse personnel. Balancing staffing levels, managing employee productivity, and fostering a safe and motivated workforce are ongoing challenges in warehouse management.
 - **Technology integration:** Implementing and integrating Warehouse Management Systems (WMS), barcode scanning, automation, and other technologies can be a challenge. Compatibility issues, data integration, and training employees to effectively use the technology are common obstacles. However, leveraging technology can provide significant benefits by improving accuracy, efficiency, and visibility in warehouse operations.
 - **Supply chain complexity:** Warehouse management is often part of a larger supply chain network, which introduces complexities related to coordinating inbound and outbound logistics, managing multiple suppliers, and synchronizing operations with other supply chain partners. Aligning warehouse processes with broader supply chain strategies and maintaining effective communication and collaboration with stakeholders are essential challenges to address.
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- **Seasonal demand and peak periods:** Warehouses often experience peak periods, such as during holiday seasons or promotional events, which require handling increased order volumes and managing seasonal demand fluctuations. Challenges include planning for additional capacity, managing temporary staff, and ensuring timely order fulfillment during high-demand periods.
- **Regulatory compliance and safety:** Warehouses must comply with various regulations and safety standards, including occupational health and safety regulations, hazardous material handling requirements, and food safety regulations. Ensuring compliance, conducting regular safety inspections, and implementing appropriate safety protocols are essential challenges for warehouse management.

Addressing these challenges requires a proactive approach, continuous process improvement, and the adoption of best practices in warehouse management. By implementing effective strategies, leveraging technology, and fostering a culture of continuous improvement, warehouses can overcome these challenges and optimize their operations.

Cooling India, 8 January 2024, By Aman Taluja

Image: Cooling India website - by Freepik

See also >>>

- [Three Degrees of Change, Frozen food in a resilient and sustainable food system](#) - Summary report & initial findings, November 2023
- [Adjusting Frozen Food Temperature Could Reduce Carbon Emissions While Improving Food Security, Researchers Say](#), EcoWatch, December 2023

4. The social costs of hydrofluorocarbons and the benefits from their expedited phase-down

Abstract

Hydrofluorocarbons are a potent greenhouse gas, yet there remains a lack of quantitative estimates of their social cost.

The present study addresses this gap by directly calculating the social cost of hydrofluorocarbons (SC-HFCs) using perturbations of exogenous inputs to integrated assessment models. We first develop a set of direct estimates of the SC-HFCs using methods currently adopted by the United States Government and then derive updated estimates that incorporate recent advances in climate science and economics. We compare our estimates with commonly used social cost approximations based on global warming potentials to show that the latter is a poor proxy for direct calculation of hydrofluorocarbon emissions impacts using integrated assessment models.

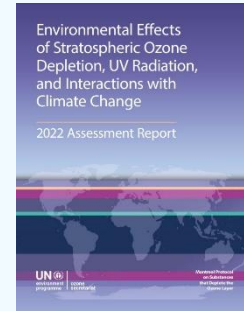
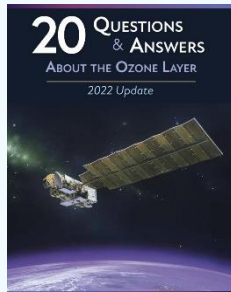
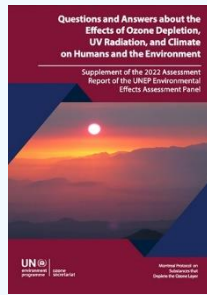
Applying our SC-HFCs to the Kigali Amendment, a global agreement to phase down HFCs, we estimate that it provides US\$₂₀₂₀37 trillion in climate benefits over its lifetime. Expediting the phase-down could increase the estimated climate benefits to US\$₂₀₂₀41 trillion. [...]

Authors: Tammy Tan, Lisa Rennels & Bryan Parthum

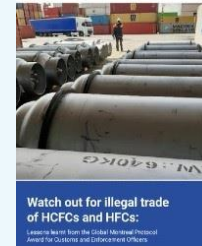
Nature Climate Change, volume 14, 3 January 2024, pages 55–60

Image: Nature Climate Change





Watch out for Illegal Trade of HCFCs and HFCs: Lessons learnt from the Global Montreal Protocol Award for Customs and Enforcement Officers. This publication provides an analysis of the cases submitted in the context of the **Global Montreal Protocol Award for Customs and Enforcement Officers**. The Global Award was launched in 2018 by UNEP OzonAction. This Global Award is intended to raise awareness about the Montreal Protocol and to recognise customs and enforcement officials for their efforts in preventing and combating illicit traffic in Montreal Protocol and Kigali Amendment-regulated substances. Ozone-depleting substances (ODS) include hydrochlorofluorocarbons (HCFCs) and other compounds with a high Global Warming Potential (GWP), particularly hydrofluorocarbons (HFCs).



UNEP OzonAction, ASHRAE, April 2023 Fact sheet: Update on New Refrigerants Designations and Safety Classifications. The purpose of this fact sheet is to provide an update on ASHRAE standards for refrigerants and to introduce the new refrigerants that have been awarded an «R» number over the last few years and introduced into the international market.



Sustainable cold chains: Virtual Exhibition - The virtual exhibition for sustainable cold chains aims to highlight the critical role of cold chains in ensuring food safety and security, access to vaccines, reducing global warming and preventing ozone layer depletion.

The exhibition showcases commercially available cold chain technologies for food and vaccines, mainly targeting applications and equipment with refrigeration and cooling cycles that use ozone and climate-friendly refrigerants and have enhanced energy efficiency characteristics. It also aims to promote game-changing and systemic approaches, relevant initiatives, and not-in-kind solutions to cold chains

These technologies and approaches directly contribute to meeting national obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer including its Kigali Amendment and the Paris Agreement on Climate Change. Sustainable cold chain contributes to the achievement of many **Sustainable Development Goals**.

The exhibition is ongoing and continuously updated with submissions accepted on a rolling basis. The partners of the exhibition will continue promoting the exhibition at all relevant events and throughout 2022 and beyond.

Click [here](#) for more information / submit a nomination >>>

Image: Sustainable cold chains website



Categories



1 exhibit
On site post-harvesting
and/or precooling
applications



6 exhibits
Storage of product, e.g.,
large warehouses /
Distribution centers



0 exhibits
Storage on board ships,
aircraft, and containers



4 exhibits
Food processing plants



1 exhibit
Transport (large and
smaller trucks, smaller
containers)



6 exhibits
Supermarkets (wholesale
markets & Retailers)



1 exhibit
Food services
(Restaurants, cafes,
tourism facilities, etc)



2 exhibits
Vaccines and other
pharmaceutical
products



0 exhibits
Game-changing and
systemic approaches

AFRICA

5. Approval of the first-ever Kigali Implementation Plan for Cameroon by the Multilateral Fund

Interview

Hyacinth Mboh, Director, Standards and Control, Ministry of Environment, Protection of Nature and Sustainable Development, Cameroon, and National Ozone Officer speaks on the approval of the first-ever Kigali Implementation Plan for Cameroon by the Multilateral Fund.

Cameroon became the first country to get the Kigali Implementation Plans approved by the Executive Committee of the Montreal Protocol in June 2023. When did UNIDO examine the potential of Cameroon as capable of submitting the plan and how did it all begin?

The process began during the time we started the exchange of ideas with UNIDO over the last few years. During these exchanges, we came to realize the biggest problems facing the country—challenges in having the right data; having correct policy instruments in place; having an impact on the consumption patterns; without any checks in system; among others. For example, while the import of Hydrofluorocarbons (HFCs) into Cameroon had no restrictions, the Hydrochlorofluorocarbons (HCFCs) were strictly controlled. There was no quota system for the HFCs. There was an urgent need for the right policies to be in place.

There were issues to be addressed both from the policy side: the regulations, quota system, licensing system, and the enforcement mechanism; as well as the consumption side: the enterprises, and the importers, etc.

Can you explain the KIP preparation? How did the national office support the process?

We saw the potential of Cameroon based on the similar things we had done before in the area of climate action. This gave us the needed energy to process the issues in Cameroon—looking at the country's priorities, overall development goals where both the domestic and commercial sector was involved. A workshop conducted in Douala with all the stakeholders led us to a direction we should pursue. After our later meeting and deliberations with UNIDO officials, we became confident to talk more about the scientific processes and the points to ponder were shortlisted.

Based on the data collected on the consumption patterns, we could estimate where the priorities in our preparation could be. We mapped the consumption of each sector—from domestic, commercial to the firefighting sector. This gave us a clear picture of the consumption patterns in the country and helped us prioritize.

With the active support of the government, we initiated the process and thanks to the specialists' team that was a part of the National Ozone Unit, the data collection was possible. We presented different scenarios based on the data collected, to the Minister of Environment, Protection of Nature and Sustainable Development, Hele Pierre who was always supportive and was aware of the situation. Then we looked at each priority area in finer detail—the policy regulation for that sector and implementation, the issues concerning safety, etc.

Gender comprises of an important component of the plan. How do you plan to ensure more representation of women in the sector?

One of the important issues that came up in our priority areas was the inclusion of gender. We needed to look at the long-term goals of the country—to have more representation of women in the sector. We wanted to encourage women's participation in the planning process. We incorporated gender sensitization activities involving gender trainers. We work with schools and our specialists are involved in curricula development in the area of technical education pertaining the Refrigeration and Air Conditioning (RAC) sector. We are recruiting women as trainers and encouraging investors to bring women into the field. We are also considering scholarship schemes for girl students in Cameroon to pursue education in the RAC sector, like the Charity Mbapek Scholarship in Nigeria—to build a strong pool of women technicians in the country.

How did you manage the challenge of data availability? Did Cameroon maintain any database(s) that made preparing the KIP easier?



It was quite challenging to clearly demarcate the consumption patterns across various sectors—whether domestic, residential or industrial.

We had a list of approved importers—who were in most cases, the same actors involved in various sectors. We also had a flexible line and we tied our limit to 28 importers. We had extensive consultations with various stakeholder institutions based on our earlier work. This was very helpful to help us understand the distribution of the baseline values within various sectors. We were also in touch with the experts for the exact requirements for the KIP during the preparation process. All these factors have helped us come out with a final baseline.

Some may express doubts on the accuracy of the values. However, the process was very transparent, and one could examine our data.

What were the steps involved in the preparation of the KIPs—from the conception to the final approval? How did you prioritise the different areas?

The main steps in our KIP preparation process were:

1. Collecting data: Because of the circumstances explained above, we were able to collect the required data, which is critical in the preparation process. The data was properly classified and consumption patterns were derived. This helped us in finalizing the baseline values.
2. Documentation and review: We had a regular exchange of various documents and templates, which were reviewed, by our experts and various stakeholders, leading to refinement of the plans from the national level.
3. Critical examination and review: Our team was bold enough to submit our work to be critically examined and reviewed by the Multilateral Fund secretariat, which collaborated in our preparation plan throughout the process. We received numerous questions and because of our robust working relationship, we had prolonged discussions on numerous issues and suitable modifications where needed.
4. Addressing newer questions: As newer questions came up during the preparation process, we tried addressing and incorporating, with an aim at constantly striving for better plan.
5. Commitment: I believe that the entire team involved in the preparation was very highly motivated in doing what they envisaged. Support from UNIDO Project Managers, especially Fukuya Iino was very encouraging and kept us motivated in the preparation process.

What were the comparative advantages in Cameroon for KIP? What challenges did you face and how did you address them?

The comparative advantages were that Cameroon's national unit had worked on projects earlier and the team was aware of the challenges and the advantages. Complemented to this was experienced

international experts like Bassam Elssaad who brought in their insights and knowledge. The Ministry of Environment was supportive and the numerous training sessions for the technicians helped us to get accurate data. Our plan was also pioneering and visionary that it incorporated the gender aspect. Due emphasis was given to train more female technicians and have considerable representation in the planning and programming aspects. All these were some of the advantages.

The challenges faced were mainly in exact classification of the usage data under each sector. For example, the mobile air-conditioning sector (MAC) the country witnessed 50-80 percent leakages. We focused on the recovery actions so that the MAC sector could plug the leakages as much as possible, to achieve the target. If one looks at the structure of our project, policy enforcement remains a key issue. In the management of refrigerants, there are also national issues like safety, security, energy efficiency and gender—issues we sought to address in our plan.

We also face challenges on how to direct the market towards the gases with low Global Warming Potential (GWP) because they are scarce and expensive. If the global Community can find a solution on how these products could reach and be promoted on the African continent, it can go a great way in attaining compliance.

The issue of refrigerant management in the country is incomplete without mentioning synergies. We now have to address not only the R-22 gas, but also seven other chemicals. There are numerous blends, and we need strong policies and their enforcement mechanism to comply with the requirements. There is also a need for the harmonization of laws. With the new equipment entering the market, there is a need to establish a Minimum Energy Performance Standards (MEPS) through the national standards and quality control agency. This will also lead to the standardization of the labelling systems.



We have prepared plans for various sectors and stakeholders and the parties involved are ready to support. Since many sectors are involved, we need to face big challenges. The effects will be felt everywhere. Our plan was also ambitious in the sense that we started on an early quota system. Aiming to freeze our consumption levels by 2024-25 gives indications of the seriousness on our part.

What are the key lessons learned from this process and what are your recommendations for the countries that are now developing their KIP proposals?

Some important lessons learnt from our experience are as follows.

1. Have the right strategy: respond to the needs as to how to meet the compliance requirement
 2. Involve a wide range of actors: involve all and not just the direct stakeholders.
 3. Awareness and sensitization issues: we advocated labels and stickers to be displayed on the cooling equipment so that the people are made aware of the issues well in advance. Some indicator labels on the product help the customer to make the right choices.
 4. Working with the servicing shops: this was essential to collect the data—from both the assembling plants as well as the installation firms.
 5. Focus on the assembling sector: The big industries producing RAC equipment are facing challenges from various imported products. The Multilateral Fund was asking us data on assemblage.
 6. Record losses due to absence of recycling and recovery facilities: we provided recovery machines and this helped us move towards compliance. The loss values now are close to 20%.
 7. Stay in compliance: releasing without any regulations is not profitable for anyone.
 8. Baseline studies in Cameroon: a baseline study is being done on how RRR could be achieved. The early trends indicate positive role and profits.
-

Suggestions to other countries:

1. Emphasize and manage on gathering correct data
2. Involve the stakeholders from the beginning
3. Ensure proper regulations are in place
4. Licencing and quota system: Involve all of the important stakeholders and encourage them to come onboard to prioritise the sectors.
5. Be open to learning based on the results

We are willing to provide any further inputs and suggestions based on our experiences, to the countries if they need. I wish them the best in their pursuit of sustainable policies and climate actions.

More UNIDO video on Kigali Implementation Plan (KIP) Cameroon:



UNIDO Montreal
12 December 2023

Protocol newsletter,
issue

Images: UNIDO

LATIN AMERICA AND CARIBBEAN

6. Cuba shows progress in ozone layer protection

HAVANA, Cuba, Jan 3 (ACN) Cuba has made progress in 2023 with a view to eliminating all hydrochlorofluorocarbon (HCFC) gases by 2030 and is drawing up a plan to do the same with chlorofluorocarbons, widely used in refrigeration, foams and aerosols, and in the production of new products.



An annual summary of the Ozone Technical Office (OTOZ) confirmed compliance with the country's commitments to the Montreal Protocol, in the sense that the reduction of HCFCs reached 35 % in their import values, regulated by the latter and even below the established.

According to the report, they promoted the implementation of the Kigali amendment to the Montreal Protocol, in which the resolution of chemical substances for the licensing system is applied and the Office of Regulation and Environmental Safety, of the Ministry of Science, Technology and Environment (CITMA by its Spanish acronym), issued the corresponding resolution on the quota system for HFCs.

The United Nations General Assembly selected September 16, 1994 for the celebration of the International Day for the Preservation of the Ozone Layer, coinciding with the signing of the Montreal Protocol in that city, the largest in the province of Quebec, Canada, to which Cuba has been a signatory since 1992, as well as its Kigali Amendment, capital of Rwanda.

The Kigali Amendment came into force on January 1, 2019, to establish that over the next 30 years the projected production and consumption of HFCs be reduced by more than 80 %.

With full implementation, it can avoid up to 0.4 degrees Celsius of global warming by the end of this century, while continuing to protect the ozone layer.

[Agencia Cubana de Noticias \(ACN\), 3 January 2024](#)

Image: ACN

Vanuatu's Case Study on Integrating ODS/HFC Module into the National Single Window System - The National Single Window is a centralized system that links all relevant government approving authorities and acts as a 'one-stop-shop' where importers and exporters may submit applications electronically including information and all required paperwork to support the application and approval process. [Read/Download the Factsheet >>>](#)

[UN Environment Programme, OzonAction, July 2023](#)



Recognition of Prior Learning Scheme for Refrigeration and Air-Conditioning Servicing Technicians in Mongolia - The Recognition of Prior Learning (RPL) process can help those in the industry acquire a formal qualification that matches their knowledge and skills and thereby contributes to improving their employability, mobility, and lifelong learning. RPL can make a significant contribution to providing the relevant learning framework necessary for the present and ongoing maintenance of a quality workforce, especially in the RAC servicing sector. In Mongolia, the RPL process has been rolled out in over 30 TVET trades in the construction, mining, and other sectors, including apparel and culinary etc. Mongolia initiated the RPL scheme for RAC servicing technicians as part of their implementation of the HPMP in cooperation with various national stakeholders.

[Read/ Download the Factsheet >>>](#) [UN Environment Programme, OzonAction, July 2023](#)



ASIA AND THE PACIFIC

7. Australia and UNEP train 12 Pacific Island Countries on good servicing practices in RAC sector

Melbourne, Australia 11 – 15 December 2023 –

United Nations Environment Programme (UNEP) OzonAction Asia Pacific Compliance Assistance Programme (CAP) team in collaboration with the Government of Australia and the Air-Conditioning & Refrigeration Equipment Manufacturers Association of Australia (AREMA) jointly organized the Second Training-the-Trainers Workshop on Good Servicing Practices (GSP) in Refrigeration and Air-Conditioning (RAC) Sector. The workshop contributes to enabling the 12 Pacific Island Countries (PICs) to completely phase out of remaining hydrochlorofluorocarbon (HCFC) consumption.

As part of the Regional HCFC Phase-out Management Plan or HPMP implementation, 12 PICs comprising Cook Islands, Kiribati, Marshall Islands, Micronesia, Palau, Nauru, Niue, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu are obligated to completely phase out the remaining HCFC consumption by 1 January 2030. The Government of Australia invited UNEP to join hands in the implementation of its component, which is related to RAC technician training and certification.

With an emphasis on strengthening technical expertise, the second training workshop aimed to equip the newly nominated master trainers from the PICs with the requisite knowledge and skills to effectively implement Good Servicing Practices in the RAC sector through extensive theoretical and practical training delivered by experienced trainers of Australia.

“The workshop was fantastic, we really learned and appreciated being part of these new changes in the RAC industries and this workshop. The trainers were very knowledgeable, and our knowledge and skills gained were practical. The institution has the best resources for us to learn and exercise hands-on. We learnt tremendously about the new refrigerants, technologies, and RAC equipment,” said the group of newly nominated master trainers of technicians.

Gained expertise will be utilized to support the National Ozone Officers in the planning and delivery of GSP training to local RAC technicians under their national HPMP. The new master trainers are expected to strengthen their capacities and skills and be sensitized on a) GSP procedures and techniques, including handling emerging alternative technologies, recovery of refrigerants, enhancing/maintaining energy efficiency, b) operation and maintenance of RAC servicing tools to allow them to properly handle RAC equipment, and c) effective approach for delivery of GSP training for local RAC technicians.

A total of 20 participants attended the training workshop including 13 RAC master trainers nominated by the National Ozone Unit (NOU), resources persons, and UNEP CAP staff.





UNEP CAP team expressed its appreciation to the Government of Australia, AREMA, and the PICs for their active presence, participation, and contribution to the training. Their determined dedication to upholding the Montreal Protocol and acquired knowledge and skills will equip them to make greater impacts within their respective countries. The training was supported by UNEP OzonAction CAP team, Asia and the Pacific Office as part of the HPMP funded under the Multilateral Fund.

Contact: [Pipat Poopeerasupong](#), Montreal Protocol Programme Management Officer Southeast Asia/ Pacific Island Countries Network CAP, Asia and Pacific Office

Image: UNEP OzonAction

8. Rules tightened to better guard ozone layer

Chinese Premier Li Qiang has signed an amendment to a regulation overseeing ozone-depleting substances, as the country strives to implement the Montreal Protocol on Substances that Deplete the Ozone Layer, according to a media release from the State Council, the nation's Cabinet.

The amendment rules that enterprises that generate ODS incidentally in their production process should not discharge the substances directly. Instead, they should dispose of them in an environmentally friendly manner.

It also stipulates that companies that produce and consume such substances in large quantity and those that generate a large amount of ODS incidentally should install automated monitoring devices, which will be connected to the monitoring systems of environmental authorities.

There will also be stiffer penalties for violations, according to the release.

It said companies that receive administrative penalties for violating the regulation will have their misconduct included in their credit records, and the violations will be made public.

Finalized in 1987, the Montreal Protocol came into effect in 1989. Parties then agreed on the Kigali Amendment to the protocol in 2016, which aims to gradually reduce the consumption and production of hydrofluorocarbons, based on the consensus that they are powerful greenhouse gases.

ODS were once widely used in foam-blowing agents and refrigerants. Given their zero impact on the depletion of the ozone layer, HFCs are used as replacements for some of the substances that have such an effect.



© 视觉中国
A file photo shows air pollution in Beijing. [Photo:VCG]

According to the release, under the revised rules, the definition of ODS was changed through the removal of some descriptive words, allowing HFCs to also be covered by the regulation.

At an event held on Sept 14 to celebrate the International Day for the Preservation of the Ozone Layer, Zhao Yingmin, vice-minister of ecology and environment, said China has accomplished data verification in the HFC sector. It has worked out a plan to cap the production and consumption of such substances and will distribute the allowances in 2024.

The International Day for the Preservation of the Ozone Layer falls on Sept 16 every year.

The vice-minister said China will fully implement an allowance-based HFC management mechanism to ensure it can realize its HFC control target this year.

He also said China has phased out roughly 628,000 metric tons of ozone-depleting substances, which represent over half the contributions made by developing nations.

China's efforts to phase out ODS from 1991 to 2020 avoided the emissions of greenhouse gases equivalent to 26 billion tons of carbon dioxide.

[China Daily, 8 January 2024, By Hou Liqiang](#)

Image: China Daily

NORTH AMERICA

9. Washington State Sets Stricter GWP Limits for Refrigerants in New Commercial and Industrial Refrigeration Systems

Washington State has banned the sale of refrigerants with a GWP of more than 150 for new and retrofit commercial and industrial refrigeration as well as refrigerants with a GWP of more than 750 for new and retrofit industrial chillers, with effective dates in 2025 and 2029, according to new regulations.



The law authorizing the regulations, originally signed by Governor Jay Inslee in May 2021, is an attempt to rein in HFC emissions, which account for 4% of Washington's greenhouse gas emissions according to the state's Department of Ecology.

The regulations apply to refrigeration systems that use more than 50lbs (22.7kg) of refrigerant. For new equipment, it takes effect January 1, 2025. The selling and leasing of equipment subject to the regulation but manufactured before it went into effect will be allowed until January 1, 2026. Retrofitted equipment will not be subject to the regulation until January 1, 2029.

The 150-GWP limit applies to new and retrofit supermarket systems as well as cold storage and industrial processing systems (excluding chillers) and new ice rinks (including chillers).

The law also covers the residential sector and sets a limit of 750 GWP on refrigerants in new and retrofit air conditioners, heat pumps and dehumidifiers. For new room air conditioners, this took effect January 1, 2024; for retrofit air conditioners, it will take effect January 1, 2029.

Washington's HFC regulation is modeled after a 2020 California regulation. More recently, under the American Innovation and Manufacturing (AIM) Act, the Environmental Protection Agency set similar restrictions on GWPs for HVAC&R equipment.

In addition to regulating manufacturers, operators of large stationary air conditioners and refrigeration systems are required to record their HFC usage and take measures to repair leaks. These provisions will be enforced through a new refrigerant management program overseen by the Department of Ecology.

"The new refrigerant management program will address the approximately 3.4 million metric tons of carbon dioxide equivalent that leak into the atmosphere every year," the Department of Ecology said in a July 2023 article in the Center Square Washington. "That's equivalent to what comes out of the tailpipes of about 740,000 cars. While HFCs pose a real risk to the climate, the good news is that safer alternatives are readily available. Many manufacturers have already made the switch."

Usage fees in 2026

Under the new law, businesses that continue to use existing refrigeration or air-conditioning systems with more than 200lbs (90.7kg) of refrigerant with a GWP greater than 150 will be subject to fees beginning in 2026.

Operators of refrigeration equipment that uses between 200 and 1,499lbs (679.9kg) of refrigerant will pay annual fees of \$170, while systems requiring 1,500lbs (680.4kg) of refrigerant or more will owe a one-time fee of \$150 and an annual fee of \$370. The funds will be used to administer the refrigerant management program.

The Department of Ecology has set leak rate thresholds for commercial operators using equipment with more than 50lbs of refrigerant. The thresholds use a 12-month rolling average, with businesses required to calculate leaks every time they're inspected for them or when new refrigerant is added. Those thresholds are:

- 16% percent for commercial or retail refrigeration
- 24% percent for industrial process refrigeration
- 8% percent for air-conditioning

Businesses will be required to report all leaks to the Department of Ecology and, starting in 2024, will have to complete repairs within 14 days using a certified technician or within 45 or 120 days if an allowance is granted.

Speaking to Seattle's KUOW Public Radio, Leonard Machut, HFC Unit Implementation Supervisor at the Department of Ecology, detailed the objectives of the refrigerant management program.

"The goal here really is to allow those systems to continue operating through their natural lifespan because they are obviously significant investments for a business, but doing so in a way that is minimizing the amount of refrigerant that's leaking out of them," said Machut.

[Ammonia21, 9 January 2024, By Michael Hines](#)

Image: Ammonia21 - Washington State Governor Jay Inslee speaking at an event at the Deschutes Estuary in Washington. Source-Governor Jay Inslee on Flickr

EUROPE & CENTRAL ASIA

10. Romania Chilled: 50 Tonnes of Illegal Refrigerant Seized at Constanta Port

Romanian authorities have dealt a major blow to the illegal refrigerant trade, intercepting a massive 50-tonne shipment of R134a at the Black Sea port of Constanta. This haul, representing thousands of cylinders of the banned ozone-depleting substance, marks a significant victory in the fight against environmental damage and unfair market practices.



Chilling Details

The haul: Four containers crammed with 4,136 12kg cylinders of R134a were detained, raising concerns about a potential smuggling ring exploiting international trade routes.

The culprit: While details remain under investigation, the importing company reportedly lacked the necessary quotas for such a large quantity of refrigerant.

The threat: R134a, once widely used in refrigerators and air conditioners, is a potent greenhouse gas banned under the Montreal Protocol for its role in depleting the ozone layer.

The implication: This illegal shipment not only posed an environmental threat but also threatened fair competition for legitimate refrigerant distributors operating within legal limits.

Constanta Steps Up

Joint effort: The discovery was a product of a coordinated operation involving the Constanta Environmental Guard, coast guard, and customs officials, highlighting Romania's commitment to combatting environmental crimes.

Previous action: This isn't the first time Romanian authorities have cracked down on illegal refrigerant imports. In April 2023, border police seized another 12 cylinders of R134a in a separate incident.
Deterrent effect: This operation sends a strong message to potential smugglers that Romania is vigilant in protecting its borders and enforcing environmental regulations.

Beyond the Bust

Environmental considerations: The seized R134a will be properly disposed of or recycled, preventing its harmful release into the atmosphere.

Market implications: The seizure disrupts illegal supply chains and protects legitimate businesses who play by the rules.

Future vigilance: While this is a win for environmental protection, Romanian authorities and international partners must remain vigilant against future attempts to smuggle illegal refrigerants.

A Chill in the Air, but Hope for the Future

The interception of this massive shipment shows Romania's unwavering commitment to safeguarding its environment and upholding international environmental agreements. It serves as a reminder that collective action and vigilance are crucial in tackling the illegal trade in harmful substances. While the chill of this bust may still linger, it carries a ray of hope for a future where environmental protection takes center stage in global trade practices.

[HVACR global, 6 January 2024](#)

Image: HVACR global

11. AREA: Women in cooling video competition- 2nd edition!

AREA and [World Refrigeration Day](#) (WRD) have launched the second edition of the video competition on best practices for EU women in cooling.



The challenge is to provide a video showing best practices in the design and application of RACHP systems and/or handling of refrigeration, air conditioning or heat pumps.

The video must be posted privately on [AREA's Facebook page: "AREA"](#)

or sent to info@area-eur.be

by **Sunday 7th of April 2024 at midnight.**

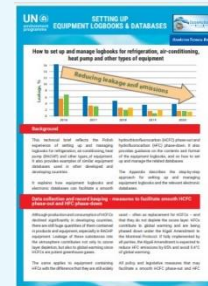
All European languages are welcome. Good luck to our EU women in cooling!

[Learn more / Apply >>>](#)

[Air conditioning and Refrigeration European Association \(AREA\), October 2023](#)

Image: AREA

How to set up and manage logbooks for refrigeration, air-conditioning, heat pump and other types of equipment - Background: This technical brief reflects the Polish experience of setting up and managing logbooks for refrigeration, air-conditioning, heat pump (RACHP) and other types of equipment. It also provides examples of similar equipment databases used in other developed and developing countries. It explains how equipment logbooks and electronic databases can facilitate a smooth hydrochlorofluorocarbon (HCFC) phase-out and hydrofluorocarbon (HFC) phase-down. It also provides guidance on the contents and format of the equipment logbooks, and on how to set up and manage the related databases. The Appendix describes the step-by-step approach for setting up and managing equipment logbooks and the relevant electronic databases. **This factsheet is available in [English](#) and [Russian](#).**

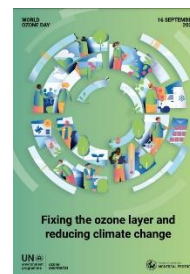


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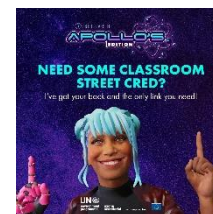
Overview for the meetings of the ozone treaties - Click [here](#) for upcoming and past Montreal Protocol Meetings dates and venues.

World Ozone Day 2023 theme: Montreal Protocol: fixing the ozone layer and reducing climate change - On World Ozone Day, we celebrate the achievements of the Montreal Protocol on Substances that Deplete the Ozone Layer in fixing the ozone layer and reducing climate change. The theme for the 2023 International Day for the Preservation of the Ozone Layer, to be marked on 16 September, is **Montreal Protocol: fixing the ozone layer and reducing climate change**. This reiterates the recent finding by the Scientific Assessment Panel of the positive impact the Montreal Protocol has on climate change, that ozone recovery is on track and how climate challenges can be supported through the Kigali Amendment.



The theme and other related materials available [here](#) in the six UN official languages.

New gaming technology to create environment simulation game for teenagers-The UN Environment Programme's (UNEP) Ozone Secretariat today launched a simulator game and avatar using the latest software technology. **Apollo's Edition** is the latest addition to the **Reset Earth education platform**. Targeting 13-18-year-olds, the free online education material developed provides educators with resources to teach students the importance of environmental protection.



Online introductory course 'International legal framework on ozone layer protection' - Designed for government representatives and national stakeholders new to the Vienna Convention and Montreal Protocol, students of environmental law, and anyone interested in learning about the ozone treaties, the **online course** launched by the Ozone Secretariat aims to provide an introduction to the international legal framework on ozone layer protection. **United Nations Environment Programme (UNEP), Ozone Secretariat**



Free teaching kits on ozone layer and environmental protection

- New free online teacher toolkits and lesson plans based on the success of UNEP's Ozone Secretariat's **Reset Earth** animation and video game
- Targeting Tweens by adopting animation and gamification to create innovative online lessons to raise awareness on ozone layer and environmental protection



- Available online in digital and print format for universal access

Read/download >>> [Ozone Secretariat's education platform](#)

The UN Environment Assessment Panels

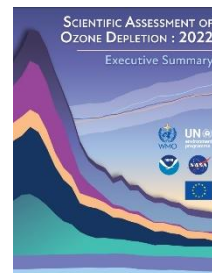
The Assessment Panels have been vital components of ozone protection since the Montreal Protocol was first established. They support parties with scientific, technological, and financial information in order to reach decisions about ozone layer protection and they play a critical role in ensuring the Protocol achieves its mandate. The Assessment Panels were first agreed in 1988 to assess various direct and indirect impacts on the ozone layer. The original three panels are:

- [The Technology and Economic Assessment Panel](#)
- [The Scientific Assessment Panel](#)
- [The Environmental Effects Assessment Panel](#)

In the past there were 4 main panels. The Panels for Technology and Economic Assessments were merged in 1990 into one Panel, now called the Technology and Economic Assessment Panel.

Why are the three current panels important to ozone layer protection? Each carries out assessment in its respective field. Every four years, the key findings of all panels are consolidated in a synthesis report. [Learn more >>>](#)

Scientific Assessment of Ozone Depletion: 2022 - [Executive Summary](#)



[United Nations Environment Programme \(UNEP\), Ozone Secretariat](#)



The Multilateral Fund for the Implementation of the Montreal Protocol

The Fund is dedicated to reversing the deterioration of the Earth's ozone layer. It was established by a decision of the Second Meeting of the Parties to the Montreal Protocol (London, June 1990) and began its operation in 1991. The main objective of the Fund is to assist developing country parties to the Montreal Protocol whose annual level of consumption of the ozone depleting substances (ODS) chlorofluorocarbons (CFCs) and halons is less than 0.3 kilograms per capita to comply with the

control measures of the Protocol. Currently, 147 of the 197 Parties to the Montreal Protocol meet these criteria. They are referred to as Article 5 countries.

The Multilateral Fund is managed by an Executive Committee with equal membership from developed and developing countries. Since the inception of the Fund, the Executive Committee has held 91 meetings. The Fund Secretariat, located in Montreal, assists the Executive Committee in its tasks. Projects and activities supported by the Fund are implemented by four international implementing agencies and a few bilateral agencies.

Last 16 July 2022, following the adoption of interim budgets for the Multilateral Fund due to the Covid-19 pandemic, the Fifth Extraordinary Meeting of the Parties to the Montreal Protocol (5th ExMOP) decided on the replenishment of the Multilateral Fund for the triennium 2021-2023. The Parties agreed on a budget of US \$540 million for the triennium.

As at 5 December 2022, the contributions received by the Multilateral Fund from developed countries, or non-Article 5 countries, totalled over US\$ 5.02 billion. The Fund has also received additional voluntary contributions amounting to US \$25.5 million from a group of donor countries to finance fast-start activities for the implementation of the HFC phase-down.

To facilitate phase-out by Article 5 countries, the Executive Committee has approved 144 country programmes, 144 HCFC phase-out management plans and has funded the establishment and the operating costs of ozone offices in 145 Article 5 countries.

New and updated guides and submission forms for the preparation of project proposals:

- Guide for funding requests for preparation of national inventories of banks of used or unwanted controlled substances and a plan for the collection, transport and disposal of such substances >>>
- Updated interim guide for the presentation of stage I of Kigali HFC implementation plans (July 2023) >>>
- Updated guide for the presentation of new stages of HCFC phase-out management plans (July 2023) >>>

All guides and submission forms are available [here](#)

- Click [here](#) for the Executive Committee upcoming and past Meetings and related documents.



OzonAction Compliance Assistance Programme produces and outreaches a wide variety of information and capacity building materials and tools that support the implementation of the

Montreal Protocol programs and assist Article-5 countries in meeting the compliance targets. These include publications, technology briefs and factsheets, mobile applications, videos, e-Learning, modelling, and database programs and special educational or certification programs.

The section below features several of our most recent products.
Visit [OzonAction website](#) for more information, discover the entire range of products.

Images in this section are by OzonAction

Considerations for establishing national HFC Quota System - As HFC consumption in most countries is determined by their import, this document aims to highlight guiding principles and key aspects that countries need to consider when developing their import quota system. The underlying principles and approaches are equally applicable for production and export quota allocation. **Read/download the [full document](#)**



Every Action Counts: Kigali Amendment - UNEP 2022 - This brochure targets the general public and explains in a simplified manner what the Montreal Protocol and its Kigali Amendment signify. It includes some actions that everybody can do to support the Kigali Amendment. It also covers the relationship between the Kigali Amendment and Sustainable Development Goals. It introduces some examples of successful communication campaigns on the Kigali Amendment. **English / Spanish**



Gender Mainstreaming in the Montreal Protocol: Experiences in Latin America and the Caribbean - Taking into account that women and girls constitute half of the world's population and, therefore, represent half of the potential and innovation necessary to face the "triple planetary crisis" – climate change, nature and biodiversity loss, pollution and waste –, positioning people and the planet as central pillars of the transformation necessary to overcome it, and considering the guiding principles and the scopes of action of the Operational Policy on Gender Mainstreaming of the Multilateral Fund, the United Nations Environment Programme (Latin America and the Caribbean Office). **English / Spanish**



Refrigeration, Air-Conditioning, and Heat Pumps (RACHP) Associations & Organizations: This Knowledge Map provides a global directory of RACHP associations, societies, and organisations around the world. These are key stakeholders for ensuring safe and efficient refrigerant transitions.

Local Technical & Vocational Education and Training (TVET): This Knowledge Map provides a global directory of TVET entities and centres around the world. These are the strategic partners for conducting and promoting training and certification programmes related to the refrigeration servicing sector.

Click [HERE](#) to access the OzonAction Knowledge Maps tool
Click [HERE](#) to download the OzonAction Knowledge Maps tool flyer



Gas Card Tool: Web-based Visual Printable Cards of Refrigerant Gases

Content of Gas Cards - Each Gas Card is printable (in PDF or image format) and includes the following information about each substance/gas: a) General Characteristics (Chemical name, formula and type, ASHRAE designation, Trade names, Harmonized System (HS) codes, Chemical Abstract Service (CAS), United Nations (UN) numbers, Blend/ mixture components, Montreal Protocol Annex and Control measures, main usage, etc.) b) Gas Performance—Radar Chart (in terms of: Ozone depleting potential-ODP, Global warming potential- GWP, Toxicity Class & Flammability Class) c) Environmental and Safety Impact, and Safety Impact (with visualization of Toxicity & Flammability Class, Hazardous Symbols).

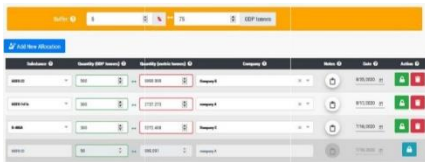


More Information - The Gas Card web-based tool is part of UNEP OzonAction's portfolio of activities and tools to assist various stakeholders in developing countries, including customs officers and technicians, to achieve and maintain compliance with the Montreal Protocol on Substances that Deplete the Ozone Layer. In the left navigation bar of the Gas Card tool web page, you will find a list of commonly used HFCs and HFC Blends in different sectors. *

Using the Gas Gard web-based tool

- The Gas Gard tool is available online on the [OzonAction website](#)
- Read the full [2021 annual iPIC report](#)
- See the [flyer](#) introducing the new iPIC platform

* Based on the Overall Analysis of the Results of the Survey of ODS Alternatives Report (conducted in 119 countries from 2012 to 2015)



HCFC Quota and Licence Tracker - a new desktop application

to assist with HCFC licences and quotas - National Ozone Officers have the great responsibility of managing the allocation and monitoring of quotas for substances controlled under the Montreal Protocol. This process can be complex with many importers, especially if the country imports a range of different hydrochlorofluorocarbons (HCFCs) and mixtures

containing HCFCs. To address this challenge, OzonAction developed a new desktop application that helps Ozone Officers with the tasks of planning, calculating, monitoring, and managing consumption quotas and licences. It can be used on a daily basis to track and manage the current year's quota allocations for different importers, or for future planning by trying different scenarios that adjust the type of substances imported, their quantity, or the number of importers. The HCFC Quota and Licence Tracker allows Ozone Officers to see the effect of such scenarios on the national HCFC consumption and helps ensure that the quotas stay within agreed HCFC Phase-out Management Plan (HPMP) targets. For countries that have ratified the Kigali Amendment, in the future OzonAction will extend the tracker to include hydrofluorocarbons (HFCs) once countries begin designing their quota systems for those controlled substances. **Access the:**

- [HCFC Quota tracker app](#)
- [Flyer for more information on the tracker](#)
- [Short video tutorial on the OzonAction YouTube Channel](#)

GWP-ODP Calculator Application - Updated- "Quickly, efficiently and accurately convert between values in metric tonnes, ODP tonnes and CO₂-equivalent tonnes"

Data are extremely important for the Montreal Protocol community, and the data reporting formats for both A7 and CP have changed recently, to a large degree triggered by the Kigali Amendment. HFCs, blends, CO₂-equivalent values, etc, now have to be addressed much more frequently by Ozone Officers during their daily work. Sometimes the terminology and values are complex and can be confusing, and it helps to have it all the official facts and figures in one place. Conversion formulas need to be applied to calculate CO₂-eq values from both GWP and metric tonne values. This free app from OzonAction is a practical tool for Ozone Officers



to help demystify some of this process and put frequently-needed information at their fingertips.

What's new in the app:

- An updated more user-friendly interface
- Multilingual interface: English, French and Spanish
- A new **Kigali Amendment mode** - in this mode the GWP values used to calculate the refrigerant blends/mixtures only include GWP contributions from components that are controlled HFCs
- Latest updated ODP and GWP values from the recent reports from the Montreal Protocol technology and scientific expert panels as well as the Intergovernmental Panel on Climate Change (IPCC) reports
- References added for sources of all values
- New refrigerant mixtures (with ASHRAE -approved refrigerant designations)

If you already have the application installed on your device, be sure to update to benefit from the new features. The app can be viewed in English, French or Spanish.



Smartphone Application: Just search for "GWP-ODP Calculator" or UNEP in the Google Play store or use the QR code – free to download! If you already have the application installed on your device, be sure to update to benefit from the new features.



Desktop Application: *GWP-ODP Calculator* is also available online on the OzonAction [website](#)



Watch the new short introductory tutorial **video** on the *GWP-ODP Calculator* - available now on [YouTube](#)

>>> [Read/download the flyer](#)

Updated OzonAction "WhatGas?" Mobile App

The OzonAction 'WhatGas?' application is an information and identification tool for refrigerants gases: ozone depleting substances (ODS), HFCs and other alternatives. It is intended to provide some stakeholders, including Montreal Protocol National Ozone Officers, customs officers, and refrigeration and air-conditioning technicians with a modern, easy-to-use tool that can be accessed via mobile devices or the OzonAction website to facilitate work in the field, when dealing with or inspecting ODS and alternatives, and as a useful reference tool.



This latest release includes the 2022 Harmonized System (HS) Codes for HFCs and blends, which facilitates the process of inspection and identification of controlled and alternative substances.

Scan the QR code to download the app (*currently available for Android devices only*). If you've already downloaded the app, to update visit the [Google Play Store](#)

RAC Technician Videos - Full length films! Two 'full length' videos for refrigeration and air-conditioning (RAC) sector servicing technicians: on 1) Techniques, Safety and Best Practice and 2) Flammable Refrigerant Safety. The OzonAction Refrigeration and Air-Conditioning Technician Video Series consists of instructional videos on techniques, security and best practice and flammable refrigerant safety. They are intended to serve as a complementary training tool for RAC sector servicing technicians to help them revise and retain the skills they have acquired during hands-on training. The videos are not intended to replace structured formal technician training, but to supplement and provide some revision of tips and skills and to build on training already undertaken. These videos are based on the successful UNEP OzonAction smartphone application, the RAC Technician Video Series app. This application has been downloaded on more than **86,000** devices since its launch.



Following many requests to make the videos more versatile and better suited to classroom and training settings, OzonAction has responded to this demand and produced two 'full-length' instructional videos.

You may wish to share this message and the flyer with:

- Your national/regional RAC associations
- Training or vocational institutes
- Master RAC trainers in your country
- Any other interested national stakeholders



You can watch these videos on the OzonAction YouTube Channel:

- [Techniques, Safety and Best Practice](#)
- [Flammable Refrigerant Safety](#)



The videos are also available for download by request from UNEP OzonAction: unep-ozonaction@un.org



If you prefer to access the video clips via the OzonAction smartphone application, just search for "RAC Technician Video Series" or UNEP in the Google Play Store and iTunes/App Store or scan the QR code – **Free to download!**

The flyer is available from the [OzonAction website](#).

OzonAction's iPIC platform - Updated Collaboration between China and Thailand using OzonAction's informal Prior Informed Consent (iPIC) system has resulted in the prevention of a huge consignment of ozone-depleting and climate damaging hydrochlorofluorocarbons (HCFCs). Those chemicals, which are primarily used as refrigerants for air conditioners and fridges, are controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer and are being phased out by all countries according to a specific timeline.



Women in the refrigeration and air-conditioning industry: Personal experiences and achievements The United Nations Environment Programme's (UNEP), OzonAction, in cooperation with UN Women, has compiled this booklet to raise awareness of the opportunities available to women and to highlight the experiences and examples of women working in the sector and to recognise their successes. All of the professionals presented in the booklet are pioneers. They are role models whose stories should inspire a new generation of young women to enter the field and follow in their footsteps. **Read/download the [publication](#)**

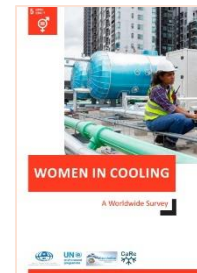


As part of IIR and UNEP OzonAction's partnership, a set of Cold Chain Technology Briefs was released over the past few years, which includes in-depth summaries about the cold chain in different key sectors. They include descriptions of technology, refrigerant options and trends and conclude with prospects and challenges. They cover the main cold chain sub-sectors, i.e., **Production & Processing, Cold Storage, Transport Refrigeration, Commercial & Domestic**, and **Fishing Vessels**. **Download the Cold Chain Technology brief in [English](#) | [French](#) | [Russian](#) | [Spanish](#)**

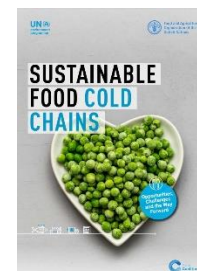


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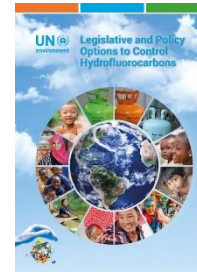
Results of a Worldwide Survey about Women in Cooling Released by IIR and UNEP OzonAction - Refrigeration, Air-Conditioning, and Heat-pumps (RACHP) are crucial for our health, nutrition, comfort, and well-being. It is one of the sectors that crosscuts many of the UN sustainable development goals and can contribute significantly to safeguard the environment, advance welfare of humanity and support the growth of employment and economics worldwide. Women are highly under-represented in this sector as indicated by the fact that only 6% of the members of national refrigeration associations/organisations/institutions are women. To better understand the background, motivation, challenges, and opportunities faced by women working in RACHP a worldwide survey was undertaken by the International Institute of Refrigeration (IIR) and OzonAction of UN Environment Programme (UNEP) in cooperation with several partners. **Read/Download the [Full Report](#)**



Sustainable Food Cold Chains: Opportunities, Challenges and the Way Forward-This [UNEP-FAO] report explores how food cold chain development can become more sustainable and makes a series of important recommendations. These include governments and other cold chain stakeholders collaborating to adopt a systems approach and develop National Cooling Action Plans, backing plans with financing and targets, implementing, and enforcing ambitious minimum efficiency standards. At a time when the international community must act to meet the Sustainable Development Goals, sustainable food cold chains can make an important difference.



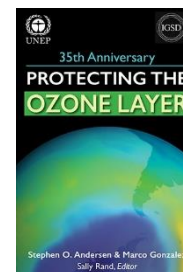
Legislative and Policy Options to Control Hydrofluorocarbons - To follow and facilitate the HFC phase-down schedules contained in the Kigali Amendment, the Parties, including both developed and developing countries, will have to implement certain measures. This booklet contains a recommended set of legislative and policy options which the developing (Article 5) countries may wish to consider for implementation. It is intended to be a guide/tool for countries. [Read/download](#)



Green Cooling in public procurement How to advance the procurement of climate-friendly and energy-efficient cooling equipment in the public sector? Air conditioning in public buildings is often responsible for around 50% of total electricity consumption. Switching to climate-friendly cooling technologies ("Green Cooling") can reduce costs and energy consumption and improve the carbon footprint of public buildings. This study takes a closer look at the benefits of Green Cooling in the public sector and discusses current barriers and possible solutions. The information presented provides a solid basis to revise current procurement criteria for sustainable cooling systems in public buildings. [Read/Download the study](#)



Protecting the Ozone Layer - 35th Anniversary Edition - a new book celebrating the 35th Anniversary of the Montreal Protocol. The electronic version (Kindle Edition) of the book has become available for purchase \$3.03 on Amazon. The book highlights successes and documents innovation during the first 35 years and inspires new ambition to strengthen protection of stratospheric ozone and climate before Earth passes tipping points. The book tells the story of the Montreal Protocol, revealing a model of cooperation, collaboration, universal ratification, record of compliance with over 99 per cent of controlled ozone-depleting substances (ODSs) phased out, the ozone layer on the path to recovery, the 2007 Montreal Adjustment, and the 2016 Kigali Amendment moving the Montreal Protocol further into environmental protection. Unfinished business includes: HCFC phase out, ODS bank management, HFC phase down, uncontrolled ozone-depleting greenhouse gas nitrous oxide (N₂O), feedstock exemptions for plastics production, and dumping of obsolete cooling appliances.



The book was released at 34th Meeting of the Parties to the Montreal Protocol on 31 October 2022.



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