

# OzoNews

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

**Volume XXIII | 30 November - 15 December 2023**

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**GLOBAL**



## 1. Kigali Amendment latest ratifications

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

**Belize, 3 October 2023**

**Kenya, 22 September 2023**

**Republic of Moldova, 22 September 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. Over 60 countries pledge to slash cooling emissions amid rising temperatures - COP28

Over 60 countries signed up to a so called 'cooling pledge' with commitments to reduce the climate impact of the cooling sector, that could also provide "universal access to life-saving cooling, take the pressure off energy grids and save trillions of dollars by 2050."

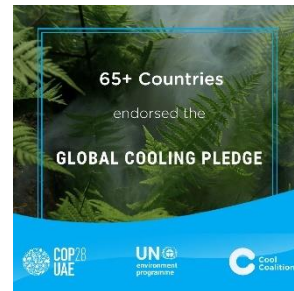
### The cost of keeping cool

The UN Environment Programme (UNEP) estimates that more than 1 billion people are at high risk from extreme heat due to a lack of cooling access – the vast majority living in Africa and Asia.

Moreover, nearly one-third of the world's population is exposed to deadly heat waves more than 20 days a year.

The cooling brings relief to people and is also essential for several other critical areas and services such as global food security and vaccine delivery through refrigeration.

But at the same time, conventional cooling, such as air conditioning, is a major driver of climate change, responsible for over seven per cent of global greenhouse gas emissions. If not managed properly, energy needs for space cooling will triple by 2050, together with associated emissions.



In short, the more we try to keep cool, the more we heat the planet. If current growth trends continue, cooling equipment represents 20 per cent of total electricity consumption today – and is expected to more than double by 2050.

### **Energy guzzlers**

Today's cooling systems, such as air-conditioners (ACs) and refrigerators, consume massive amount of energy and often use refrigerants that warm the planet.

The latest UNEP report shows that by taking measures to reduce the power consumption of cooling equipment could lead to a reduction of at least 60 per cent off predicted 2050 sectoral emissions by 2050.

"The cooling sector must grow to protect everyone from rising temperatures, maintain food quality and safety, keep vaccines stable and economies productive," said Inger Andersen, Executive Director of UNEP, who launched the report during a press conference at Expo City, where COP28 has been underway since last Thursday.

"But this growth must not come at the cost of the energy transition and more intense climate impacts," she urged.

### **Global Cooling pledge**

The report was released in support of the '[Global Cooling Pledge](#)', a joint initiative between the United Arab Emirates as host of COP28 and the UNEP-led 'Cool Coalition'.

It outlines actions to take in passive cooling strategies – such as insulation, natural shading, ventilation and reflective surfaces, higher energy efficiency standards and a rapid phase down of climate-warming hydrofluorocarbon (HFC) refrigerants.

Following the report's recommendations could reduce the projected 2050 emissions from business-as-usual cooling by around 3.8 billion tons of CO<sub>2</sub> equivalent.

This would:

- Allow an additional 3.5 billion people to benefit from refrigerators, air conditioners or passive cooling by 2050;
- Reduce electricity bills for end users by US\$1 trillion in 2050, and by US\$17 trillion cumulatively between 2022 – 2050;
- Reduce peak power requirements by between 1.5 and 2 terawatts (TW) – almost double the EU's total generation capacity today: and
- Avoid power generation investments in the order of \$4 to \$5 trillion.

### **[The United Nations Environment Programme \(UNEP\), 5 December 2023](#)**

*Image: UNEP website / © Unsplash / Sergei A / Cooling systems are a major contributor to climate change.*

**See also >>>**

- [The Global cooling pledge for COP-28](#)

- Read/download the [Pledge](#)

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### 3. Cooling Demand Surges in HAT Countries: Balancing Efficiency and Environmental Impact

Dubai, UAE, 5 December 2023 - In a world grappling with a surge in cooling demand, particularly in high ambient temperature (HAT) countries, the intricate interplay between rising living standards, escalating temperatures, and the imperative for efficient cooling technologies has emerged as a critical concern. The escalating global demand for cooling brings forth the daunting challenge of simultaneously mitigating its environmental impact.



The dynamic landscape of cooling products and technologies requires a nuanced understanding of technical needs and regulatory frameworks. Representatives from the manufacturing sector and government representatives from West Asia convened at the Montreal Protocol Pavilion during COP28 on 3 December, to deliberate on the current state and shortcomings of technical development.

Moderated by the UNEP Montreal Protocol Regional Coordinator for West Asia, Khaled Klaly, a panel of four experts delved into the merits of new technologies in refrigeration. Atta Alrayyes, Senior Product Manager of Taqueef, showcased projects utilizing R-32 refrigerant gas, emphasizing increased energy efficiency and reduced CO<sub>2</sub> footprint by 78,000 kg CO<sub>2</sub>e through replacing old on/off Air-Conditioning (AC) units with new highly efficient Inverter AC units in five villas.

Andrea Cavalet, Managing Director of EPTA Middle East, discussed the integration of transcritical CO<sub>2</sub> technology in supermarkets, demonstrating significant energy efficiency gains with up to 50% reduction in consumption compared to standard technology. He highlighted the technology's efficiency, reliability, and sustainability, both financially and environmentally.

Gerry Van den Eynde, Area Sales Manager at Baltimore Aircoil EMENA, elucidated the benefits of evaporative cooling in reducing refrigerant load compared to air-cool systems. He underscored that 40% of electricity produced in the Middle East is allocated to refrigeration, pointing out the crucial need to enhance the energy efficiency of refrigeration systems.

Finally, Vilas Bakshi, Managing Director of Aeroseal, stressed the importance of duct sealing to enhance the energy efficiency of air conditioning systems in buildings. Cutting-edge technology enables a reduction of duct leakage by up to 95%, curbing energy wastage and CO<sub>2</sub> emissions.

While the cooling sector needs growth, it paradoxically contributes to global warming. The adoption of these four innovative technologies - high efficient Inverters ACs with R-32 refrigerant, transcritical CO<sub>2</sub>, evaporative cooling, and duct sealing—holds the potential to enhance the energy efficiency of the air conditioning sector in HAT countries. However, achieving this goal demands reinforced awareness and understanding of technical

requirements to contend with extreme temperatures, fostering environmental responsibility.

Following the presentations, the panel, in conjunction with Yaqoub Al-Matouq, Head of Ozone Section, EPA Kuwait, engaged in a compelling discussion moderated by Markus Lattner, Managing Director at Eurovent Middle East. The discourse aimed to unravel the current state and shortcomings of technical development, discern the reasons for these shortcomings, and identify potential measures to integrate more efficient technology. The discussion highlighted progress in technical evolution despite challenges arising from absent regulatory frameworks, knowledge gaps, and deficiencies in technical skills.

**Contact:** [Khaled Klaly](#), UNEP Montreal Protocol Regional Coordinator for West Asia



## [UNEP, OzonAction, 5 December 2023](#)

*Image: UNEP, OzonAction*

### 4. Keeping it Chill: How to meet cooling demands while cutting emissions

#### Foreword

Cooling protects people from rising temperatures, maintains food quality and safety, keeps vaccines stable and enables economic productivity. It is central to achieving the sustainable development goals. The flip side is that cooling growth, under business as usual, would lead to a doubling of the sector's greenhouse gas emissions by 2050 – which cannot be allowed to happen if the world is to limit climate change to manageable levels.

There are, however, solutions to this dilemma, which would allow cooling to reach an additional 3.5 billion people and dramatically reduce predicted emissions.

The Global Cooling Watch report, *Keeping it Chill: How to meet cooling demands while cutting emissions*, lays out measures that would, by 2050, reduce greenhouse gas emissions from cooling by at least 60 per cent below business-as-usual, reduce peak load demand by between 1.5 and 2 terawatts, and save US\$22 trillion for end-users and the power sector.

The report, from the UNEP-led Cool Coalition, looks at actions in three areas. Deploying passive cooling measures, such as insulation, natural shading, and ventilation, would dramatically reduce cooling loads. Higher efficiency standards, including through updated Minimum Energy Performance Standards and better labelling, would triple the global average efficiency of cooling equipment by 2050. A faster phase down of climate-warming



hydrofluorocarbon (HFC) refrigerants through the Kigali Amendment to the Montreal Protocol would also make a huge difference. If rapid grid decarbonization were added to these actions, predicted 2050 emissions could be reduced by 96 per cent.

To deliver these benefits, governments must introduce aligned policies that support and integrate passive cooling, energy efficiency and faster refrigerant phase down – including through frameworks like National Cooling Action Plans. Some countries already have policies in place, but they need to be better implemented. Other nations must catch up. Finance for cooling also needs to rise – although US\$22 trillion in savings and the societal benefits of deep emissions cuts would make the sustainable cooling transition affordable.

I ask all nations, cities, and private sector to commit to sustainable cooling with concrete actions. The Global Cooling Pledge, a joint initiative between the Cool Coalition and the United Arab Emirates as host of the 2023 United Nations Climate Change Conference (COP28), provides a real opportunity to act. If we follow the recommendations in this report, we will deliver a cooler, and better, world for all.

Foreword by Inger Andersen, Executive Director, United Nations Environment Programme

### [UNEP, Cool Coalition, December 2023](#)

*Image: UNEP Cool Coalition*

#### **See also >>>**

- [The Global Cooling Pledge for COP 28](#) includes 66 national government signatories committed to working together with the aim of reducing cooling-related emissions across all sectors by at least 68 per cent globally relative to 2022 levels by 2050.
- [UNEP Report Proposes Steps to Meet Cooling Demand While Cutting Emissions.](#)
- [Why countries are contemplating a “cooling pledge” at the UN climate conference.](#)
- [Key measures could slash predicted 2050 emissions from cooling sector.](#)

## **5. GFCCC and its Partners Launch the Cool Move Initiative**

Dubai, UAE, December 5, 2023 – The Global Food Cold Chain Council (GFCCC), and its partners including Rabobank, World Resources Institute, World Bank, Enviu, Efficiency for Access, Wageningen University, the United Nations Food and Agriculture Organization, the United Nations Environment Programme, including its bureaus OzonAction, the Montreal Protocol Multilateral Fund and Cool Coalition, announced the launch of the Cool Move Initiative (CMI). The program aims to become a central and digital “food cold chain transition hub” for cold chain investments in emerging markets, driven by market demands with the aim to support global expansion of a sustainable food cold chain.



“Sustainable cold chain expansion can reduce food loss and waste, increase food security and economic opportunity, and achieve major environmental benefits,” said Rajan

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Rajendran, Chairman of the Global Food Cold Chain Council, and Global Vice President of Copeland.

The launch of Cool Move was announced at COP 28, the climate policy negotiations taking place this week in Dubai, which has major themes of the meeting focused on sustainable cooling and the importance of an effective and efficient food system. In a Call to Action, GFCCC Executive Director Kevin Fay invited policymakers, private sector interests, and NGOs to come together to support the initiative. "Cool Move will provide a transition hub to bring together data, technology, business model development, and expansion of finance mechanisms in a way that will support many of our Sustainable Development Goals," said Fay.

Expansion of the sustainable cold chain globally is a key element to reducing food loss and waste worldwide and will benefit local communities both economically and environmentally. CMI will assist in coordinating these parameters, through a multi-stakeholder partnership among different food system actors. The end goal is for cold chain projects to grow beyond the need for ongoing philanthropic support and become sustainable and successful systems of businesses within the community.

Some of the parameters CMI is focusing on include data gathering and impact measurement, technology innovation, business model development, expansion of viable public and private financial mechanisms, and policy engagement. If these are addressed responsibly and comprehensively, local businesses that develop and rely upon cold chain infrastructure will flourish. CMI aims to create a cohesive space for best practices to be shared and opportunities to be given that will allow these systems of cold chain businesses to expand into pillars of their respective communities and achieve economic, environmental, and societal goals.

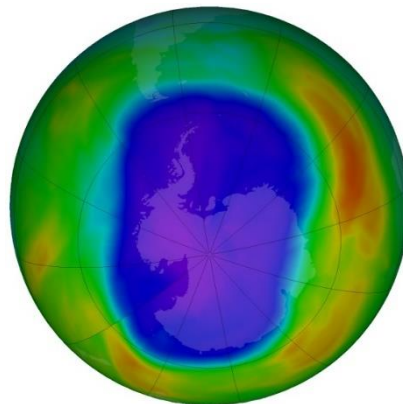
**Contact:** Kevin Fay, Global Food Cold Chain Council, [email](#)

*Image: GFCCC*

## 6. 2023 ozone hole not as large as anticipated

Despite fears that due to the eruption of the Hunga Tonga volcano in 2022 and early projections that 2023 would result in the biggest ozone hole ever, this is not the case.

According to Paul Newman, former co-chair of the Scientific Assessment Panel to the Montreal Protocol on Substances that Deplete the Ozone Layer and leader of NASA's ozone research team and chief scientist for Earth sciences at NASA's Goddard Space Flight Center in Greenbelt, Maryland, "It's a very modest ozone hole."



While the hole this year averaged 8.9 million square miles (23.1 million square kilometers), approximately the size of North America, he goes on to say, "Declining levels of human-

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produced chlorine compounds, along with help from active Antarctic stratospheric weather slightly improved ozone levels this year.”

The 2023 Antarctic ozone hole reached its maximum size at 10 million square miles, or 26 million square kilometers, on Sept. 21, which ranks it the 12th largest since 1979, according to annual satellite and balloon-based measurements made by NASA and NOAA.

Scientists keep a close watch on the size of the ozone hole each year and the ozone layer in general because of its importance in safeguarding all human life on Earth. The ozone layer acts like sunscreen, filtering out up to 99% of harmful solar UV radiation. Extensive exposure to UV radiation can result in sunburns, skin cancer and eye cataracts and also damage animals and plants.

In 1985 the world was first alerted that a severe thinning of the ozone layer, more commonly referred to as a “hole” had been created by our use of chlorofluorocarbons (CFCs), ozone depleting substances used in everyday items such as fridges, air conditioners and aerosols. The Montreal Protocol was adopted in 1987 under which CFCs were banned. Since then, the Protocol has controlled additional ozone-depleting substances including hydrochlorofluorocarbons (HCFCs) used as substitutes for CFCs. The most recent [Scientific Assessment Panel quadrennial assessment of 2022](#) indicates that ozone levels are slowly starting to recover and are expected to get back to pre-1980 levels by 2040. The more severe ozone loss over Antarctica will only recover around 2066.

“The full recovery of the ozone layer is a long-term project. It will require continued implementation and adherence to the Montreal Protocol. This is why we rely on our colleagues at NASA and NOAA to keep an eye on the annual ozone hole. It is vital that we know that we’re still on track or veered off course,” said Meg Seki, Executive Secretary of the Ozone Secretariat.

**Contact:** [Stephanie Haysmith](#), Communications & Information, Ozone Secretariat

**[UNEP, Ozone Secretariat, November 2023](#)**

*Image: UNEP Ozone Secretariat*

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## 7. General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention: Call for project proposals

The Ozone Secretariat letter from Ms. Megumi Seki Nakamura, Executive Secretary, on the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention: Call for project proposals. [...]

Sir/Madam,

I have the honour to refer to decisions XII(II)/1 on the recommendations of the Ozone Research Managers of the Parties to the Vienna Convention at their eleventh meeting and XII(II)/2 on the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention, adopted by the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer at its twelfth meeting, part II (COP12(II)), held online in October 2021.

In decision XII(II)/1, parties were encouraged to adopt and implement, as appropriate, the recommendations of the Ozone Research Managers under the topics of research, systematic observations, gaps in the global coverage of atmospheric monitoring of controlled substances and options to enhance such monitoring, data archiving and stewardship, and capacity building. These recommendations are set out in the report of part II of the eleventh meeting of the Ozone Research Managers and in document UNEP/OzL.Conv.12(II)/7.

In decision XII(II)/2, the Advisory Committee of the Trust Fund was requested, with the assistance of the World Meteorological Organization and the Secretariat, to implement its long-term strategy and short-term plan of action for the Trust Fund. The Advisory Committee continues working on implementing its strategy and will report on the progress made at the twelfth meeting of the Ozone Research Managers, which is scheduled to take place from 24 to 26 April 2024 in Geneva, Switzerland.

I would also like to refer to my correspondence to all parties, dated 16 October 2023, which included a brief update on the status of the Trust Fund and its activities, and on the work of the Advisory Committee. As the Advisory Committee has evaluated all the project proposals submitted to the Secretariat in response to our call on 8 December 2020, it is now time to renew our invitation for submission of project proposals to developing countries and countries with economies in transition.

We hereby kindly solicit your proposals for possible support under the Trust Fund.

Requests for support of proposed activities should not exceed \$50,000. In line with the long-term strategy and short-term plan of action for the Trust Fund, and taking into consideration the availability of funds, priority will be given to short-term activities (approximate duration of one year) which initiate programmes that can be supported by the host institution/country over a more extended period, and relate to monitoring of



column ozone, ozone profiles and ultraviolet radiation in developing countries and countries with economies in transition.

Priority will also be accorded to proposals involving the participation of developing countries or countries with economies in transition along with developed countries, such as training and calibration activities, whereby scientists from developing countries participate along experts from developed countries.

Each proposal should:

- Provide detailed information about the proposed activity and its link to the recommendations of the Ozone Research Managers at their eleventh meeting;
- Address the expected returns on the investment (in terms of both scientific achievements and capacity-building) and its long-term sustainability;
- Include sufficient details on project relevance, implementation requirements (financial and infrastructure) and timelines, and capacity-building expectations so as to allow in-depth review and prioritization by the Advisory Committee;
- Include the name and a description of the institution where the project will be carried out and the names and curricula vitae of the persons who will be responsible for the proposed project. Information on any in-kind contributions from parties participating in the project is also desirable.

We kindly request that such proposals be submitted to the Secretariat no later than 15 March 2024. Although we currently have only limited resources, additional funds will be solicited from the parties, as appropriate, for implementing the proposed projects that would be recommended by the Advisory Committee as having the highest priority.

We look forward to continuing strengthening the work under the Vienna Convention and supporting your country in the area of research and systematic observations.

Please accept, Sir/Madam, the assurances of my highest consideration.

Megumi Seki Nakamura

Executive Secretary

The letter is also available in [French](#) and [Spanish](#)

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**UNEP, Ozone Secretariat, 24 November 2023**

*Image: UNEP Ozone Secretariat*

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## **8. Record number of Montreal Protocol-related seizures under WCO's Global Customs Operation DEMETER IX**

**4 December 2023, Paris/Brussels** – The World Customs Organisation (WCO) has just announced another successful outcome for Operation DEMETER, a series of coordinated global enforcement actions that seek to intercept illegal shipments of ozone depleting substances (ODS) and hydrofluorocarbons (HFCs) and hazardous wastes. These commodities are regulated respectively by the Montreal Protocol on Substances that Deplete the Ozone Layer and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.



Dubbed DEMETER IX, this operation was led by the WCO Secretariat, financially backed by China Customs, and technically supported by the Regional Intelligence Liaison Office for Asia/Pacific (RILO A/P). International partners included UNEP OzonAction, Basel Convention Secretariat, European Anti-Fraud Office (OLAF), UNODC Unwaste Project, INTERPOL, European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL), and the WCO RILO network.

All WCO Member States were invited to join the operation. A record number of customs agencies – 106 – from both Article 5 and non-Article 5 countries participated in this edition of DEMETER, whose operational phase took place between 1-31 October 2023.

Based on preliminary findings, national customs agencies seized almost 70 tonnes of substances controlled under the Montreal Protocol and 6,046 pieces of pre-charged equipment (unweighed). Most of the seizures concerned HFCs, but there were also ODS such as hydrochlorofluorocarbons (HCFCs) and even chlorofluorocarbons (CFCs). The WCO reports: “There was a significant increase in illegal trade cases involving Montreal Protocol substances and related equipment (over 250% compared to the previous edition)... Most of the seizures were made in Gambia and Bulgaria. The biggest seizure was reported by Italy. Most of the seizures originated from Europe and were destined for Europe and Africa. Some shipments lacked the required licenses, while others contained prohibited commodities, such as non-refillable cylinders containing controlled substances.”

Mr. Jim Curlin, Head of UNEP OzonAction, congratulated the work of WCO and the other partners on this impressive outcome, “Operation Demeter is one part of the antidote to discourage and hopefully make illegal trade in controlled substances disappear. It acts like a vaccine against criminals – the viruses – who smuggle restricted or banned substances like HCFCs that deplete the ozone layer, or HFCs that contribute to climate change... The need for climate protection is more urgent than ever, and every action counts. Every seizure counts. Every kilogram counts.” He added “Operation Demeter serves as punctual reminder that illegal trade is still out there, but also that our customs officers – both women and men – are on the job and are constantly watching out for, and acting upon, suspicious shipments. They are protecting us and helping to make the Montreal Protocol and Basel Convention succeed.”

As an Implementing Agency of the Montreal Protocol's Multilateral Fund, UNEP considers WCO to be a strategic partner for promoting compliance and enforcement of this multilateral environmental agreement. As part of its Compliance Assistance Programme

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(CAP), UNEP OzonAction cooperates with the WCO, regional institutions, and National Ozone Units on coordinated enforcement operations aiming to detect and deter illegal trade in controlled substances. OzonAction has participated in nine editions of Operation DEMETER, including this year's edition of this high-profile global enforcement action.

The controls that countries are successfully using to meet their compliance objectives with the Montreal Protocol result in HCFCs and HFCs becoming more expensive as their supply becomes more restricted, which provides conditions for criminals to break the law to make a profit. Illegal trade in many of these substances continues to be detected across the globe, as criminals attempt to evade the controls and make money by supplying substances that should no longer be in use. The global community is pushing back against this trend by strengthening customs agencies' capacities with regard to substances controlled under the Montreal Protocol and other environmentally sensitive goods, as well as through targeted initiatives like the ongoing DEMETER operations.

For more information, see the WCO press release in [English](#) and [French](#)

## UNEP, OzonAction, 4 December 2023

Image: WCO

### 9. Summary of the 35<sup>th</sup> Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (MOP35), 22–27 October 2023

In the collegial spirit that the Montreal Protocol on Substances that Deplete the Ozone Layer is known for, delegates at the thirty-fifth Meeting of the Parties (MOP35) committed firmly to address threats to both the ozone layer and the global climate, designating a significant portion of funding to bring down global temperatures. In an historic decision, parties adopted the largest ever replenishment of the Multilateral Fund (MLF) for the implementation of the Protocol. The replenishment, at over 1 billion USD, is the largest developing countries in implementing their obligations under the Protocol and its Kigali Amendment, with a strong focus on shifting away from harmful greenhouse gases and substances with high global warming potential (GWP).

Delegates worked intensely throughout the week on a very heavy agenda. While they made progress on almost every item before them, despite best efforts, they were unable to agree on a decision to address quarantine and pre-shipment (QPS) uses of methyl bromide for which alternatives exist. They also agreed to defer discussion on a potential roadmap to end illegal trade in controlled substances to the next meeting of the Montreal Protocol's Open-Ended Working Group (OEWG).

Since 2023 is a replenishment year, delegates engaged in focused discussions on the MLF. Replenishment is critical to ensure progress throughout the week. In the final hours of the meeting, the delicate compromise reached by the entire group on the replenishment was shaken slightly when some delegations questioned the binding nature of contributions to the MLF. But, in a spirit of compromise, parties were able to take the historic decision to support developing countries in their efforts to transition away from hydrofluorocarbons (HFCs).

Parties also adopted a host of decisions on substantive matters, including:

- strategic national actions;
- enhancing the impact of the COVID-19 pandemic on HFC financial commitments for certain parties;
- energy efficiency;
- two dual-use substances;
- technical uses of methyl bromide;
- potential areas of focus for the 2026 quadrennial reports of the Protocol's Assessment Panel;
- the impact and extent of prohibited cooling equipment, to address the long-standing issue of freezing and

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- enhancing the impact of the COVID-19 pandemic on HFC financial commitments for certain parties;
- energy efficiency;
- two dual-use substances;
- technical uses of methyl bromide;
- potential areas of focus for the 2026 quadrennial reports of the Protocol's Assessment Panel;
- the impact and extent of prohibited cooling equipment, to address the long-standing issue of freezing and

• further strengthening Protocol institutions, including for controlling illegal trade.

They also took decisions on the completion of the Protocol's Assessment Panel, as well as inviting new members to the governing bodies by accreditation, avoiding a work.

MOP35 concluded from 23:27 (October 2023) to 16:00. Parties with parties concerning at the end of the Secretariat for the first time in 20 years. Over 100 participants attended the meeting, which was presided by a workshop on energy efficiency on 22 October 2023.

**A Brief History of the Ozone Regime**

Concerns that the Earth's stratospheric ozone layer could be at risk from chlorofluorocarbons (CFCs) and other substances motivated the action in the early 1970s. At that time, scientists warned that reducing these substances into the atmosphere could deplete the ozone layer, hindering its ability to prevent harmful ultraviolet (UV) rays from reaching the Earth. This would adversely affect ocean ecosystems, agricultural productivity, and animal populations, and harm humans through higher rates of skin cancer, cataracts, and weakened immune systems. In response, a UN Environment Programme (UNEP) conference held in March 1977 adopted a World Plan of Action on the Ozone Layer and established a Coordinating Committee to guide future international action.

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Since 2023 is a replenishment year, delegates engaged in focused discussions on the MLF replenishment in closed-door negotiations throughout the week. In the final hours of the meeting, the delicate compromise reached by the contact group on the replenishment was shaken slightly when some delegations questioned the binding nature of contributions to the MLF. But, in a spirit of compromise, parties were able to take the historic decision to support developing countries in their efforts to transition away from hydrofluorocarbons (HFCs).

Parties also adopted a host of decisions on substantive matters, including:

- stratospheric aerosol injection;
- addressing the impacts of the COVID-19 pandemic on HFC baseline consumption for certain parties;
- energy efficiency;
- very short-lived substances;
- feedstock uses of methyl bromide;
- potential areas of focus for the 2026 quadrennial reports of the Protocol's Assessment Panels;
- the import and export of prohibited cooling equipment, to address the long-standing issue of dumping; and
- further strengthening Protocol institutions, including for combating illegal trade.

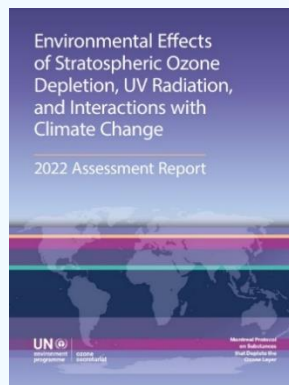
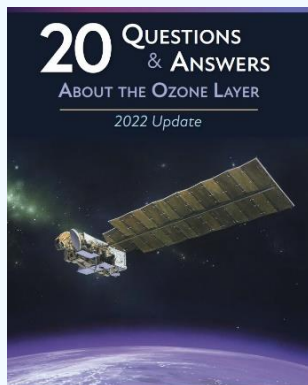
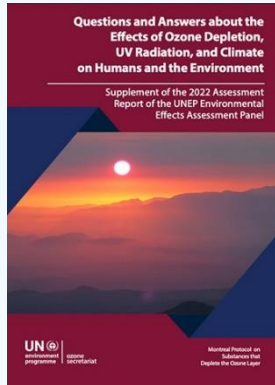
They also took decisions on the composition of the Protocol's Assessment Panels, as well as electing new members to the governing bodies by acclamation, avoiding a vote. MOP 35 convened from 23-27 October 2023 in Nairobi, Kenya, with parties convening at the seat of the Secretariat for the first time in 20 years. Over 600 participants attended the meeting, which was preceded by a workshop on energy efficiency on 22 October 2023. [...]

### [IISD, Earth Negotiations Bulletin \(ENB\), Vol. 19 No. 170, 30 October 2023](#)

*Image: IISD*

#### **See also >>>**

- **ADVANCE-Decisions adopted by the Thirty-Fifth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer**, Nairobi, 23–27 October 2023
  - **Ozone Secretariat website related to the Thirty-Fifth Meeting of the Parties**
  - **The Montreal Protocol: multilateralism done right**, Speech delivered by Inger Andersen, UNEP Executive director for the Opening of high-level segment, 35<sup>th</sup> Meeting of the Parties to the Montreal Protocol (MOP35), 26 October 2023, Nairobi, Kenya
  - **How HVAC Is Getting Increasingly Cleaner & Greener In 2023?**
-



**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.

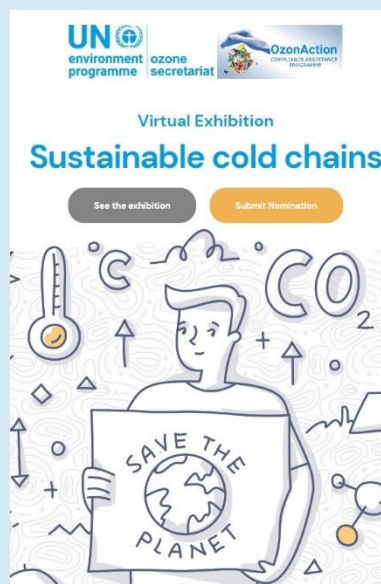


**Sustainable cold chains: Virtual Exhibition** - The virtual exhibition for sustainable cold chains aims to highlight the critical role of cold chains in ensuring food safety and security, access to vaccines, reducing global warming and preventing ozone layer depletion.

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 throughout 2022 and beyond.



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

*Image: Sustainable cold chains website*

## Categories



1 exhibits

On site post-harvesting  
and/or precooling  
applications



8 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 exhibits

Transport (large and  
smaller trucks, smaller  
containers)



6 exhibits

Supermarkets (wholesale  
markets & Retailers)



1 exhibits

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



2 exhibits

Vaccines and other  
pharmaceutical  
products



0 exhibits

Game-changing and  
systemic approaches

**LATIN AMERICA AND CARIBBEAN**



## 10. Caribbean Ozone Officers Network Meeting held back-to-back with Regional Workshop for Women in Refrigeration and Air Conditioning (RAC)

Port of Spain, Trinidad and Tobago, 15 November 2023 – The United Nations Environment Programme (UNEP) OzonAction Compliance Assistance

Programme (CAP) Caribbean Regional Team organized a Thematic Network Meeting of the National Ozone Officers (NOOs) from the English-speaking Caribbean and Haiti held back-to-back with a Regional Workshop for Women in Refrigeration and Air Conditioning (RAC) from 14 to 15 November 2023 in Port of Spain, Trinidad and Tobago.



The network meeting, attended by 12 NOOs (comprised of 7 females and 5 males), facilitated the continued strengthening of cooperation within network countries in the region. It provided information on the current progress of hydrochlorofluorocarbons (HCFC) phase-out and new commitments aimed at the hydrofluorocarbons (HFC) phase-down under the Kigali Amendment. New developments and current funding opportunities were also shared with the network to support their efforts towards the adoption of low global warming potential (GWP), climate-friendly, and energy-efficient technologies. Finally, the meeting used the opportunity to gather ideas and plans for the year 2024 to ensure the CAP team provided adequate and specific support.

Following the network meeting, the workshop for Women in RAC aimed to promote gender mainstreaming in the RAC sector, raise awareness of the latest RAC technology developments, provide hands-on demonstrations, and facilitate the sharing of experiences between the female RAC technicians in the Caribbean Network. The workshop also sought to provide NOOs with the information, knowledge, and resources necessary to comply with the obligations arising from the Montreal Protocol and its evolving commitments from the Kigali Amendment.

This workshop was attended by 24 participants, including 14 female RAC technicians from 11 countries, 12 NOOs, and representatives from UNEP OzonAction, the **International Network of Women in Cooling (INWIC)**, the Multilateral Fund Secretariat, the Ozone Secretariat, GIZ Proklima, United Nation Development Programme (UNDP), European Commission and the Government of Trinidad and Tobago.

Presentations, discussions, group work, and practical sessions, covering various topics such as the status of the RAC servicing sector in the countries, the gender mainstreaming policies under the Multilateral Fund, the challenges and opportunities for women in the RAC sector, the introduction to INWIC, and the good practices in refrigeration. The workshop also featured a practical demonstration of RAC servicing techniques which was organized through the kind support of the National Ozone Unit (NOU) of Trinidad and Tobago, ARIA Technical Institute Limited (ATI), and Trinidad & Tobago Bureau of Standards (TTBS). Demonstration techniques included the fitting and removal of gauges without loss of refrigerant, leak prevention, and detection procedures, system pressure testing with nitrogen, charging refrigerant as a vapour or a liquid, refrigerant identifier,

recovery, recycling, and reclaim, working with zeotropic blends and hydrocarbon refrigerants.

The workshop culminated in a set of concrete actions and recommendations to be implemented by the participants, such as organizing women's groups in RAC associations, conducting outreach campaigns and mentorship programs, enhancing gender mainstreaming in the Montreal Protocol projects, and strengthening the network and collaboration among the female RAC technicians in the region.

These activities were part of UNEP's 2023 CAP work programme under the Montreal Protocol's Multilateral Fund and in line with decision 84/92 of the Executive Committee and the gender mainstreaming policy of the Multilateral Fund. Importantly, it also contributed to the **empowerment of women and the promotion of gender equality as per Sustainable Development Goal 5**.

The network meeting and female workshop received positive feedback and appreciation from the participants, who expressed their gratitude and satisfaction with the knowledge and skills gained, the networking and experience-sharing opportunities, and the support and encouragement from the organizers and facilitators. The participants also expressed their interest and commitment to continue their involvement and contribution to the RAC sector and the Montreal Protocol implementation.

**Contact:** [Donnalyn Charles](#), Montreal Protocol Regional Coordinator, Caribbean, [UNEP OzonAction](#)

*Image: OzonAction*

## 11. Starting in 2024, Grenada Restricts Refrigerant GWP to Below 150 in Refrigerators and 750 in AC Units

Starting in 2024, the South Caribbean country of Grenada will no longer allow the importation or exportation of residential refrigeration appliances using a refrigerant with a GWP of 150 or greater or air-conditioning (AC) units with a GWP of 750 or greater.

The country's Montreal Protocol Bill – which becomes effective in 2024 – addresses the phasing down and phasing out of CFC and HFC refrigerants to protect the ozone layer, according to Leslie Smith, Head of the National Ozone Unit, Grenada's Ministry of Climate Resilience, the Environment and Renewable Energy, in a presentation at [2023 ATMOSphere LATAM](#).

The event was held November 8–9 in Mexico City, Mexico.

Refrigerators, refrigeration units, freezers or refrigerator/freezer combinations affected by the act include those with a total size capacity of up to 64ft<sup>3</sup> (479gal) with a compressor using a refrigerant with up to or greater than 150 GWP.



In the case of AC equipment, the bill affects units, condensers, and compressors with cooling capacity of up to 2TR (7kW) using a refrigerant with up to or greater than 750 GWP.

"[We] seek to make Grenada the first HFC-free or natural refrigerant island in the world," Smith said. After consulting the sector, we agreed that there are globally available alternatives for refrigerators and air-conditioners, he noted.

"The act controls the import, export, sale, storage and use of Montreal Protocol Controlled substances [CFCs and HFCs]," with provisions for recovery where possible of such substances before disposal of any such equipment. In addition, the bill mandates that during the repair or servicing of equipment containing a controlled substance, "the refrigerant has to be replaced with a non-controlled substance" where practicable.

Also, prohibited in the act is the import, export or sale of vehicles with mobile air-conditioning units using a refrigerant listed in Part 1 or 2, referring to CFCs and HFCs, Smith explained. "We may be the first country in the world to implement these kinds of control measures."

### **R290 Air Conditioners**

"Fiscal incentives for any refrigeration or AC appliance operating with renewable energy and meeting the minimum energy performance standard or with a GWP of less than 150 for refrigerators or less than 750 for ACs are subject to or entitled to 100% concessions on all customs, duties and taxes," Smith said. These policy measures already adopted in Grenada have made R290 (propane) AC units cheaper than R410a units of similar size, with importers passing the savings onto end-users.

According to Smith, three local distributors sell R290 split air conditioners on the island. "I don't think there are any other territories in this part of the world that have that available from three different suppliers," he remarked.

In addition, Smith noted the country's increased rate of air-conditioning installations in 2022 due to heat waves.

According to Smith, establishing a regional hydrocarbon training center with a certification scheme was one of the country's "major" success stories. "Using code training [from] Germany, over 80% of the country's technicians have been trained in natural refrigerants, particularly R290."

Local refrigeration and air-conditioning technicians were trained earlier this year along with the installation of 30 R290 AC units in Grenada government buildings as part of a pilot venture of the Cool Contributions Fighting Climate Change (C4) project commissioned and funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection.

Smith indicated that training for local technicians was also piloted with Baltimore, Maryland (U.S.)-based Ari, a commercial HVAC&R installation and service company, and the United Nations Environmental Program (UNEP).

"We were only able to get the [R290] equipment into the island when we were able to convince the manufacturers that we have sufficiently trained technicians with set standards and regulations in place," Smith said when asked about the safety of the AC units.

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The R290 charge in single air conditioners is no more than 330g (11.6oz), Smith told ATMOsphere in an interview. However, he also indicated that Grenada has not yet set a R290 charge cap for the units.

“We are a small, low-volume consuming country, but we carry a big punch, making a significant impact in the area of natural refrigerants,” Smith remarked.

With a population of 110,000, Grenada covers 133mi<sup>2</sup> (344km<sup>2</sup>) between its mainland and two sister islands.

**Hydrocarbons21, 16 November 2023, By Jae O. Haroldsen**

*Image: Hydrocarbons21 / ATMOsphere*

**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**

## 12. The story of India's first state-wide cool roof policy

### Introduction

India, with its growing urban population and fast-growing economy, is striving to balance climate change with the rising need for cooling. Extreme heat in India is not merely an inconvenience; it seriously endangers public health. The Intergovernmental Panel on Climate Change (IPCC)'s 6<sup>th</sup> assessment report on Climate Change Impacts, Adaptation, and Vulnerability highlighted the intensifying heat and humidity in India, which could pose increasing challenges to human survival.<sup>1</sup>

As per the study by Indian Meteorological Department (IMD) and Ministry of Earth Sciences, India, the average number of heat wave events had increased by 138% per year between year 2000–2019 as compared to year 1980–1999.<sup>2</sup> Rising heat brings with it the challenge of providing access to climate-friendly cooling solutions. Sustainable Energy for ALL's "Chilling Prospects" report identified India as having the largest number of people- 309.2 million - at high risk due to lack of access to cooling.<sup>3</sup>

With less than 10% of India's households having air conditioning, millions more are expected to purchase air conditioners, leading to soaring demand for electricity.<sup>4</sup> At the same time, India has nearly half a billion people living in densely populated cities, with skyrocketing development that converts green open space into paved, heat-trapping roofs and roads. These hot surfaces worsen the urban heat island effect (UHI)<sup>i</sup>, driving temperatures even higher and ratcheting up the need for even more electricity to keep cool with fans and air-conditioning. In this scenario, cool roofs and surfaces provide a low-carbon, low-cost cooling solutions that can help people cope with extreme heat, reduce UHI effects, and mitigate the need for air conditioning.

Cool roofs are installations designed to reflect solar radiation and prevent the absorption of heat onto a building's roof surface and keep indoor temperature lower than conventional roofs. Also known as solar reflective and high albedo roofs, these types of roofs have been widely studied and adopted globally.<sup>5</sup> When implemented at scale, cool roofs can help reduce the UHI effect and benefit the entire city.<sup>6</sup>

This factsheet highlights the experience of the Indian state of Telangana in pioneering a state-wide cool roofs policy.

**Natural Resources Defense Council (NRDC), December 2023**

Image: NRDC



### 13. Japan faces disruption in food supplies as cold storage falls short

Rental-type warehouses gain popularity amid high costs and land scarcity

TOKYO -- Japan is about to be on the verge of a food supply crisis. Many refrigerated warehouses are aging rapidly, and it will be very difficult to maintain the distribution of fresh and frozen foods. High construction costs and land scarcity are shackling the replacement and expansion of those temperature-controlled storage units.



There is growing concern among logistics operators in Japan that refrigerated warehouses that store frozen foods and agricultural and livestock products will come into short supply.

Although more than 30% of domestic warehouses are over 40 years old, they are not being replaced, and some estimates suggest that most of Japan's regions will run out of refrigerated warehouses in 10 years. If a shortage develops, the distribution of fresh and frozen foods will be disrupted, and it could also create a bottleneck for securing a stable supply of imported food.

As the refrigerated warehouse industry seeks to improve revenues and secure funds, some small and medium-size businesses that could be forced to close are calling for cooperation between the government and the industry.

"The role of refrigerated warehouses is expanding, but the industry as a whole is not investing in facilities for them," said an executive at a major refrigerated warehousing company.

"Small companies will likely go out of business without replacing their warehouses when those reach the end of their service life, so we are concerned about a potential shortage of refrigerated warehouses, which are vital for food infrastructure," he said.

According to the Japan Association of Refrigerated Warehouses, whose members are warehouse companies and related businesses, 34% of warehouses in Japan were over 40 years old, the benchmark age for replacement, as of June 2022. In Tokyo, where land for replacement is scarce, the figure was 46 %.

Yuri Nagashima, a senior consultant at the Nomura Research Institute, estimated the warehouse supply and demand in 2032 based on the outlook for the domestic consumption of refrigerated and frozen foods, the proportion of small and medium-size businesses that will go out of business without replacing their old warehouses, and other factors.

If 30% of small and medium-size businesses' refrigerated warehouses that are over 40 years old were closed down as of 2032, the demand for such warehouses would exceed the supply in 36 out of Japan's 47 prefectures.

If 80% were closed down, there would be a shortage in every prefecture except Gunma.

Refrigerated warehouses are cornerstones for the logistics of agriculture and livestock products, marine products, dairy products, frozen foods and more.

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In recent years, the domestic distribution of fresh foods has been on the rise due to e-commerce.

There is also demand for the storage of semiconductors, pharmaceuticals, and other products. A shortage of refrigerated warehouses could lead to stagnation in the flow of these goods.

In addition, Japan is highly dependent on imported food from overseas. Food importers and others need to increase their purchases when international prices fall or buy a certain number of products continuously to maintain their relationships with their suppliers. Therefore, the timing of purchases does not always match the domestic demand.

If there is a shortage of storage space, Japan would have no choice but to reduce its imports, likely jeopardizing the stable supply of food.

According to Nagashima, major refrigerated warehousing companies have been expanding their business by renovating and building new refrigerated warehouses in recent years.

For example, Yokorei, a Japanese seller of frozen food and operator of refrigerated warehouses, has set a goal of boosting its refrigerated warehouse storage capacity from the 1.04 million metric tonnes as of 2022 to 1.3 million tonnes by 2030, a 25% increase.

"We are building new warehouses to expand our storage capacity to meet demand," said Yokorei Corporate Officer Takuji Uchiyama.

On the other hand, the cost of such investments poses a major challenge to small and medium-size warehouse companies.

In addition to rising operating costs due to skyrocketing electricity prices, construction costs have increased as well due to the high prices of materials caused by the COVID-19 pandemic and Russia's invasion of Ukraine, making it more difficult to replace warehouses or build new ones.

Even if they continue to use their old facilities, warehouse companies face the need to renovate or upgrade. Cold storage warehouses are labor-intensive and require employees to endure low temperatures, leading to a serious shortage of workers.

Therefore, approaches such as automation and labor-saving are in demand.

There is also a need to switch from HCFC refrigerants to alternatives, such as fluorocarbons and natural refrigerants, that do not destroy the ozone layer.

Warehouse companies are trying to improve their revenues by raising storage fees or passing on higher electricity costs while securing funds for investment. Those that find it difficult to do so will exit the market, accelerating the stream toward the crunch in refrigerated warehousing.

The burden of investment is also likely to promote collaboration and consolidation in the industry.

"We want to be flexible about our cold storage facilities, not only owning them ourselves but also considering rebuilding or expanding them as needed," said an official at a major cold storage warehouse company.

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Cooperation with other companies, including small and medium-size ones, and warehouses where multiple tenants rent space are also options.

Kazuko Takahashi, senior director at CBRE, a real estate service giant in Tokyo's Chiyoda Ward, said of these trends, "Owning your own warehouse can reduce long-term costs, but due to the rise in initial costs and the shortage of land, the use of rental-type warehouses will also expand down the line."

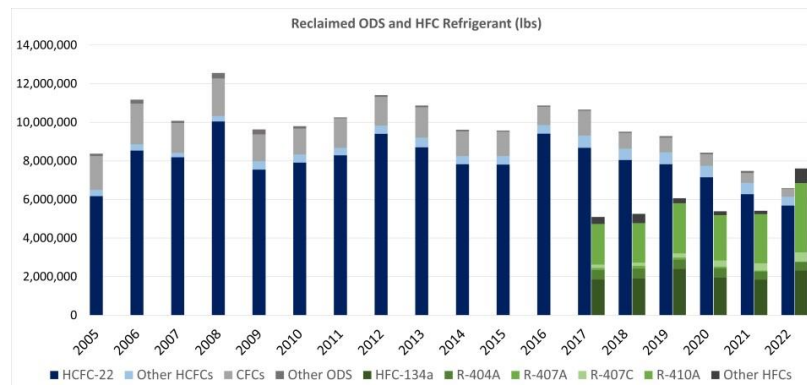
**Nikkei Asia, 11 December 2023, By Riona Gomi**

*Image: Nikkei Asia website / Photo by Makoto Okada "Refrigerated warehouses are cornerstones for the distribution of frozen foods, livestock products, marine products, dairy products and more."*

## NORTH AMERICA

### 14. Summary of Refrigerant Reclamation Trends

Below is a chart illustrating reclaimed refrigerant trends, in pounds, each year from 2005 - 2022. Starting in 2017, the chart includes data on hydrofluorocarbon (HFC) refrigerant. The five most common HFCs and HFC blends are disaggregated. A table with figures, by refrigerant type, is available below.



**Were more hydrofluorocarbon (HFC) refrigerants reclaimed in 2022 than in previous years?**

Yes. In 2022, the data reported to EPA show an increase of more than 40 percent in the total volume of HFCs reclaimed compared to 2021. For the first time, the total amount of HFCs reclaimed in pounds is greater than the amount of ozone-depleting substances (ODS) reclaimed.

**When comparing 2022 data to 2021 data, are there specific HFC refrigerants that contributed to the increase in HFC refrigerants that were reclaimed?**



The reported reclamation data show HFC-134a and R-410A are the main drivers contributing to the large year-over-year increase in HFC reclamation. Currently, these are the most widely used HFCs for refrigeration and air conditioning. Such increases are not unexpected as the United States phases down the production and consumption of virgin HFCs in accordance with the [American Innovation and Manufacturing \(AIM\) Act and the Kigali Amendment to the Montreal Protocol](#). Similar increases in reclamation occurred when ODS refrigerants were being phased out.

#### **How does the EPA collect and verify reported HFC reclamation data?**

EPA-certified reclaimers are required to report the total amount of received and reclaimed HFCs annually under the Clean Air Act Section 608 Program and on a quarterly basis under the [HFC Allocation program](#). The EPA reviews these reports, including identifying data discrepancies in the reported totals. Starting in 2024, the HFC Allocation program requires that EPA-certified reclaimers have [third-party auditing](#) of their records concerning HFC reclamation.

#### **Does the EPA expect reclamation totals to continue to increase throughout the HFC phasedown?**

Yes. As the supply of virgin HFCs declines, the demand for reclaimed HFCs is expected to continue to increase. Starting January 1, 2024, total production and consumption of virgin HFCs will be reduced to 60% of the baseline for the United States, with further phasedown steps through 2036. The anticipated increase in reclaimed HFC refrigerants is consistent with how the market responded to the phaseout of ODS. There was an increase in ODS reclamation as the phaseout progressed.

#### **[The US EPA, 13 December 2023](#)**

*Image: USEPA*

#### **15. A-State researchers receive \$700,000 to study food supply protections**

Two professors at Arkansas State University have received grant funding totaling more than \$700,000 to conduct research that will ultimately help secure the nation's food supply.



Dr. Tanja McKay, professor of entomology and interim department chair for biological sciences, and Dr. GwanSeon Kim, assistant professor of agricultural economics, were recently awarded a \$420,391 grant through the U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture Methyl Bromide Transition Program.

McKay will lead the multi-state, multi-institutional research project which will include Kansas State University and the USDA-Agricultural Research Service in Manhattan, Kan. The team will focus on improving various techniques that are used in the industry to control insects that target grains in shipping containers.

"Methyl bromide was a fumigant that was used to effectively control insects in agricultural settings and in shipping. However, this insecticide depletes the ozone layer," McKay said.

“As part of the United States’ commitment to implementing the Montreal Protocol in 1987, a global agreement to protect the ozone layer, methyl bromide can no longer be used as part of that treaty. This leaves stakeholders in the grain industry with a significant dilemma where they need new alternative control strategies to control insects.”

The research team will conduct a series of studies over the next three years to study other insect control strategies. They will be working with rice and flour stakeholders in Arkansas and Kansas, improving the use of phosphine, a fumigant used worldwide in warehouses, shipping containers, silos and bulk cargo ships.

Temperature changes and commodity configurations inside a shipping container can impact the density of the gas inside, and improper fumigation can lead to treatment failure and insect survival, she explained.

“The team will be optimizing fumigant applications by developing and validating a computational fluid dynamics model of phosphine distribution inside containers,” McKay also said. “At the same time, they will evaluate the effectiveness of pre-loading applications of contact insecticides in shipping containers and insecticide-incorporated packaging at suppressing insect populations and protecting commodities.”

Kim will conduct a comprehensive cost/benefit analysis for each of these integrated pest management (IPM) technologies alone and in combination.

“The final aim is to transfer this information on best practices to U.S. and international stakeholders, including food and feed industries and humanitarian aid agencies to better implement IPM practices,” Kim added.

Within these broad objectives, they will show how combining IPM tools could reduce infestation from stored product insects economically compared to fumigation alone.

A second grant of roughly \$280,000 was also awarded to the group through the USDA-NIFA Crop Protections Pest Management program.

This multi-institutional grant, including Kansas State University, University of Nebraska and the USDA-ARS, Manhattan, will aim to improve phosphine resistance management for insect pests in food facilities. McKay’s team will be working with local rice mills, screening insects for insecticide resistance.

**Talk Business & Politics, 17 November 2023, By George Jared**

*Image: TBP*

**EUROPE & CENTRAL ASIA**

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## 16. Revision of the Ozone Regulation - EU

### Briefing 12-12-2023

Stratospheric ozone absorbs ultraviolet radiation from the sun and reduces the overall amount of radiation reaching the Earth's surface. Ozone-depleting substances (ODS) are human-made chemicals that, once emitted, reach the upper atmosphere and destroy the protective ozone layer, causing what is known as the ozone hole. They have significant adverse impacts on human health and the environment and are also greenhouse gases with high global warming potential.

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer lays down rules on the production, use, trade, recovery, recycling, reclamation, and destruction of ODS and sets out requirements and measures for products and equipment containing these substances.

On 5 April 2022, the European Commission adopted a proposal for a regulation on ODS repealing the current one. The aim is to increase the efficiency of the existing measures in order to achieve additional emissions reductions in line with the European Green Deal, to ensure more comprehensive monitoring of ODS, to reduce administrative costs by simplifying the rules, to modernise the licensing system and reduce costs for industry, and to improve the coherence with other pieces of legislation such as Regulation (EU) No 517/2014 on fluorinated greenhouse gases, which is being revised in parallel.

One of the main objectives of the proposal is to prevent emissions from old products and equipment still containing ODS that have to be recovered and destroyed. The file was referred to the European Parliament's Committee on Environment, Public Health, and Food Safety (ENVI).

Interinstitutional negotiations concluded on 5 October 2023 with a provisional agreement, endorsed by Coreper on 18 October, and approved by the ENVI committee on 24 October. Parliament now has to vote on the agreed text at first reading. Third edition. The 'EU Legislation in Progress' briefings are updated at key stages throughout the legislative procedure.

**EPRS | European Parliamentary Research Service, December 2023**

Image: EPRS

The image shows the cover of a briefing document titled "Revision of the Ozone Regulation". At the top left, it says "BRIEFING" and "EU Legislation in Progress". At the top right is the European Parliament logo. The title "Revision of the Ozone Regulation" is prominently displayed. Below the title is an "OVERVIEW" section with a short summary of the regulation's purpose and key objectives. A table provides details about the committee responsible (ENVI), the rapporteur (Jessica Puffert), shadow rapporteurs, and the legislative procedure. At the bottom, there is a timeline diagram showing the legislative process from proposal to final vote, and the EPRS logo and author information (Dimitra Yougou, December 2023).

Proposal for a Regulation of the European Parliament and of the Council on substances that deplete the ozone layer and repealing Regulation (EC) No 1005/2009		
Committee responsible:	Environment, Public Health and Food Safety (ENVI)	COM(2022) 151
Rapporteur:	Jessica Puffert (EPP, Sweden)	3 4 2022
Shadow rapporteurs:	Rosana Purnis (S&D, Romania) Ondřej Knotek (Renew, Czechia) Pär Holmgren (Greens/EFA, Sweden) Anja Zalevska (ECR, Finland) Anja Hazekamp (The Left, the Netherlands)	2022/0140(COD) Ordinary legislative procedure (COD) (Parliament and Council on equal footing - formerly co-decision)
Next steps expected:	Final first reading vote in plenary	

## 17. Refrigerant smuggled into Ukraine as humanitarian aid

UKRAINE: Authorities in Ukraine have seized a large shipment of refrigerant being brought into the country and mis-declared as humanitarian aid to evade customs duties.



Detectives of the Territorial Department of the Economic Security Bureau in Kyiv region, in cooperation with border guards and customs officers, exposed the illegal importation of the refrigerant said to be worth around €354,000.

The investigation identified a group of people who had used the details of a charitable organisation to import the gas declared as humanitarian aid to evade paying customs duties.

The pre-trial investigation revealed that the director of the unnamed charitable organisation had previously been prosecuted for the illegal use of humanitarian aid for profit.

The economic crime agency did not identify the refrigerant(s) involved but one of the cylinders in photos of the seizure is marked R125.

**CoolingPost, 7 December 2023**

*Image: CoolingPost*

## 18. New regulations to protect the ozone layer are proposed

On November 24, 2017, the Comprehensive and Enhanced Partnership Agreement was signed between the Republic of Armenia, the European Union and the European Atomic Energy Community and their member states. The roadmap, which is the result of the signing of that Agreement, sets out obligations to restore ozone-depleting substances in the regulation from 2024, which means that the new notions must be reflected in the Law on the Protection of the Ozone Layer.



The RA Deputy Minister of Environment Tigran Gabrielyan presented the addenda and amendments to the Law on Protection of the Ozone Layer and the Code on Administrative Offenses in the first reading. The issue was debated at the regular sitting of the National Assembly.

The Deputy Chair of the Standing Committee on Territorial Administration, Local Self-Government, Agriculture and Environment Protection Aren Mkrtychyan presented the endorsement of the Committee. According to him, ozone depletion is one of the key factors in the global warming problem. The Deputy Chair of the Committee added that global

climate changes in Armenia significantly increased in 2006-2007 and talked about their risks.

In response to the question of the NA Vice President Hakob Arshakyan, Aren Mkrtychyan clarified that the regulations mainly refer to cold storage, the operation of which leads to emissions of certain chemical elements.

The legislative package was adopted in the first reading.

### National Assembly of the Republic of Armenia, 7 December 2023

Image: National Assembly of the Republic of Armenia website

#### Upcoming 14<sup>th</sup> IIR Conference on Phase-Change Materials and Slurries for Refrigeration and Air Conditioning - Call for abstracts still open!



Submit your abstracts for the 14<sup>th</sup> IIR Conference on Phase Change Materials and Slurries in Refrigeration and Air Conditioning (PCM 2024) to be held **on May 29-31, 2024, in Paris, France. Submit your abstract** The call for abstracts is open now and **the deadline for submission of abstracts is January 15, 2024,** don't miss this opportunity to present your research. Learn more from the [International Institute of Refrigeration \(IIR\)](#)

**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**  
[UN Environment, OzonAction, August 2023](#)

FEATURED

Summary of the 45<sup>th</sup> meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer: 2-7 July 2023. Read/Download the full [Summary Report](#)

See also >>>

- [IISD daily reporting/highlights](#)
- [UNEP Ozone Secretariat/OEWG-45](#)

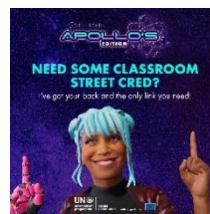
**Overview for the meetings of the ozone treaties** - Click [here](#) for upcoming and past Montreal Protocol Meetings dates and venues.

**World Ozone Day 2023 theme announced: 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:

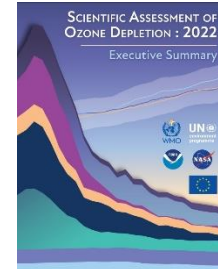
- **[The Technology and Economic Assessment Panel](#)**
- **[The Scientific Assessment Panel](#)**
- **[The Environmental Effects Assessment Panel](#)**

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.

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**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 of 5 December 2022, the contributions received by the Multilateral Fund from developed countries, or non-Article 5 countries, totaled 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](#)**

**Upcoming events:**

- The **93<sup>rd</sup> meeting** is scheduled for 11 to 15 December 2023, in Montreal, Canada
- 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 Card web-based tool

- The Gas Card 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)



Substances	Monthly ODP Allowed	Quarterly ODP Allowed	Remaining	Quota
Substance 1	100,000	300,000	100,000	100,000
Substance 2	200,000	600,000	200,000	200,000
Substance 3	150,000	450,000	150,000	150,000
Substance 4	80,000	240,000	80,000	80,000

### 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 CO<sub>2</sub>-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, CO<sub>2</sub>-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 all the official facts and figures in one place. Conversion formulas need to be applied to calculate CO<sub>2</sub>-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](mailto: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!**

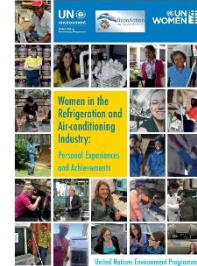
The flyer is available from the [OzonAction website](#).

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**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 particular 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](#)

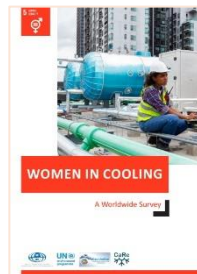


As part of IIR and UNEP OzonAction's partnership, a set of Cold Chain Technology Briefs was released over the past few years, which includes in-depth summaries about the cold chain in different key sectors. They include descriptions of technology, refrigerant options and trends and conclude with prospects 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](#)



## PUBLICATIONS

**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. In order 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](#)



**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** - In order 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](#)



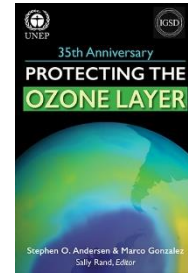
E-Book on Process Safety Management (PSM) Training for Ammonia Refrigeration - a new e-book about the critical elements of a process safety management (PSM) training program for facilities operating an ammonia refrigeration system. The e-book, titled "[7 Keys to a Compliant PSM Training Program for Ammonia Refrigeration](#)," outlines important questions a facility's program should address and questions that trained plant personnel should be able to answer. **Topics covered include:**

- Safety hazards and health considerations
- Emergency shutdown procedures
- Addressing deviations from system operating limits
- Risks and costs of non-compliance with regulatory standards

**Request free Download [here](#)**



**Protecting the Ozone Layer - 35<sup>th</sup> Anniversary Edition** - a new book celebrating the 35<sup>th</sup> 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 (N<sub>2</sub>O), feedstock exemptions for plastics production, and dumping of obsolete cooling appliances.



*The book was released at 34<sup>th</sup> Meeting of the Parties to the Montreal Protocol on 31 October 2022.*



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