Volume XXII | 30 October 2022

In this issue:

GLOBAL

1. Kigali Amendment latest ratification

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

Brazil, 19 October 2022
Zimbabwe, 18 October 2022

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. 34th Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (MOP34), 31 October – 4 November 2022 | Montreal, Canada

Thirty-five years ago, the adoption of the Montreal Protocol on Substances that Deplete the Ozone Layer marked a turning point in environmental history. When scientists discovered that man-made chemicals used in aerosol sprays and coolants were depleting the earth's protective ozone layer, potentially exposing millions to dangerous ultraviolet radiation, governments took action.

On 16 September 1987, governments adopted the Montreal Protocol to control and reduce ozone-depleting substances, mainly chlorofluorocarbons (CFCs) and halons. The Protocol came into effect in 1989. By 2008, it was the first and only United Nations environmental agreement to have universal ratification. Over the years, more ozone-depleting substances have been phased out and the ozone layer is healing. Yet there is more work to be done.

When delegates to the Thirty-Fourth Meeting of the Montreal Protocol (MOP34) convene in late October, they will have a full agenda, with work ranging from technical issues related to the Convention's work to protect the ozone layer from harmful substances to essential budgetary matters. MOP34 will build on the deliberations of the Forty-Fourth Meeting of the Open-ended Working Group (**OEWG44**), which was held in July 2022.

Parties will tackle a lengthy list of substantive issues, including, but not limited to, work on:

- energy efficiency;

- identification of gaps in global coverage of atmospheric monitoring of controlled substances;
- ongoing emissions of carbon tetrachloride;
- the future availability of halons and their alternatives;
- implementation of the Kigali Amendment to phase down hydrofluorocarbons; and
- institutional processes to strengthen the effective implementation and enforcement of the Montreal Protocol.

During the preparatory segment (31 October -2 November), delegates will address crucial administrative matters, including the 2023 budget of the Montreal Protocol and the financial reports for the trust funds for the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol. Parties will also consider the membership of key bodies, including: the Implementation Committee, which receives, considers, and reports on issues of non-compliance with the Montreal Protocol; the Executive Committee of the Multilateral Fund, which oversees the operation of the Fund; and the Co-Chairs of the OEWG, which prepares for the MOP.

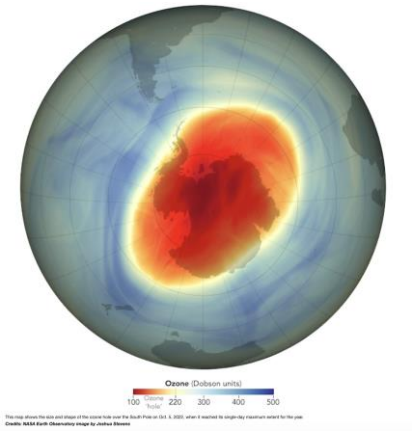
During the high-level segment (3-4 November), the Co-Chairs of the three assessment panels will report on their work and highlight any key issues from their quadrennial assessments to be completed by the end of 2022. The assessment panels, which include the Technology and Economic Assessment Panel, the Scientific Assessment Panel, and the Environmental Effects Assessment Panel, provide scientific, technological and financial information to help parties take decisions about ozone layer protection.

Additionally, delegates will hear a presentation by the Chair of the Executive Committee of the Multilateral Fund, the Multilateral Fund Secretariat, and the Fund's implementation agencies. Heads of delegations will make statements and delegates will consider decisions recommended for adoption.

MOP34 will be held at the International Civil Aviation Organization Conference Centre in Montreal, Canada, 31 October – 4 November 2022.

>>> Follow the **daily highlights** by The Earth Negotiations Bulletin-International Institute for Sustainable Development (IISD)
>>> Access the **MOP-34** related documents and information, The United Nations Environment Programme (UNEP), Ozone Secretariat
>>> Side events
Image: ENB-IISD website

3. Ozone layer recovery on track despite large annual hole

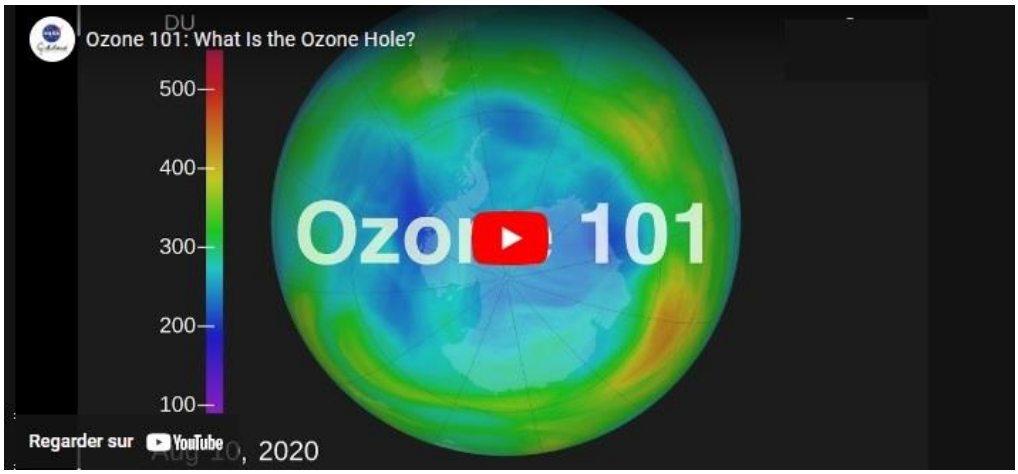


The annual Antarctic ozone hole reached an average area of 23.2 million square kilometers between September 7, 2022, and October 13, 2022. This depleted area of the ozone layer over the South Pole was slightly smaller than the average for the same period last year and generally continued the overall shrinking trend of recent years.

“Over time, steady progress is being made, and the hole is getting smaller,” said Paul Newman, chief scientist for Earth sciences at NASA’s Goddard Space Flight Center. “We see some wavering as weather changes and other factors make the numbers wiggle slightly from day to day and week to week. But overall, we see it decreasing through the past two decades. The elimination of ozone-depleting substances through the Montreal Protocol is shrinking the hole.”

The ozone layer—the portion of the stratosphere that protects our planet from the Sun’s ultraviolet rays—thins to form an “ozone hole” above the South Pole every September. Chemically active forms of chlorine and bromine in the atmosphere, derived from human-produced compounds, attach to high-altitude polar clouds each southern winter. The reactive chlorine and bromine then initiate ozone-destroying reactions as the Sun rises at the end of Antarctica’s winter.

Researchers at NASA and NOAA detect and measure the growth and breakup of the ozone hole with instruments aboard the Aura, Suomi NPP, and NOAA-20 satellites. On Oct. 5, 2022, those satellites observed a single-day maximum ozone hole of 26.4 million square kilometers (10.2 million square miles), slightly larger than last year. The map at the top of this page shows the size and shape of the ozone hole over the South Pole on that day.



When the polar sun rises, NOAA scientists also make measurements with a Dobson Spectrophotometer, an optical instrument that records the total amount of ozone between the surface and the edge of space—known as the total column ozone value. Globally, the

total column average is about 300 Dobson Units. On Oct. 3, 2022, scientists recorded a lowest total-column ozone value of 101 Dobson Units over the South Pole. At that time, ozone was almost completely absent at altitudes between 14 and 21 kilometers (8 and 13 miles)—a pattern very similar to last year.

Some scientists were concerned about potential stratospheric impacts from the January 2022 eruption of the Hunga Tonga-Hunga Ha'apai volcano. The 1991 Mount Pinatubo eruption released substantial amounts of sulfur dioxide that amplified ozone layer depletion. However, no direct impacts from Hunga Tonga have been detected in the Antarctic stratospheric data.

View the latest status of the ozone layer over the Antarctic with **NASA's ozone watch**.

NASA Earth Observatory, 5 October 2022

*Images: NASA Earth Observatory image by **Joshua Stevens**, using data courtesy of **NASA Ozone Watch** and GEOS-5 data from the **Global Modeling and Assimilation Office** at NASA GSFC. **Video** by NASA's Goddard Space Flight Center. **Story** by Kathryn Cawdrey, NASA Earth Science News Team.*

4. ASHRAE, UNEP Invite Lower GWP Innovation Award Entries

ATLANTA/PARIS (October 28, 2022) – Entries are now being accepted for the ASHRAE and OzonAction of the UN Environment Programme (UNEP) **2022 Lower GWP Refrigeration & Air-Conditioning Innovation Award**. The award promotes innovative design, research and practice by recognizing people who have developed or implemented innovative technological concepts applied in developing countries to minimize global warming potential (GWP) through refrigeration and air-conditioning applications. The award is part of the ASHRAE-UNEP OzonAction joint workplan for 2021-2023 under the global cooperation agreement established by both parties in 2007.

Due to the global pandemic, judging of submissions received for the 2020 award was not completed. However, entries submitted for the 2020 award will be automatically entered into consideration for the 2022 award. Those who submitted entries for 2020 will be allowed and encouraged to update those entries if desired.

"We must support and recognize innovative efforts that seek to minimize negative impacts on our environment," said 2022-23 ASHRAE President Farooq Mehboob, Fellow Life Member. "ASHRAE is proud to continue our partnership with UNEP OzonAction to sponsor this award in support of pioneering refrigerant technologies that will play a crucial role in our global marketplace and help us to achieve important climate management goals."

The award's selection criteria include:

- Description of innovation in field of lower-GWP refrigerants.
- Confirmation project has been implemented in a developing country.
- Extent of need.
- Environmental impact achieved including specific reference to the GWP chemicals' contribution.
- Description of further application in developing countries from both the technology and economic perspectives, including how the innovation is financially feasible to be replicated.

The entry period ends 31 December 2022. **Information about the award and the online submission form can be found at ashrae.org/lowerGWP**. Entries will be judged by an international jury of experts in the field of refrigerant research and management selected by ASHRAE and UNEP.

The individuals who worked on projects selected for 2022 awards will be announced at Montreal Protocol related events. ASHRAE and UNEP will also team to disseminate information to specialists and government officials in developing countries about the projects selected to raise awareness of successful technology applications.

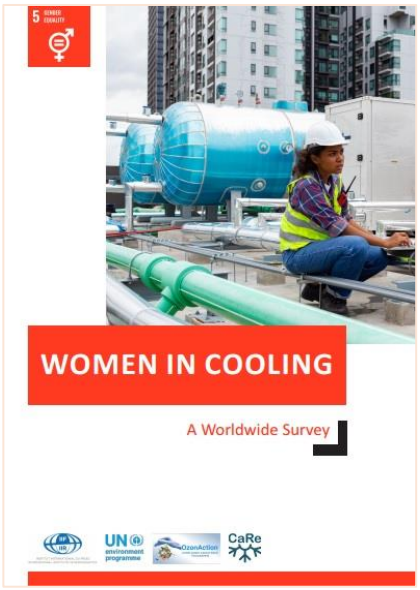
In 2019, ASHRAE and UNEP identified five projects – two Residential Applications and three Commercial/Industrial Applications for awards.

- *Low Charge Ammonia Vapor Compression Refrigeration System implemented in India*
- *HFC-161 Application for High Cooling Capacity Household Air Conditioners implemented in China*
- *Packaged Chillers with Integrated Air Handling Units Using HFC-32 and HC-290 implemented in Saudi Arabia*
- *CO_2Transcritical Refrigeration System for a Hot-and-Humid Region implemented in Thailand*
- *Low Charge Propane Chiller for a Supermarket Refrigeration System implemented in Brazil*

Contact:
Karen Buckley Washington, ASHRAE Senior Public Relations Specialist
Amr Abdelhai, Montreal Protocol officer, UNEP OzonAction

Image: ASHRAE website

5. 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.

Over 15 million people are employed worldwide in the refrigeration industry, which means that almost 5 out of 1000 people have a job linked to the manufacturing, installation, maintenance and servicing of refrigeration equipment. 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.

As the need for RACHP professionals continues to grow, a high potential that can be unleashed by encouraging women to pursue education and job opportunities in this sector. In 2019, the UNEP OzonAction and UN Women published a booklet of stories of 107 women from 50 countries who work in the RACHP sector to raise awareness of the opportunities available to women and recognise their success. The booklet showcased inspirational career experiences from many women across the globe, but also highlighted some of the challenges.

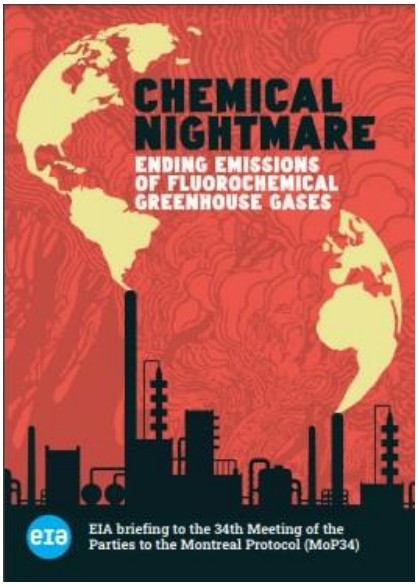
In order to better understand the background, motivation, challenges, and opportunities faced by women working in RACHP a worldwide survey was undertaken by the International Institute of Refrigeration (IIR) and OzonAction of UN Environment Programme (UNEP) in cooperation with several partners.

Read/Download the Full Report >>>

Contact:
Sonja Wagner, Programme Management Officer, OzonAction, Law Division, UNEP
Ina Colombo-Youla, Deputy General Director, International Institute of Refrigeration

Image: Women in Cooling Survey Report

6. World's most successful environmental treaty threatened by a chemical nightmare of harmful gas emissions



MONTREAL: A deadly cocktail of unexplained chemical gases harmful to the Earth's ozone layer and climate is building up in the atmosphere, a new report warns.

The Environmental Investigation Agency (EIA) report ***Chemical Nightmare – Ending emissions of fluorochemical greenhouse gases*** is released as the 34th Meeting of the Parties to the Montreal Protocol (MoP34) opens in Montreal, Canada.

In 2018, scientists discovered unexpected emissions of CFC-11, a potent ozone-depleting substance which had been banned for nearly a decade.

EIA investigations traced the source of CFC-11 to illegal production and use in the polyurethane foam sector in China, which had gone undetected for years by the Montreal Protocol's existing monitoring and compliance mechanism.

China's response appears to have had immediate impact, with atmospheric data indicating that these emissions significantly decreased in 2019, a trajectory that has continued through 2020 and the early part of 2021.

But *Chemical Nightmare*'s review of the latest scientific findings suggests that CFC-11 is just the tip of the iceberg.

"The alarm bells of mounting scientific evidence are impossible to ignore – the production of man-made fluorochemicals is leading to vast uncontrolled emissions of dangerous gases, which are damaging the planet's ozone layer and exacerbating the climate emergency," said EIA US Climate Campaign Lead, Avipsa Mahapatra.

The Montreal Protocol's own Scientific Assessment of Ozone Depletion draws attention to unexplained emissions of multiple CFCs, carbon tetrachloride and HFC-23, attributing emissions to feedstocks, by-products or unknown sources.

The meeting will also discuss several proposals to curb industrial emissions and strengthen institutional processes to avoid a repeat of the CFC scandal.

EIA UK Climate Campaign Leader Clare Perry said: "We should be very worried at these unexpected and unexplained emissions of fluorochemical greenhouse gases, which amount to many hundreds of millions of carbon dioxide equivalent tonnes in the atmosphere every single year.

“We urge the Montreal Protocol to take immediate action to address these emissions and to include all fluorochemical industrial processes in a comprehensive review of the Protocol’s institutions.”

Environmental Investigation Agency (eia), 31 October 2022
Image: eia website

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

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

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

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

Click here for more information / submit a nomination >>>
Image: Sustainable cold chains website

ASIA AND THE PACIFIC

7. Release of long-awaited results on the energy benefits of refrigeration and air conditioning preventative maintenance

In October 2022, the Australian Government released results on bench testing a selection of refrigeration and air conditioning equipment against frequently occurring common faults to determine the energy penalty of these faults. The work was a close collaboration between the **Department of Climate Change, Energy, the Environment and Water** and Australia's Air conditioning and Refrigeration Equipment Manufacturers Association. To our knowledge, this is a global first where research quantifying the benefits of preventative maintenance on equipment has been published.

Through testing facilities well established in Australia, four pieces of equipment – a refrigerated display cabinet, a walk-in cool room set up, a reverse cycle non-ducted variable speed split system and a reverse cycle ducted package with fixed speed compressor - were tested. The faults tested were condenser and evaporator blockages, refrigerant leaks, and refrigerant contamination. The units were installed by licensed technicians and baseline tests were undertaken for each piece of equipment before the faults were introduced and performance measured. The purpose was to capture data on the impact on performance caused by common faults and if preventative maintenance can improve equipment operational efficiency. The findings will be used to increase awareness on the benefits of routine maintenance.

The key findings showed efficiency losses or increased energy consumption for most faults tested, with 14 to 20 per cent energy losses across most tests. It also found that when several maintenance issues co-exist in a system, it increased energy consumed and if not addressed, led to system failure.

The reports can be found at **Ozone publications and resources** at the Department of Climate Change, Energy, the Environment and Water's **website**. The Australian Government continues to work to reducing direct and indirect emissions through its commitment under the Montreal Protocol.

Australian Government, Department of Climate Change, Energy, the Environment and Water, October 2022
Images: Wikipedia

See also >>>

- **Bench testing results of refrigeration and air conditioning equipment** - 2022
- **Phasing out and phasing down substances controlled by the Montreal Protocol** - 2022
- **Quarantine and Pre-shipment uses of methyl bromide, 2017-2020** - 2022

8. Vietnam will reduce HFC consumption by 80% by 2045

The Ministry of Natural Resources and Environment will develop a management plan to eliminate ozone-depleting substances and controlled greenhouse gases and submit it to the Prime Minister for promulgation in 2023. Accordingly, Vietnam applies a roadmap to gradually eliminate HFCs from 2024 according to international commitments, towards an 80% reduction in base consumption by 2045.

Information given at the workshop “Disseminating legal regulations on ozone layer protection, launching cooperation on fluorocarbon life cycle management and developing a management plan for elimination of HFCs in Vietnam in the first phase.” phase I”, organized by the Department of Climate Change (MONRE) in collaboration with partners on October 24, in Hanoi.

Attending were representatives of the Japanese Ministry of Environment, the Asian Development Bank and other ministries and branches; experts, representatives of enterprises importing and exporting chemicals, equipment, equipment manufacturing, hazardous waste collection and treatment, management boards of high-rise buildings.

Roadmap for phasing out HCFCs and HFCs
Implementing the Montreal Protocol on substances that deplete the ozone layer (under the Vienna Convention on the protection of the ozone layer), Vietnam is on a roadmap to phase out hydrochlorofluorocarbons (HCFCs). Specifically, in the period 2020-2025, with the goal of eliminating 35% of the base consumption, the import quota of HCFCs applied to Vietnam is only 2,600 tons, and 1,300 tons in the period 2025-2030. It is expected to gradually decrease in the following period until the complete cessation of imports of HCFCs by 2040.

From 2024, Vietnam will begin a roadmap to eliminate hydrofluorocarbons (HFCs) and will have to take measures to aim at not increasing the consumption of HFCs in the period 2024-2029, gradually reducing consumption gradually. to an 80% reduction in base consumption by 2045. […]

Requirements for technicians performing installation, operation, maintenance and repair of equipment are required to have an intermediate or higher diploma in one of the following professions: thermal engineering technology, technology building electronics and energy, mechanical technology, heating and air conditioning, installation of refrigeration equipment, maintenance and repair of thermal equipment, refrigeration and air conditioning engineering, operation, repair refrigeration equipment, seafood refrigeration. Where a

license is not available, the technician must attend and complete training in the collection and handling of controlled substances.

In the process of developing a management plan to eliminate ozone-depleting substances, controlled greenhouse gases, and submit them to the Prime Minister for promulgation in 2023, MONRE pays special attention to construction. capacity for teaching staff, technicians in the field of maintenance services and application of good practices to reduce refrigerant leakage to the environment; encourage and take measures to promote enterprises to switch technologies and apply alternative solutions that do not use HCFCs as soon as possible; develop relevant technical regulations and standards on ensuring safety in production and use of climate-friendly refrigerants.

To prepare for the development of a plan on management of the elimination of controlled substances under the Montreal Protocol in accordance with the domestic context, the Department of Climate Change is expected to conduct an investigation, survey to collect information and numbers. data on the areas of use of controlled substances and identify the regulatory measures and pathways to be applied for each controlled substance, as well as the product/equipment containing those substances.

Vietnam Posts, 25 October 2022

Images: Vietnam Posts

NORTH AMERICA

9. President Biden Signed: Instrument of Ratification of the Kigali Amendment to the Montreal Protocol

OCTOBER 27, 2022

On Wednesday, October 26, 2022, the President signed the instrument of ratification of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer.

The White House, Briefing Room, 26 October 2022

Image: The White House website

10. Biden Administration Continues Phasedown of Super-Pollutants to Combat Climate Change and Boost U.S. Manufacturing-Key Actions to Phasedown HFCs 40% in 2024 Put U.S. on Track with Kigali Amendment to Protect People and the Planet

EPA United States Environmental Protection Agency

News Releases: Headquarters | Air and Radiation (OAR)

Biden Administration Continues Phasedown of Super-Pollutants to Combat Climate Change and Boost U.S. Manufacturing

Key Actions to Phasedown HFCs 40% in 2024 Put U.S. on Track with Kigali Amendment to Protect People and the Planet

October 20, 2022

Contact Information
EPA Press Office (press@epa.gov)

WASHINGTON – Today, [20 October 2022] the U.S. Environmental Protection Agency (EPA) announced additional actions to phase down climate-damaging hydrofluorocarbons (HFCs), a crucial component of President Biden's ambitious agenda to combat the climate crisis while advancing American manufacturing and innovation. EPA today issued a proposed rule to implement the next step of the nation's HFC phasedown, an ambitious 40% reduction below historic levels starting in 2024. The proposal follows the Senate's bipartisan approval to **ratify the Kigali Amendment** to the Montreal Protocol, a global agreement to phase down HFCs and avoid up to 0.5°C of global warming by the end of this century.

"From day one, President Biden promised ambitious action to address the climate crisis and its impacts, which are becoming ever more disruptive and costing billions of dollars every year. Today's action once again delivers on his promise," said EPA Administrator Michael S. Regan. "This proposal also sets the United States on track to meet the goals of the Kigali Amendment, fostering innovation and economic growth in the private sector and reinforcing U.S. leadership in the global fight against climate change."

HFCs are a class of potent greenhouse gases commonly used in refrigeration and air conditioning, aerosols, and foam products. Their climate impact can be hundreds to thousands of times stronger than the same amount of carbon dioxide. Under the bipartisan American Innovation and Manufacturing (AIM) Act, the EPA has established a national HFC Phasedown Program that will reduce the production and consumption of these chemicals by 85% by 2036. The Biden-Harris Administration has also launched actions across other agencies to support this phasedown, which will create thousands of jobs to help ensure American companies outcompete the rest of the world in innovating and manufacturing HFC alternatives.

Today's proposal establishes the methodology for allocating HFC production and consumption allowances for 2024 and later years, similar to the methodology used for issuing allowances in 2022 and 2023—an initial step to achieve 10% of this phasedown. Now, the number of available allowances in 2024 will be reduced significantly to 40% below historic levels. Today's proposal would amend the historic consumption baseline level from which reductions are made to reflect corrected data submitted to EPA, as well as more precisely specify recordkeeping and reporting requirements, to help preserve the environmental and economic benefits associated with the HFC phasedown.

"Last month, we achieved a historic climate win in the Senate by coming together in a bipartisan manner to ratify the Kigali Amendment," said Senate Environment and Public

Works Committee Chairman Tom Carper (Del.). “I applaud the Biden Administration’s continued commitment to fully implementing the American Innovation and Manufacturing Act on schedule. Doing so keeps our nation on track to meet our HFC-reduction goals required under this global treaty, which is good for our planet and good for American businesses and workers.”

“I am proud to see the Biden Administration take this next step to implement the AIM Act. Phasing down HFCs is a critical component of our national climate action strategy, which is why Congress provided EPA with even more funding to administer this law under the Inflation Reduction Act,” said Congressman Paul Tonko (NY-20). “I hope EPA will move forward with a rule that further demonstrates that smart climate policies not only protect our environment, but also support U.S. consumers and manufacturers.”

"Super pollutants, like HFCs and methane, are the low-hanging fruit in the fight to slow climate change” said Congressman Scott Peters (CA-52). “Two years ago, Congress passed bipartisan legislation to phase down the production and consumption of HFCs by 85% by 2036. Today, the U.S. Environmental Protection Agency will ensure we reduce these dangerous pollutants and protecting communities across the globe from climate change-fueled disasters.”

To ensure a level playing field for companies complying with the phasedown requirements, the HFC Phasedown Program has established robust enforcement mechanisms, drawing from experience globally with illegal HFC trade and with attempts to illegally introduce ozone-depleting substances into the U.S. market. Since January 1 of this year, companies have needed allowances for producing or importing HFCs. In the first nine months of this year, the Interagency Task Force on Illegal HFC Trade, co-led by EPA and the Department of Homeland Security, has prevented illegal HFC shipments equivalent to more than 889,000 metric tons of carbon dioxide (CO_2) at the border, the same amount as the emissions from nearly 173,000 homes’ electricity use for one year.

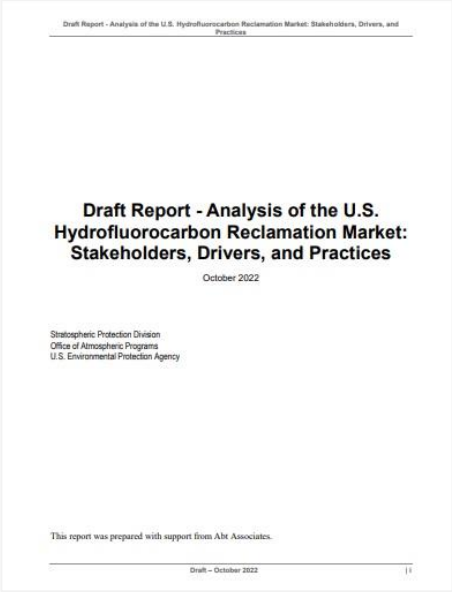
Additionally, on September 30, EPA issued allowances to companies authorizing them to produce or import HFCs in 2023. EPA issued total allowances at the same level as in 2022 per the phasedown schedule, although the number of entities receiving allowances for 2023 increased slightly. EPA also notified certain companies that the Agency intends to retire some of their allowances due to misreporting data. The Agency’s administrative consequences authority, which allows EPA to retire, revoke, or withhold the allocation of allowances, or ban a company from receiving, transferring, or conferring allowances, is an important tool to deter illegal HFC production and import.

EPA is planning to issue additional proposed rules regarding HFCs under the AIM Act. The next proposed rule will focus on transitioning away from HFCs in the refrigeration and air conditioning, foams, and aerosols sectors. The refrigeration and air conditioning sector uses the most HFCs in the United States.

U.S. Environmental Protection Agency, Stratospheric Protection Division Office of Atmospheric Programs, 20 October 2022

Image: U.S. Environmental Protection Agency website

11. Analysis of the U.S. Hydrofluorocarbon Reclamation Market: Stakeholders, Drivers, and Practices-Draft Report



The American Innovation and Manufacturing Act (AIM Act or AIM), enacted on December 27, 2020 (codified at 42 U.S.C. 7675), directs the United States (U.S.) Environmental Protection Agency (EPA) to phase down hydrofluorocarbon (HFC) production and consumption by 85 percent by 2036. HFCs, which are highly potent greenhouse gases (GHG), are commonly used in refrigeration and air conditioning equipment, as well as in foams, aerosols, fire suppression and other applications. A global phasedown of HFCs is expected to avoid up to 0.5°C of global warming by 2100. The AIM Act authorizes EPA to address HFCs in three main ways:

- phasing down HFC production and consumption through an allowance allocation program;
- facilitating sector-based transitions to next-generation technologies; and
- issuing certain regulations for purposes of maximizing reclamation and minimizing releases of HFCs and their substitutes from equipment.

With respect to the third point, subsection (h) of the AIM Act directs EPA to promulgate regulations to control, where appropriate, any practice, process, or activity regarding the servicing, repair, disposal, or installation of equipment that involves a regulated substance; a substitute for a regulated substance; the reclaiming of a regulated substance used as a refrigerant; or the reclaiming of a substitute for a regulated substance used as a refrigerant. While this report focuses on the recovery and reclamation of regulated HFCs being used as refrigerants, subsection (h) of the AIM Act does not limit activities identified in subsection (h) only to refrigerants. [1] Although not a focus of this report, EPA understands that regulated HFCs and their substitutes recovered from other equipment, such as fire suppression systems, may be reprocessed and reused as well. This report provides background information on the reclamation industry.

This report is organized as follows:

- Section 2 provides background information on reclamation and EPA's regulatory authority over refrigerant reclamation as well as information on state actions pertaining to reclamation.
- Section 3 identifies key stakeholders in the reclamation industry and describes their roles and responsibilities.
- Section 4 identifies the sectors of the economy that use HFCs as refrigerants.
- Section 5 describes the U.S. reclamation market and includes a description of reclamation methods and processes, cost drivers, and incentives.
- Section 6 describes safety considerations for technicians and consumers.

- Section 7 discusses the barriers and key challenges to increasing refrigerant reclamation.
- Section 8 includes references cited in the text.
- Appendix A includes the statutory text of subsection (h) of the AIM Act.

[1] Subsection (h)(4), however, states that: "No regulation promulgated pursuant to this subsection shall apply to a regulated substance or a substitute for a regulated substance that is contained in a foam."

U.S. Environmental Protection Agency, Stratospheric Protection Division Office of Atmospheric Programs, October 2022

Image: U.S. Environmental Protection Agency website

See also >>> **Phasedown of Hydrofluorocarbons: Allowance Allocation Methodology for 2024 and Later**, USEPA, 19 October 2022

EUROPE AND CENTRAL ASIA

12. European Parliament Member Calls for Bans on F-Gases in Refrigeration and ACs from 2024-2027

In an **opinion** on the revision of the EU F-gas Regulation, Member of the European Parliament (MEP) Bas Eickhout calls for greater ambition than the European Commission (EC)'s **proposal**, through both bans on new refrigeration and air-conditioning equipment with fluorinated gases (HFCs and HFOs) between 2024 and 2027 and a more stringent HFC phase down.

Eickhout, a Dutch representative from the Group of the Greens/European Free Alliance (EFA), is the Rapporteur (MEP appointed to report on proceedings) for the Committee on the Environment, Public Health and Food Safety (ENVI), which is in charge of drafting the European Parliament's position on the F-gas Regulation.

Eickhout, in his third term in the European Parliament, is vice-chair of the ENVI committee and has worked **on the Parliament's position** during the negotiations leading to the current version of the regulation.

In his opinion, Eickhout proposed the following amendments concerning refrigeration equipment using fluorinated greenhouse gases (HFCs or HFOs):

- A ban on new self-contained refrigerators and freezers for commercial use that contain fluorinated greenhouse gases as of January 1, 2024.

- A ban on new stationary refrigeration equipment, that contains, or whose functioning relies upon, fluorinated greenhouse gases as of January 1, 2024.
- A ban on new domestic refrigerators and freezers that contain fluorinated greenhouse gases as of January 1, 2025.
- A ban on any new self-contained refrigeration equipment that contains fluorinated greenhouse gases as of January 1, 2025.

“Stationary refrigeration no longer requires the use of fluorinated greenhouse gases, as there is an abundance of natural refrigerant alternatives available,” states Eickhout in his opinion.

These bans are aligned with the growing European market uptake of systems relying on natural refrigerants, as described in ATMOsphere’s latest report on “**Natural Refrigerants: State of the Industry**” for commercial and industrial sectors in Europe. ATMOsphere is the publisher of this website.

Bans on f-gases in ACs and heat pumps

Eickhout also seeks to restrict the following new air-conditioning and heat pumps using fluorinated greenhouse gases (HFCs or HFOs):

- A ban on new plug-in room and other self-contained air-conditioning and heat pump equipment that contains fluorinated greenhouse by January 1, 2025.
- A ban on the following new stationary split air-conditioning and split heat pump equipment:

(a) Single split systems containing less than 3kg (6.6lbs) of fluorinated greenhouse gases listed in the Kigali Amendment’s Annex I (only HFCs), which contain, or whose functioning relies upon, fluorinated greenhouse gases, by January 1, 2025;

(b) Split systems of a rated capacity of up to and including 12kW (3.4TR) containing, or whose functioning relies upon, fluorinated greenhouse gases, except when required to meet safety standards, by January 1, 2027;

(c) Split systems of a rated capacity of more than 12 and up to 200kW (56.9TR) containing, or whose functioning relies upon, fluorinated greenhouse gases with GWP of 750 or more, except when required to meet safety standards, by January 1, 2027;

(d) Split systems of a rated capacity of more than 200kW containing, or whose functioning relies upon, fluorinated greenhouse gases, by January 1, 2027.

“Given the recent **adoption** of standard IEC-60335-2-40, the proposed ban in split systems up to 12kW can be met with propane (R290). In specific cases where this is not possible, the safety exception allows for some flexibility. In split systems above 200 kW, ammonia (NH_3/R717) and CO_2 (R744) are available alternatives,” explains Eickhout.

Finally, Eickhout introduces a ban on fluorinated greenhouse gases (HFCs and HFOs) in transport refrigeration and mobile air-conditioning as of January 1, 2027, due to the high leakage rates of these subsectors and poor end of life refrigerant recovery, in addition to the availability of alternatives.

Minichillers and displacement and centrifugal chillers are also banned from using fluorinated greenhouse gases (HFCs and HFOs) as of January 1, 2027.

HFC phase down and PFAS

Eickhout also recommends tightening the HFC phase down, opting for the schedule listed in the maximum feasibility scenario of the Impact Assessment (the EC's economic assessment of the F-gas proposal), and reducing available quotas to zero as of 2049. In addition, he proposes a higher fee to maintain a stable stream of revenues from selling allowances. The fee would increase from €10 (US$9.8) per metric ton of CO_2e in 2024–2026 to €99.28 (US$97.2) from 2048 onwards.

Eickhout also considers the growing issue of **PFAS**, so-called "forever chemicals," in the environment, stating that "in order not to repeat mistakes from the past, the rapporteur proposes to move several (sub)sectors, such as refrigeration, air conditioning, heat pumps and switchgear, to F-gas free alternatives." Certain f-gases and their atmospheric degradation product trifluoroacetic acid (TFA) are considered to be PFAS by the Organisation for Economic Co-operation and Development (OECD).

ATMOsphere recently released a **report** on the growing threat of HFOs and TFA on human health and the environment.

R744, 17 October 2022, By Thomas Trevisan

Image: r744 website

13. Turkmenistan will completely abandon environmentally hazardous freons by 2047

The Kigali Amendment to the Montreal Protocol of the Vienna Convention for the Protection of the Ozone Layer binds all countries of the world to withdraw eighteen hydrofluorocarbons, causing severe warming, from circulation.

The document has been ratified by 129 countries, including Turkmenistan.

Turkmenistan is developing a project plan for the six-year transition phase for the use of new refrigerants, according to the Ozone Center of the Ministry of Agriculture and Environmental Protection.

The plan will include options for large businesses such as pumping out and restoring waste substances that, after purification, have over 98 percent of the quality of a comparable new product, as well as replacing prohibited freons with allowed freons with similar technical parameters.

Hydrofluoroolefins, including the most recent innovation, R-1234YF and R449-A, which is already supplied to Turkmenistan, are among the refrigerants of the new generation. Now

cars work mainly on R-134A, which is a powerful greenhouse gas, and therefore it is also subject to replacement with an alternative freon.

By 2047, Turkmenistan will completely switch to new brands of equipment running on other freons that are neutral to ozone and climate.

So, until 2025, the Ozone Center plans to create a training platform in Ashgabat for technicians on the basis of the Yagshygeldi Kakayev International University of Oil and Gas, where the lecturers will be the university teachers. In the future, such training centers will appear in the regions.

A national association of refrigerators is being considered, and its members—including business owners—would receive legal and consulting support.

Furthermore, taking into account the country's accumulated reserves of spent freons, it is planned to establish a collection, recycling, and subsequent return to circulation. Enriching the domestic market with additional volumes of refrigerants will reduce the import of such mixtures.

Turkmenistan has banned the supply of obsolete equipment containing banned R-22 since 2015. Its use is now maintained through quota-based imports. The quota for R-22 is 80 tons, licenses for its supply are issued by the Türkmenhimiýa Concern.

Turkmenistan imports refrigerants from China, Turkey, and the UAE. At the same time, the system of bilateral transactions is strictly regulated.

The current practice of issuing environmental passports serves as another control mechanism. The Ozone Center's specialists classified the refrigerants used in the country by toxicity, properties, and composition, and compiled a list of prohibited ODS for internal use.

News Central Asia, 19 October 2022

Image: National Today website

FEATURED

UN environment programme | ozone secretariat

OZONE SECRETARIAT

Overview for the meetings of the ozone treaties in 2022

69th IMPCOM, Montreal, Canada | 29 October 2022
33rd MOP Bureau, Montreal, Canada | 30 October 2022
34th MOP, Montreal, Canada | 31 October - 04 November 2022

Click here for past and upcoming Montreal Protocol Meetings Dates and Venue.

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

Image: UNEP, Ozone Secretariat website

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

Image: UNEP, Ozone Secretariat website

The UN Environment Assessment Panels

The Assessment Panels have been vital components of ozone protection since the Montreal Protocol was first established. They support parties with scientific, technological,

and financial information in order to reach decisions about ozone layer protection and they play a critical role in ensuring the Protocol achieves its mandate. The Assessment Panels were first agreed in 1988 to assess various direct and indirect impacts on the ozone layer. The original three panels are:

- **The Technology and Economic Assessment Panel**
- **The Scientific Assessment Panel**
- **The Environmental Effects Assessment Panel**

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

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

THE MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL

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 90 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.

As at September 2022, the contributions received by the Multilateral Fund from developed countries, or non-Article 5 countries, totaled over US$ 4.49 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.

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.

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.

- Updated guide for the presentation of stage II of HCFC phase-out management plans (August 2022), 9/19/2022
- The provisional agenda for the 91st meeting is now posted, 9/14/2022
- The Information Note for the 91st meeting is now available, 9/9/2022
- Policies, Procedures, Guidelines and Criteria of the Multilateral Fund (July 2022), 7/29/2022
- HCFC phase-out management plans and HCFC production phase-out management plans (July 2022), 7/28/2022
- Updated guide for project preparation of Stage I of Kigali HFC implementation plans (KIP) (April 2022), 4/28/2022
- Executive Committee Primer 2022, 1/23/2022
- Adjusted consolidated business plan of the Multilateral Fund 2022-2024, 1/5/2022

>>> Click **here** for the Executive Committee upcoming and past Meetings and related documents.

OzonAction

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.

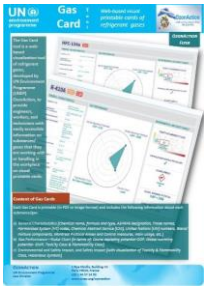
Images in this section are by OzonAction

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

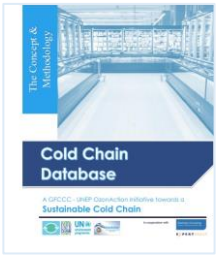
Click **HERE** to download the OzonAction Knowledge Maps tool flyer



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 the Deplete the Ozone Layer. In the left navigation bar of the Gas Card tool web page, you will find a list of commonly used HFCs and HFC Blends in different sectors. *
Using the Gas Gard web-based tool

- The Gas Gard tool is available online on the **OzonAction website**
- Read the full **2021 annual iPIC report**
- See the **flyer** introducing the new iPIC platform

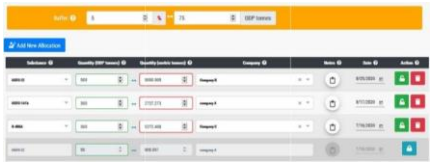
** Based on the Overall Analysis of the Results of the Survey of ODS Alternatives Report (conducted in 119 countries from 2012 to 2015)*



OzonAction and GFCCC launch the methodology questionnaires the Cold Chain Database Initiative - The Global Food Cold Chain Council (GFCCC) and the United Nations Environment Programme (UNEP) OzonAction announced the launch of their Cold Chain Database and Modeling initiative. The initiative marks the first formal step to assist developing countries in identifying their cold chain baseline along with consumption of relevant HCFCs or HFCs or other refrigerants. The initiative was conceived in 2019 and kicked off during the 31st Meeting of Parties to the Montreal Protocol (Rome, Italy), which concluded with the Rome Declaration on "The Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development".

> ***GFCCC-UNEP OzonAction Cold Chain Modelling Press Release***
> ***GFCCC-UNEP Cold Chain Database Methodology Final***
> *For countries or partners interested to use the model data collection detailed questionnaires, please fill in the* ***Expression of Interest and NDA of Cold Chain Database*** *form and return to* ***Ayman Eltalouny***

Contact: Ayman Eltalouny, Coordinator International Partnerships, UNEP, OzonAction



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_2-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_2-equivalent values, etc, now have to be addressed much more frequently by Ozone Officers during their daily work. Sometimes the terminology and values are complex and can be confusing, and it helps to have it all the official facts and figures in one place. Conversion formulas need to be applied to calculate CO_2-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 RAC sector servicing technicians to help them revise and retain the skills they have acquired during hands-on training. The videos are not intended to replace structured formal technician training, but to supplement and provide some revision of tips and skills and to build on training already undertaken.

These videos are based on the successful UNEP OzonAction smartphone application, the RAC Technician Video Series app. This application has been downloaded on more than **86,000** devices since its launch. Following many requests to make the videos more versatile and better suited to classroom and training settings, OzonAction has responded to this demand and produced two 'full-length' instructional videos.

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

- Your national/regional RAC associations
- Training or vocational institutes

- Master RAC trainers in your country
- Any other interested national stakeholders

You can watch these videos on the OzonAction YouTube Channel:

- **Techniques, Safety and Best Practice**
- **Flammable Refrigerant Safety**

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

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

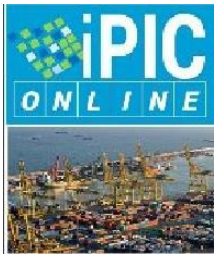
The flyer is available from the **OzonAction website**.

Refrigerant Cylinder Colours: What has Changed - *A new UNEP OzonAction factsheet on the new AHRI revised guideline on a major change to refrigerant cylinder colours* - One of the ways in which refrigeration cylinders are quickly identified is by cylinder colour. Although there was never a truly globally adopted international standard, the guideline from the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) although not required by law was used by the vast majority of industry and chemical producers around the world. An AHRI revised guideline, first published in 2015, now removes paint colour assignments for refrigerant containers and specifies that all refrigerant containers should have the same paint colour from 2020 onwards. NOOs and technicians should be aware of this change and inform national stakeholders, as well as familiarising themselves with relevant container labels and markings for refrigerants. **Read/download the factsheet**

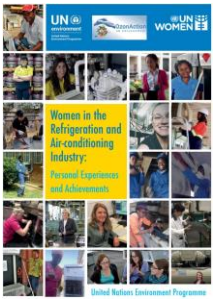
Update on new refrigerants designations and safety classifications - The latest version of the factsheet providing up to date information on refrigerant designations and safety classifications is now available (September 2020 update). The factsheet, produced by **ASHRAE** in cooperation with **UN Environment Programme OzonAction** is updated every 6 months. **Read/download the factsheet**

Contact: **Ayman Eltalouny**, OzonAction, UN Environment Programme

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 hydrochlorofluoro-carbons (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.



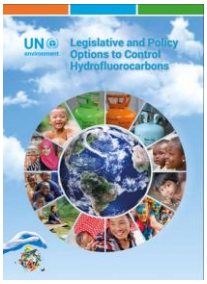
Women in the refrigeration and air-conditioning industry: Personal experiences and achievements-The United Nations Environment Programme's (UNEP), OzonAction, in cooperation with UN Women, has compiled this booklet to raise awareness of the opportunities available to women and to highlight the particular 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 weld and follow in their footsteps. **Read/download the publication**



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

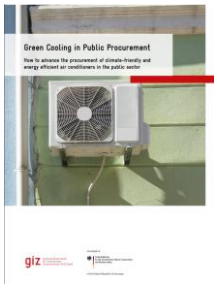
PUBLICATIONS

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



Latest issue of Centro Studi Galileo magazine,
Industria & Formazione, n. **8-2022**
(in Italian).

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**



Cut Super Climate Pollutants Now!: The Ozone Treaty's Urgent Lessons for Speeding Up Climate Action (Resetting Our Future). We have a decade or less to radically slow global warming before we risk hitting irreversible tipping points that will lock in catastrophic climate change. The good news is that we know how to slow global warming enough to avert disaster. Cut Super Climate Pollutants Now! explains how a 10-year sprint to cut short-lived "super climate pollutants" -- primarily HFC refrigerants, black carbon (soot), and methane -- can cut the rate of

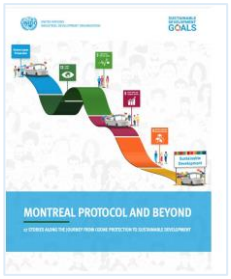
global warming in half, so we can stay in the race to net zero climate emissions by 2050.
Authors: Alan Miller, Durwood Zaelke, Stephen O. Andersen.

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.

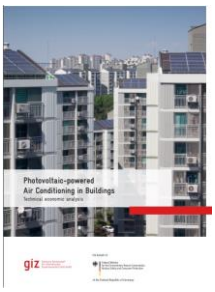
The e-book, titled "**7 Keys to a Compliant PSM Training Program for Ammonia Refrigeration**," outlines important questions a facility's program should address and questions that trained plant personnel should be able to answer. Topics covered include:

- 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

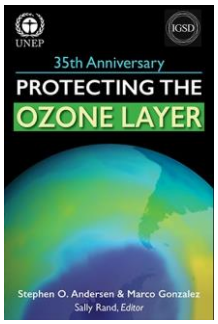


Montreal Protocol and beyond: 17 stories along the journey from ozone layer protection to sustainable development - The 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs) embody the global commitment to build a more sustainable future for all. These universally agreed objectives address the most urgent environmental, social and economic challenges of our time... **Read/Download here**



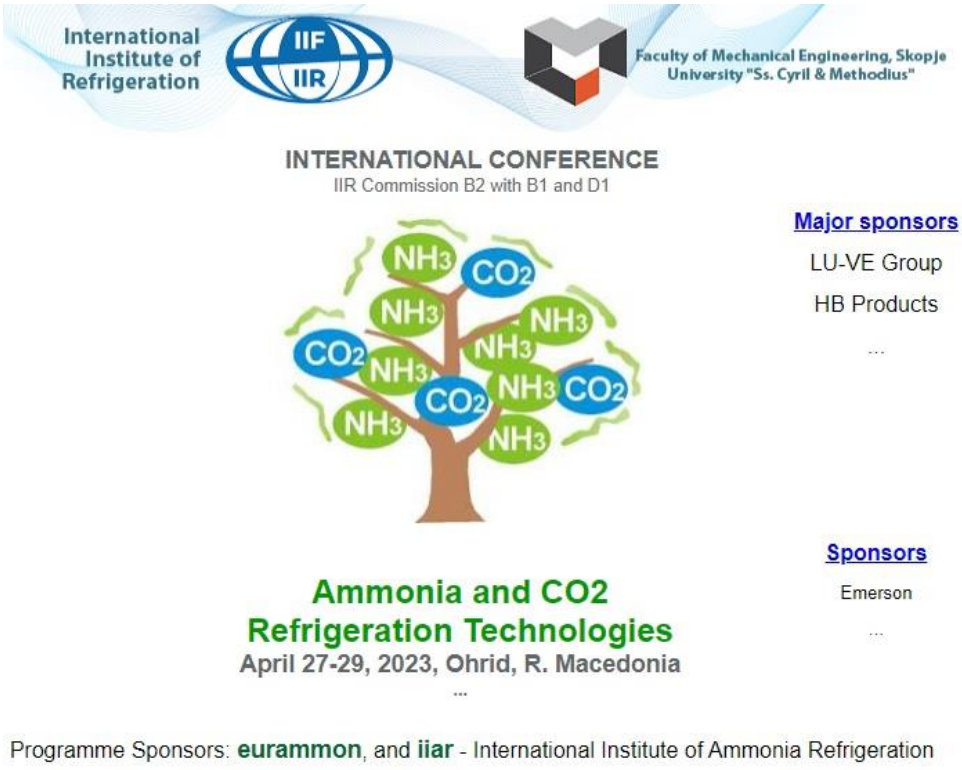
Photovoltaic-powered Air Conditioning in Buildings - Space cooling in buildings is characterized by enormous growth rates, due to increasing ambient temperatures, growing population and urbanisation. Air-conditioned buildings in many countries are largely dominated by mid to low appliance energy efficiency levels, highly climate-damaging refrigerants as well as fossil-fuel based electricity supply. This in sum generates a huge amount of greenhouse gas (GHG) emissions, furthering climate change. The objective of this paper is to further unfold the technical and economic potential of solar PV-powered green air conditioners. Therefore, it focuses on the most widely applied type of active cooling appliance: single split-type air conditioning systems with a cooling capacity up to 5 kW. It looks at the current development of technical main components and based on that defines model cases for hybrid and off-grid solutions for private and small commercial applications. The technical and economic potential for these cases is then

analysed for 13 countries worldwide. Subsequently, a case study on Médecins Sans Frontières' (MSF) solar AC project in Haiti provides practical insights on the use of PV-powered AC systems in the context of off-grid social infrastructure. **Read/Download the study** [here]



Protecting the Ozone Layer - 35th Anniversary Edition - a new book celebrating the 35th Anniversary of the Montreal Protocol. The book highlights successes and documents innovation during the first 35 years and inspires new ambition to strengthen protection of stratospheric ozone and climate before Earth passes tipping points. The book tells the story of the Montreal Protocol, revealing a model of cooperation, collaboration, universal ratification, record of compliance with over 99 per cent of controlled ozone-depleting substances (ODSs) phased out, the ozone layer on the path to recovery, the 2007 Montreal Adjustment, and the 2016 Kigali Amendment moving the Montreal Protocol further into environmental protection. Unfinished business includes: HCFC phase out, ODS bank management, HFC phase down, uncontrolled ozone-depleting greenhouse gas nitrous oxide (N2O), feedstock exemptions for plastics production, and dumping of obsolete cooling appliances. **The book is anticipated to be released at 34th Meeting of the Parties to the Montreal Protocol on 31 October 2022.**

MISCELLANEOUS



I am in the Montreal Protocol Who's Who… Why Aren't You?

The United Nations Environment Programme, OzonAction, in collaboration with Marco Gonzalez and Stephen O. Andersen are updating and expanding the "**Montreal Protocol Who's Who**".

We invite you to submit your nomination*, and/or nominate Ozone Layer Champion(s). ***The short profile should reflect the nominee's valuable work related to the Montreal Protocol and ozone layer protection.***

Please notify and nominate worthy candidates through the **on-line form**.

We look forward to receiving your nomination(s), and please feel free to contact our team for any further assistance concerning your nomination.

Take this opportunity to raise the profile of women and men who made an important contribution to the Montreal Protocol success and ozone layer protection.

- View the «Montreal Protocol Who's Who» **Introductory video**
- Contact : **Samira Korban-de Gobert,** UN Environment Programme, OzonAction

** If you are already nominated, no need to resubmit your profile*

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If you wish to submit articles, invite new subscribers, please contact:

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