

OzoNews

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

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GLOBAL



1. Kigali Amendment latest ratifications

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

Eritrea, 7 February 2023

Republic of Korea, 19 January 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).

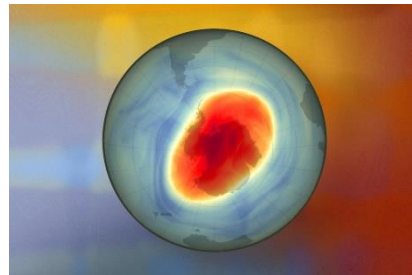
Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Status of Ratification 15 October 2016 to [date](#).

[United Nations Treaty Collection](#)

Image: UN Treaty Collection website

2. Study: Smoke particles from wildfires can erode the ozone layer MIT chemists show the Australian wildfires widened the ozone hole by 10 percent in 2020

A wildfire can pump smoke up into the stratosphere, where the particles drift for over a year. A new MIT study has found that while suspended there, these particles can trigger chemical reactions that erode the protective ozone layer shielding the Earth from the sun's damaging ultraviolet radiation.



The study, which [appears today](#) in *Nature*, focuses on the smoke from the “Black Summer” megafire in eastern Australia, which burned from December 2019 into January 2020. The fires – the country’s most devastating on record – scorched tens of millions of acres and pumped more than 1 million tons of smoke into the atmosphere.

The MIT team identified a new chemical reaction by which smoke particles from the Australian wildfires made ozone depletion worse. By triggering this reaction, the fires likely contributed to a 3-5 percent depletion of total ozone at mid-latitudes in the Southern Hemisphere, in regions overlying Australia, New Zealand, and parts of Africa and South America.

The researchers’ model also indicates the fires had an effect in the polar regions, eating away at the edges of the ozone hole over Antarctica. By late 2020, smoke particles from

the Australian wildfires widened the Antarctic ozone hole by 2.5 million square kilometers – 10 percent of its area compared to the previous year.

It's unclear what long-term effect wildfires will have on ozone recovery. The United Nations recently reported that the ozone hole, and ozone depletion around the world, is on a recovery track, thanks to a sustained international effort to phase out ozone-depleting chemicals. But the MIT study suggests that as long as these chemicals persist in the atmosphere, large fires could spark a reaction that temporarily depletes ozone.

"The Australian fires of 2020 were really a wake-up call for the science community," says Susan Solomon, the Lee and Geraldine Martin Professor of Environmental Studies at MIT and a leading climate scientist who first identified the chemicals responsible for the Antarctic ozone hole. "The effect of wildfires was not previously accounted for in [projections of] ozone recovery. And I think that effect may depend on whether fires become more frequent and intense as the planet warms."

The study is led by Solomon and MIT research scientist Kane Stone, along with collaborators from the Institute for Environmental and Climate Research in Guangzhou, China; the U.S. National Oceanic and Atmospheric Administration; the U.S. National Center for Atmospheric Research; and Colorado State University.

Chlorine cascade

The new study expands on a 2022 discovery by Solomon and her colleagues, in which they **first identified** a chemical link between wildfires and ozone depletion. The researchers found that chlorine-containing compounds, originally emitted by factories in the form of chlorofluorocarbons (CFCs), could react with the surface of fire aerosols. This interaction, they found, set off a chemical cascade that produced chlorine monoxide – the ultimate ozone-depleting molecule. Their results showed that the Australian wildfires likely depleted ozone through this newly identified chemical reaction.

"But that didn't explain all the changes that were observed in the stratosphere," Solomon says. "There was a whole bunch of chlorine-related chemistry that was totally out of whack."

In the new study, the team took a closer look at the composition of molecules in the stratosphere following the Australian wildfires. They combed through three independent sets of satellite data and observed that in the months following the fires, concentrations of hydrochloric acid dropped significantly at mid-latitudes, while chlorine monoxide spiked.

Hydrochloric acid (HCl) is present in the stratosphere as CFCs break down naturally over time. As long as chlorine is bound in the form of HCl, it doesn't have a chance to destroy ozone. But if HCl breaks apart, chlorine can react with oxygen to form ozone-depleting chlorine monoxide.

In the polar regions, HCl can break apart when it interacts with the surface of cloud particles at frigid temperatures of about 155 kelvins. However, this reaction was not expected to occur at mid-latitudes, where temperatures are much warmer.

"The fact that HCl at mid-latitudes dropped by this unprecedented amount was to me kind of a danger signal," Solomon says.

She wondered: What if HCl could also interact with smoke particles, at warmer temperatures and in a way that released chlorine to destroy ozone? If such a reaction was possible, it would explain the imbalance of molecules and much of the ozone depletion observed following the Australian wildfires.

Smoky drift

Solomon and her colleagues dug through the chemical literature to see what sort of organic molecules could react with HCl at warmer temperatures to break it apart.

“Lo and behold, I learned that HCl is extremely soluble in a whole broad range of organic species,” Solomon says. “It likes to glom on to lots of compounds.”

The question then, was whether the Australian wildfires released any of those compounds that could have triggered HCl’s breakup and any subsequent depletion of ozone. When the team looked at the composition of smoke particles in the first days after the fires, the picture was anything but clear.

“I looked at that stuff and threw up my hands and thought, there’s so much stuff in there, how am I ever going to figure this out?” Solomon recalls. “But then I realized it had actually taken some weeks before you saw the HCl drop, so you really need to look at the data on aged wildfire particles.”

When the team expanded their search, they found that smoke particles persisted over months, circulating in the stratosphere at mid-latitudes, in the same regions and times when concentrations of HCl dropped.

“It’s the aged smoke particles that really take up a lot of the HCl,” Solomon says. “And then you get, amazingly, the same reactions that you get in the ozone hole, but over mid-latitudes, at much warmer temperatures.”

When the team incorporated this new chemical reaction into a model of atmospheric chemistry, and simulated the conditions of the Australian wildfires, they observed a 5 percent depletion of ozone throughout the stratosphere at mid-latitudes, and a 10 percent widening of the ozone hole over Antarctica.

The reaction with HCl is likely the main pathway by which wildfires can deplete ozone. But Solomon guesses there may be other chlorine-containing compounds drifting in the stratosphere, that wildfires could unlock.

“There’s now sort of a race against time,” Solomon says. “Hopefully, chlorine-containing compounds will have been destroyed before the frequency of fires increases with climate change. This is all the more reason to be vigilant about global warming and these chlorine-containing compounds.”

This research was supported, in part, by NASA and the U.S. National Science Foundation.

Massachusetts Institute of Technology (MIT), 8 March 2023 , By Jennifer Chu

Image: MIT website

3. What is sustainable cooling and how can it help tackle the climate crisis?

- Sustainable cooling replaces traditional refrigeration with more energy-efficient and sustainable solutions to reduce emissions.
- Transforming urban buildings and environments with green spaces, plants and shaded areas can increase ambient cooling.
- A policy framework can help encourage cleaner cooling with green building codes, tax incentives, grants and subsidies.

Scorching heatwaves, more and more intense droughts, wildfires, and other weather extremes... the signs of the climate crisis are all around us. But sustainable cooling could help beat the heat while cutting emissions.

Rethinking how we stay cool could contribute to tackling today's cooling paradox - in which heatwaves and extreme temperatures caused by the climate crisis send people in many parts of the world rushing to switch on air conditioning units, which release gases that contribute to climate change

What is sustainable cooling?

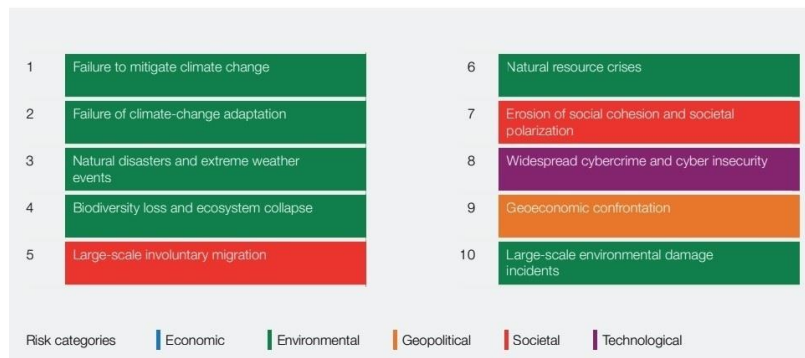
As the name suggests, sustainable cooling is more climate-friendly than traditional refrigeration. It targets efficiency improvements to cooling solutions alongside measures that lower ambient temperatures in buildings and urban environments.

Traditional air conditioners and refrigerants contain fluorinated gases that can leak, depleting the planet's ozone layer and harming the environment. Sustainable cooling replaces these gases with climate-friendly alternatives, which when coupled with enhanced energy-efficiency measures reduce both direct emissions from refrigerant leakage and indirect emissions from the energy used to power the cooling unit.

Why is sustainable cooling important?

According to the UN World Meteorological Organization, **2022 was one of the hottest years on record, with the past eight years the hottest since records began.**

Global risks ranked by severity over the long term (10 years)



Climate change and nature's collapse dominate the [World Economic Forum's Global Risks Report 2023](#) list of top-10 long-term threats, with these concerns occupying the top four places.

As our planet's atmosphere warms, heatwaves, soaring temperatures, droughts, and other weather extremes are becoming both more frequent and more intense.

[Global warming has made simultaneous large heatwaves in the Northern Hemisphere six times more likely over the past 40-year period](#), according to research published in the Journal of the American Meteorological Society.

Furthermore, [cooling is critical](#) to comfort, productivity and health. Cooling is needed in agriculture to ensure food security and hospitals and healthcare centers need cooling to transport vaccines and other medical products.

Sustainable cooling strategy #1: Design

A rethinking of building designs and city layouts can play an important role in sustainable cooling.

Ambient cooling puts measures in place to help nature reduce the sun's intensity, such as covering building roofs, balconies and other areas with plants and greenery to absorb heat, and fitting insulation and double glazing to block the sun's heat.



In urban areas, adding green spaces, installing shade cover and planning wide urban streets and low buildings to increase wind flow-through, are among the many measures that help to reduce heat gain.

Sustainable cooling strategy #2: Innovation

Some sustainable innovations, as explained by organization [Sustainable Energy for All \(SEforALL\)](#), use no operational energy or refrigerants. These are sometimes referred to as nature-based or passive technology solutions.

For instance, WAVIN (MetroPolder), a World Economic Forum Uplink innovator, [builds green roofs that capture and store rainwater, which is recycled for use in cities](#). Captured

rainwater is used for everything from irrigating the greenery on the roof, flushing the building's toilets, and cooling the building during summer heat.

Urban climate-tech start-up [BioShade reimagines how cityscapes look](#) and feel, using AI, IoT and hydroponic technologies to autonomously generate natural shade. Roofs, walls and urban spaces become green, living organisms that create a cooler microclimate.

Sustainable cooling can also leverage a more efficient use of refrigerants. These technologies use certain types of refrigerants (such as ultra-low [Global Warming Potential \(GWP\)](#) natural refrigerants) and depend on clean energy sources. Additionally, special features often help maximize the delivery of cool air, to save energy.

Sustainable cooling strategy #3: Policy & Finance

[Cooling technologies like refrigeration and air-conditioning could account for two-fifths of Southeast Asia's electricity demand by 2040](#), according to a report called Freezing in the tropics: Asean's air-con conundrum. Rapid growth in economic output, wealth and population density, and increasing migration to cities prompts heavy reliance on cooling solutions in the burgeoning economies of regions like Asia.

Driving progress on sustainable cooling requires a policy framework that encourages people, businesses and local governments to go green, including sustainable building codes and tax incentives, grants and subsidies to encourage take-up.

[According to the UN](#), policymakers can incentivize businesses to create energy efficient cooling products, all while working sustainable cooling into climate pledges and ensuring that sustainable cooling is considered during the planning and design energy, urban, transport, agricultural and health service projects.

To be sure, finance for sustainable cooling technologies and initiatives is another must have. Many poorer households and rural communities are disproportionately impacted by extreme heat and have fewer resources to put energy-efficient or nature-based cooling solutions into place.

What impact can sustainable cooling have?

Cooling currently contributes to [3.4% of global emissions](#). Additionally, the [International Energy Agency estimates](#) that "Climate friendly cooling" could sidestep more than 460 billion tonnes of greenhouse gas emissions – or approximately eight years of global emissions at 2018 levels

Of course, there's no one-size-fits-all solution to scale sustainable cooling. Tackling this issue will require a combination of strategies and empowering local leaders to work quickly to craft lasting solutions that work for their locality.

But while these steps will take leaders of all stripes in the right direction, urgent action is needed to address the underlying causes of climate change to keep global temperatures within the Paris Agreement climate target.

[The World Economic Forum, 14 March 2023](#)

Images: The world economic forum website

4. Experimental and Simulation Study of the Latest HFC/HFO and Blend of Refrigerants in Vapour Compression Refrigeration System as an Alternative of R134a

Abstract

Experimental and simulation investigation of the performance and characteristics of different refrigerants and blends of refrigerants is carried out to replace the existing refrigerant R134a for a vapour compression refrigeration system.

The performance of VCRS systems was improved by several researchers by introducing the concept of mixing the family of refrigerants with low GWP in the working circuit.

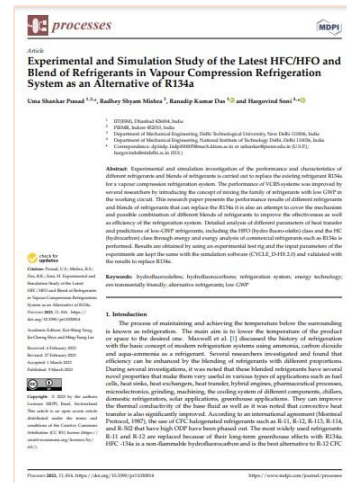
This research paper presents the performance results of different refrigerants and blends of refrigerants that can replace the R134a it is also an attempt to cover the mechanism and possible combination of different blends of refrigerants to improve the effectiveness as well as efficiency of the refrigeration system.

Detailed analysis of different parameters of heat transfer and predictions of low-GWP refrigerants, including the HFO (hydro fluoro-olefin) class and the HC (hydrocarbon) class through energy and exergy analysis of commercial refrigerants such as R134a is performed.

Results are obtained by using an experimental test rig and the input parameters of the experiments are kept the same with the simulation software (CYCLE_D-HX 2.0) and validated with the results to replace R134a. [...]

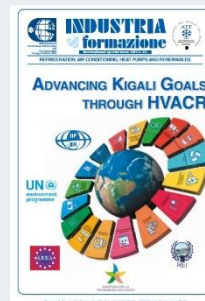
Authors: Uma Shankar Prasad, Radhey Shyam Mishra, Ranadip Kumar Das and Hargovind Soni

Processes, 9 March 2023
Image: Processes website



Advancing Kigali goals through HVACR - International Special Issue 2022- 2023

To provide an update on this global effort, The Centro Studi Galileo (CSG) and the Renewable Energy Institute (REI), with support from the International Institute of Refrigeration (IIR), The United Nations Environment Programme-OzonAction, (UNEP-OzonAction) and The Air conditioning and Refrigeration European Association (AREA), Ministero Della Transizione Ecologica, have collected experiences from around the world, compiled in this special publication, featuring papers from leading global institutions and experts, addressing the current situation, the challenges ahead, and sharing opinions from different National Ozone Units, on issues related among others to HVAC&R, training, and the role of women in the cooling industry.



The **International Special Issue 2022- 2023** was officially launched during a side event at the Thirty-Fourth Meeting of the Parties to the Montreal Protocol in Montreal, (MOP34), 31 October – 4 November 2022 | Montreal, Canada

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



6 exhibits

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



0 exhibits

Storage on board ships,
aircraft, and containers



4 exhibits

Food processing plants



1 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

AFRICA

5. Uganda - Female Experts in Cooling – Mary Najjuma

When we think about cooling, we think about refrigeration and air conditioning. Access to cooling is important for food security, health prosperity, and productivity. However, currently, cooling equipment contributes 7% of all global greenhouse gas emissions. If we continue operating at business-as-usual, the cooling sector's emissions could double by 2050.

In summary, cooling equipment uses conventional refrigerants with high ozone-depleting potential and global warming potential. Our guest, Mary, talks about her work that supports the transition to clean and sustainable cooling technologies.

Hi Mary, thank you for joining us today. I am excited to learn about this cooling side of engineering from you
Thanks, Winnie for reaching out. What you are doing is very interesting and I am happy to be involved.

Would you mind sharing a little bit about yourself with our audience?

My name is Mary Najjuma from Uganda, and a mother of one. I am currently a Ph.D. student at the London South Bank University where I am researching rural efficient and optimal cooling hubs. Before this position, I worked with the United Nations Industrial Development Organisation (UNIDO), as an international consultant for the Montreal Protocol; a treaty aimed at phasing out ozone-depleting substances. The treaty has been amended to include global warming substances and is now referred to as the Kigali Amendment to the Montreal Protocol.

This is my first-time hearing about work done in cooling hubs. I am interested in learning more about how you joined this field

Growing up, I had always wanted to be a medical doctor, seeing how my mother, who was a nurse, cared for and treated sick people. I was fascinated with the whole medical profession until it was time for high school Biology, and they brought in caterpillars for dissection. One look at those creatures and all the passion for medicine died, untimely.

On the bright side, I was more enthused by Chemistry and everything that had to do with elements and their combinations. I wanted to pursue a degree in Chemical Engineering and possibly work with nuclear weapons. This decision sent my parents' thinking into overdrive, making me an instant prayer topic. A family gathering was summoned, and I was repeatedly advised against a career in such an explosive domain. Besides, universities in Uganda weren't offering degrees in Chemical Engineering anyway.

My only options were the more ubiquitous sectors of engineering studies, Civil Engineering, Mechanical Engineering, and Electrical Engineering. For someone who adored chemistry, I



went for Civil Engineering at Makerere University, with the hope that it would be somewhat closer to Chemical Engineering, and boy was I wrong!

I had absolutely zero passion for this field and this dispassion was all the more confirmed on my first day at work as a Site Manager. Altogether, I practiced for less than a year, but I already felt like an upgrade would help me shift careers. At that moment, the booming oil and gas industry beckoned unto me, I answered. I won my first scholarship to study Oil and Gas Engineering at Aberdeen University, in Scotland for a year and came back to contribute my quota to the national agenda.

Sadly, it was the time of the recession and there were global layoffs in the oil industry. Looking for a job was hectic; I was mostly rejected on the basis that I was overqualified. I was later invited to serve as a business analyst at the company that sponsored my master's studies. After a year and a half in this position, the recession went from bad to worse. I became a victim of the incessant layoffs that were going on.

Fortunately, I was still in the business of trying to find myself, my passion, and an area that would keep me fascinated all day every day. While looking for a job, I stumbled upon another opportunity to upgrade. This time it was a master's in business administration, particularly in the field of green energy and Sustainable Businesses. With much enthusiasm, I jumped on a flight bound for Italy to pursue an MBA in Green Energy and Sustainable Businesses at Bologna Business School. It was after this academic upgrade that I received the most important call of all. The call to work as an intern at the UN in the department of Environment, Montreal Protocol Division.... phew!

It was during the internship that my passion for the cooling sector was birthed. I am glad to say that, while I have never been in a position this long, I enjoy being here and I believe I will be here for a long time. Who knew that after all these years I would find my passion in the Cooling sector and that I would be fascinated enough to join a Ph.D. program in it?

What goes on in the Cooling Sector? I am asking on behalf of myself and many others out there – we have no idea, haha

Do not worry, I keep getting the same question everywhere, haha. I am always wondering how best to explain what I do to a layman. It's a work in progress. One thing I purpose to achieve from my research is simply for people to understand what I do and not just use complicated terminologies.

Well, the cooling sector is mainly about refrigeration and air conditioning. As far as the Montreal Protocol is concerned, refrigerators and air conditioning units use refrigerants, which many refer to as 'gases', which are overwhelmingly harmful to the environment. These refrigerants are the worst culprits in the depletion of the ozone layer and global warming. Hence, the need to take action towards efficient, environmentally friendly solutions.

What have been the most challenging moments on your journey in the cooling industry?

My most challenging times were after university with all the job rejections because I am "over qualified"surpriiiiiise!:) Well, back home, when you have many degrees to your name, you're a threat to your superiors and yet all we're looking for is gaining hands-on experience.

Fortunately, I have had a number of 'destiny-helpers' along the way who have given me their undying support. Most of these were men who were intentional about supporting the girl child to achieve her dream. My internship supervisor had enormous confidence in my ability, even though I was unable to complete a task in the beginning. He said to me, "Mary, I know you can do this, I know you have so much potential." This came with a few guidelines to help me successfully accomplish that task. He's one person who always celebrates my career wins.

What has kept you inspired during such challenges?

What has kept me going all these years is my ability to embrace change. I'm not afraid to try out something new, to go through another door when one door closes. I always glory in the fact that I did not settle for what I did not enjoy doing. My ability to accept constructive feedback and pay attention to it no matter its form has given me the impetus to develop immensely. Trying new things by adapting to change has landed me right here, in my passion.

Tell us about some of the most prestigious moments on your journey as someone working in the cooling industry

Recently I was invited to an energy-efficient working group and replenishment task force for the technological and economic assessment panel of the Montreal Protocol. Together with other experts, we offer technical advice to the panel on the decisions made by the members of parties to the protocol.

Who is Mary outside of work?

The best that happened to me is the free gift of salvation. God restored my life. When I close my laptop, I listen to podcasts, audio bible, and music. Sunday is for church.

When not on a work mission, I spend most of the time with my son. He likes movies, so we have movie dates.

Let me see... do I even have hobbies? When I am not doing "cooling" stuff, I like to have a quiet time with my loved ones, go out for a movie or do some cooking because I love cooking. Yeah, that's how boring it is, haha.

Do you have a favorite quote?

I took my favorite quote from a song by Nas; "I know I can, be what I wanna be. If I work hard at it, I'll be where I wanna be".

How would you encourage a young girl who wants to join the cooling industry?

To the young ones I will say, "never settle for less, don't be afraid of change, don't be afraid to try new things till you find what you love, till you find your passion". It might take time but, in the end, it will pay off. I promise you; nothing comes close to earning from what you are passionate about, absolutely nothing.

Most importantly, "seek first the kingdom of God and His righteousness, and all the things you desire will be given to you" – Matthew 6:33

Thank you very much, Mary, for teaching us about the cooling industry. We appreciate your time and look forward to other great things you do in the future.

Words That Count, 13 March 2023

Image: Words that count Website

NORTH AMERICA

6. EPA Announces Enforcement Actions to Control Hydrofluorocarbon Imports

Efforts Support National Commitments on Climate Change

WASHINGTON — Today [March 2,

2023], the U.S. Environmental Protection Agency (EPA) announced several enforcement actions that support national and international goals to reduce the use of hydrofluorocarbons (HFCs) in our fight against climate change. These civil penalty actions include three landmark settlements with HFC importers who failed to report their imported quantities in violation of the Clean Air Act's (CAA) Greenhouse Gas Reporting Program: Artsen Chemical America, LLC (\$247,601 penalty), Harp USA, Inc. (\$275,000 penalty), and the IGas Companies (\$382,473 penalty). EPA is aggressively pursuing similar actions against several other importers that failed to report their HFCs.

EPA also recently issued the first notices of violation (NOVs) under the American Innovation and Manufacturing Act of 2020 (AIM Act) to alleged violators who imported regulated substances without required allowances. Under the AIM Act, importers are required to expend allowances to import HFCs. Compliance with the allowance system is critical to assuring the success of the United States' HFC phasedown program. Illegal imports undermine the phasedown, disadvantage companies who follow the rules, and contribute to global warming.

"These NOVs demonstrate EPA's commitment to enforcing the American Innovation and Manufacturing Act of 2020," said Larry Starfield, Acting Assistant Administrator for EPA's Office of Enforcement and Compliance Assurance. "In addition, our Greenhouse Gas Reporting Program settlements with HFC importers recognize that accurate data is essential for setting sound climate change policy."

Stopping illegal HFC imports is a top priority of a federal interagency task force that includes EPA and U.S. Customs and Border Protection. In fiscal year 2022, the task force prevented illegal HFC imports equal to more than 889,000 metric tons of carbon dioxide. This equates to the carbon dioxide released from powering 173,000 homes with electricity for a year.



HFCs are commonly used in refrigeration and air conditioning equipment. Released to the atmosphere, HFCs can have a climate impact thousands of times stronger than carbon dioxide. Enforcement of the Greenhouse Gas Reporting Program demonstrates the Biden Administration's commitment to address HFCs and protect our climate. The United States agreed under the bipartisan AIM Act to phasedown HFC production and consumption by 85% by 2036, consistent with the international HFC phasedown laid out in the Kigali Amendment to the Montreal Protocol. Global efforts to phase down HFCs are expected to avoid up to 0.5 °C of global warming by 2100. Accurate reporting of HFCs helps set sound policy and going forward under the HFC phasedown will allow the United States to verify we are meeting the limits under the AIM Act.

More information on the settlements and outstanding NOV's can be found at: [Enforcement of the Greenhouse Gas Reporting Program: HFC Importers | US EPA](#). More information on the AIM Act NOV's can be found at: [Enforcement of the American Innovation and Manufacturing Act of 2020 | US EPA](#).

Learn more about the Greenhouse Gas Reporting Program here: [Greenhouse Gas Reporting Program](#). For more information on the EPA's actions to address HFCs, visit: [Protecting Our Climate by Reducing Use of HFCs](#).

US EPA, 2 March 2023

Images: USEPA website

7. NOAA research in the stratosphere is taking off A major airborne research mission of the stratosphere is underway in Alaska

A converted Cold War bomber packed with sensitive instruments is investigating atmospheric chemistry and aerosols over the Arctic this month in the most ambitious NOAA airborne stratospheric research mission yet.



The project, dubbed SABRE, is one element of NOAA's growing Earth's Radiation Budget research program, an effort to provide baseline observations of the stratosphere and other elements of Earth's climate system to inform evaluations of potential future efforts to slow global warming by modifying the amount of heat captured by the atmosphere.

"Processes in the stratosphere can change climate at the Earth's surface," said Karen Rosenlof, the Chemical Science Laboratory's senior scientist for climate and climate change. "Satellites give us important information, but not everything we need to know. SABRE measurements will help to assess the increasing impacts to the stratosphere through space flight or deliberate climate intervention."

Flying out of Eielson Air Force Base in Fairbanks, Alaska, a NASA WB-57 research jet is carrying a payload of 17 sampling instruments from NOAA, NASA, Harvard and the University of Vienna into the stratosphere, which in the Arctic extends from about 4 miles

to 30 miles above the surface. The flights will gather extensive and detailed measurements of trace gases and aerosols in an undersampled region of the atmosphere.

Aerosols can reflect or absorb heat and therefore influence the climate. They also provide surfaces for important chemical reactions that control the amount of stratospheric ozone, which protects life on Earth from harmful ultraviolet solar radiation.

The WB-57 is one of the few research aircraft that can carry instruments like those deployed in SABRE well into the stratosphere.

After completing research flights in Alaska, SABRE research flights are planned for the tropics in 2024 and in the Southern Hemisphere in 2025. [...]

National Oceanic and Atmospheric Administration (NOAA), 2 March 2023

Images: NOAA website

8. Despite CFCs Being Banned for Decades from Consumer Products, “CFC Free” Labeling Remains Common

In 1994, with the issuance of U.S. EPA’s Pesticide Regulation Notice (PRN) 93-4, CFCs were effectively banned in pesticides and other consumer aerosol products. Following that new regulation, all consumer aerosols must be CFC free.



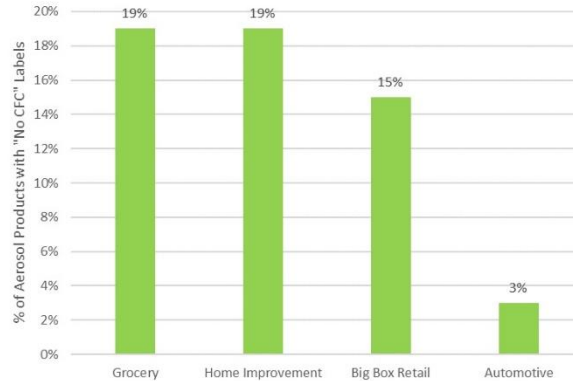
In the 1970s, when researchers discovered that CFCs triggered a chain reaction that destroyed the ozone layer ([read previous article](#)), they were widely used across the globe in refrigeration systems, as well as in consumer aerosol products like hairspray or bug sprays (pesticides), and spray paints. This discovery triggered many CFC product manufacturers to begin phasing out its use and to seek alternatives. It even spurred many developed nations to create legislation that would phase out and ultimately ban CFC use, via the Montreal Protocol. The late 1970s to the mid-1990s represented a period in the U.S. where certain consumer products may or may not have contained CFCs, so aerosol manufacturers began adding “No CFCs” labeling on their products.

Example of a “No CFCs” Label on an Aerosol Product.

It’s been over 30 years since this legislation went into effect, so one might expect “No CFCs” labeling to have disappeared, much like the hole in the ozone layer, right? Recently, the Environmental Research & Education Foundation (EREF) conducted a study on consumer environmental labeling of aerosol products at grocery, big box, automotive, and home improvement stores across the nation. This work included an assessment of whether or not aerosols still displayed a “No CFCs” label. The results show that use of these labels is still alive and well. In fact, of the nearly 4,500 aerosol products catalogued, over 17% were branded “No CFCs.”

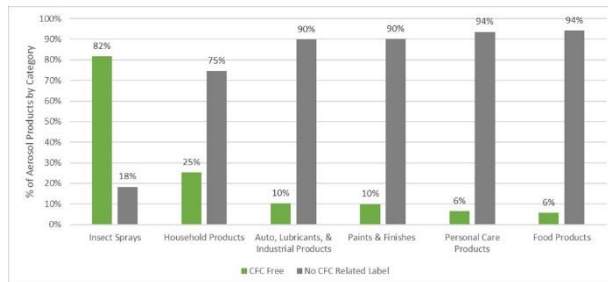
The figure below shows that grocery and home improvement stores had the largest prevalence of aerosol products with “No CFCs” labeling, followed closely by big box retail stores. On the other hand, automotive stores had a very low prevalence of aerosols with

this labeling. Given the large percentage of the U.S. population who routinely shops at grocery, home improvement, and big box retail stores, consumers purchasing aerosol products are highly likely come across “No CFCs” labeling.



Prevalence of “No CFCs” Labeling on Aerosol Products at Different Retail Store Types.

EREF also compared the types of aerosol products. The figure below highlights that insect sprays (i.e. pesticides) have a 3-fold higher prevalence of “No CFCs” labeling compared to household products (e.g. disinfectants, laundry products, cleaners, air fresheners) and over 8 times more compared to all other product types.



Prevalence of “No CFCs” Labeling on by Product Category.

Since the mid-90s issuance of EPA PRN 93-4 was specific to the banning of CFCs in pesticide aerosol products, “No CFCs” labeling is, essentially, unnecessary. It’s on par with Coca Cola labeling its products “No Cocaine” even though it’s been over a century since its inclusion. So, why would products still contain these labels decades later? While there may still be some legitimate reasons to have such a label, these justifications would make far more sense for non-consumer CFC-containing products (such as some refrigerants) that are still being phased out.

While speculative, product manufacturers might still feel that such labeling offers differentiation from a marketing standpoint. This perspective could play off a couple of factors: (1) the decrease in use of “No CFCs” labeling due to it being unnecessary, and (2) consumer ignorance.

First, the labels *are* far less prevalent than they were in the 1990s, despite still being around. Still, the unnecessary use of this branding could lead unaware consumers to

believe that they're making a better environmental choice by purchasing "No CFCs" products. If this were the case, this branding is nothing more than a form of greenwashing. Conversely, consumers who are aware but perhaps not well-educated on the CFC issue may feel products without "No CFCs" branding are not environmentally responsible, which puts product manufacturers in a tough spot. Such issues highlight how, in addition to sound science, strong consumer education is a necessary ingredient to advance sustainability.

Waste360, 8 March 2023, By Bryan Staley

Images: Waste360 website

EUROPE & CENTRAL ASIA

9. Croatia customs fine HFC smuggler €13,200

A Croatian citizen has been €13,200 for an attempt to smuggle 50 cylinders of HFC refrigerant across the border from Bosnia-Herzegovina.

Local reports say police and customs officials stopped the truck at the border point in Stara Gradiška in the Brod-Posavina County of Croatia.



The truck, with Bosnian-Herzegovinian registration, was driven by a Croatian citizen. Forty-five cylinders of R134a and five cylinders of R32 were found, weighing 657kg.

CoolingPost, 9 March 2023

Image: CoolingPost website

10. The Swiss parliament has approved a government proposal to increase a credit for global environmental measures

The House of Representatives on Wednesday followed the Senate in agreeing CHF198 million (\$211.8 million) for several funds to finance the protection of the ozone layer and other climate protection measures in the least developed countries between 2023 and 2026. [...]



SwissInfo, 8 March 2023

Image: SwissInfo website

AREA: EU Women in cooling video competition

AREA (Air conditioning and Refrigeration European Association) and World Refrigeration Day (WRD) have partnered to launch a competition on best practices for all EU women in cooling.

The challenge is to provide a video showing their best practices (e.g. installation, repair, charging, leak checking, recovery...) using the right PPE, right tools, etc... (please refer to the attached modalities); the video will be provided by uploading it on AREA's Facebook page within the **deadline of May 13th**.

AREA's appointed judges will decide the winner, who will be awarded:

- by AREA (through ATF) of flight, accommodation, and conference fee
- and by Steve Gill (WRD) of a check in the value of 1,000 EUR
- receiving the prize in the frame of **UNEP-IIR-AREA-CSG 20th European Conference (Milan, 8-9 June 2023)**.

Any AREA language is welcome.

Thank you, very much, and good luck, to EU women in cooling!

- [Specifications for the award WOMAN IN COOLING.pdf](#)
- [WOMEN IN COOLING leaflet.pdf](#)

AREA (Air conditioning and Refrigeration European Association), February 2023

Image: AREA website



FEATURED



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

- Read/Download the [full report](#)
- pre/post documents, United Nations Environment Programme (UNEP), Ozone Secretariat [MOP-34](#)
- [Daily highlights](#) Earth Negotiations Bulletin-International Institute for Sustainable Development (IISD) / [Presentations and statements](#) / [Side events](#)

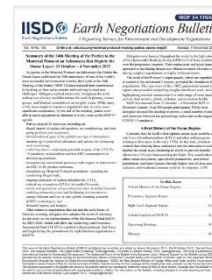
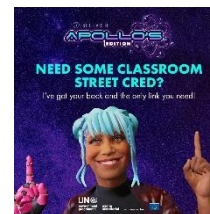


Image: ENB-IISD website

Overview for the meetings of the ozone treaties in 2022-2023 - Click [here](#) for upcoming and past Montreal Protocol Meetings dates and venues.

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](#)

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:

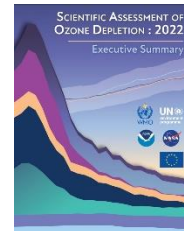
- [The Technology and Economic Assessment Panel](#)
- [The Scientific Assessment Panel](#)
- [The Environmental Effects Assessment Panel](#)

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 >>>](#)

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

[United Nations Environment Programme \(UNEP\), Ozone Secretariat, November 2022](#)



The Multilateral Fund for the Implementation of the Montreal Protocol

The Fund is dedicated to reversing the deterioration of the Earth's ozone layer. It was established by a decision of the Second Meeting of the Parties to the Montreal Protocol (London, June 1990) and began its operation in 1991. The main objective of the Fund is to assist developing country parties to the Montreal Protocol whose annual level of consumption of the ozone depleting substances (ODS) chlorofluorocarbons (CFCs) and halons is less than 0.3 kilograms per capita to comply with the control measures of the Protocol. Currently, 147 of the 197 Parties to the Montreal Protocol meet these criteria. They are referred to as Article 5 countries.

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

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

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

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

Latest News and Announcement:

[Updated guide for the presentation of new stages of HCFC phase-out management plans \(February 2023\)](#), 3/7/2023

[Updated guide for the presentation of tranches of HPMPs \(Updated, March 2023\)](#) 3/7/2023

The 92nd meeting is scheduled for 29 May to 2 June 2023, in Montreal, Canada

The 93rd 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

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).

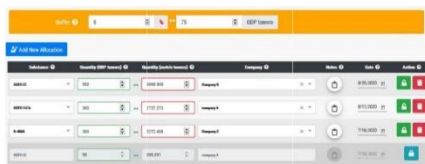


More Information - The Gas Card web-based tool is part of UNEP OzonAction’s portfolio of activities and tools to assist various stakeholders in developing countries, including customs officers and technicians, to achieve and maintain compliance with the Montreal Protocol on Substances that Deplete the 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)*



HCFC Quota and Licence Tracker - a new desktop application to assist with HCFC licences and quotas

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

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

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

GWP-ODP Calculator Application - Updated- "Quickly, efficiently and accurately convert between values in metric tonnes, ODP tonnes and CO₂-equivalent tonnes". Data are extremely important for the Montreal Protocol community, and the data reporting formats for both A7 and CP have changed recently, to a large degree triggered by the Kigali Amendment. HFCs, blends, CO₂-equivalent values, etc, now have to be addressed much more frequently by Ozone Officers during their daily work. Sometimes the terminology and values are complex and can be confusing, and it helps to have all the official facts and figures in one place. Conversion formulas need to be applied to calculate CO₂-eq values from both GWP and metric tonne values. This free app from OzonAction is a practical tool for Ozone Officers to help demystify some of this process and put frequently needed information at their fingertips. **What's new in the app:**



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

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



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



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



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

>>> Read/download the flyer

Updated OzonAction "WhatGas?" Mobile App

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



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

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

RAC Technician Videos - Full length films! Two ‘full length’ videos for refrigeration and air-conditioning (RAC) sector servicing technicians: on 1) Techniques, Safety and Best Practice and 2) Flammable Refrigerant Safety.




The OzonAction Refrigeration and Air-Conditioning Technician Video Series consists of instructional videos on techniques, security and best practice and flammable refrigerant safety. They are intended to serve as a complementary training tool for RAC sector servicing technicians to help them revise and retain the skills they have acquired during hands-on training. The videos are not intended to replace structured formal technician training, but to supplement and provide some revision of tips and skills and to build on training already undertaken.

These videos are based on the successful UNEP OzonAction smartphone application, the RAC Technician Video Series app. This application has been downloaded on more than **86,000** devices since its launch.


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

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

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

 You can watch these videos on the OzonAction YouTube Channel:

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

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



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

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

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



Women in the refrigeration and air-conditioning industry: Personal experiences and achievements-The United Nations Environment Programme’s (UNEP), OzonAction, in cooperation with UN Women, has compiled this booklet to raise awareness of the opportunities available to women and to highlight the 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**

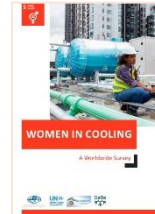


As part of IIR and UNEP OzonAction's partnership, a set of Cold Chain Technology Briefs was released over the past few years, which includes in-depth summaries about the cold chain in different key sectors. They include descriptions of technology, refrigerant options and trends and conclude with prospects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

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 the Full Report**



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



Legislative and Policy Options to Control Hydrofluorocarbons - 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. 10-2022
(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**

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

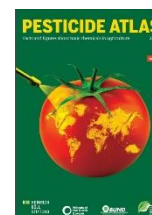
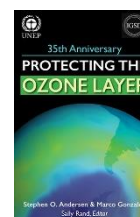
Request free Download [here](#)

Protecting the Ozone Layer - 35th Anniversary Edition - a new book celebrating the 35th Anniversary of the Montreal Protocol. **The electronic version (Kindle Edition) of the book has become available for purchase \$3.03 on Amazon.** The book highlights successes and documents



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

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


The **PESTICIDE ATLAS 2022** is jointly published by Heinrich-Böll-Stiftung, Berlin, Germany Friends of the Earth Europe, Brussels, Belgium Bund für Umwelt und Naturschutz, Berlin, Germany PAN Europe, Brussels, Belgium Chief executive editors: Lisa Tostado, Heinrich-Böll-Stiftung European Union (project management) Dr. Silke Bollmohr, EcoTrac Consulting Managing editor, graphics research: Martin Eimermacher Art direction, graphic development: STOCKMAR+WALTER Kommunikationsdesign English editor: Caspar Shaller Proof reader: Pia Hartmer, Judith Höppner; Joan Lanfranco, Heinrich-Böll-Stiftung European Union Contributors: Johanna Bär, Ulricke Bickel, Silke Bollmohr, Larissa Mies Bombardi, Clara Bourgin, Wolfgang Bödeker, Carsten Brühl, Helmut Butscher-Schaden, Henrike von der Decken, Dave Goulson, Susan Haffmans, Johannes Heimrath, Carla Hoinkes, Heike Holdinghausen, Dominic Lemken, Layla Liebetrau, Martha Mertens, Moritz Nabel, Andre Prescher, Ilang-Ilang Quijano, Anna Satzger, Achim Spiller, Lisa Tostado, Katrin Wenz, Johann Zaller, Anke Zühlsdorf. **Read/Download**



MISCELLANEOUS

International Institute of Refrigeration  Faculty of Mechanical Engineering, Skopje University "Ss. Cyril & Methodius" 

INTERNATIONAL CONFERENCE
IIR Commission B2 with B1 and D1



Ammonia and CO2 Refrigeration Technologies
April 27-29, 2023, Ohrid, R. Macedonia

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To be organised by the French Association of Refrigeration (AFF) under the theme "**Towards Efficient, Controlled and Smart Refrigeration**", the **26th IIR International Congress of Refrigeration will be held in Paris (France) on August 21-25, 2023.**

Participate and share the latest developments with the international refrigeration community.

This international event will bring together scientific and technical experts in all fields of refrigeration from across the globe to provide perspectives on the future of the industry in line with sustainable development.

[Learn more >>>](#)



26^E CONGRÈS
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The views expressed in articles written by external authors are solely the viewpoints of those authors and do not represent the policy or viewpoint of UNEP. While UNEP strives to avoid inclusion of misleading or inaccurate information, it is ultimately the responsibility of the reader to evaluate the accuracy of any news article in OzoNews. The citing of commercial technologies, products or services does not constitute endorsement of those items by UNEP.

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Prepared by: Samira Korban-de Gobert
Reviewed by: James S. Curlin

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

Samira Korban-de Gobert, samira.degobert@un.org



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