Volume XXII | 15 January 2022

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

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

OzonAction is delighted to bring you the OzoNews 22nd anniversary edition. Thank you for your continued interest, feedback, and invaluable support throughout the years.

We wish all our readers a successful and productive year 2022.

In this issue:

GLOBAL

1. Kigali Amendment latest ratifications

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

Turkey, 10 November 2021
St. Lucia, 2 November 2021

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. The Multilateral Fund for the Implementation of the Montreal Protocol New Chief Officer

Upon the forthcoming retirement of the current chief officer, Mr. Eduardo Ganem, the United Nations Secretary General has appointed Ms. Tina Birmpili as the fourth Chief Officer of the Secretariat of the Multilateral Fund for the Implementation of Montreal Protocol. Ms. Birmpili will join the Fund Secretariat on 1 March 2022.

Ms. Birmpili is an international professional with over twenty-five years of experience in policy analysis and implementation on sustainable development and management. Prior to her current position as the Deputy Executive Secretary for the UN Convention to Combat Desertification, Ms. Birmpili was the Executive Secretary of the Ozone Secretariat and was instrumental in the extensive negotiations that resulted in the Kigali Amendment of the Montreal Protocol, hailed as one of the most important climate agreements reached by all countries of the world.

She is a former Minister of Environment, Energy and Climate Change in Greece and a former Ambassador to the Organization for Economic Cooperation and Development (OECD). Her academic qualifications include a Bachelor of Science in Physics from the University of Athens, a Master of Science in Environmental Technology and a Doctor of Philosophy in Environmental Management from Imperial College of Science, Technology and Medicine, London.

Secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol
Image: Ozone Secretariat website

3. World Refrigeration Day Announces International Stemazing Programme - Registration open until 28 January 2022

World Refrigeration Day (WRD) has announced that it is partnering with STEMAZING to launch the International WRD Stemazing Inspiration Academy. This initiative supports women in STEM (Science, Technology, Engineering and Mathematics) to shine as visible role models and inspires young people through fun, interactive online STEM sessions.

The women in STEM participants take part in training and workshops to build their confidence on camera and their STEM delivery toolbox. These newly empowered role models then deliver a 4-week programme of LIVE online STEM sessions designed to engage children aged 7 - 9 years old.

Schools and families benefit from this FREE programme by taking part in hands-on simple STEM activities and experiments to promote children's curiosity, creativity and courage led by a woman in STEM role model.

For the first time, the Stemazing Programme will be available free of charge to women and the schools participating anywhere in the world. This pilot international programme will be delivered in English and therefore a working understanding of the English Language is essential.

If you are interested in participating, please register your interest below.

Registration is now open for both women applicants until the 28 January 2022. Successful applicants will start on 14 February, with the live school STEM sessions being delivered in May 2022. Thanks to the support of the sponsors, the training will be free of charge.

Steve Gill - WRD Secretariat - said “We are excited to be partnering with Stemazing once again to launch this new international programme exclusive to women from the RACHP/HVACR sector from around the world. Interest in participating in this programme is already arriving from Australia, Indian, Africa and the USA, in addition to the UK and Europe. “In addition to the wonderful training being offered, it will be a great opportunity for women from our sector to network and share experiences with other women from the sector from around the world”.

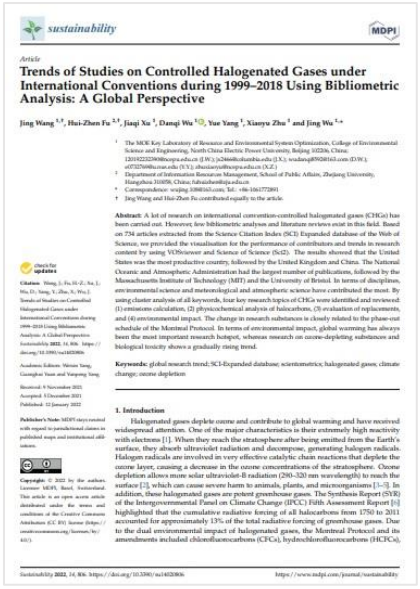
Steve continued "Although this pilot version of the programme will be delivered in English, if there are sufficient numbers interested that don't speak English, we can look into the possibility of using a translator".

The launch of this international programme builds upon the success of the Stemazing pilot programme earlier this year which exceeded all expectations with 45 women, of which the majority where from the RACHP sector delivering STEM sessions to more than 1,600 primary school children. The feed-back from everyone involved and the schools has been fantastic.

People interested in finding out more about the International WRD Stemazing programme and applying should visit [Registration open for International WRD Stemazing Programme | World Refrigeration Day]

Anyone interested in the WRD/Stemazing international programme can contact Steve Gill
Image: WRD website

4. Trends of Studies on Controlled Halogenated Gases under International Conventions during 1999–2018 Using Bibliometric Analysis: A Global Perspective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MDPI

Article

Trends of Studies on Controlled Halogenated Gases under International Conventions during 1999–2018 Using Bibliometric Analysis: A Global Perspective

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Abstract: A lot of research on international convention-controlled halogenated gases (CHGs) has been carried out. However, few bibliometric analyses and literature reviews exist in this field. Based on 734 articles extracted from the Science Citation Index (SCI) Expanded database of the Web of Science, we provided the visualisation for the performance of contributors and trends in research content by using VOSviewer and Science of Science (Sci2). The results showed that the United States was the most productive country, followed by the United Kingdom and China. The National Oceanic and Atmospheric Administration had the largest number of publications, followed by the Massachusetts Institute of Technology (MIT) and the University of Bristol. In terms of disciplines, environmental science and meteorological and atmospheric science have contributed the most. By using cluster analysis of all keywords, four key research topics of CHGs were identified and reviewed: (1) emissions calculation, (2) physicochemical analysis of halocarbons, (3) evaluation of replacements, and (4) environmental impact. The change in research substances is closely related to the phase-out schedule of the Montreal Protocol. In terms of environmental impact, global warming has always been the most important research hotspot, whereas research on ozone-depleting substances and biological toxicity shows a gradually rising trend.

Keywords: global research trend; SCI-Expanded database; scientometrics; halogenated gases; climate change; ozone depletion

1. Introduction

Halogenated gases deplete ozone and contribute to global warming and have received widespread attention. One of the major characteristics is their extremely high reactivity with electrons [1]. When they reach the stratosphere after being emitted from the Earth's surface, they absorb ultraviolet radiation and decompose, generating halogen radicals. Halogen radicals are involved in very effective catalytic chain reactions that deplete the ozone layer, causing a decrease in the ozone concentrations of the stratosphere. Ozone depletion allows more solar ultraviolet-B radiation (290–320 nm wavelength) to reach the surface [2], which can cause severe harm to animals, plants, and microorganisms [3–5]. In addition, these halogenated gases are potent greenhouse gases. The Synthesis Report (SYR) of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report [6] highlighted that the cumulative radiative forcing of all halocarbons from 1750 to 2011 accounted for approximately 13% of the total radiative forcing of greenhouse gases. Due to the dual environmental impact of halogenated gases, the Montreal Protocol and its amendments included chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs),

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Conclusions

Based on 734 SCI publications on CHGs, this study provides an overview of the research on CHGs using two bibliometrics software VOSviewer and Sci2. The results showed that the United States was the most productive country, followed by UK and China. China has shown a strong growth momentum over the past decade. NOAA had the largest number of publications, followed by MIT and the University of Bristol. The most prolific authors were McCulloch, A, Ray F. Weiss, O'Doherty, S. and the authors who collaborated more with others mainly focused on the atmospheric concentrations and emissions of CHGs.

Using cluster analysis of all keywords and reading the articles in each cluster, four research hotspots of CHGs were identified and reviewed: (1) emissions calculation, (2) physicochemical analysis of halocarbons, (3) evaluation of replacements, and (4) environmental impact. Two types of methods are often used to estimate CHG emissions: top-down and bottom-up methods, and they can be used to verify each other's results. Physicochemical experiments are mainly carried out to study the removal process of CHGs and to obtain the key parameters, including reaction constants, atmospheric lifetime, and radiation efficiency, which can be used to calculate GWP and ODP. The purpose of replacement research is to find suitable substances to replace CHGs. The main evaluation index is the appraised index that includes cooling capacity, coefficient of performance, consumption, volumetric efficiency of the compressor, and safety. The environmental impact of CHGs is generally focused on ozone depletion, global warming, and biological toxicity.

The emerging topics and changes in research trends are closely related to the phase-out schedule of the Montreal Protocol. The original research topic was mainly CFCs and other ozone-depleting substances. With the phase-out of CFCs, research of HCFCs, as the transitional substitutes of ODSs, has gradually increased. Around the year when HCFCs began to freeze under the Montreal Protocol (2009 and 2010), research on HCFCs was gradually replaced by that on HFCs, HFOs, and other new substances. Global warming has always been the most concerning research hotspot, while research on ozone depletion shows a gradually rising trend. A total of 189 journals published articles on CHGs, referring to 90 disciplines, and the main disciplines were environmental science and physical science.

The purpose of this study is to provide an analysis of the publication knowledge related to CHGs. In addition, it provides guidance for researchers who want a comprehensive and quick understanding of the field. [...]

Authors: Jing Wang, Hui-Zhen Fu, Jiaqi Xu, Danqi Wu, Yue Yang, Xiaoyu Zhu and Jing Wu
Read/download **full text**.

Sustainability, Published by MDPI, 12 January 2022
Image: MDPI website

5. High-flying wildfire smoke may threaten ozone layer

Record Arctic ozone loss linked to Siberian wildfires

A 2019 heat wave sparked widespread fires in Siberia. The smoke may have wound up in the Arctic stratosphere.

Two years ago, the crew of the Polarstern, a German icebreaker frozen into Arctic Sea ice, shot a green laser up into the night. The beam's reflected light was meant to help researchers study icy winter clouds. Instead, the beam encountered something unexpected: a kilometers-thick layer of particles in the stratosphere, more than 7 kilometers up. The haze, the researchers later concluded, was smoke from enormous wildfires that had ripped through Siberia that summer.

The smoke was more than a curiosity. By March 2020, as the Siberian smoke lingered, satellite measurements of ozone levels in the Arctic hit a record low—not quite a "hole," by Antarctic standards, but worryingly low. Although the case is far from closed, it seems likely the smoke helped deplete the ozone, says Kevin Ohneiser, a graduate student at the Leibniz Institute for Tropospheric Research (TROPOS). Similar dips have occurred the past 2 years in Antarctica following Australia's record-breaking "Black Summer" fires, which injected more than 1 million tons of smoke into the stratosphere. "We cannot prove this," he says. "But these [results] seem to be a hint."

The findings, which Ohneiser and his colleagues published last month in Atmospheric Chemistry and Physics, suggest climate change may have an unexpected impact on atmospheric chemistry, as smoke from increasingly severe wildfires invades the stratosphere and potentially erodes the ozone layer that screens out damaging ultraviolet (UV) radiation. "Until recently, smoke was really discounted in terms of a global impact," says Catherine Wilka, a stratospheric chemist at Stanford University. Now, she adds, it's "shaping up to be one of the new frontiers."

"This is really new," adds Omar Torres, a remote sensing scientist at NASA's Goddard Space Flight Center. Since the late 1970s, satellites have been capable of tracking smoke particles, easily visible from space because they are strong absorbers of UV light. Until 2017, however, the satellites saw no sign of smoke penetrating the stratosphere in any appreciable amount, Torres says.

The Arctic smoke event is particularly worrisome because it had no business being there. "Everyone thought the Arctic would be really clean," Ohneiser says, because it lacks the thunderstorms that can propel pollutants into the stratosphere, a calm, isolated layer above the troposphere. Today's fiercest wildfires, such as those in Australia, can generate their own towering storm systems, capable of pumping material into the stratosphere like volcanoes. But while Siberia burned, it was trapped in a heat wave and a high-pressure system that smothered the convective updrafts that form large storms. The smoke must have had another route to the stratosphere.

In a model not yet published, the TROPOS group attempts to explain how the region could feed smoke so high, invoking a decade-old theory called “self-lifting.” Their model suggests the dark smoke particles absorbed sunlight so effectively that they rapidly heated the air around them, causing the smoke to rise. After only a few days, the process could have lofted smoke 10 kilometers above the ground, where winds could then usher it into the low Arctic stratosphere. And indeed, on passes over the Siberian fires, NASA’s Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) laser satellite captured plumes of what seemed to be smoke rising from 4 to 10 kilometers, Ohneiser says.

The self-lifting idea, never documented in the troposphere, is controversial. In the small world of fire storm, or pyrocumulonimbus (pyroCB), research, “Somehow the idea has been advanced that the only way smoke aerosol can get to the stratosphere is due to direct injection,” says Torres, who identified self-lifting as part of the way that smoke from 2017 fires in British Columbia reached the stratosphere. “But the observations are showing it is still happening when we have no pyroCBs.”

Others are not convinced. Michael Fromm, a pyroCB researcher at the U.S. Naval Research Laboratory, calls it an “extraordinary claim,” requiring more robust evidence. He thinks that without the extra boost from a firestorm, smoke is unlikely to penetrate the tropopause, a boundary that helps isolate the stratosphere. Instead of smoke, Fromm believes most of the Arctic particles are lingering sulfate aerosols from Raikoke, a volcano southwest of Russia’s Kamchatka Peninsula that in 2019 heaved gas and ash into the stratosphere. He points out that CALIPSO can’t distinguish between smoke and sulfates.

But Ohneiser and his colleagues are standing firm. Their advanced lidar measures light absorption and reflection at two different wavelengths, and observations of the Australian fires using the same instrument showed smoke particles have a distinctive signature. These are “unambiguous optical fingerprints of wildfire smoke,” Ohneiser says. “There is no room for other interpretations.” In the paper, the TROPOS team does see sulfate particles from Raikoke, but they form a thin layer even higher up in the stratosphere.

Once smoke is in the stratosphere, “the potential is certainly there” for it to deplete ozone, says Jessica Smith, an atmospheric chemist at Harvard University. Polar ozone loss depends on chlorine, still lingering in the stratosphere from chlorofluorocarbons and other pollutants even though they were banned decades ago. The chlorine attacks in winter when thin iridescent clouds form in the stratosphere. Their droplets provide a surface for chemical reactions that result in free radicals of chlorine, which chew through ozone. Smith says smoke particles might boost ozone loss by seeding the formation of these clouds and endowing them with smaller, more abundant droplets.

Smoke particles might also be coated in chemicals such as sulfates that could reduce ozone by directly reacting with chlorine. Or the smoke could somehow strengthen a collar of stratospheric winds called the polar vortex, further chilling the poles and boosting depletion. The loss mechanisms are speculative, Smith says, but they “could take a strong year and tip into an extreme year.”

The influence of stratospheric smoke isn’t necessarily limited to the poles. At midlatitudes, the stratosphere is much higher, and in theory more insulated from pollution. But as wildfires worsen, Wilka says, smoke might even have a shot at reducing ozone above the midlatitudes, home to most of the world’s population, much as the 1991 volcanic eruption

from Mount Pinatubo did. Throw enough smoke and other particles up there, she says, and "you can absolutely start driving this chemistry."

Science, 18 November 2021, By Paul Voosen

Image: Science website - DONAT SOROKIN/TASS/GETTY IMAGES

See also >>> **Ozone depletion due to dust release of iodine in the free troposphere**, article in Science Advances, 22 December 2021• Vol 7, Issue 52 • **DOI: 10.1126/sciadv.abj6544**

ASIA AND THE PACIFIC

6. China clips hydrofluorocarbon production to reduce global warming

China has started to phase down the production of hydrofluorocarbons (HFCs) – potent greenhouse gases responsible for depleting the Earth's ozone layer and contributing significantly to global warming.

The Ministry of Environment and Ecology (MEE) barred companies from expanding HFC production capacity from January 1. "Companies shall not build or expand the HFC chemical production facilities. Enterprises that violate the new regulations will be liable to punishment," said a notification issued by the ministry.

HFCs are used widely in cooling systems such as air conditioners and refrigerators. Under the Kigali Amendment to the Montreal Convention, which came into effect in 2019, countries decided to phase down production and use of HFCs by 80 percent in the next 30 years.

China became the 122nd country to accept the amendment last year. Currently, the global action focuses on reducing the manufacturing of HFC-23, the most potent gas among HFCs.

As the world's largest producer of HFC-23, China has already banned the direct release of the gas into the atmosphere by directing industries to incinerate HFC-23.

"The government has started conducting workshops to assist companies in reducing production and use of HFCs," Zhang Jianjun, director of the Zhejiang Chemical Engineering Research Institute, told CGTN. "Automobile and refrigerant industries will be the biggest changemakers to replace HFCs with green options."

According to recent estimates, a global phase down of HFCs could help prevent global warming by 0.5 degrees Celsius by 2100. The decisive action on HFCs will also help meet the climate target of keeping the global temperature rise within 1.5 degrees Celsius by 2050.

CGTN, 4 January 2022

Image: CGTN website- (Women work on a production line for manufacturing air conditioners in Anhui Province, China. /Reuters)

Asia Pacific Ozone2Climate Art Contest organized by the Asia-Pacific Regional Network of Ozone Officers, as part of UNEP's workplan under the Montreal Protocol's Multilateral Fund. The Art Contest will run its course and close on 31 March 2022, followed by the regional contest of nominated winners. The final winners in the three categories of artworks - photography, drawing, and graphic design, will be evaluated and announced on World Ozone Day in 2022.

For more information about the contest, please visit: **www.ozone2climate.org**

Contact: **Shaofeng Hu**, Senior Montreal Protocol Regional Coordinator, UNEP, **OzonAction** Compliance Assistance Programme (CAP) Asia-Pacific.

Image: OzonAction

LATIN AMERICA AND CARIBBEAN

7. Unos 190 científicos e investigadores argentinos serán apostados este verano en la Antártida

En una de las atmósferas más puras que existen, Argentina mide la capa de ozono en el Pabellón Científico de la base antártica Marambio.

Un total de 187 científicos y técnicos que forman parte de 46 equipos de investigación en distintos campos científicos y tecnológicos serán desplegados durante

este verano en diez de las trece bases que Argentina opera en su sector de la Antártida, en el marco del Plan Anual Antártico que será presentado este lunes por el ministro de Relaciones Exteriores, Santiago Cafiero, junto a otras autoridades nacionales.

El Plan Anual Antártico (PAA) contiene todas las actividades que el Programa Antártico Argentino planea llevar a cabo en el continente blanco entre el 1 de noviembre de 2021 y el 31 de octubre de 2022, las mismas se desarrollan en las bases argentinas, en campamentos desplegados desde algunas de esas bases, en particular desde la Base Marambio, y a bordo de buques dotados de instrumental para investigación en ciencias del mar. [...]

Las investigaciones previstas abordan áreas del conocimiento científico como ciencias de la vida, que incluye ecosistemas y recursos marinos, comunidades microbianas, biología de predadores tope, ecofisiología y ecotoxicología, ecosistemas terrestres, biología humana y psicología. Y ciencias de la Tierra, que contempla los vínculos geológicos entre la Antártida y América del Sur, relevamiento cartográfico geológico, aspectos abióticos del cambio climático, geofísica y geodesia antártica.

También hay proyectos que se desarrollan en el área de las ciencias físico químicas e investigaciones ambientales, como los efectos del cambio climático global, control de la contaminación marina, oceanografía física, actividades multidisciplinarias de invierno, estudios de la alta atmósfera y parámetros relacionados al clima espacial, y la vigilancia de la atmósfera. [...]

El País, 9 de enero de 2022, Por Julio Mosle

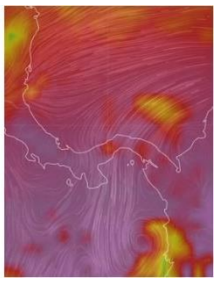
Image: El País website

8. Sinaproc advierte de índices de radiación extremos hasta el 8 de enero

El Sistema Nacional de Protección Civil (Sinaproc) emitió un aviso por índices elevados de radiación ultravioleta desde este martes 4 de enero hasta el sábado 8 de enero de 2022.

“La capa de ozono está debilitada sobre nuestra región, por lo que se prevé índices de radiación UV-B hasta extremos, generando quemaduras de piel”, informó Sinaproc. […]

CLASIFICACION	INDICE UV-B	TIEMPO DE ERITEMA (MINUTOS)	PROTECCIÓN SUGERIDA
BAJO	> 2	> 60	
MODERADO	3 - 5	45	
ALTO	6 - 8	30	
MUY ALTO	8 - 10	25	
EXTREMO	> 11	10	



El Sinaproc también mantiene hasta el 7 de enero un aviso de prevención por mareas altas en la zona del pacífico. Las mareas máximas alcanzarán hasta 17.0 pies de altura. Por tal motivo piden a la población evitar actividades en el pacífico panameño. En el caso de los

pescadores artesanales, es obligatorio el uso de equipos de navegación y chalecos salvavidas.

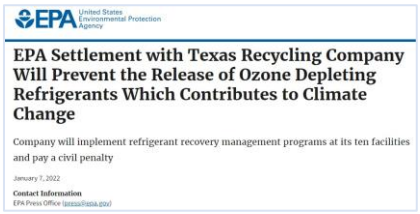
La Prensa, Panamá, 13 de enero del 2022, Por: Marggie Caballero

Image: La Prensa website

NORTH AMERICA

9. EPA Settlement with Texas Recycling Company Will Prevent the Release of Ozone Depleting Refrigerants Which Contributes to Climate Change

Company will implement refrigerant recovery management programs at its ten facilities and pay a civil penalty.


EPA United States Environmental Protection Agency

EPA Settlement with Texas Recycling Company Will Prevent the Release of Ozone Depleting Refrigerants Which Contributes to Climate Change

Company will implement refrigerant recovery management programs at its ten facilities and pay a civil penalty

January 7, 2022

Contact Information
EPA Press Office

The United States Environmental Protection Agency (EPA) and the Department of Justice announced a settlement with Derichebourg Recycling USA Inc. (Derichebourg) of Houston, Texas, to resolve Clean Air Act violations at 10 scrap metal recycling facilities in Texas and Oklahoma.

The federal complaint filed simultaneously with the consent decree alleges that Derichebourg failed to recover refrigerant from appliances and motor vehicle air conditioners before disposal or verify with the supplier that the refrigerant had been properly recovered prior to delivery. Under the settlement, Derichebourg will prevent the release of ozone-depleting refrigerants and non-exempt substitutes from refrigerant-containing items during their processing and disposal processes. Derichebourg will also pay a civil penalty of $442,500.

“Refrigerants that are not captured properly can be damaging to the earth’s ozone layer and are known to increase greenhouse gases which leads to climate change,” said Acting Assistant Administrator Larry Starfield for the EPA’s Office of Enforcement and Compliance Assurance. “Today’s settlement is a win for the communities surrounding Derichebourg’s facilities, and the environment.”

“To continue protecting stratospheric ozone, we need companies like Derichebourg to comply with the Clean Air Act when recycling appliances and motor vehicles containing harmful refrigerants,” said Assistant Attorney General Todd Kim of the Justice Department’s Environment and Natural Resources Division.

The settlement also requires Derichebourg to implement a Refrigerant Recovery Management Program at its 10 U.S. facilities; provide notice to its suppliers that all refrigerant, if not being recovered by Derichebourg, must be recovered properly from

appliances and motor vehicle air conditioners; reject any appliance or vehicle where there is evidence of unlawful refrigerant venting; and provide an educational handout to its customers on compliant handling of refrigerant-containing items. Derichebourg must also complete an environmental mitigation project that involves ensuring the destruction of all R-12 refrigerant that Derichebourg collects at its ten facilities for the duration of the consent decree. R-12 is one of the most destructive ozone depleting substances and has a global warming potential greater than 10,000 times the power of carbon dioxide.

The consent decree, lodged in the U.S. District Court for the Southern District of Texas, is subject to a 30-day public comment period and final court approval. The consent decree will be available for viewing at **https://www.justice.gov/enrd/consent-decrees**.

The United States Environmental Protection Agency (EPA), 7 January 2022

Image: USEPA website

EUROPE & CENTRAL ASIA

10. France Takes Over the Presidency of EU Institution, Vowing to Implement European Green Deal

With the turn of the year, France took over the Presidency of the Council of the European Union (EU), following Slovenia. The Council consists of a representative of each Member State at ministerial level and is the EU co-legislator together with the European Parliament. While it is the European Commission, EU executive, that has the power to propose new EU legislation, the co-legislators in principle get to amend and adopt such proposals. [...]

Regarding sustainability policy, the French Presidency says it will continue to “enforce” the European Green Deal, the broad climate, energy, and environment policy agenda presented by the European Commission in December 2019. [...]

As part of its work for a healthier environment, France wants to better take into account the fight against endocrine disruptors in all EU legislation, begin work on the revision of regulations on ozone-depleting substances and fluorinated greenhouse gases, continue with amendments to the Regulation on Persistent Organic Pollutants (POPs) and

coordinate the work in the framework of multiple international conventions on chemicals. [...]

[The National Law Review (NLR), 14 January 2022]

Image: Ministry for Europe and Foreign Affairs website

11. European Commission adopts new calculation methodology for renewable cooling

The European Commission has adopted a new calculation methodology in which the renewable share of cooling depends on energy performance. This should serve as an incentive for the deployment of innovative technologies that both reduce energy consumption and increase the use of renewable sources for cooling.

In December 2021, the European Commission published a new methodology for calculating the amount of renewable cooling and district cooling that can be counted towards EU renewable energy targets. Cooling accounts for 5 - 20% of final energy consumption in some EU countries. Therefore, the adoption of a renewable cooling calculation methodology was a topical and pressing issue for the EU and its Member States. Under Article 7(3) of the 2018 Renewable Energy Directive, the Commission was obliged to adopt a renewable cooling methodology by the end of 2021.

The new calculation methodology fills a gap in the current legislation, since the renewable cooling contribution to renewables could not so far be calculated in practice, even though it was in principle covered by the Renewable Energy Directive since 2009. The EU methodology is the first calculation method of its kind introduced worldwide.

In practice, the new methodology introduces a progressive system in which the renewable share of cooling depends on its energy performance. It sets two thresholds: cooling from systems at or above the upper threshold will be recognised as renewable, whereas cooling systems below the lower threshold will not. Cooling systems between the two thresholds will be able to credit a linearly increasing amount of cooling as renewable energy, as their efficiency approaches the upper threshold.

This methodology will reward technologies such as highly efficient reversible heat pumps and free cooling through district cooling networks. It also incentivises the deployment of innovative cooling technologies, such as solar cooling, that both reduce energy consumption and increase the use of renewable sources for cooling.

Details of the methodology are available **here**. The methodology will now undergo a two-month review by the European Parliament and the Council before entering effectively into force after publication in the Official Journal of the European Union.

[The International Institute of Refrigeration (IIR), 10 January 2022]

Image: IIR website

12. Germany Rules Out F-Gas Equipment in Public Procurement

Western side of the Reichstag building, Germany's parliament lower House in Berlin. Photo credit: Matthew Field

The German government has disqualified a number of HVAC&R systems using f-gases from being purchased by federal agencies, thereby favoring natural refrigerant alternatives.

The action was taken in September by the German Federal Minister for Economic Affairs and Climate Action as part of the newly adopted General Administrative Regulation on the Procurement of Climate-Friendly Services (AVV Klima). The regulation went into effect January 1.

The government created a "negative list" that excludes products in multiple sectors from public procurement. As a significant user of energy and high-GWP refrigerants, multiple HVAC&R products are featured on this list. These include:

- Refrigerators and freezers (including iceboxes and vending machines) and other stationary and mobile refrigeration and air-conditioning equipment containing halogenated refrigerants (if alternatives are available on the market).
- Liquid chillers with more than 10kW (2.8TR) of nominal cooling capacity using refrigerants that have a GWP of 150 or more.
- Multi-split/VRF air-conditioning units with more than 10kW of nominal cooling capacity. (Liquid chillers can be used as an alternative.)

In addition, aerosol cans (such as cold spray, cleaning spray and insect spray) with halogenated propellants (such as R1234ze(E)) and medium-voltage switchgear containing sulfur hexafluoride (SF_6) are excluded.

Notably, the procurement regulation requires that federal agencies consider the entire life cycle of products and the equivalent emission of greenhouse gases. They must also take into account energy efficiency and environmental and climate protection. The new regulation thus supports the German Climate Action Law's objective of climate neutrality by 2030.

Other European countries are also supporting environmentally friendly HVAC&R products in their procurement efforts. One example is the Nordic Green Public Procurement Criteria, a project to mitigate the impact of f-gases on global warming. It promotes the use of natural refrigerants rather than HFOs in refrigeration, air conditioning and heat pumps (RACHP) as the default option for public procurement in Denmark, Finland, Iceland, Norway, Sweden, and the Faroe Islands.

[r744, 10 January 2022, By Thomas Trevisan]

Image: r744 website - Photo credit: Matthew Field

See also >>> The related official [press release] in German language.

13. Institute of Refrigeration DRAFT Policy 3 – Selection of Refrigerant December 2021

"Strategies to support users of refrigeration, air conditioning and heat pump technologies to achieve carbon reduction through effective policy implementation, financial incentives, and emissions monitoring".

Objective is to provide policy makers with
- expert advice from Institute of Refrigeration professionals on effective solutions to aid the move to net zero
- the information needed to ensure that policy decisions take into account the interrelation of heating and cooling needs
- realistic and achievable opportunities, solutions, targets, and goals for users in this sector
- the necessary depth of understanding of total life cycle and sustainable operation
- advice for non-technical specialists responsible for high level net zero strategies within BEIS and DEFRA / DFE and devolved nations.

Policy Brief 3 – Selection of Refrigerant
The IOR Environment Working Group has identified a number of key areas for supporting the path to net zero (www.ior.org.uk/beyondrefrigeration). However, underlying any cooling and many heat pump operations is a vapour compression system that uses a refrigerant as a working fluid. Equipment owners, operators and advisors are making purchasing decisions that influence the selection of refrigerant and equipment being installed now and in use well into the future.

To support Net Zero targets the IOR recommends that equipment designers, purchasers, owners, and operators implement a policy that requires the selection of a refrigerant with the lowest GWP possible. With the on-going phase down and quota restrictions on HFC refrigerants having the greatest impact on the availability of higher GWP refrigerants as well as certain use bans under national regulations, there are very good commercial and environmental reasons for moving to low GWP refrigerants.

The IOR Guidance Note 37 “Refrigerant Selection” summarised below gives a more complete explanation of all the criteria that should be adopted in selecting the most appropriate refrigerant for the application.

Note: a future policy brief will cover whole system sustainability, considering embodied carbon, breakdown of chemicals etc. and these issues should also be taken into account when selecting suitable refrigerant. International policy frameworks Selection of refrigerant has been continually debated since the commercialisation of refrigeration technology.

Recent amendments to the Montreal Protocol (particularly the Kigali Amendment, which seeks to phase down the production and consumption of hydrofluorocarbons, HFCs), the issuance of EU and UK ozone and F-gas regulations as well as the wider discussion over "net zero" encourages the selection of low GWP refrigerants. However, many of the low GWP options have additional safety and/or cost implications associated with them and therefore selection of refrigerant is not usually straightforward.

Refrigerant selection must be approached through several steps, considering environmental legal obligation, safety requirements, efficiency, material compatibility and availability of components, competent technicians, and the refrigerant itself. [...]

Institute of Refrigeration (IOR)-DRAFT Policy 3–Selection of Refrigerant December 2021
Image: IOR website

FEATURED

OZONE SECRETARIAT

Overview for the meetings of the ozone treaties in 2022

68th IMPCOM, Venue – to be determined, | 09 July 2022
44th OEWG, Venue – to be determined, | 11 - 15 July 2022
69th IMPCOM, Venue – to be determined, | 29 October 2022
33rd MOP Bureau, Venue – to be determined, | 30 October 2022
34th MOP, Venue – to be determined, | 31 October - 04 November 2022

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

Summary of the Combined 12th Meeting of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer (part II) and the 33rd Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer: 23-29 October 2021.

The Earth Negotiations Bulletin, 1 November 2021, Vol. 19 No. 157
See also >>> **IISD Daily coverage and photos**

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 Executive Committee Eighty-seventh Meeting, Montreal, 28 June-2 July 2021

REPORT OF THE INTERSESSIONAL APPROVAL PROCESS AND ONLINE MEETINGS FOR THE 87TH MEETING

The present document consists of the following two parts:

I. Process for the 87th meeting, describing the agreed process followed by the Executive Committee for conducting the 87th meeting, which included consideration of several items of the agenda through an intersessional approval process (IAP) and several other items through online meetings.

II. Comments, discussions, and decisions by the Executive Committee, containing a compilation of comments and discussions where applicable, and decisions on each of the documents considered during the 87th meeting, presented in the order of the agenda of the meeting.

- 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

New OzonAction Knowledge Maps tool - The UNEP OzonAction Knowledge Maps tool was developed to provide the National Ozone Units (NOUs) and different UNEP partners with a

simple tool to help them access data and information about relevant stakeholders, who are mainly involved in the implementation of programmes and projects under the Montreal Protocol (MP) supported by Multilateral Fund (MLF).

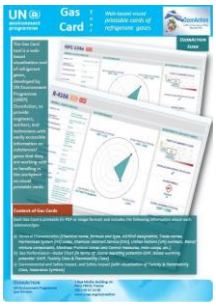
Currently, the first two available knowledge maps are described below:

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, for the training of technicians and supporting the national policies related to the Montreal Protocol.

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.

To develop this tool, UNEP OzonAction collected and reviewed different datasets from multiple sources, and then presented the collected datasets into a common platform and format (mainly in the form of a global map so that data can be geographically displayed). Kindly note that the data and information provided will be updated regularly through the feedback that will be received from NOUs and partners to update and/or add new records. Other maps are currently under development which will include access to other key data and information of importance to the implementation of Montreal Protocol programmes.

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



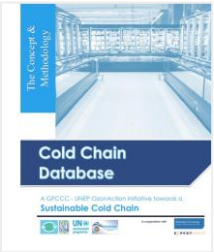
Gas Card Tool: Web-based Visual Printable Cards of Refrigerant Gases developed by the UN Environment Programme (UNEP) OzonAction, to provide engineers, workers, and technicians with easily accessible information on substances/ gases that they are working with or handling in the workplace on visual printable cards. 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". The launch also comes in advance of the United Nations Food Systems Summit.

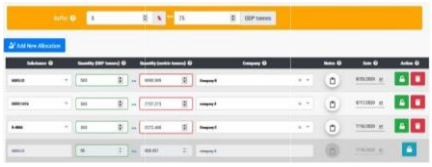
With the support provided by the Montreal Protocol's Multilateral Fund, the Cold Chain Database initiative is currently being piloted in six countries – Bahrain, Bosnia and Herzegovina, Maldives, North Macedonia, Paraguay, and Senegal. From the pilot data gathering initiatives, a model is being developed that will allow the projection of benefits of cold chain expansion.

GFCCC is an independent not-for-profit industry organisation that seeks to simultaneously reduce food waste, and related greenhouse gas emissions in the processing, transportation, storage, and retail display of cold food by expanding and improving access to energy efficient low-global warming potential technology. The Cold Chain Database concept, methodology and data collection questionnaires are offered to interested countries and partners to help in assessing local cold chain capacities and designing respective action plans and policies.

> **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

United Nations Environment Programme (UNEP), OzonAction
Image: OzonAction



HCFC Quota and Licence Tracker - UNEP OzonAction launches 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)

The new and updated UNEP OzonAction **GWP-ODP Calculator** application will help you to convert between values in metric tonnes, ozone depleting potential (ODP) tonnes and CO_2-equivalent tonnes of substances controlled by the Montreal Protocol and their alternatives.

This application, available at no cost, is particularly useful for National Ozone Officers to assist with understanding and calculating quantities of controlled substances, both pure substances and mixtures, for quota assignment, reporting requirements, etc. Other stakeholders interested in ODP, and global warming potential (GWP) values of controlled substances and their alternatives will also find this tool useful.

Operation of the application is very simple — just select a substance from the dropdown list and enter the known value in the appropriate field; the calculator will automatically perform the conversion between metric tonnes, ODP tonnes and/or CO_2-equivalent tonnes and display the corresponding converted values. The ODP, GWP and information about the substance is provided. For mixtures, the components of the mixture and their relative proportions (metric, ODP, CO_2- equivalent tonnes) are also calculated.

The updated **GWP-ODP Calculator** application now includes a new Kigali Amendment mode. The app can now be used in two different modes: the regular "Actual Values" mode and the "Kigali Amendment" mode. In the Kigali Amendment mode, the GWP values provided are those specified in the Kigali Amendment to the Montreal Protocol, i.e. GWP values are only assigned to controlled HFCs. In this mode the GWP values used to calculate the refrigerant blends/mixtures only include GWP contributions from components that are controlled HFCs. The user can effortlessly switch between modes.

The OzonAction GWP-ODP Calculator uses standard ODP values and GWP values as specified in the text of the Montreal Protocol to make the conversions. Other ODP and GWP values from the recent reports of the Montreal Protocol Technology and Economic Assessment Panel and Scientific Assessment Panel as well as the Intergovernmental Panel on Climate Change (IPCC) are used when appropriate, with references to sources of

all values used. The app includes new refrigerant mixtures (with ASHRAE- approved refrigerant designations).

This application is designed primarily for use by Montreal Protocol National Ozone Units and other related stakeholders. The application was produced by UN Environment Programme (UNEP) OzonAction as a tool principally for developing countries to assist them in meeting their reporting and other commitments under the Protocol and is part of the OzonAction work programme under the Multilateral Fund for the Implementation of the Montreal Protocol.

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** for more information

OzonAction WhatGas? Updated

New features:
- An updated more user-friendly interface
- Multilingual interface: English, French and Spanish
- HFCs and HFC containing mixtures
- Latest updated ozone depleting potential and global warming potential values from the recent reports from the Montreal Protocol technology and scientific expert panels as well as the Intergovernmental Panel on Climate Change; as well as the standard ODP and GWP values as specified in the text of the Montreal Protocol
- References to sources of all values used
- New refrigerant mixtures (with ASHRAE approved refrigerant designations)
- Values for 'actual GWP' and 'Kigali Amendment context' GWP for pure substances and mixtures (i.e., only including GWP values/components assigned to controlled hydrofluorocarbons - HFCs).

The WhatGas? application is an information and identification tool for refrigerant gases: ozone depleting substances (ODS), HFCs and other alternatives. It is intended to provide a number of 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. If the user requires additional information or assistance in identifying a refrigerant gas they are inspecting or that is described in the relevant paperwork, this can be easily obtained by consulting the application.
Using the application:
If you already have the application installed on your device, be sure to update to benefit from the new features.
Smartphone Application: Just search for "WhatGas?" or UNEP in the Google Play store or use the QR code – free to download!

Desktop Application: WhatGas? is also available online on the OzonAction **website**

For more information: Watch the new short introductory tutorial **video** on WhatGas? available on **YouTube**
See/download the **WhatGas? flyer**

Over 10,000 installations on Android and iOS devices to date!

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.

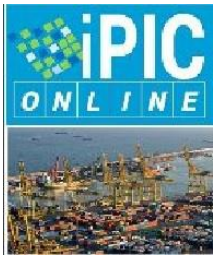
Read/download the **factsheet**

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.
The purpose is to provide an update on ASHRAE standards for refrigerants and to introduce the new refrigerants that have been awarded an "R" number (or ASHRAE designation) over the last few years and which have been introduced into the international market.
Read/download the factsheet
The factsheet, as well as more information on ASHRAE-UNEP joint activities and tools, is also available on the ASHRAE UNEP Portal.

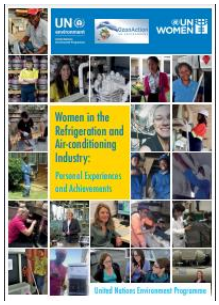
Contact: Ayman Eltalouny, OzonAction, UN Environment Programme

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 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



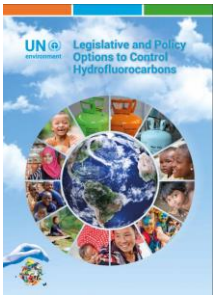
The United Nations Environment Programme's (UNEP), OzonAction, in cooperation with UN Women, has compiled this booklet to raise awareness of the opportunities available to women and to highlight the particular experiences and examples of women working in the sector and to recognise their successes.
All 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**

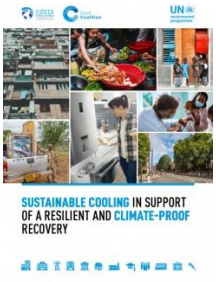
PUBLICATIONS

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

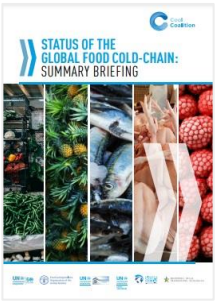


Latest issue of Centro Studi Galileo magazine, Industria & Formazione, n. **9-2021**
(in Italian).

[Sustainable Cooling in support of a Resilient and Climate Proof Recovery], Report by the Climate and Clean Air Coalition (CCAC), 2021.



[Status of the Global Food Cold-Chain: Summary Briefing-Food Cold Chain Food saved is as important as food produced]. The UNEP-led Cool Coalition in collaboration with the Climate & Clean Air Coalition (CCAC), United Nations Environment Programme (UNEP), United Nations Food and Agriculture Organization (FAO), OzonAction and the Ozone Secretariat, with the support of the Italian Government, are producing a status report on the global food cold-chain, which will include case studies to show the current state and development across areas such as technologies, design approaches, finance and business models, policy, and planning. This brief is a short summary of the full report that will be published in December 2021. The aim is to help better identify and accelerate solutions to simultaneously feed the world, support smallholder and marginal farmers, and protect our environment.



[Cool Coalition Secretariat, September 2021]

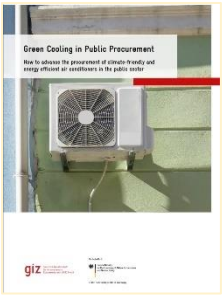
Image: Cool Coalition

[Leaks, maintenance and emissions: Refrigeration and air conditioning equipment report] details common faults identified in both residential and commercial refrigeration and air conditioning equipment. The report also lists the impacts of these faults and how routine maintenance of the equipment has the potential to significantly reduce electricity use, refrigerant leaks and emissions.

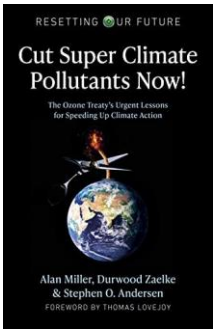
The research was supported by an extensive survey of international and domestic literature included as Appendix B to the report.

[Australian Government, Department of Agriculture, Water and the Environment, Expert Group, 2021]

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.



Application of copper(II)-based chemicals induces CH_3Br and CH_3Cl emissions from soil and seawater - Methyl bromide (CH_3Br) and methyl chloride (CH_3Cl) are major carriers of atmospheric bromine and chlorine, respectively, which can catalyze stratospheric ozone depletion. However, in our current understanding, there are missing sources associated with these two species. [...]
Authors: Yi Jiao, Wanying Zhang, Jae Yun Robin Kim, Malte Julian Deventer, Julien Vollering & Robert C. Rhew. **Nature Communications, 13 January 2022**

Ecolabeling a Critical Tool to Manage Chemicals in Electronics - Ecolabeling initiatives can help manage chemicals of concern in the electronics sector, according to a report published by the UN Environment Programme (UNEP). The authors make recommendations for scaling up ecolabeling initiatives to better track and control the use of chemicals of concern along the electronics

value chain. The report titled, 'Addressing the Issue of Chemicals of Concern in Electronics: Challenges and recommendations for labelling initiatives,' explores the ways in which ecolabels for electronic products may incentivize the reduction of such chemicals, and/or their improved management. It argues that ensuring access to chemical information by all stakeholders in the value chain is important to minimizing chemical hazards of electronic products, while enabling circularity. It also concludes that, while legislation can control market access and include specific provisions on the use of chemicals of concern, ecolabels can recognize best practices and are a practical tool for the industry to enhance transparency and traceability through the value chain and drive progress beyond regulations...

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Prepared by: Samira Korban-de Gobert
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