OzonAction

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In this issue

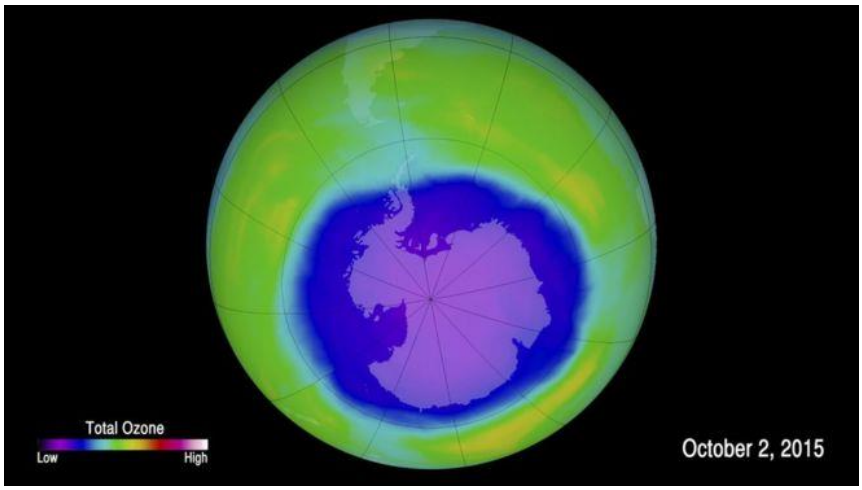
UN environment

Multilateral Fund for the Implementation of the Montreal Protocol

A fortnightly electronic news update on ozone and climate protection and the implementation of the Montreal Protocol

GLOBAL

1. Ozone Layer Recovery Could be Delayed by 30 Years



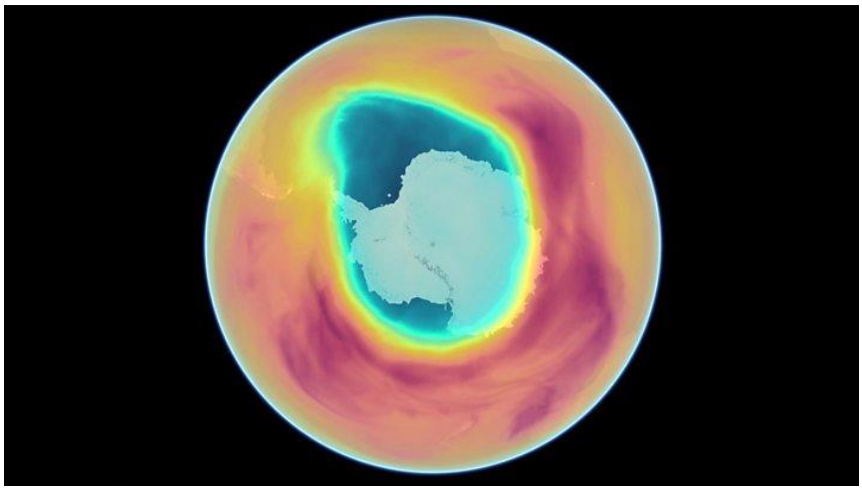
Rising global emissions of some chlorine-containing chemicals could slow the progress made in healing the ozone layer.

A study found the substances, widely used for paint stripping and in the manufacture of PVC, are increasing much faster than previously thought.

Mainly produced in China, these compounds are not currently regulated.

Experts say their continued use could set back the closing of the ozone hole by up to 30 years.

Scientists reported last year that they had detected the first clear evidence that the thinning of the protective ozone layer was diminishing



The Montreal Protocol, which was signed 30 years ago, was the key to this progress. It has progressively helped governments phase out the chlorofluorocarbons and the hydrochlorofluorocarbons that were causing the problem.

However, concern has been growing over the past few years about a number of chemicals, dubbed "very short-lived substances".

Dichloromethane is one of these chemicals, and is used as an industrial solvent and a paint remover. Levels in the atmosphere have increased by 60% over the past decade.

Another compound highlighted in this new report is dichloroethane. It's used in the manufacture of polyvinyl chloride or PVC, a light plastic widely used in construction, agriculture and elsewhere.

For a long time, scientists believed that both these compounds would decay before getting up as far as the ozone layer.

However, air samples analysed in this new study suggest this view may be mistaken and these destructive elements are getting there quicker and doing more damage than thought.

The authors found that cold wind blows these chemicals from factories in China to the eastern Pacific. This is one of the main locations where air gets uplifted into the stratosphere.

"Our aircraft samples show the path from emissions in China, through the tropics in Malaysia and up to about 12km in the atmosphere," said lead author Dr David Oram from the University of East Anglia.

"This implies a route whereby these short-lived compounds can get into the atmosphere much quicker than if they had been released in North America or Manchester."

What is surprising for the scientists is that both these compounds are valuable and also toxic to workers, so there is every incentive for producers to ensure there is no leakage.

However, the new study suggests that leaks and fugitive emissions are occurring and at rates which could have serious implications for the ozone layer.

"We believe that if we carry on with these emissions we'll delay the recovery of the layer," said Dr Oram.

"At the moment an average date for ozone recovery could be about 2050 but there are studies that say this could be delayed by 20-30 years depending on future emissions of things like dichloromethane."

The researchers say that a building boom in India is a concern as that will likely see a rise in the amounts of PVC being used with a knock-on effect on levels of dichloroethane in the air.

Other scientists in this field are also concerned about the rise of these unregulated substances.

"Short lived chlorocarbons have been generally overlooked in terms of ozone loss in recent years," said Dr David Rowley from University College London, who wasn't involved in the study.

"This was wrong as they affect lower atmospheric ozone (and therefore oxidising capacity, the ability of the air to remove pollutants), but they can also be transported to the stratosphere through deep convective events, where they can destroy ozone really effectively."

However, some researchers are not convinced that the new study shows the compounds getting into the exact part of the atmosphere where damage to the ozone layer can be done.

"The measurements report dichloromethane at an altitude of 10-12km - this is still the troposphere," said Dr Susan Strahan from Nasa.

"To demonstrate that it is a threat to ozone requires measurements of dichloromethane in the tropical lower stratosphere.

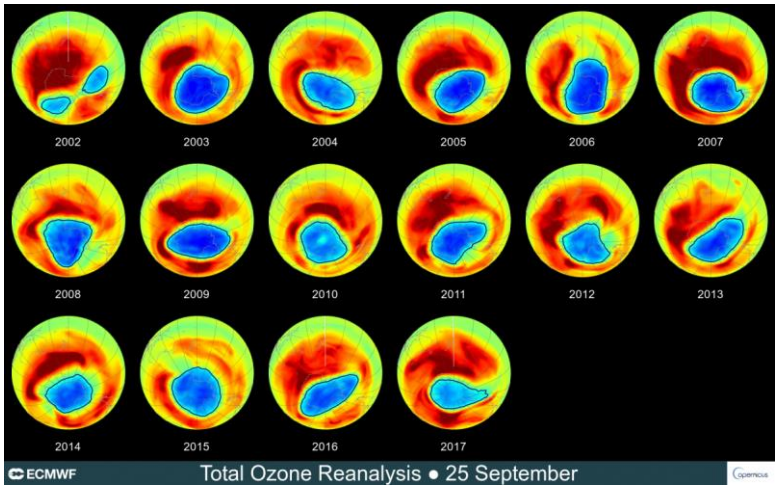
"In the additional weeks required to travel to the lower stratosphere, which is above 16km, even more of the compound will be destroyed."

Despite these reservations, the authors of the new study are calling for policy makers to extend the remit of the Montreal Protocol to cover these very short-lived substances.

The **new paper has been published** in the journal Atmospheric Chemistry and Physics.

- BBC, 12 October 2017, By Matt McGrath, Environment correspondent

2. Smaller Ozone Hole Observed in September 2017



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CAMS monitors the Antarctic ozone hole in near real-time with satellite observations and model data. The ozone hole this year started to develop in early September, slightly later than in most years since 2002 (Figure 1).

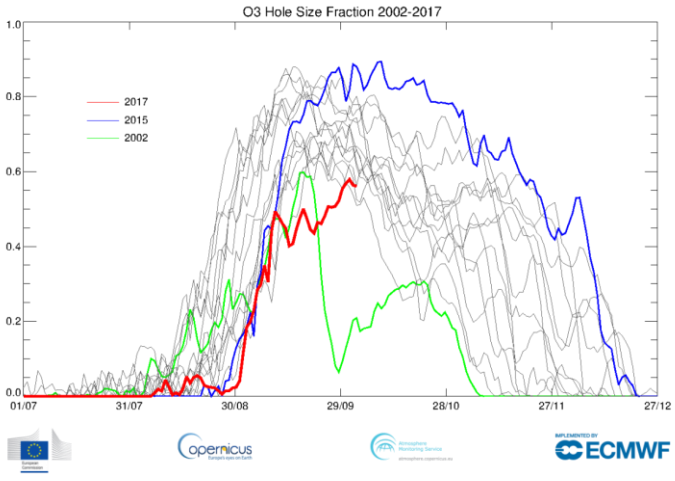


Figure 1: Size of the ozone hole over Antarctica from 1/7 to 31/12 for the years 2002-2017 (2017 in red, 2015 in blue and 2002 in green). The size is defined as the area south of 62-90S with ozone total columns below 220 DU. The data are taken from the CAMS interim reanalysis (2003-2016), the CAMS NRT (Near Real Time) forecast (2017) and ERA5 (2002) (Credit: ECMWF Copernicus Atmosphere Monitoring Service) Download the original image

At the end of September, the ozone hole area was smaller than in previous years. We attribute its reduced size predominantly to a less stable polar vortex that is associated with higher temperatures (Figure 2).

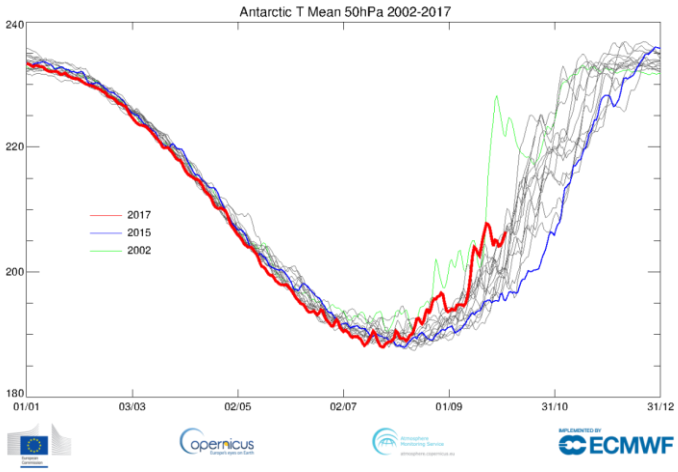


Figure 2: Average temperatures at 50 hPa (20 km) over Antarctica from 1/1 to 31/12 for the years 2002-2017 (Credit: ECMWF Copernicus Atmosphere Monitoring Service) Download the original image

The ozone hole is currently almost as small as it was during the exceptional year of 2002, when the polar vortex split into two parts. However, there is no strong indication in the ECMWF monthly forecasts that such a vortex split will occur this year as well. A comparison with observations from ozone sondes shows that the CAMS system also captures the details of the ozone hole's vertical profile very well (Figure 3).

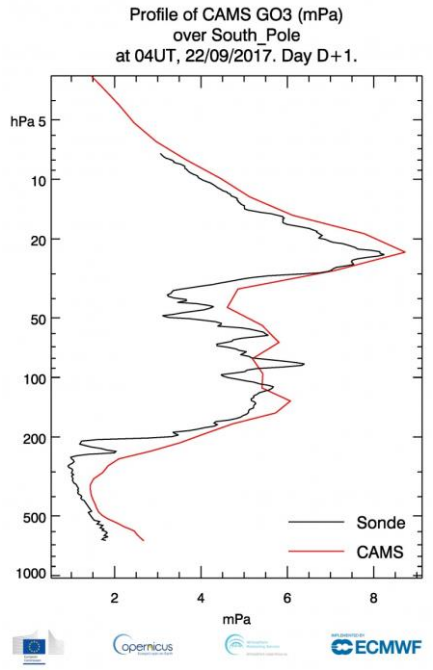


Figure 3: Observed vertical profile of ozone at the South Pole station on 22 September 2017 and the corresponding CAMS NRT (Near Real Time) analysis. The ozone loss occurred mostly in the region from 100 to 30 hPa. (Credit: ECMWF Copernicus Atmosphere Monitoring Service) Download the original image

How does the ozone hole develop?

The ozone hole over Antarctica has occurred every year in spring (September-November) since the late 1970s. The rapid ozone loss is caused by halogenated chemical species that have accumulated on polar stratospheric clouds (PSC) in the polar vortex during the winter (June-August). PSC are formed only in the coldest part of the winter vortex. When the sun starts heating the polar vortex at the beginning of spring, the PSC are dissolved and the halogenated species, such as chlorine and bromine, are suddenly released. These species then start chemical reactions that deplete ozone in a very effective way. The ozone loss initially occurs at the edge of the vortex because these parts receive the first exposure to the sun after the polar night (Figure 3). During this process, the polar vortex becomes warmer and thereby weaker, and ozone-rich air from the outside is gradually mixed in. This begins to close the ozone hole in a process that is normally completed by mid-December.

The halogenated chemical substances that cause the ozone depletion originate from long-lived chemical substances, such as chlorofluorocarbons (CFCs). Since a reduced ozone layer means that more harmful ultraviolet radiation from the sun reaches the Earth's surface, the Montreal Protocol was signed 30 years ago to control the production of CFCs.

Even though there is a ban on the emission of many of these CFCs, they still remain in the atmosphere because of their long lifetime, which can be up to 100 years.

The size of the ozone hole is controlled by the variable meteorological conditions as well as the slow decline of ozone-depleting substances. The effects of the Montreal Protocol are assumed to have started about a decade ago, and researchers have observed the first signs of the ozone layer's healing process. Model projections (based on values dating back to the late 1970s) indicate that the complete closure of the ozone hole will occur around the middle of this century.

CAMS will continue to monitor the ozone hole

The Antarctic ozone hole will be an important issue for years to come. It is important that satellite observation of stratospheric ozone remains available for CAMS to produce high-quality ozone forecasts and analyses. For example, the Sentinel-5P satellite of the Copernicus space programme will be launched on 13 October 2017 carrying the TROPOMI instrument, which will measure global ozone. The observations will be ingested in the CAMS system in near real-time.

CAMS is also improving the modelling of stratospheric chemistry by considering not just ozone, but also many other chemical species (including ozone-depleting substances) to better understand the ozone-hole healing process.

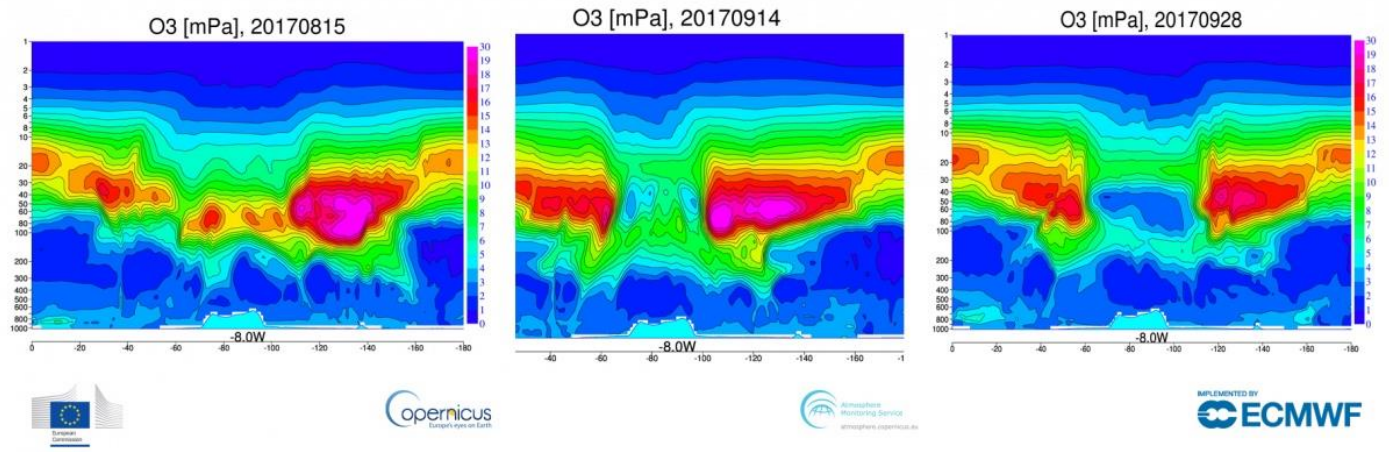


Figure 4. Cross section of ozone at three stages of the ozone-hole development over Antarctica. Left: High ozone concentrations can be found in the polar vortex at the end of the winter. Middle: Chemical ozone destruction is initiated by sunlight at the edges of the vortex at the start of spring. Right: The ozone hole has developed over the whole polar vortex at about 50 hPa (20km) (Credit: ECMWF Copernicus Atmosphere Monitoring Service)

- Atmosphere Copernicus, October 2017

3. ESA launches Sentinel-5P to track pollution daily

Europe's Sentinel-5P satellite has blasted off from the northern Russian launch site of Plesetsk on a mission to monitor the world's pollution from space.

The satellite is the part of the EU's Copernicus Earth observation programme, and will contribute to daily forecasts of air quality, track where greenhouse gases are being released in unprecedented detail, and verify if the planet's ozone layer is recovering after being damaged by CFCs in the 20th Century.

There's only one instrument on board, called Tropomi, developed by scientists in the Netherlands.

[…] A key question Sentinel-5P should answer is the state of the high-altitude ozone layer, a protective band of gas that allows life on Earth to thrive by absorbing harmful radiation from space. The ozone layer was damaged by mankind's emission of CFC gases, but these were banned from January 1989 following the UN's Montreal Protocol. However, there is still a 'hole' in the ozone layer above the South Pole between September and October, and globally there is still thought to be a lower level of ozone than in the 1960s.

Pieternel Levelt told Euronews how important this mission is for ozone monitoring: “The ozone layer is often looked at as something which is solved. We understand the chemistry, we understand the dynamics, we know how to improve, to get the ozone back, basically, by reducing the cooling agents (CFCs). But of course it’s important to measure it, to prove that that your measures work, and we don’t expect a complete recovery before 2050, 2060, so we need these measurements to know that the ozone layer is there, because it’s a pre-requisite for life on Earth- without the ozone layer we cannot live here.” […]

- EuroNews, 13 October 2017

AFRICA

4. The Gambia is Moving Towards NatRefs

Bafoday Sanyang of the Gambian National Environment Agency explains how the country is currently using natural refrigerants in refrigeration and air-conditioning at ATMOsphere Europe 2017 that took place in Berlin, Germany.

Sanyang also tells all about his country's natural refrigerant training programme in this exclusive interview. #GoNatRefs

- Watch on hydrocarbons21's YouTube channel

LATIN AMERICA AND CARIBBEAN

5. Inédito centro permitirá a Chile reciclar sustancias que dañan la Capa de Ozono


Planta reciclará gases refrigerantes para reducir su impacto en el medio ambiente

Por primera vez, Chile podrá reciclar gases refrigerantes nocivos para la Capa de Ozono y que contribuyen al calentamiento global.

El ministro de Medio Ambiente, Marcelo Mena, inaugurará este 11 de octubre la primera etapa de Regener Chile, centro que ayudará a que el país reutilice y reduzca significativamente la cantidad de gases refrigerantes que se importan cada año, cumpliendo con las metas del Protocolo de Montreal.

(Santiago, 11 de octubre de 2017) El ministro de Medio Ambiente inaugurará el próximo 11 de octubre la primera etapa de Regener Chile, el primer centro del país dedicado al reciclaje de gases refrigerantes Hidroclorofluorocarbonos (HCFC), sustancias agotadoras de la Capa de Ozono (SAO) e Hidrofluorocarbonos (HFC), sustancias que tienen un alto potencial de calentamiento global. A través de un sistema con tecnología traída desde Estados Unidos, se eliminarán los contaminantes (sólidos, humedad y ácidos) de los gases refrigerantes usados en equipos de refrigeración y aires acondicionados, obteniendo un gas apto para ser reutilizado. “Estamos ante un tremendo avance en materia de preservación de la Capa de Ozono y mitigación del calentamiento

global, fomentando el reciclaje. La industria debe avanzar hacia el desarrollo sostenible en todas sus áreas, y este es un gran paso", indica **Marcelo Mena, ministro de Medio Ambiente**.

La industria usuaria de frío y las empresas de mantenimiento podrán reutilizar gases refrigerantes HCFC y HFC, disminuyendo la importación de refrigerante nuevo al país y, al mismo tiempo, reduciendo la liberación de los gases a la atmósfera. "Por lo general, ciertos gases refrigerantes son liberados al medio ambiente. Esta mala práctica ocurre principalmente por dos razones, o no se cuenta con el equipamiento necesario para limpiar gases usados y hacer el proceso de reciclaje, o porque los técnicos en refrigeración no saben dónde almacenarlos", explica **José Luis Rojas, director de Regener Chile**.

Ante este panorama, con el apoyo de la Unidad Ozono del Ministerio del Medio Ambiente y financiado por el Fondo Multilateral a través del Protocolo de Montreal, la empresa se dedicará a recuperar, reciclar, regenerar e incluso transportar y almacenar gases refrigerantes HCFC para su reutilización (como el conocido R-22) y HFC (como el R-134a).

Nuestro país ha comenzado a disminuir el consumo de SAO, cumpliendo los objetivos propuestos por el Protocolo de Montreal al que Chile está suscrito, según explica Marcelo Mena. "Este centro significa un importante apoyo a los usuarios en cuanto a la reducción de las importaciones de gases refrigerantes, especialmente frente a las metas propuestas para 2020 y 2025 del Protocolo de Montreal que buscan disminuir hasta en un 67,5% las importaciones de la línea base de estos gases. Este tipo de iniciativa se enmarca en las tareas del gobierno hace para dar cumplimiento al Protocolo de Montreal". Regener permitirá que a nivel nacional no se produzcan desbalances y que los usuarios puedan usar los refrigerantes regenerados a precios convenientes.

La meta estimada es reciclar, a través de este centro, 27 toneladas de gases refrigerante HCFC y HFC al año; por lo cual se deja de liberar a la atmósfera esta cantidad de potenciales sustancias agotadoras de la capa Ozono. "Este gas reciclado o regenerado será tan bueno como un gas virgen o nuevo, es decir, contará con las mismas propiedades, y además será más barato que el gas nuevo que se comercializa en el mercado", agrega José Luis Rojas.

Regener Chile

Si quieres reciclar tus refrigerantes, ingresa a www.regenerchile.cl, completa y envía el formulario para que un especialista se ponga en contacto contigo y atender personalmente la solicitud.

- **Coordenadas:**
  Fecha/hora: 11 de octubre, 11:00 am.
  Lugar: Regener Chile. Porto Seguro 4772, Quinta Normal. Santiago.

NORTH AMERICA

6. Variety of Chemical Threats to Ozone Layer Being Observed

There are a variety of chemicals not listed or controlled by the Montreal Protocol that pose a threat to the ozone layer. While not necessarily new, it was thought that they have little impact and certainly much less than the refrigerants, halons, methyl bromide and other chemicals targeted for immediate attention and eventual phase-out such as CFCs, HCFCs and now HFCs.

One example is a chemical contained in some paint stripper solvents. The substance is called dichloromethane (DCM). This product along with several other short-lived ozone destroying chemicals (i.e. CFC 113a) are now in focus as they cumulatively are potentially harmful and growing in use as the world continues its industrial expansion in the developing nations. 1,2-dichloroethane is another example, used in the manufacture of PVC pipe.

Some estimate the healing of the ozone layer will be postponed for another 30 years given the impact of these short lived ozone chemicals.

- Learn more
- The Manitoba Ozone Protection Industry Association Inc (MOPIA), e-Bulletin # 170, 12 October 2017

EUROPE & CENTRAL ASIA

7. Tirana Meeting on Implementation of HCFC Phase-out Management Plans and HFC Phase-down Initiatives under the Kigali Amendment

Tirana, 10 October 2017 - National Ozone Officers and climate focal points from Albania, Bosnia and Herzegovina, Macedonia FYR, Montenegro, Serbia and Turkey, bilateral partners from Croatia and Romania, representatives of UN Environment and UNIDO and technology experts from Centro Studi Galileo and Daikin participated in the *Europe and Central Asia (ECA) Thematic Meeting on HCFC Phase-out Management Plans and HFCs Phase-down Initiatives*, 10-12 October 2017. The meeting was hosted by the Ministry of Tourism and Environment of Albania and organized by UN Environment OzonAction in collaboration with UNDP Tirana. The Multilateral Fund for the Implementation of the Montreal Protocol supported this event.

The meeting took place in the context of the implementation of the Montreal Protocol on Substances that Deplete the Ozone Layer including its Kigali Amendment, which was agreed during the 28th Meeting of the Parties in Rwanda on 15 October 2016. Whereas the Protocol is phasing out ozone depleting hydrochlorofluorocarbons (HCFCs), the amendment aims to phase-down high global warming hydrofluorocarbons (HFCs), transforming the Montreal Protocol into a powerful treaty for climate protection. It is expected to significantly contribute to the objectives of the Paris Agreement e.g. limiting global warming to 2 degrees by 2100.

Mr. Pellumb Abeshi, Director General of Environmental Policies of the Ministry of Tourism and Environment and Mr. Brian Williams, UN Resident Coordinator and UNDP Resident Representative opened the meeting and welcomed the participants. Mr. Abeshi reconfirmed Albania's commitment to protect the environment and to implement the Montreal Protocol provisions. Mr. Williams highlighted the importance to such regional meetings not only to address technical and policy issues but also to build bridges between countries and to encourage collective and forward looking action. Mr. Halvart Koeppen, Coordinator of OzonAction's Regional Ozone Network for Europe & Central Asia stated that the cooperation between Montreal Protocol focal points and experts on refrigeration, climate change, energy-efficiency and safety standards will become more and more crucial in the context of the Kigali Amendment, and this was one of the objectives of the meeting - to explore opportunities for joint action and synergies.

The main objective of this thematic meeting is, amongst others, to share experiences and information between the Montreal Protocol and climate change focal points of the participating countries to assist them to implement their national HCFC Phase out Management Plans and to get prepared for the HFC phase-down under the Kigali Amendment.

- **Contact:** Halvart Koeppen, Coordinator of OzonAction's Regional Ozone Network for Europe & Central Asia

8. India and EU Strengthen Partnership to Implement the Paris Agreement and Boost Clean Energy Cooperation

The EU and India have adopted a historic Leaders' Joint Statement on clean energy and climate change. The statement was endorsed by leaders at the EU-India summit in Delhi on 6 October 2017.

6 October 2017: India and the European Union (EU) have issued a joint statement on clean energy and climate change, pledging to step up cooperation to enhance implementation of the Paris Agreement on climate change and the 2030 Agenda for Sustainable Development, and to encourage global low greenhouse gas (GHG) emissions to achieve climate-resilient and sustainable development. […]

In their joint statement, the EU and India also: look forward to rapid and universal ratification of the Kigali Amendment to the Montreal Protocol for phasedown of hydrofluorocarbons (HFCs); and reiterate their commitment to cooperation in the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), the International Solar Alliance (ISA) and the Group of 20 (G20). […]

- IISD, 6 October 2017

9. Food Retailers Should Take Advantage of the HFC Phase-down for a More Sustainable Future

Since the signing of the Montreal Protocol in 1987, a global agreement to phase-down CFCs and other substances that deplete the ozone layer, we've come a long way. The hole in the ozone layer has made a significant recovery and perhaps more importantly, the agreement demonstrated that the world can make and stick to a challenging decision for the global good.

However, 30 years since the historic agreement, it has become abundantly clear that hydrofluorocarbons (HFCs) – the substance used to replace CFCs for refrigeration – have solved one problem, but exacerbated another potentially even more significant one. HFCs have been discovered to have a significant impact on global warming, up to 4,000 times more potent than CO_2.

As a result, the world has once again come together and agreed to move away from environmentally damaging refrigerants in favour of sustainable alternatives. This shift, agreed as part of the Kigali Amendment in October last year, will have a significant positive impact on the environment, with estimates suggesting it could prevent a 0.5 degree increase in global temperatures.

This is great news for climate change, but simultaneously presents a major challenge for the food retail sector, which is heavily dependent upon refrigeration. As they tackle this challenge the question is whether we can learn lessons from the past, and avoid creating a new problem in the attempt to address another.

HFC phase-down puts pressure on retailers

Retailers are under increasing pressure to act. The signing of the Kigali Amendment, coupled with action at an EU level, has helped to highlight the environmental impact of HFCs and has demonstrated that regulatory pressure will grow on operators to make a shift to natural refrigerants. One of the driving factors will be the shrinking availability of HFCs - in the UK alone, the supply will be reduced by 85% between 2019 and 2036.

However, research suggests that as an industry across Europe, retailers are already lagging behind schedule in moving away from HFCs and adopting natural alternatives. As a result, business owners are hastening to replace their refrigeration systems quickly, and run the risk of making rushed decisions that don't always take into account broader business and environmental factors.

So far, CO_2 is the most common replacement for HFCs and this can deliver significant benefits. Aldi for example reports new CO_2 systems will help them cut their potential refrigeration emissions in UK stores by 99%. However, according to a new report from the University of Birmingham, the capital cost of CO_2 systems can be 5-10% higher than the HFC systems they replace, and their energy consumption can also be significantly higher than other natural refrigerant systems. Given so many retailers are adopting CO_2refrigerants, this raises the question of whether businesses that are

moving too quickly are missing the opportunity to install the most environmentally friendly, or even cost effective alternatives.

In particular, there is growing evidence that simpler, hydrocarbon based refrigeration systems, which are far more like domestic fridges, can provide a more sustainable alternative in every sense of the word. They are easier to install and crucially to maintain, which means they will continue to perform as designed for longer. They are also more energy efficient and thereby cheaper to run.

The ultimate opportunity

Given the aggressive phase-down of HFC supplies, it is not surprising that European supermarkets and other food retailers are focused upon meeting obligations under the Kigali Amendment and EU F-gas Regulation. But, as business owners ditch their HFC refrigeration systems for natural alternatives, they also have a great opportunity to do more than just reduce refrigerant leakage. By finding a replacement refrigeration solution that requires less maintenance, enables improved energy efficiency and therefore a reduced overall carbon footprint, they can improve their sustainability credentials while also delivering long term cost savings.

There could be real business and environmental benefits for those who don't rush into decisions. And it's positive to see more retailers have begun to adopt hydrocarbon refrigerants. Boots has recently launched various pilot projects to assess the feasibility of both propane/propylene and CO_2 systems. Similarly Waitrose has opted for a water-cooled, self-contained hydrocarbon alternative.

It's not to say there is one solution, or one refrigerant that will be right for all applications. However for many, taking CO_2 refrigeration systems as the obvious choice may be a short-sighted solution which replaces HFCs but leaves other potential business benefits unrealized, including longer term environmental performance. Therefore we urge businesses to take advantage of the Kigali Amendment to select the most cost effective and crucially environmentally friendly refrigeration technology with a long-term mindset.

Let's not repeat the experience of the first Montreal protocol and make a decision that as an industry we come to regret.

- edie.net, 10 October 2017

10. EU Backs Flammable Refrigerant Project

BELGIUM: A bid to remove barriers currently facing flammable refrigerants in refrigeration and air conditioning applications has received €1m of EU funding.

A new project, led by "natural" refrigerants group Shecco, aims to remove "barriers posed by standards" for flammable refrigerants and improve system design to address flammability risks. This will include setting up a standards action group and best practice manuals for EU equipment manufacturers using flammable refrigerants.

The project – Flammable Refrigerant Options for Natural Technologies – Improved standards & product design for their safe use (FRONT) – is funded under LIFE, the EU's financial instrument supporting environmental, nature conservation and climate action projects.

LIFE FRONT is coordinated by a consortium of six partners. In addition to Shecco, the other partners are European Environmental Citizens Organisation for Standardisation (asbl), German environmental consultancy Heat GmbH, commercial refrigeration manufacturer AHT, Swedish heat pump manufacturer NIBE, and chiller and heat pump manufacturer AIT-Deutschland.

The project, with a total budget of €1.75m, runs until June 2020.

- CoolingPost, 3 October 2017

11. Marco Buoni, vice-president of AREA (the European Association of Refrigeration, Air Conditioning and Heat Pump (RACHP) Contractors), Believes the Industry Needs to be Upskilled to Use Natural Refrigerant Equipment

Marco Buoni, vice-president of AREA, speaking at ATMOsphere Europe in Berlin, Germany- *Photo Credit: Anna Salhofer*

AREA's Marco Buoni believes there is a strong need to upskill the industry to use natural refrigerant-based equipment.

Speaking at ATMOsphere Europe in Berlin, Germany, the vice-president of AREA (the European Association of Refrigeration, Air Conditioning and Heat Pump (RACHP) Contractors) argued that more technicians and engineers must be trained to use low-GWP refrigerants to meet the HFC phase-down objectives of the EU F-Gas Regulation.

Buoni said: "Half a million are certified for f-gas, those people need to be trained and upskilled for alternative refrigerants." AREA is running the Real Alternatives for LIFE Refrigerant Emissions Alternatives and Leakage, an EU-funded project by the European Commission, to provide online and in-person training on low-GWP refrigerants.

The programme, previously based online and translated into 13 languages, will now run study visits (in five training centres in Belgium, Germany, UK, Poland and Italy) and train the trainer events (five in stakeholder locations, with 20 people at each).

Through online and in-person training, AREA and its other industry partners believe they have the potential to "reach 228,0000 employers, 26,000 RACHP installation businesses and 100 suppliers across Europe," he said.

Volker Stamer, director of BITZER's SCHAUFLER Academy, said that online training cannot be a substitute for live training sessions.

The academy, which provides in-person training on compressor and system technology for sub-critical CO_2, transcritical CO_2, ammonia and hydrocarbons, has "had 3,800 visitors in the first year – 80% of them are from outside Germany," Stamer said during the training session.

Which path forward?

Stamer nonetheless noted that this training is no substitute for vocational refrigeration and air-conditioning schools. "On the path to natural refrigerants we need training," he said.

shecco COO Alvaro de Oña, who also took part in the panel session, said it was not just a question of providing training but making people aware of the training already on offer. "Close to 200 companies provide natural refrigerants training in Europe," he said, citing shecco's *Guide to Natural Refrigerants Training in Europe 2017*.

De Oña noted more could be done by national governments. "There is no mandatory condition to handle natrefs and this is affecting number of people trained," he said.

The Netherlands is currently the only EU country to require natural refrigerant certification.

AREA's Buoni advocated introducing a certification similar to the f-gas one that most EU countries require for HFCs. "We will do natural refrigerants certification" in the future, he said.

Bafoday Sanyang of the National Environment Agency of Gambia hopes EU countries can come up with a coherent scheme soon. Once Europe has it, it will trickle down to Africa, Sanyang said.

The ozone officer from the Gambia said his country was "training [technicians] on CO_2 and hydrocarbon management" for air-conditioning and refrigeration applications.

So far, his country has achieved much with the help of shecco, the UNIDO, GTTI, Centro Studio Galileo and gef:

- 50 technicians trained nation-wide.
- 20 technicians identified as 'Super Technicians' to train the trainers.
- 200 customs & other law enforcement agents trained on identifying refrigerants.
- 28 environmental inspectors & other stakeholders.

He said they were now working on creating a network of natural refrigerant suppliers and manufacturers. “We have to go to natural refrigerants. It’s the future,” he said.

- Hydrocarbon21, 11 October 2017, By Charlotte McLaughlin

FEATURED

OZONE SECRETARIAT

- Vienna Convention and Montreal Protocol Meetings: A Primer - Read/Download
- 29th Meeting of the Parties to the Montreal Protocol
- COP11-MOP29 : Issues for discussion by and information for the attention of the Conference of the Parties to the Vienna Convention at its eleventh meeting and the Twenty Ninth Meeting of the Parties to the Montreal Protocol - UNEP/OzL.Conv.11/2–UNEP/OzL.Pro.29/2 - Advance copy (E)
- 28th Meeting of the Parties to the Montreal Protocol
- Final text of the Kigali Amendment to the Montreal Protocol available in all the six official UN languages (A C E F R S)
- OEWG 39: The 39th Session of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, preceded by the 58th meeting of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol, held on 9 July and a workshop on safety standards relevant to the use of low-GWP alternatives to HFCs, held on 10 July 2017.
  - Draft report of the thirty-ninth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer - Addendum

  - Draft report of the thirty-ninth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer
- Click here for further information.

- Browse through the Ozone Secretariat “In Focus” to learn about latest updates.
- Click here for Montreal Protocol Meetings Dates and Venues

The UN Environment Assessment Panels have been the pillars of the ozone protection regime since the very beginning of the implementation of the Montreal Protocol. Through provision of independent technical and scientific assessments and information, the Panels have helped the Parties reach informed decisions that have made the Montreal Protocol a world-recognized success.

UNEP initiated the process of setting up the assessment panels in 1988, pursuant to Article 6 of the Montreal Protocol, to assess the scientific issues of ozone depletion, environmental effects of ozone depletion, and the status of alternative substances and technologies and their economic implications.

Four panels, namely the panels for Scientific, Environmental Effects, Technology, and Economic Assessments were formally established and approved at the First Meeting of the Parties to the Montreal Protocol in 1989 where their first set of Terms of Reference were adopted. Shortly after the Second Meeting of the Parties in 1990, the Panels for Technical Assessment and the Panel for Economic Assessment were merged into one Panel called the Technology and Economic Assessment Panel (TEAP), which together with the Scientific Assessment Panel (SAP) and the Environmental Effects Assessment Panel (EEAP) make up the three assessment panels active today.

In accordance with Article 6 of the Montreal Protocol and subsequent decisions of the Parties, the three panels carry out a periodic assessment at least every 4 years. The first assessment reports were published in 1989 and since then major periodic assessments have been published by all three panels in 1991, 1994, 1998, 2002, 2006 and 2010. For each periodic assessment, the key findings of the panels are synthesized into a short report. The full SAP assessment report for 2014 was published in December 2014, while the EEAP assessment report for 2014 was published in January 2015.

PROGRESS & QUADRENNIAL ASSESSMENT REPORTS

- EEAP
- SAP
- TEAP

Assessment Panels List of Meetings

SYNTHESIS REPORTS

- 2014 assessments
- 2010 assessments
- 2006 assessments

THE MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL

79th meeting of the Executive Committee, Bangkok, 3-7 July 2017

Report of the 78th meeting of the Executive Committee

Adjusted business plan of the Multilateral Fund for 2017-2019 after the 77th meeting of the Executive Committee

Learn more

OZONACTION

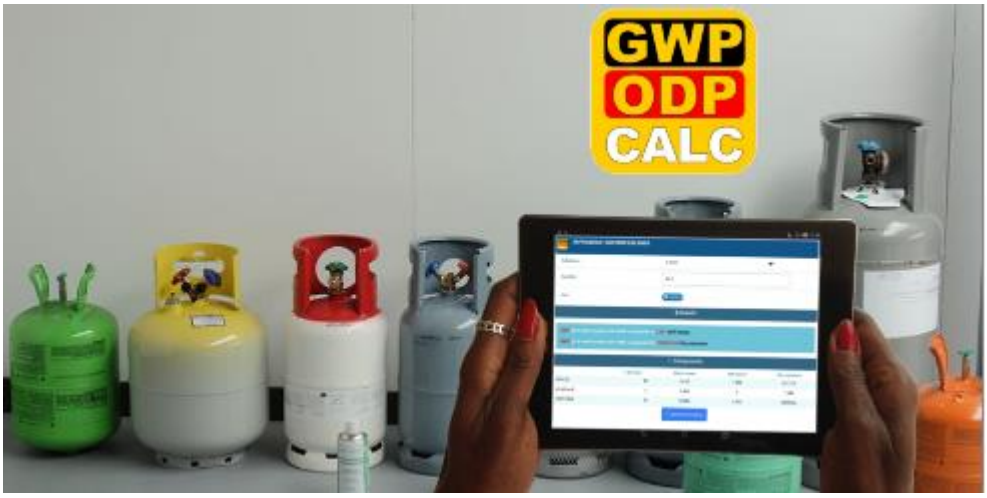
UN Environment, OzonAction highlights

Please visit the OzonAction Ozone Day website for other interesting products. Also, in the right-hand column of this webpage you will find links to last year's Ozone Day webpage and other previous years; please feel free to browse through them for useful information and ideas.

We would also appreciate receiving your Ozone Day planned activities/reports for posting on the OzonAction website. You may send this information through your respective regional OzonAction CAP office or to Ms Jo Chona.

- OzonAction Ozone Day 2017 website

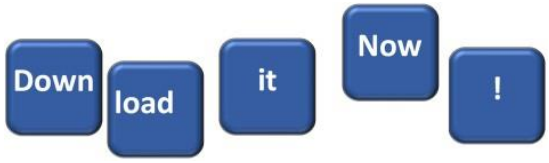
GWP-ODP Calculator smartphone application



The application allow you to easily convert ODP, CO_2-eq and metric quantities of refrigerants and other chemicals

- **Helps in understanding and reporting under the Montreal Protocol** (and future commitments under the Kigali Amendment)
- **The calculator will automatically perform the conversion between metric tonnes, ODP tonnes and/or CO_2-equivalent tonnes (or kg) and display the corresponding converted values**
- **The app includes both single component substances and refrigerant blends**
- **The components of a mixture and their relative proportions (metric, ODP, CO_2-eq) are also displayed.**

Available for free from the Google Playstore (*iOS version available very soon*)
Search for "GWP ODP CALC" in the Playstore to install!



NEW

OzonAction Smartphone Application

WhatGas?

Quickly search for the information you need

- Chemical name
- Chemical formula
- Chemical type
- ASHRAE designation
- Trade names
- HS code •
- CAS number
- UN number
- Montreal Protocol Annex and Control measures
- Ozone depleting potential (ODP)
- Global warming potential (GWP)
- Blend components
- Toxicity and flammability class
- Main uses

Now available for free in the Google Play and Apple Store

Scan the QR code or search for "UNEP", "OzonAction" or "WhatGas?"

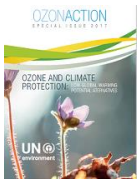
Download on the App Store | GET IT ON Google Play

[The Kigali Amendment to the Montreal Protocol - Opportunities and Next Steps](#) - OzonAction Video

The Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer reached agreement at their 28th Meeting of the Parties on 15 October 2016 in Kigali, Rwanda to phase down hydrofluorocarbons (HFCs). The UN Environment, OzonAction developed a video to find out from renowned international scientific, health, technical, financial and national experts about background and significance of this Kigali amendment.

The amendment presents many opportunities: improving the environment, refrigeration and air-conditioning systems and especially energy efficiency. It also presents new challenges. It is absolutely critical now for industry, governmental bodies and civil society to work together to adopt greener technologies in each country of the world and fight global warming.

[OzonAction YouTube](#) | See also: [United Nations Treaty Collection](#)



Ozone and Climate Protection: Low-Global Warming Potential Alternatives - [OzonAction Special Issue 2017](#)

OzonAction Factsheets:

[HS codes for HCFCs and certain other Ozone Depleting Substances ODS](#) (post Kigali update)

[The Kigali Amendment to the Montreal Protocol: HFC Phase-down] - The phase-down of HFCs under the Montreal Protocol on Substances that Deplete the Ozone Layer has been under negotiation by the Parties since 2009 and the successful agreement on the Kigali Amendment at the 28th Meeting of the Parties on 15 October 2016 in Kigali, Rwanda to phase-down hydrofluorocarbons (HFCs) continues the historic legacy of the Montreal Protocol. This factsheet summarises and highlights the main elements of the Amendment of particular interest to countries operating under Article 5 of the Protocol (Article 5 Parties).

OzonAction Factsheet: [Refrigerant Blends: Calculating Global Warming Potentials] (post-Kigali update)

OzonAction Factsheet: [Global Warming Potential (GWP) of Refrigerants: Why are Particular Values Used?] (post-Kigali update).

OzonAction Factsheet: [Tools Commonly used by Refrigeration and Air-Conditioning Technicians]

OzonAction Multimedia Video Application: **Refrigeration and Air-conditioning Technician Video Series** - OzonAction has launched an exciting new application which hosts series of short instructional videos on techniques, safety and best practice for refrigeration and air-conditioning technicians. This application, consisting of short instructional videos on techniques, safety and best practice, serves as a complementary training tool for refrigeration and air-conditioning (RAC) sector servicing technicians to help them revise and retain the skills they have acquired during hands-on training. Additional videos will be added regularly.

Please share with your RAC associations, technicians and other interested stakeholders… **Over 13,000 installations to date!**

Now available in the [Android Play Store] and Apple Store/iTunes.

Available on the App Store | ANDROID APP ON Google play

(*Just search for 'OzonAction' or scan this QR Code*)

OzonApp eDocs+ launched in Android Play Store and Apple Store. This new application launched by OzonAction on February 12, includes publications, videos, fact sheets and other awareness materials to help National Ozone Units (NOUs) and other stakeholders to build their capacity to implement the Montreal Protocol in a sustainable manner and at the same time to derive climate benefits. Now available in the [Android Play Store] and Apple Store/iTunes.

Available on the App Store | ANDROID APP ON Google play

(*Just search for "OzonAction", or scan this QR code*)

[OzonAction News Drops] - UNEP OzonAction is presenting a series of short video "**News Drops**" which focus on ozone layer protection, climate change and the importance of continuing ozone observations.

Regional News Drops

The Regional Networks of National Ozone Units (NOUs) under the Multilateral Fund are a path-breaking mechanism for North-South and South-South cooperation. Networking provides a platform for NOUs from Article 5 countries to exchange experiences, develop their skills and tap the expertise of their peers in both developing and developed countries. Conducted at the regional level, the Networking activity builds the Ozone Officers' skills for implementing and managing their national ODS phase-out activities. During 2016 these videos were filmed at the regional network meetings around the world.

The NOUs were asked about their success stories, alternative refrigerants selected and their personal messages for national ozone celebrations…

Click [here] to access the News Drops

OzonAction Recent Publications:

Lower-GWP Alternatives in Commercial and Transport Refrigeration: An expanded compilation of propane, CO_2, ammonia and HFO case studies - This booklet presents an expanded compilation of case studies on lower-GWP alternatives in commercial and transport refrigeration and provides an update to the first set of case studies which was published in 2014 by UNEP DTIE OzonAction/CCAC (Low GWP Alternatives in Commercial Refrigeration: Propane, CO_2 and HFO Case Studies.

NATIONAL CERTIFICATION SCHEMES FOR RAC SERVICING TECHNICIANS - This publication aims to provide introductory information for institutions in developing countries to better understand the issue of certification in the field of refrigeration and air conditioning, to assist in the creation of such certification and training schemes and to demonstrate to service technicians and enterprises why it is in their interest to participate.

THE MONTREAL PROTOCOL AND HUMAN HEALTH - This booklet summarizes how the successful implementation of the Montreal Protocol has protected human health. It describes how ozone depletion would have led to increases in UV radiation and, based on current understanding of the mechanisms by which UV affects biological processes, how that would have led to a dramatic increase in skin cancers, cataracts and affected human health in other ways. It also covers recent progress in understanding the 'World Avoided' – that is the world we would have lived in without a successful Montreal Protocol.

FINANCING THE CLIMATE CO-BENEFITS OF THE HCFC PHASE-OUT - A guide for Low Volume Consuming Countries - Hydrochlorofluorocarbons (HCFCs) are being phased out worldwide under the Montreal Protocol on Substances that Deplete the Ozone Layer. The Parties to this treaty encouraged countries to promote the selection of alternatives to HCFCs that minimise environmental impacts, in particular impacts on climate. The Protocol's Multilateral Fund encourages developing countries to explore potential financial incentives and opportunities for additional resources to maximise the environmental benefits from HCFC Phase out Management Plans (HPMPs). This booklet explains how Ozone Officers in low volume consuming countries can explore such opportunities for climate co-benefits. English | French | Spanish

SAFE USE OF HCFC ALTERNATIVES IN REFRIGERATION AND AIR CONDITIONING - An Overview for Developing Countries - Many of the alternative refrigerants to hydrochlorofluorocarbons (HCFCs) have particular characteristics in terms of toxicity, flammability and high pressure which are different from those used previously. It is therefore important that the refrigeration and air-conditioning industry adapts to both the technical and safety issues concerning these refrigerants. This publication provides an overview of the alternatives, their general characteristics and their application in the context of the safety issues. It provides guidance for National Ozone Units (NOUs) and other interested parties in developing countries on how they can advise and assist their national stakeholders in the selection and implementation of alternative refrigerants.

PHASING-OUT HCFCS IN SMALL AND MEDIUM-SIZED ENTERPRISES - This booklet aims to assist foam enterprises, especially SMEs, to better understand policies on HCFC phase-out, access to assistance from the Multilateral Fund for the Implementation of the Montreal Protocol and access alternative technologies in different foam applications taking into account challenges in converting to alternative technology. It also discusses some tips on how to identify enterprises that may use HCFCs and verify the HCFCs consumption of enterprises.

INTERNATIONAL STANDARDS IN REFRIGERATION AND AIR-CONDITIONING - This guide provides an introduction and simple overview of the issues related to international standards in the refrigeration and air-conditioning sector and how they can be useful in the context of the phase-out of hydrochlorofluorocarbons (HCFCs) in developing countries as required by the Montreal Protocol on Substances that Deplete the Ozone Layer.

EVENTS

2017

Le salon SIFA (salon interprofessionnel du froid et ses applications), organisé par La Rpf et le groupe LSA / Usine Nouvelle, aura lieu du 3 au 5 octobre 2017 au Dock Pullman de Paris, France. Le SIFA est un salon-congrès portant sur les enjeux réglementaires, économiques, techniques et environnementaux relatifs au FROID dans les domaines du tertiaire, de la grande distribution, l'agroalimentaire et de l'industrie.

EUREKA 2017: Heating, Cooling & Ventilation: Sustainable technologies for a better life, 11-12 December 2017, Berlin, Germany

2018

1st IIR International Conference on the Application of HFO Refrigerants. 2-5 September 2018, Austin Court Conference Centre, Birmingham, United Kingdom

The HVAC & Refrigeration Show, 23 - 25 January 2018, London, United Kingdom

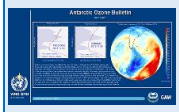
A/Ccess is the theme of the MACS 2018 Training Event and Trade Show to be held 14-18 February 2018, at the Caribe Royale Hotel and Convention Center, USA

AIRAH Refrigeration 2018, 26 – 27 March 2018, Sydney, Australia

READING

Twenty Questions and Answers About the Ozone Layer, presents complex science in a straightforward manner. It complements the 2014 Scientific Assessment Report of Ozone Depletion by WMO and the U.N. Environment Programme.

UNEP and USEPA: Promoting ozone and climate-friendly technologies in public procurement - a scoping study of Asia Pacific



WMO Antarctic Ozone 2016 Bulletins - Containing information on the state of the ozone layer in the Antarctic at roughly two week intervals from August to November. The bulletins are based on data provided by WMO Members which operate ozone monitoring stations in the southern hemisphere and satellites to observe ozone globally.

The EU F-Gas Regulation Handbook, Keeping Ahead of the Curve as Europe Phases Down HFCs - a free online resource for climate media and other concerned parties, published by the London-based Environmental Investigation Agency (EIA).

Alternative Refrigerant Evaluation for High-Ambient-Temperature Environments: R-22 and R-410A Alternatives for Mini-Split Air Conditioners

AREA Guidance on minimum requirements for contractors' training & certification on low GWP Refrigerants - AREA has updated its Guidance on minimum requirements for contractors' training & certification on low GWP Refrigerants.

Free guide to F-gas changes The European contractors association AREA has produced a timely guide to the F-gas regulations which clarifies the new rules, their impact and their practical application…Read more

The recent Alternatives to HCFCs/HFCs in developing countries with a focus on high ambient temperatures" study carried out by Öko-Recherche for the European Commission stresses that the refrigerant and blowing agent demand is expected to triple by 2030 in developing countries as a result of economic growth. A sector by sector analysis shows that a climate-friendly replacement for current and future of HCFCs and high GWP HFCs is possible in most applications …

Primer on Hydrofluorocarbons, Fast action under the Montreal Protocol can limit growth of HFCs, prevent up to 100 billion tonnes of CO_2-eq emissions by 2050, and avoid up to 0.5°C of warming by 2100. IGSD, January 2014, Lead authors: Durwood Zaelke, Nathan Borgford-Parnell, and Danielle Fest Grabiel. Contributing authors: Stephen O. Andersen, Xiaopu Sun, Dennis Clare, Yuzhe Peng Ling, and Alex Milgroom.

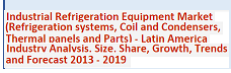
Flammable Refrigerants Safety Guide, AIRAH - Many of the refrigerants traditionally used in refrigeration and air conditioning systems in Australia have been non-flammable, non-toxic, synthetic greenhouse gases (SGGs) that have a high global warming potential (GWP). These were typically synthetic refrigerants including CFCs, HCFCs and HFCs. Due to the growing national and international concern regarding the resulting atmospheric effects of SGGs, the use of alternative low GWP refrigerants is increasing. …

Recent Trends in Global Emissions of Hydrochlorofluorocarbons and Hydrofluorocarbons: Reflecting on the 2007 Adjustments to the Montreal Protocol. S. A. Montzka *†, M. McFarland ‡, S. O. Andersen §, B. R. Miller †‖, D. W. Fahey †, B. D. Hall †, L. Hu †‖, C. Siso †‖, and J. W. Elkins †† Earth System Research Laboratory, National Oceanic and Atmospheric Administration, Boulder, Colorado 80305, United States ‡ DuPont Chemicals & Fluoroproducts, Wilmington, Delaware 19805, United States § Institute for Governance & Sustainable Development, Washington, D.C. 20007, United States‖ Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, United States.

Geothermal Heating and Cooling: Design of Ground-Source Heat Pump Systems- ASHRAE

A first edition, the IIR guide "CO_2 as a Refrigerant" highlights the application of carbon dioxide in supermarkets, industrial freezers, refrigerated transport, and cold stores as well as ice rinks, chillers, air conditioning systems, data centers and heat pumps. This guide is for design and development engineers needing instruction and inspiration as well as non-technical experts seeking background information on a specific topic. Publication, IIR Technical Guide, 2014.

FREE HVAC Optimisation Guide released by AIRAH and the NSW Office of Environment & Heritage outlines 20 HVAC optimisation strategies and how they can be applied to the vast majority of commercial systems, both in older and modern buildings…



Latin America Industrial Refrigeration Equipment Market Benefits from Region Flourishing Food and Beverage Production and Processing Market – Trends and forecast 2013-2019.

Solvents & Bio Solvents Market Outlook - Global Trends, Forecast, and Opportunity Assessment (2014-2022)

Chlorofluorocarbon Market: Global Industry Analysis and Forecast 2015 to 2021

Getting The World Off the Chemical Treadmill: A per capita convergence framework for an ambitious phase-down of HFCs under the Montreal Protocol, By: Umang Jalan, Research Associate, Climate Change Programme, Centre for Science and Environment

The Importance of Ambition in the 2016 HFC Phase-Down Agreement. Download the full report from EIA, here

Update on the Illegal Trade in Ozone-Depleting Substances – The Environmental Investigation Agency (EIA) briefing to the 38th meeting of the Open-Ended Working Group of Parties to the Montreal Protocol, in Vienna, Austria, from July 18-21, 2016.

F-Gas Regulation shaking up the HVAC&R industry. Commissioned by the Greens in the European Parliament, the study provides qualitative and quantitative analysis of the early impacts of the EU F-Gas Regulation on the European industry and evaluates its influences on other countries and regions in designing their own policies to curb HFCs.

"The Road to Competence in Future Green Technologies", the International Special Issue 2016-2017 of Centro Studi Galileo. Read/Download pdf version | E-book

The 2016 editions of ASHRAE's major refrigerants-related standards have been published as a package with 30 new refrigerants and refrigerant blends added.

Quest for climate-friendly refrigerants finds complicated choices, National Institute of Standards and Technology (NIST), 17 February 2017, Summary: Researchers have just completed a multiyear study to identify the 'best' candidates for future use as air conditioning refrigerants that will have the lowest impact on the climate.

The second issue of The Natural Voice magazine, entitled 'Mainstreaming Natural Refrigerants' showcases examples of installations using natural refrigerants around the world, including in the Gambia, Jordan, South Africa, China, Thailand, Tanzania and Saudi Arabia.

Industria & Formazione, no. 2/17, Preview of the journal Industry & Training in refrigeration and air conditioning, technical refrigeration and air-conditioning, Centro Studi di Galileo # 406 Technological innovations in cooling and air conditioning with special focus on the F-Gas new regulations, new refrigerants, components and systems, food storage and cold sector. Vol. XLI - No. 2-2017.

Refrigeration: An increasingly strategic issue for data centres - Cooling data centres: A major economic challenge Today, data centres play a key role in many businesses as information technology is becoming an increasingly strategic factor. Cooling can present a major economic challenge for data centres. If cooling is implemented incorrectly or is inadequate, the amount of energy required to cool a data centre can equal or exceed that used to operate the equipment. Larger data centres can use a staggering amount of energy just to ensure the day-to-day running of electronic equipment. As a result, these data centres can produce a great deal of heat, which require large-scale cooling systems in order to maintain efficient and continual operation… Browse through a selection of articles and papers, by iifiir

shecco GUIDE to Natural Refrigerants Training in Europe shows that training is readily available. Read on r744

40 Years of Global Environmental Assessments: A Retrospective Analysis, J. Jabbour and C. Flachsland. Environmental Science & Policy

FactSheet - Hazards during the Repair and Maintenance of Refrigeration Systems on Vessels.

High-performance insulation materials market, June 2017

EIA Applauds Bipartisan Effort to Tackle Super Pollutants, Including HFCs. Environmental Investigation Agency, 8 June 2017

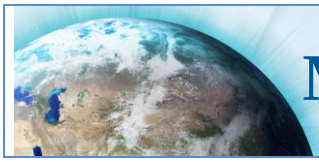
The Environmental Investigation Agency (EIA), recently launched report: *Chilling Facts VII* , *Chilling Facts I-VI* reports available here

ASHRAE Releases New Edition of *Principles of Heating, Ventilating and Air Conditioning.*- *Eighth edition of textbook updated based on the 2017 ASHRAE Handbook* - The textbook is ASHRAE's recommended text for HVAC instruction and presents the fundamental concepts for HVAC systems and design.

The Australian Institute of Refrigeration, Air Conditioning and Heating outlines the Future of HVAC in a Net-Zero World

The Dirtiest Contraband in Gibraltar, El Pais, 8 August 2017

"Absorption Chillers Market: Global Industry Analysis and Forecast, 2017-2025,"… The demand for thermally-driven chillers in multiple industrial verticals is poised to grow in the immediate future. Considering the rising demand for electrical chillers in commercial, residential as well as industrial settings, the adoption of absorption chillers will gain traction at considerable rate. By consuming lesser energy than conventional electrical chillers, absorption chillers will also garner surplus demand for not using ozone-depleting chlorofluorocarbons (CFC) for chilling purposes. Persistence Market Research's latest report delivers key insights for the future of global absorption chillers market, excerpts from which highlight that by the end of 2025, more than US$ 2 Bn worth of absorption chillers will be sold throughout the globe…



MISCELLANEOUS

Announcement!

The UN Environment, OzonAction, in collaboration with Marco Gonzalez and Stephen O. Andersen are updating and expanding the Montreal Protocol Who's Who" as part of the celebration of the 30th Anniversary of the Montreal Protocol - which was agreed as 16 September 1987.

The new website will be launched during the upcoming Meeting of the Parties to the Montreal Protocol, Montreal, Canada, 20-24 November 2017.

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

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

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

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

- Contact : Samira Korban-de Gobert, UN Environnement, OzonAction

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

How will the heat pump market move towards natural refrigerants? Eric Delforge talks about the energy-efficient properties of natural refrigerants when used in heat pump applications.

Watch on r774's YouTube channel

UN knowledge platform launches live-tracking tools to review progress towards SDGs, UN Environment's dynamic online platform designed for sharing contextualized data...

New ***International Journal of Refrigeration*** service for IIR members - As of January 2017, not only will IIR members continue to receive the hard copy of the journal but IIR membership will now also give members access to the complete archives of the *International Journal of Refrigeration (IJR)* online. Designed with IIR members in mind, this new and practical electronic subscription gives members substantial advantages:

- Immediate and permanent access to the latest research and to IJR archive
- Access the latest articles as soon as they become available online.
- Browse, search and read each one of the nearly 4,500 papers since Volume 1, Issue 1.
- Unlimited access to seminal contributions to the field of refrigeration dating back to 1978.
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Enhanced content and functions

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- Print, download or share articles with colleagues or peers.
- See which papers, published in Elsevier or elsewhere, have cited any selected article.
- Consult the research highlights overview of articles in volumes from 2012 onwards.

To access this new service, click "activate my e-IJR subscription now" and follow the instructions.

International Observers - New AREA membership category - Due to the significant worldwide interest in European legislative developments and the increase in competence of personnel who handle new refrigerants, AREA is pleased to introduce its brand new "International Observer" membership category. This provides a fantastic opportunity for non-European RACHP installer bodies the world, to benefit from the expertise and discussions within Europe through access to AREA. Contact: info@area-eur.be

The Mobile Air Conditioning Society (MACS) Worldwide has released the **MACS Mobile A/C Diagnostics app** powered by Shiftmobility© for use on all mobile devices. The MACS app includes comprehensive mobile A/C and engine cooling system specifications for cars and light duty trucks from 1960-present; A library of heavy duty vehicle specifications donated by MACS member companies; access to MACS training calendar and website, archived MACS ***ACTION™*** magazines and ***Service Reports***, MACS mobile A/C diagnostic checklists and a MACS member supplier directory. The MACS app is available only to MACS members in good standing. Each membership will receive one free download; and additional member downloads are $60 each annually. The MACS app can be downloaded from the Google play or iTunes store

The Montreal Protocol Who's who

See the latest nominations /

Nominate Ozone Layer Protection Champion

From Your Country /Region >>

http://www.unep.fr/ozonaction/montrealprotocolwhoswho

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Prepared by: Samira Korban-de Gobert, OzonAction

Reviewed by: Shamila Nair-Bedouelle, Head OzonAction Branch, and Ezra Clark, OzonAction

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