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# OzoNews

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

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## 30<sup>th</sup> Meeting of the Parties to the Montreal Protocol Edition

### In this issue:

1. Montreal Protocol closes annual meeting with new mandates, strengthened enforcement and momentum for climate action
2. Summary of the Thirtieth Meeting of the Parties to the Montreal Protocol: 5-9 November 2018
3. Montreal Protocol assessment reveals healing ozone, untapped potential for climate action
4. Highlights Scientific Assessment of Ozone Depletion: 2018
5. Refrigerant Management Tools for Developing Countries UN Environment Programme OzonAction/ASHRAE Side Event 30th Meeting of the Parties, Quito, Ecuador
6. NEW OzonAction smartphone application: Good Servicing: Flammable Refrigerants Quick Guide
7. NEW OzonAction smartphone application: Refrigerant Identifier Video Series
8. Sustainable refrigeration for food and nutrition security in an increasingly urban world
9. Ozone hole modest despite optimum conditions for ozone depletion
10. Experts: Training deemed essential to unlock R290 RAC potential in Europe
11. Grow your business: Get ready for flammable refrigerants!

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Global

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## 1. Montreal Protocol closes annual meeting with new mandates, strengthened enforcement and momentum for climate action

Quito, 12 November 2018 – Delegates representing nearly 150 parties to the Montreal Protocol concluded their 30th Meeting of the Parties here with the unanimous adoption of a sweeping decision intended to strengthen enforcement mechanisms of this accord in response to an unexpected rise in global emissions of the banned chemical trichlorofluoromethane or CFC-11. The decision:

Ordered a conclusive scientific investigation from two assessment panels of the Protocol with the mandate to provide:

- Additional information regarding atmospheric monitoring and modelling, including underlying assumptions, with respect to such emissions
- Information on potential sources of emissions of CFC-11 and related controlled substances from potential production and uses, as well as from banks, that may have resulted in emissions of CFC-11 in unexpected quantities in the relevant regions

Mandated all the 197 parties to the Protocol to provide the latest information on CFC-11 emissions and potential sources, including:

- Regional atmospheric measurements as feasible and available
- Cooperation with the investigating panels as reasonable and as requested by the panels
- Participation from relevant scientific and atmospheric organizations and institutions to further study and elaborate the current findings related to CFC-11

Mandated a global review of enforcement measures under the Protocol beginning with:

- A review of measures taken at the national level to ensure phase-out of CFC-11 is effectively sustained and enforced in accordance with obligations under the Protocol;
- A requirement to inform the Ozone Secretariat about any potential deviations from compliance that could contribute to the unexpected increase in CFC-11 emissions.

The decision calls on the panels to provide a preliminary summary report to the Open-ended Working Group at its forty-first meeting to be held in Bangkok in July 2019, and further updates at subsequent meetings. A workshop to further examine the CFC-11 emissions is scheduled for March 2019.

The agreement is the result of careful negotiations among parties to the Montreal Protocol who met here in Quito, Ecuador, from 5 to 9 November for deliberations on a range of ozone and climate related issues.

Delegates also negotiated practical arrangements for the implementation of the Kigali Amendment, approving technologies for the destruction of substances controlled under the Protocol and adopting new data reporting requirements.

The Kigali Amendment is set to enter into force on 1 January 2019 and is expected to avoid 0.5°C of global warming by the end of the century by requiring countries to cut projected production and consumption of climate change-inducing hydrofluorocarbons (HFCs) in refrigerators, air conditioners and related products by more than 80 percent over the next 30 years. It has so far been ratified by 60 parties.

Additionally, in a bid to increase access to efficient technologies in order to maximize the climate benefits of the Kigali Amendment, the delegates asked the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol to consider how financial support for enabling activities might be granted to developing countries.

Addressing the representatives ahead of final deliberations, Tina Birmpili, Executive Secretary of UN Environment's Ozone Secretariat, spurred delegates towards ratification of a decisive course.

"The expected benefits of the Kigali Amendment, and the gains already achieved under the Montreal Protocol, show how powerful we can be when we work together," said Birmpili. "But there is no room for complacency. Safeguarding our hard-fought gains means tackling illegal use of ozone depleting substances whenever and wherever we find it. More importantly, it means stopping such actions from ever happening again by strengthening enforcement at the global level."

Hosted by the Government of Ecuador, the parties gathered here also reviewed the latest [Scientific Assessment of Ozone Depletion](#) which revealed a healing ozone layer, global warming reduction potential, and options for more ambitious climate action.

At the opening of the high-level segment of the meeting, President Lenín Moreno of Ecuador underscored the importance of seeking inclusive sustainable development to "protect the house in which our children and grandchildren must live."

He urged all countries to swiftly ratify the Kigali Amendment and called for continued financial assistance to support developing countries in implementing the Montreal Protocol and its amendments.

[UN Environment, Ozone Secretariat, 12 November 2018](#)



## 2. Summary of the Thirtieth Meeting of the Parties to the Montreal Protocol: 5-9 November 2018

The thirtieth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (MOP 30) convened from 5-9 November 2018 in Quito, Ecuador. MOP 30 was attended by over 500 delegates, including representatives of 144 parties to the Protocol, the members of the Protocol's technical advisory bodies, as well as representatives of UN agencies and programmes, regional organizations, industry and non-governmental organizations (NGOs).

MOP 30 adopted 21 decisions on, inter alia: issues important to the January 2019 entry into force of the Kigali Amendment on Hydrofluorocarbons (HFCs), including:



- data reporting issues, including timeline and revised reporting forms, ways to report mixtures and blends, and setting global warming potential (GWP) values for HCFC-123, HCFC-124, HCFC-141, and HCFC-142;
- approved destruction technologies to be used for HFCs;
- Multilateral Fund (MLF) Executive Committee's (ExCom) progress in developing guidelines for the financing of the HFC phase-down; and
- access of Article 5 parties to energy-efficient technologies in the refrigeration, air conditioning and heat pump (RACHP) Sectors.

Other decisions addressed:

- future availability of halons and their alternatives, especially in sectors such as civil aviation;
  - nominations for critical-use exemptions for methyl bromide for 2019 and 2020;
- development and availability of laboratory and analytical procedures that can be performed without using substances controlled under the Protocol;
- a proposal to permit essential use exemptions for hydrochlorofluorocarbons (HCFCs) for specific uses by certain parties;
  - unexpected emissions of CFC-11 recently detected;
  - a review of the work and recommended decisions of the Implementation Committee (ImpCom); and
  - a review of the terms of reference, composition, and balance of the scientific and technical advisory bodies.

Through decisions on data reporting, destruction technologies and access to energy-efficient technologies, MOP 30 took key steps to pave the way for implementation of the Kigali Amendment, while its decision on the ExCom cost guidelines for the HFC phase-down ensures the input of all parties to that instrument before the guidelines are finalized. MOP 30 also took action to address the issues raised by the recent discovery of CFC-11 emissions. In addition, the MOP heard the technical panels' key messages from their upcoming Quadrennial Assessments and pondered their implications for the functioning and future implementation of the Protocol.

Several other key issues were aired at MOP 30 but decisions were not adopted at this stage because the subjects require further consultation and deliberation during 2019, including:

- the relationship between stratospheric ozone and proposed solar radiation management strategies;
- linkages between HCFCs and HFCs in transitioning to low- GWP alternatives;
- new terms of reference for the TEAP;
- a possible change in the composition of the MLF ExCom; and
- safety standards. [...]

*Photo: iisd Reporting Services*

[IISD Reporting Services, Earth Negotiations Bulletin, Vol. 19 No. 145, 12 November 2018](#)

### 3. Montreal Protocol assessment reveals healing ozone, untapped potential for climate action

**Quito, 5 November 2018** –The latest Scientific Assessment of Ozone Depletion reveals a healing ozone layer, global warming reduction potential, and options for more ambitious climate action.

The quadrennial review from the Scientific Assessment Panel of the Montreal Protocol will be presented here at the 30th Meeting of the Parties to this historic accord. Its findings confirm first and foremost that actions taken under the Montreal Protocol have led to long-term decreases in the atmospheric abundance of controlled ozone-depleting substances (ODSs) and the ongoing recovery of stratospheric ozone.

Evidence presented by the authors shows that the ozone layer in parts of the stratosphere has recovered at a rate of 1-3% per decade since 2000. At projected rates, Northern Hemisphere and mid-latitude ozone is scheduled to heal completely by the 2030s followed by the Southern Hemisphere in the 2050s and polar regions by 2060. The ozone layer protects life on Earth from harmful levels of ultraviolet rays from the sun.

It is further evidence of the inspiring success of this environmental treaty now entering its fourth decade. The report also offers a view of the role the Protocol must have in decades to come.

“The Montreal Protocol is one of the most successful multilateral agreements in history for a reason,” said Erik Solheim, head of UN Environment. “The careful mix of authoritative science and collaborative action that has



Press Release //

**Montreal Protocol assessment reveals healing ozone, untapped potential for climate action**

defined the Protocol for more than 30 years and was set to heal our ozone layer is precisely why the Kigali Amendment holds such promise for climate action in future.”

Set to enter in to force on 1 January 2019, the Kigali Amendment calls for slashing the future use of powerful climate-warming gases in refrigerators, air conditioners and related products. Nations that ratify the Kigali Amendment are committing to cutting the projected production and consumption of these gases, known as hydrofluorocarbons (HFCs), by more than 80 percent. So far, 58 parties have done so.

Authors of the Assessment found the world can avoid up to 0.5°C of global warming this century through implementation of the Kigali Amendment, affirming its critical role in keeping global temperature rise below the 2°C mark.

“These new assessment results highlight the importance of continued long-term monitoring of HFCs in the atmosphere as the Kigali Amendment begins to take hold,” said David Fahey, Co-Chair of the Montreal Protocol Scientific Assessment Panel and scientist at the NOAA Earth System Research Laboratory in the US.

Full compliance would reduce future global warming due to HFCs by about 50% between now and 2050 compared to a scenario without any HFC controls.

The findings come at a time when the world is still grappling with a sobering message from the Intergovernmental Panel on Climate Change (IPCC) which found just 12 years remain to limit global warming to 1.5°C, beyond which, the impacts of a further rise in global temperatures will begin to have an increasingly extreme impact on human society and ecosystems. The IPCC report offered the clearest evidence to date of the drastic difference between the 1.5°C and 2°C scenarios.

“Carbon dioxide emissions remain by far the most important greenhouse gases which are driving global warming. But we can also help tackle climate change by reducing our commitment to other gases including HFCs. Every bit of warming matters,” said World Meteorological Organization Secretary-General Petteri Taalas.

The Assessment, which is intended to add to the scientific basis for decisions made by the Parties to the Montreal Protocol, also presents updated scenarios for hastening ozone recovery through:

Complete elimination of controlled and uncontrolled emissions of substances such as carbon tetrachloride and dichloromethane

Bank recapture and destruction of chlorofluorocarbons (CFCs), halons, and hydrochlorofluorocarbons (HCFCs)

Elimination of HCFC and methyl bromide production

Mitigation of nitrous oxide emissions

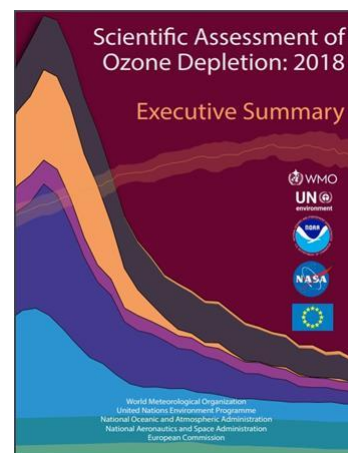
[UN Environemnet, Ozone Secretariat, 5 November 2018](#)

## 4. Highlights Scientific Assessment of Ozone Depletion: 2018

*The Assessment documents the advances in scientific understanding of ozone depletion reflecting the thinking of the many international scientific experts who have contributed to its preparation and review. These advances add to the scientific basis for decisions made by the Parties to the Montreal Protocol. It is based on longer observational records, new chemistry-climate model simulations, and new analyses. Highlights since the 2014 Assessment are:*

**Actions taken under the Montreal Protocol have led to decreases in the atmospheric abundance of controlled ozone-depleting substances (ODSs) and the start of the recovery of stratospheric ozone.** The atmospheric abundances of both total tropospheric chlorine and total tropospheric bromine from long-lived ODSs controlled under the Montreal Protocol have continued to decline since the 2014 Assessment. The weight of evidence suggests that the decline in ODSs made a substantial contribution to the following observed ozone trends:

trends:



The Antarctic ozone hole is recovering, while continuing to occur every year. As a result of the Montreal Protocol much more severe ozone depletion in the polar regions has been avoided.

Outside the polar regions, upper stratospheric ozone has increased by 1–3% per decade since 2000.

No significant trend has been detected in global (60°S–60°N) total column ozone over the 1997–2016 period with average values in the years since the last Assessment remaining roughly 2% below the 1964–1980 average.

Ozone layer changes in the latter half of this century will be complex, with projected increases and decreases in different regions. Northern Hemisphere mid-latitude total column ozone is expected to return to 1980 abundances in the 2030s, and Southern Hemisphere mid-latitude ozone to return around mid-century. The Antarctic ozone hole is expected to gradually close, with springtime total column ozone returning to 1980 values in the 2060s. [ES Sections 1 and 3]

**The Kigali Amendment is projected to reduce future global average warming in 2100 due to hydrofluorocarbons (HFCs) from a baseline of 0.3–0.5°C to less than 0.1°C.** The magnitude of the avoided temperature increase due to the provisions of the Kigali Amendment (0.2 to 0.4°C) is substantial in the context of the 2015 Paris Agreement, which aims to keep global temperature rise this century to well below 2°C above pre-industrial levels. [ES Section 2]

**There has been an unexpected increase in global total emissions of CFC-11.** Global CFC-11 emissions derived from measurements by two independent networks increased after 2012, thereby slowing the steady decrease in atmospheric concentrations reported in previous Assessments. The global concentration decline over 2014 to 2016 was only two-thirds as fast as it was from 2002 to 2012. While the emissions of CFC-11 from eastern Asia have increased since 2012, the contribution of this region to the global emission rise is not well known. The country or countries in which emissions have increased have not been identified. [ES Section 1]

**Sources of significant carbon tetrachloride emissions, some previously unrecognised, have been quantified.** These sources include inadvertent by-product emissions from the production of chloromethanes and perchloroethylene, and fugitive emissions from the chlor-alkali process. The global budget of carbon tetrachloride is now much better understood than was the case in previous Assessments, and the previously identified gap between observation-based and industry-based emission estimates has been substantially reduced. [ES Sections 1 and 5]

**Continued success of the Montreal Protocol in protecting stratospheric ozone depends on continued compliance with the Protocol.** Options available to hasten the recovery of the ozone layer are limited, mostly because actions that could help significantly have already been taken. Remaining options such as complete elimination of controlled and uncontrolled emissions of substances such as carbon tetrachloride and dichloromethane; bank recapture and destruction of CFCs, halons, and HCFCs; and elimination of HCFC and methyl bromide production would individually lead to small-to-modest ozone benefits. Future emissions of carbon dioxide, methane, and nitrous oxide will be extremely important to the future of the ozone layer through their effects on climate and on atmospheric chemistry. Mitigation of nitrous oxide emissions would also have a small-to-modest ozone benefit. [Figure ES-9, ES Section 5]

[UN Environment, Scientific Assessment, Executive Summary, November 2018](#)



## 5. Refrigerant Management Tools for Developing Countries UN Environment Programme OzonAction/ASHRAE Side Event 30th Meeting of the Parties, Quito, Ecuador

Monday 5 November, Quito, Ecuador. At the 30<sup>th</sup> Meeting of Parties of the Montreal Protocol on Substances that Deplete the Ozone Layer, UN Environment Programme OzonAction and ASHRAE held a side event on Refrigerant Management Tools for countries operating under Article 5 of the Protocol.

These tools were developed under a long-standing partnership between the OzonAction and ASHRAE. The side event was held on the first day of the meeting, and despite competition with other side events and contact groups it attracted a very good participation of 90 participants, from developed and developing countries, as well as Implementing Agencies, experts and other stakeholders.

The side event provided a background and overview of the refrigerant management tools that have been jointly developed for Article 5 Countries by OzonAction and ASHRAE. These tools are aimed at capacity building of National Ozone Officers, policy makers, refrigeration technicians and other stakeholders, facilitating the sound management of refrigerants and transition to alternative climate friendly technologies. The event launched new recently developed tools and initiatives.

Dr Sheila Hayter, ASHRAE President, in her opening remarks provided a brief introduction and overview of ASHRAE, its structure and membership, operations and activities. She stated: “The partnership between ASHRAE and the UN Environment Ozone Action Branch is how ASHRAE is able to directly support the Kigali amendments to the Montreal Protocol and help all nations move towards full implementation of these amendments. ASHRAE very much values its partnership with UN Environment Ozone Action and the opportunity this partnership has provided to engage ASHRAE in this critical global initiative.”

Shamila Nair-Bedouelle, Head of UN Environment Programme OzonAction, provided a brief overview of the work of OzonAction, particularly that relevant to supporting the refrigeration and air-conditioning servicing sector in all Article 5 countries. Dr Nair-Bedouelle described the range of tools and information materials developed by OzonAction for technicians, including innovative tools such as smartphone applications and training videos. She praised the excellent cooperation between UN Environment Programme and ASHRAE and the practical, usable tools developed that can assist developing countries in meeting their commitments under the Montreal Protocol.

An overview of the highlights and key achievements of the ASHRAE-OzonAction Partnership was provided by Dr. Ezra Clark, OzonAction, providing a background to the launch of the new tools.

Ms. Shirley Sotto, the Montreal Protocol Focal Point of Costa Rica and W. Stephen Comstock, Manager of Business Development EMEA, ASHRAE, jointly launched the Spanish version of the Refrigerants Literacy E-Course which was developed under the OzonAction-ASHRAE partnership.

The Refrigerants Literacy e-Learning Course is the first of its kind course on refrigerants for non-specialists and the English version was launched by the partners in July 2017. The courses include interactive activities, knowledge checks, audio and video, and a final test. The course is mainly designed for non-specialists in HVAC&R operation and servicing i.e. NOUs, policy makers, procurement officers, buildings owners, facility managers, etc, but is also recommended for HVAC&R engineers, consultants and technical people who wish to get an overall and holistic overview about refrigerants and its progression.

Ms. Shirley Sotto said: “for Costa Rica, it has been an honour to have been selected to carry out the technical review of the Refrigerants Literacy E-Course translated by the ASHRAE and the OzonAction program, and we remain always willing to collaborate so that all these ‘knowledge building tools’ can continue to be developed and become available to all countries, especially those who are not English speaking”.

Mr Comstock then launched the 2<sup>nd</sup> E-learning course developed under the partnership, “Sound Management of Refrigerants”; an interactive web-based course that reviews best practices for key environmental issues, ASHRAE standards, and refrigerant applications including good service practices and issues related to new and flammable refrigerants. Mr Comstock explained that this course targets technicians, engineers, operators and contractors who in addition to the basic Refrigerant Literacy course need an in-depth training program for servicing air conditioning and refrigeration equipment.

During this side event, a new award recognising innovation in refrigerant management was launched. Mr Comstock explained that the ‘Lower-Global Warming Potential Refrigeration and Air Conditioning Innovation award’ will be an international award for innovative design, research or practice of lower-GWP technologies for RAC applications in developing countries.

Its aim is to increase awareness of how sound refrigerant practices contribute to mitigation of climate change through recognition of those who conceive innovative technologies in refrigerant management as well as communication of innovation techniques through ASHRAE publishing vehicles, ASHRAE’s chapter/member network, and through the OzonAction Compliance Assistance Programme, Clearinghouse functions and Regional Networks of National Ozone Units.

**All the Refrigerant Management Tools developed under this partnership are provided to developing countries at no cost.**

The presentations and more information can be found on the [OzonAction meetings portal](#)

For more information please contact:

[Ayman Eltalouny](#), OzonAction, UN Environment Programme

[W. Stephen Comstock](#), Manager of Business Development EMEA, ASHRAE

UN Environment, OzonAction, 5 November 2018



## 6. NEW OzonAction smartphone application: Good Servicing: Flammable Refrigerants Quick Guide

### An interactive Quick Guide on Good Practices for Flammable Refrigerants.

This is the electronic and interactive version of the UN Environment OzonAction **Quick Guide on Good Servicing Practices for Flammable Refrigerants**.

It offers easy reference to the key safety classification and technical properties of flammable refrigerants that are available in the market.

It also provides important safety guidance for the installation and servicing of room air-conditioners designed to use flammable refrigerants.

This interactive guide allows you to scroll and browse the text, jump to specific chapters or use the comprehensive dynamic index to locate specific keywords, figures and tables.



The application also includes a refrigerant charge size calculator and a room size calculator for flammable refrigerants.

Available for free on the Google play store (*Apple version coming soon*) - Search for "UNEP Quick guide" or use the QR code.

UN Environment, OzonAction, October 2018



## 7. NEW OzonAction smartphone application: Refrigerant Identifier Video Series

### Guidance on how to identify refrigerants using a refrigerant identifier.

This new OzonAction video series consists of short instructional videos showing how to use and maintain a refrigerant identifier.

The videos provide useful guidance on safety and best practice, understanding the difference between different identifier units, testing procedures and identification of results.

It is intended for use by Montreal Protocol National Ozone Officers, Customs and Enforcement Officers as well as technicians involved in the servicing and maintenance of refrigeration and air-conditioning systems.

Available for free on the Google play store (*Apple version coming soon*) Search for "UNEP Refrigerant ID" or use the QR code.



UN Environment, OzonAction, October 2018



## 8. Sustainable refrigeration for food and nutrition security in an increasingly urban world

According to UN Statistics, in 2016 an estimated 54.5% of the world's population lived in urban settlements. By 2030, urban areas are projected to house 60% of people globally and one in every three people will live in cities with at least half a million inhabitants<sup>1</sup>. Rural-to-urban migration is a key driver of this increasing urbanisation, accounting for about 25% of urban population growth,<sup>2</sup> which means that there are less people in rural areas to produce food and that the majority of food is consumed in urban areas.

Despite the benefits of urban food production, which is being promoted across the world with varying degrees of success, the majority of food will continue to be produced in rural areas and supply chains have to adapt to accommodate these new realities. As an increase in urbanisation is at its most extreme in the developing and emerging economies, the development of infrastructure will have to be accelerated to meet the need for more efficient food supply chains.

Refrigeration – in particular, the food cold chain, is a key element of food supply chains and critical to ensuring food and nutrition security. Today's world actually produces enough food to feed all 7.2 billion human beings, yet the poor availability, preservation and access to this food means that food systems are failing to fulfil nutritional and environmental needs. There are profound imbalances in availability, consumption and diets, as seen by over 800 million people being hungry, two billion malnourished who lack the essential micronutrients needed to lead healthy lives, and more than 1.4 billion adults being overweight/obese.

The UN's Food and Agriculture Organisation (FAO) estimates that to satisfy the demand of a growing and richer population – who seek more meat in their diet – by 2050, food production will have to increase by at least 60% in the next few decades. However, this figure can be reduced by improving production efficiency, changing dietary trends and decreasing food losses and waste. Cold chains can play a significant role in this last process.

In developing regions such as sub-Saharan Africa, Asia and parts of Latin America, there is a high level of food loss (i.e., food that becomes unfit for human consumption due to spoilage). Fresh produce, such as dairy, fruits, vegetables, meat and fish can spoil easily – sometimes more than half the produce can go to waste. With the increased demand for resource intensively produced and resource-inefficient foods, such as livestock products, it is imperative that of the food that is harvested, as much as possible is consumed. This resource loss is even more important considering resource scarcity in these regions that are on the frontline when it comes to climate change and extreme weather events.

Studies show that increased cold storage facilities in developing countries can reduce about a quarter of the amount of food lost if levels of refrigeration were at a similar level as in developed countries. One of the most important steps in ensuring that fresh produce is consumed comes just after harvest. The shorter time it takes for food to be cooled after harvest the better its shelf life and nutritional quality. This, however, presents a significant challenge given that most food is produced in rural areas where electricity provisions are basic and/or that fuel to generate electricity is scarce and/or expensive. For example, 70% of people in Sub-Saharan Africa have no access to electricity and 80% of those are located in rural areas.

Refrigeration, including the food cold chain, is a sector that is experiencing rapid technological advancements, both in terms of obtaining better energy efficiency and also in responding to policy demands such as the phase-out of ozone depleting substances under the Montreal Protocol, and the future requirement to phase down hydrofluorocarbons (HFCs) under the 2016 Kigali Amendment to the Protocol.

The developments and innovations in this fast moving sector are not limited to developed countries, with technical advancements also emerging from developing countries. The question is not why there should be a cold chain, but how to ensure that there is appropriate technology and energy to sustain it. In many parts of the developing world, renewable energy sources are abundant, but cannot be easily harnessed due to lack of infrastructure or expertise. More investments are needed in these aspects, or else massive volumes of food will continue to get spoilt and lost, and issues of food safety and food security will continue to affect millions, especially in the developing world.

This represents an incredible opportunity for targeted public and private sector investment in this area to contribute to achieving food security and nutrition. And with these investments there is an opportunity to ensure that new cold chain infrastructure is evolving with ozone- and climate-friendly refrigerants.



1 [http://www.un.org/en/development/desa/population/publications/pdf/urbanization/the\\_worlds\\_cities\\_in\\_2016\\_data\\_booklet.pdf](http://www.un.org/en/development/desa/population/publications/pdf/urbanization/the_worlds_cities_in_2016_data_booklet.pdf) Accessed 22.12.17  
2 <http://www.citiesalliance.org/node/2195> Accessed 22.12.17

**Author:** James Lomax, UN Environment Programme Officer for Sustainable Food Systems and Agriculture  
**UN Environment, OzonAction, SCOOP#3, October 2018**

## 9. Ozone hole modest despite optimum conditions for ozone depletion

Colder-than-average temperatures in the Antarctic stratosphere created ideal conditions for destroying ozone this year, but declining levels of ozone-depleting chemicals prevented the hole from as being as large as it would have been 20 years ago.

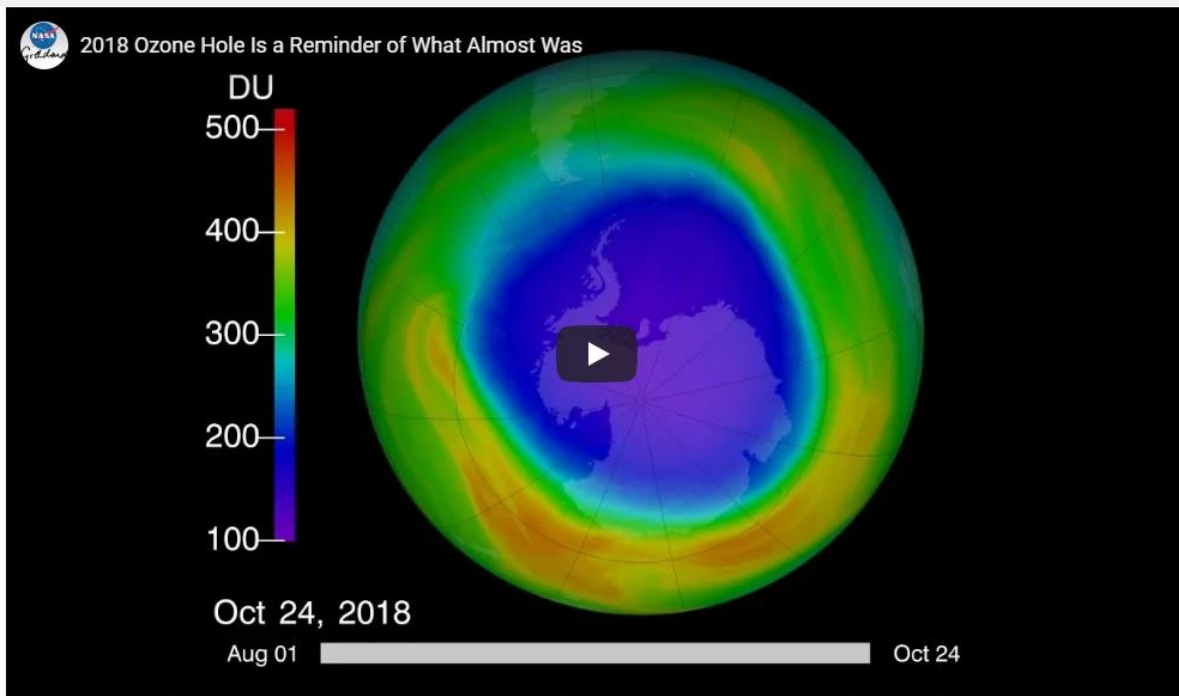
“Chlorine levels in the Antarctic stratosphere have fallen about 11 percent from the peak year in 2000,” said Paul A. Newman, chief scientist for Earth Sciences at NASA’s Goddard Space Flight Center in Greenbelt, Maryland. “This year’s colder temperatures would have given us a much larger ozone hole if chlorine was still at levels we saw back in the year 2000.”

According to NASA, the annual ozone hole reached an average area coverage of 8.83 million square miles (22.9 square kilometers) in 2018, almost three times the size of the contiguous United States. It ranks 13th largest out of 40 years of NASA satellite observations. Nations of the world began phasing out the use of ozone-depleting substances in 1987 under an international treaty known as the Montreal Protocol.

The 2018 ozone hole was strongly influenced by a stable and cold Antarctic vortex — the stratospheric low pressure system that flows clockwise in the atmosphere above Antarctica. These colder conditions — among the coldest since 1979 — helped support formation of more polar stratospheric clouds, whose cloud particles activate ozone-destroying forms of chlorine and bromine compounds.



This time-lapse photo from Sept. 10, 2018, shows the flight path of an ozonesonde as it rises into the atmosphere over the South Pole from the Amundsen-Scott South Pole Station. Scientists release these balloon-borne sensors to measure the thickness of the protective ozone layer high up in the atmosphere.  
**Credits: Robert Schwarz/University of Minnesota**



Scientists from NASA and NOAA work together to track the ozone layer throughout the year and determine when the hole reaches its annual maximum extent. This year, the South Pole region of Antarctica was slightly colder than the previous few years, so the ozone hole grew larger.  
**Credits: NASA Goddard/ Katy Mersmann**  
[This video can be downloaded for free at NASA's Scientific Visualization Studio](#)

In 2016 and 2017, warmer temperatures in September limited the formation of polar stratospheric clouds and slowed the ozone hole's growth. In 2017, the ozone hole reached a size of 7.6 million square miles (19.7 square kilometers) before starting to recover. In 2016, the hole grew to 8 million square miles (20.7 square kilometers).

However, the current ozone hole area is still large compared to the 1980s, when the depletion of the ozone layer above Antarctica was first detected. Atmospheric levels of man-made ozone-depleting substances increased up to the year 2000. Since then, they have slowly declined but remain high enough to produce significant ozone loss.

NOAA scientists said colder temperatures in 2018 allowed for near-complete elimination of ozone in a deep, 3.1-mile (5-kilometer) layer over the South Pole. This layer is where the active chemical depletion of ozone occurs on polar stratospheric clouds. The amount of ozone over the South Pole reached a minimum of 104 Dobson units on Oct. 12 — making it the 12th lowest year out of 33 years of NOAA ozonesonde measurements at the South Pole, according to NOAA scientist Bryan Johnson.

"Even with this year's optimum conditions, ozone loss was less severe in the upper altitude layers, which is what we would expect given the declining chlorine concentrations we're seeing in the stratosphere," Johnson said.

A Dobson unit is the standard measurement for the total amount of ozone in the atmosphere above a point on Earth's surface, and it represents the number of ozone molecules required to create a layer of pure ozone 0.01 millimeters thick at a temperature of 32 degrees Fahrenheit (0 degrees Celsius) at an atmospheric pressure equivalent to Earth's surface. A value of 104 Dobson units would be a layer that is 1.04 millimeters thick at the surface, less than the thickness of a dime.

Prior to the emergence of the Antarctic ozone hole in the 1970s, the average amount of ozone above the South Pole in September and October ranged from 250 to 350 Dobson units.

National Aeronautics and Space Administration (NASA), 2 November 2018, By: Ellen Gray, NASA's Earth Science News Team

## Europe & Central Asia

### 10. Experts: Training deemed essential to unlock R290 RAC potential in Europe

With lack of trained technicians often cited among the main barriers to wider uptake of propane-based (R290) room air conditioning (RAC) uptake in Europe, experts at a recent seminar agreed that proper training and adherence to necessary safety guidelines can overcome such issues.

Over 40 industry experts from both the public and private sector gathered during a one-day seminar entitled, 'Expert Day on R290 split ACs: Unlocking the European market uptake' held on 17 October alongside the Chillventa 2018 tradeshow (16-18 October) in Nuremberg, Germany.

The seminar was jointly hosted by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB), the Federal Environment Agency (UBA) and the IKI (International Climate Initiative) project Cool Contributions fighting Climate Change (C4).

Discussion centered on how to unlock the potential for R290 AC in Europe. While R290 split AC systems are increasingly used in other parts of the world (India-based manufacturer Godrej recently announced that it had sold 600,000 R290 RAC systems to date), Europe is currently lagging behind in adoption of this technology. [...]

hydrocarbons21, 31 October 2018, By: Devin Yoshimoto



Midea presenting during seminar on R290 split AC market uptake in Europe, held alongside Chillventa in Nuremberg (17 Oct.)

## 11. Grow your business: Get ready for flammable refrigerants!

As part of a broader communications campaign, four leading associations in the heating, ventilation, air conditioning and refrigeration (HVACR) sector – EPEE, AREA, Asercom and EFCTC – have joined forces in an unprecedented effort to calling upon European installers to get ready for flammable refrigerants.

To this end, the associations have developed a leaflet for installers urging them to get ready for flammable refrigerants and containing key information on what they are and why it is important to use them.

Download the leaflet in [English](#)

*Other languages version will be soon available.*

EPEE - European Partnership for Energy & the Environment, November 2018



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## Featured

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### OZONE SECRETARIAT



OzoneHeroes is the 2018 Gold Winner in the "Communication & Marketing Campaign" category of the Hermes Creative Awards.



- [61<sup>st</sup> Meeting of the Implementation Committee under the Non-Compliance Procedure of the Montreal Protocol](#), Quito (Centro de Convenciones QUORUM, Cumbaya), Ecuador | 3<sup>rd</sup> Nov 2018
- [Bureau Meeting of the Twenty-Ninth Meeting of the Parties to the Montreal Protocol](#), Quito (Centro de Convenciones QUORUM, Cumbaya), Ecuador | 4<sup>th</sup> Nov 2018
- [30<sup>th</sup> Meeting of the Parties to the Montreal Protocol](#), Quito (Centro de Convenciones QUORUM, Cumbaya), Ecuador | 5 - 9 Nov 2018

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

• [40<sup>th</sup> Meeting of the Open-ended Working Group of the Parties to the Montreal Protocol](#), 11-14 July 2018, Vienna, Austria  
 The documents for the forthcoming 40<sup>th</sup> meeting of the Open-ended Working Group of the Parties to the Montreal Protocol (11 to 14 July 2018, Vienna), and the associated workshop on energy efficiency opportunities while phasing-down hydrofluorocarbons (9 and 10 July 2018) are available on the meeting portal and mobile app.

Read/download OEWG40 [Summary](#)  
[OEWG-40 Daily coverage by IISD](#)

- Click [here](#) for Montreal Protocol upcoming Meetings Dates and Venues

## 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.



## THE MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL

- [Provisional agenda for the 82<sup>nd</sup> meeting of the Executive Committee](#), 3-7 December 2018, Montreal, Canada
- [Adjusted Prorated 2018-2020 business plan of the Multilateral Fund \(16 August 2018\)](#)
- [81<sup>st</sup> meeting of the Executive Committee](#), Montreal, Canada, 18 to 22 June 2018
- [Reports of projects demonstrating alternatives to HCFC technologies \(updated 81<sup>st</sup> meeting\)](#)
- [2018 Executive Committee Primer](#)

Learn more



## OZONACTION

### Find out about 2018 World Ozone Day Country Activities

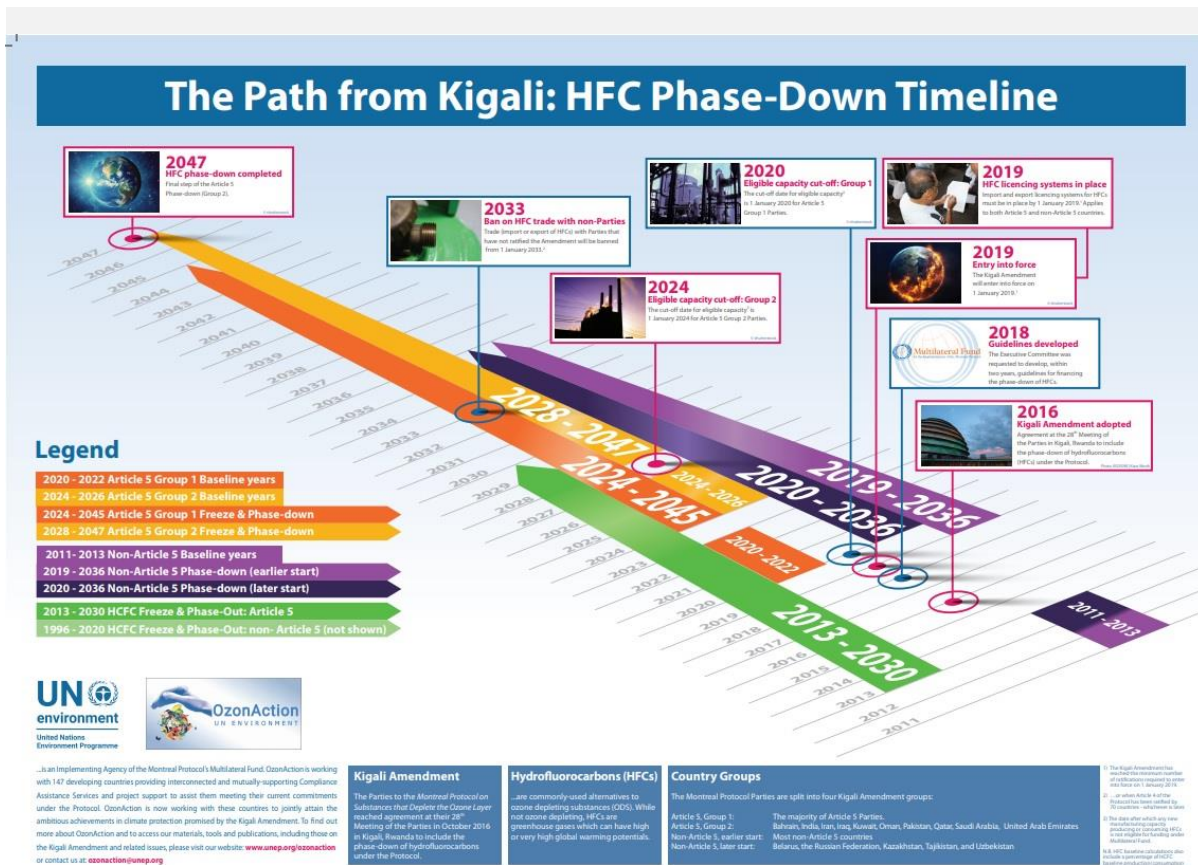


Ozone Day activities on 16 September - OzonAction is keen on highlighting your country's activities on the occasion of the 2018 World Ozone Day celebrations.

Find out about 2018 World Ozone Day Country Activities.

Take this opportunity to share your innovative and inspiring events with the world!

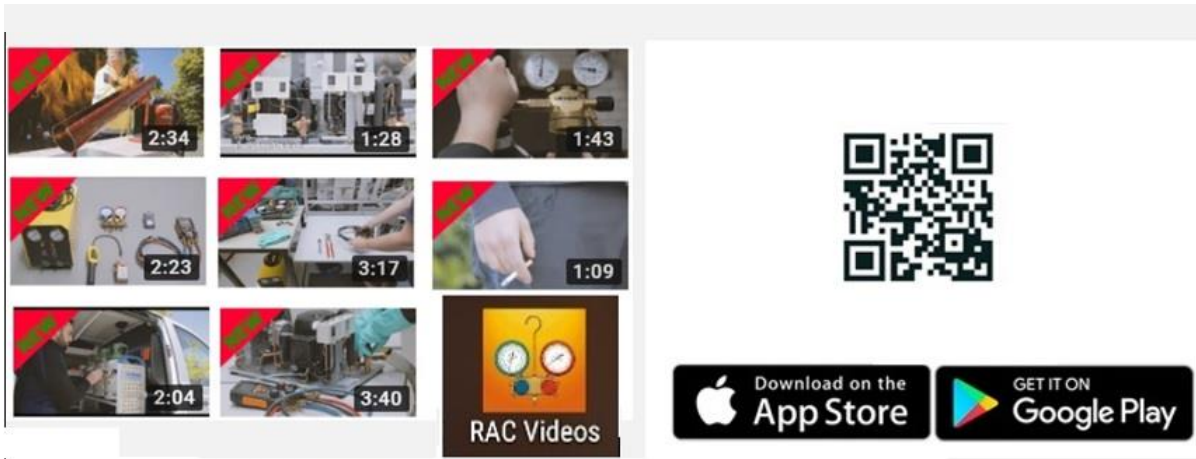
Please send us the related information/photos to this email



### The Path from Kigali: HFC Phase-Down Timeline

This timeline, produced by OzonAction, highlights key hydrofluorocarbons (HFCs) phase-down dates.

Click [here](#) to download the timeline



### New videos available on the OzonAction RAC video application

A series of new videos has just been released on the Refrigeration and Air-conditioning Technician Video Series application, with a focus on working with flammable refrigerants ...

**50,000 downloads and counting!**

To install, search for "RAC Video" in the Google Playstore or Apple IOS store, or scan the QR code.



### GWP-ODP Calculator Smartphone Application

The application allow you to easily convert ODP, CO<sub>2</sub>-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<sub>2</sub>-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<sub>2</sub>-eq) are also displayed.

Available for **free** from the **Apple IOS store** and **Google PlayStore**. Search for **"GWP ODP CALC"** in the Playstore to install!

**Download it Now!**



### 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



**OzonAction Smartphone Application WhatGas?**  
**Available for free in the Google Play and Apple IOS Store**  
**Scan the QR code or search for "UNEP", "OzonAction" or "WhatGas?"**



**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 28<sup>th</sup> 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](#)

**OzonAction Factsheets**



**NEW >>> UN Environment-ASHRAE Factsheet Update on New Refrigerants Designations and Safety Classifications**



OzonAction Series of [19 Fact Sheets](#) related to the Kigali Amendment.

[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 hydrofluoro-carbons (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).

[Refrigerant Blends: Calculating Global Warming Potentials](#) (post-Kigali update).

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

[Tools Commonly used by Refrigeration and Air-Conditioning Technicians.](#)



**OzonAction Multimedia Video Application: Refrigeration and Air-conditioning Technician Video Series - Over 50,000 download to date**

- 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.

**New videos on flammable refrigerants just added!**

Please share with your RAC associations, technicians and other interested stakeholders...

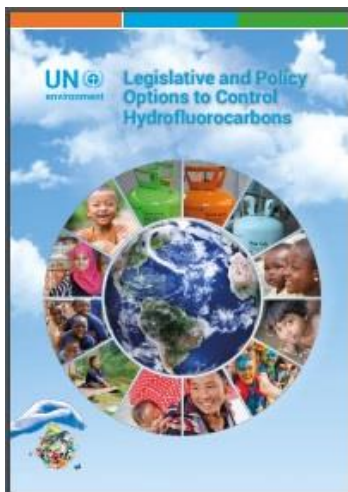
[OzonAction Multimedia Video Application: Refrigeration and Air-conditioning Technician Video Series](#)

[Available in the Android Play Store and Apple Store/iTunes.](#)  
(Just search for "OzonAction", or scan this QR code)

## Publications



**"The Dawn of a New Refrigeration Era - The Kigali Amendment for a Brighter Future"** The New International Industria&Formazione Special Issue 2018-2019 was launched on Tuesday 16 October in Chillventa. The seventh edition of this renowned international publication, edited in cooperation among Centro Studi Galileo, United Nations Environment and the International Institute of Refrigeration after months of tight joint action, will be also presented in a world premiere at the 30<sup>th</sup> Meeting of the Parties to the Montreal Protocol (MOP-30), 5-9 November 2018, Quito, Ecuador.  
**Request your free copy by filling out this [form](#)**



### **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.

## Events

### **2018**

- [ATMOsphere Europe 2018](#), 19 - 21 November 2018, Lago di Garda, Italy
- [Asia Cold Chain Show 2018](#), 28-30 November 2018, Bangkok, Thailand

### **2019**

- **Call for abstracts** - [15<sup>th</sup> Cryogenics 2019 Conference](#), 7-11 April 2019, Prague, Czech Republic
- [8<sup>th</sup> Conference on Ammonia and CO<sub>2</sub> Refrigeration Technologies](#), 11-13 April 2019, Ohrid, Macedonia (FYROM)

• 25<sup>th</sup> IIR International Congress of Refrigeration - 24-30 August 2019, Montreal, Canada

Click [here](#) for more information / [International Institute of Refrigeration](#)

## 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.

Lead Author:  
Michaela I. Hegglin  
Coauthors:

David W. Fahey, Mack McFarland, Stephen A. Montzka, Eric R. Nash



[Primer on Hydrofluorocarbons \(HFCs\)](#) - IGSD -11 January 2018

Summary:

Fast action under the Montreal Protocol can limit growth of hydrofluorocarbons (HFCs), prevent 100 to 200 billion tonnes of CO<sub>2</sub>-eq by 2050, and avoid up to 0.5°C of warming by 2100.

Lead authors:

Durwood Zaelke, Nathan Borgford-Parnell, and Stephen O. Andersen.

Contributing authors:

Kristin Campbell, Xiaopu Sun, Dennis Clare, Claire Phillips, Stela Herschmann, Yuzhe Peng Ling, Alex Milgroom, and Nancy J. Sherman.



The [IIR International Dictionary of Refrigeration Available in 11 languages](#), the complete version of the International Institute of Refrigeration (IIR) International Dictionary of Refrigeration is now freely accessible online. The IIR International Dictionary of Refrigeration offers researchers, industrialist or administrations the practical resources required to produce content related to refrigeration technologies in multiple languages.

This online tool allows you to find definitions, in English and French, of scientific and technical terms, as well as identify terms in the language of your choice and find corresponding translations in the 10 other languages.

The dictionary provides term searches in Arabic, Chinese, Dutch, English, French, German, Italian, Japanese, Norwegian, Russian and Spanish.

Access the International Dictionary of Refrigeration on the IIR [website](#)



Letter to the Editor

Refrigerants: There is still no vision for sustainable solutions

Risto Ciconkov

## Refrigerants: There is still no vision for sustainable solutions

by Risto Ciconkov

Letter to the Editor, International Journal of Refrigeration

[Abstract and highlights](#)

**Optimization, monitoring, and maintenance of cooling technology**

This Knowledge Brief from the Kigali Cooling Efficiency Program, outlines the need for maintaining and servicing of cooling technology. It estimates that better optimization, monitoring, and maintenance of cooling equipment the potential to save 30Gt of CO<sub>2</sub> emissions by 2050.

**THE NEED FOR COOLING EFFICIENCY**  
Cooling is essential to health, property, and the environment, underpinning some of the Sustainable Development Goals. Yet, currently most cooling is energy intensive and highly polluting. Demand for cooling is increasing, so there is an urgent need to not only cut pollution from existing cooling but to ensure future cooling needs are met sustainably.

**COOLING ACCOUNTS FOR ~ 1% OF EMISSIONS**  
Use of cooling technologies causes substantial global (GHG) emissions of between 3.8 T and 4.7 GtCO<sub>2</sub>e (a 1-1.7% global emissions). The International Institute of Refrigeration has estimated that cooling consumes 17.2% of global electricity (3,500 TWh a year based on 2015 consumption), releases emissions from electricity to power cooling technologies causes 80% of cooling emissions. The impact of global GHG emissions from cooling equipment is projected to grow between now and 2050 as developing regions gain access to energy and air technologies. It is estimated that improving the efficiency of cooling equipment between now and 2050 can avoid the emissions of approximately 30Gt CO<sub>2</sub>e.

**OPTIMIZATION, MONITORING, & MAINTENANCE CAN REDUCE TOTAL COOLING CONSUMPTION BY 10%**  
Negotiating the optimization, monitoring, and maintenance of cooling equipment results in increased energy use, lower cooling performance, and shorter equipment life. Effective optimization, monitoring, and maintenance of cooling equipment could deliver substantial emissions savings of up to 10% (100 TWh), particularly if equipment has not been maintained for a long time, reducing the carbon footprint of 0.1-0.15 GtCO<sub>2</sub>e.

The global view is that an investment in equipment that has 30% or higher efficiency is a 2.5 dollar unit to 2025 (Carbon Energy Efficiency 2018).

**CAROLAN TRUST**  
KIGALI COOLING EFFICIENCY PROGRAM

“[Optimization, monitoring, and maintenance of cooling technology](#)” outlines the need for maintaining and servicing of cooling technology. It estimates that better optimization, monitoring, and maintenance of cooling equipment the potential to save 30Gt of CO<sub>2</sub> emissions by 2050.

**Cooling as a Service (CaaS)**

This brief presents a new approach to cooling – Cooling as a Service. This approach can benefit companies, governments and society at large and is based on the servitization concept which is rapidly penetrating other marketplaces.

**WHAT IS CaaS?**  
The standard business model of delivering cooling typically involves the manufacturer, sale, use, and disposal of equipment. Right production volume generally supports low sales and more profit. As a result, manufacturers can lack a strong incentive to continue to focus on minimizing the energy and resource use of cooling products. Alternative business models are possible – and can generate much more energy and resource efficient technologies.

CaaS is a shared service model and customers paying for the cooling free service, rather than the purchase of product or subscription that delivers the cooling. Examples of the CaaS model include district cooling, where customers do not own the cooling infrastructure, and large commercial (B2B) models, where a technology provider installs and maintains the cooling equipment, and recovers capital through periodic payments made by the customer. These payments are fixed cost per unit for the cooling service delivered (for example, dollars per tonne of refrigeration, or cubic metres of cooled air), and are based on a set usage. The payments are not dependent on the usage (as with an EPC model) but agreed in advance as a function of actual usage. This makes it easier and more transparent for the client. In a broader sense, customers may also view some EPC models as a form of CaaS as they place the entire burden of on-going service payments and avoid the upfront capital costs of cooling equipment.

**WHY IS CaaS BEING USED?**  
As the global cities, the anticipated population of demand for cooling in developing countries become more prosperous, and in advanced and developed countries, will lead to a rapid escalation of energy and resource use from cooling. The IEA projects that global annual cooling use from cooling conditioning areas will triple to amount to 3,200 TWh in 2050 (order of magnitude an annual 300 TWh increase). There is an urgent need to reduce the energy intensity and cut pollution from cooling, and to ensure efficient cooling systems are affordable to all those who need them.

CaaS models benefit customers through lower energy and maintenance costs, the absence of upfront capital investment, industry leading equipment, and a transparent and predictable pricing structure. The model effectively transfers capital expense into an operational expense for clients, freeing up capital for other investment priorities. The model also reduces the potential technology risk for the client, as they are not required to invest in the technology directly, and are not exposed to equipment failure.

CaaS gives technology providers a stronger incentive to increase their own profits by reducing their products' operating costs through innovative, leading commercial (B2B) practices between manufacturers and users. Some cooling technology providers are already offering CaaS to differentiated themselves in the marketplace and compete against low quality, inefficient and less cost cooling solutions.

CaaS can also increase the likelihood that cooling equipment will be better serviced and maintained, lowering the risk of unplanned breakdowns and cooling inefficiency. Proper maintenance can deliver reliability savings up to 20% (B. C. 2018).

**BASE**  
KIGALI COOLING EFFICIENCY PROGRAM

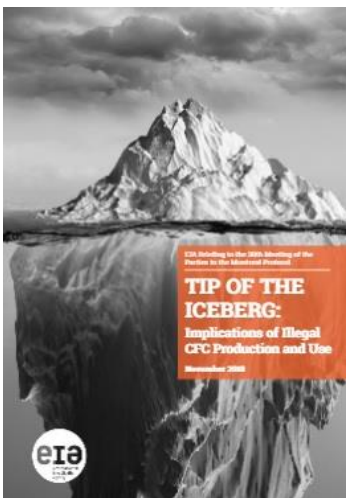
“[Cooling as a Service \(CaaS\)](#)” presents a new service approach to cooling, which can benefit companies, governments and society at large and is based on the servitization concept which is rapidly penetrating other marketplaces.





[Impact of Standards on Hydrocarbon Refrigerants in Europe – Market research report](#). The market research report was realised for the EU-funded [LIFE FRONT](#) project. Amongst the main result of the market research:

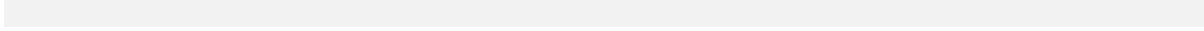
- Current charge limits set in standards both restrict and obstruct the development of hydrocarbon technology
- Over 50% survey respondents already work with hydrocarbons to some extent
- Most of those planning to start working with hydrocarbons in the future will do that in 2019-2020 timeframe - revision of standards could have a major impact on the scale of this shift
- Large proportion of respondents indicated they manufacture equipment using multiple refrigeration circuits - allowing higher hydrocarbon charge limits per single refrigeration circuit would have a profound impact on cost and availability of larger units.



[Tip of the Iceberg: Implications of Illegal CFC Production and Use](#). The Environmental Investigation Agency (EIA) recently released report urges Parties to the Montreal Protocol to address a number of remaining unanswered questions, in particular the absence of comprehensive data regarding the size of current banks of CFC-11 in PU foam and other products or equipment.



[Cold Hard Facts 3 - Review of the Refrigeration and Air Conditioning Industry in Australia](#) - The refrigeration and air conditioning industry is the largest user of synthetic greenhouse gases and ozone depleting substances in Australia. Cold Hard Facts 3 provides an economic and technological assessment of the refrigeration and air conditioning industry in Australia in 2016. The report includes an analysis of the size and economic value of the industry, the equipment and refrigerant gas bank, trends in gas imports and equipment, and direct and indirect emissions in this sector. [...] This study provides a broad view of the composition, size and value of the industry, and projections for its future. This will assist industry and policy makers with management of ozone depleting substances as they are phased out, and synthetic greenhouse gases, including hydrofluorocarbons (HFCs) which are being phased down from January 2018.



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# Miscellaneous

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

The United Nations 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 30<sup>th</sup> Anniversary of the Montreal Protocol celebration.

**The new website was launched during the 29<sup>th</sup> 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 Ozone Layer Champion(s). **The short profile should reflect the nominee's valuable work related to the Montreal Protocol and ozone layer protection.**

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

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

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

View the «Montreal Protocol Who's Who» **introductory video**

• Contact : [Samira Korban-de Gobert](#), UN Environment, OzonAction

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



### **New International Journal of Refrigeration service for IIR members -**

Access 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.
  - Keep up-to-date with subscriptions to customized e-alerts on New Volumes, Topics and saved Searches.
- Enhanced content and functions
- Easily export references, citations and abstracts.
  - 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.

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**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](mailto:info@area-eur.be)



**The International Institute of Refrigeration supports World Refrigeration Day** - As the only independent intergovernmental organisation in the field of refrigeration, the International Institute of Refrigeration (IIR) joins associations and companies worldwide to support the initiative of an official World Refrigeration Day on 26 June every year. The annual World Refrigeration Day, to be launched on 26 June 2019, aims to raise awareness among the wider public about the importance of refrigeration technologies in everyday life.

Refrigeration is essentially a question of temperature and, as such, it only seems natural to celebrate the field on the birthday of the pioneer at the origin of the international unit of temperature, Lord Kelvin (Sir William Thomson) – born 26 June 1824.

With increasing global stakes at hand, over the past years refrigeration has come to take a leading role at the heart of international affairs.

The inauguration of a World Refrigeration Day would not only be an ideal way to recognise the many historical achievements of the industry, but also a means to anticipate and overcome together the challenges we face. ... Click [here](#) for more information.



**Global Cooling Prize - Cooling for all, without warming the planet.**  
An innovation competition to develop a climate-friendly residential cooling solution that can provide access to cooling to people around the world without warming the planet

Current and previous OzoNews Issues, are available from [OzonAction website](#)  
[Download a PDF](#)



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

If you have questions or comments regarding any news item, please contact directly the source indicated at the bottom of each article.

Prepared by: Samira Korban-de Gobert, OzonAction

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

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

Samira Korban-de Gobert,

Tel. (+33) 1 44.37.14.52,

[Samira.deGobert@uneenvironment.org](mailto:Samira.deGobert@uneenvironment.org)



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