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



GLOBAL

1. « Caring for All Life under the Sun” Theme and Logo for 30th Anniversary of the Montreal Protocol and International Ozone Day 2017

The 30th anniversary of the Montreal Protocol, which we are commemorating this year, and the International Day for the Preservation of the Ozone Layer to be marked on 16 September, will be celebrated under the theme:

Caring for All Life Under the Sun

The theme is complemented by a logo that illustrates the Montreal Protocol’s focused and singular goal to protect all life on Earth.

The logo and theme celebrate the Montreal Protocol's critical role in caring for life on the planet over the past 30 years by preventing massive damage to human health and the environment from excessive ultraviolet radiation from the sun by phasing out nearly 99 per cent of close to 100 substances that deplete the ozone layer.

As a result of the unwavering commitment of the parties to the Montreal Protocol during the past three decades, the ozone layer is on track to recovery by mid-century. In addition, up to 2 million cases of skin cancer may be prevented each year by 2030.

The Montreal Protocol is also one of the prime contributors to the fight against climate change, as it averted more than 135 billion tonnes of carbon dioxide equivalent emissions from 1990 to 2010.

The Kigali Amendment to the Montreal Protocol, which was adopted in 2016, is expected to avoid up to 0.5° Celsius warming by the end of the century, while continuing to protect the ozone layer.

The logo and theme in all the six official UN languages are posted on the Ozone Secretariat [website](#) for wider dissemination, together with brand guidelines on their usage. Parties are also encouraged to download and use the email signature image of the logo and theme.

In the coming months, the Ozone Secretariat will conduct a communication campaign to celebrate the 30th anniversary and will provide the parties with more information about the campaign and related products to support commemorative activities. We would also be pleased to receive any information products for your planned commemorative activities for wide dissemination through our website.

As in previous years, we expect that the United Nations Secretary-General’s message for International Ozone Day to be shared prior to the day for further dissemination.

Once again, the Ozone Secretariat will provide limited financial assistance to four developing countries to contribute towards organizing their national commemorative activities. The Secretariat invites the parties to submit their plans of celebration activities and requests for assistance by 31 May 2017. Kindly send them to the Secretariat at dan.tengo@unep.org and ozone.info@unep.org



OZONE
SECRETARIAT

2. Concept Note and Provisional Programme for Workshop on Safety Standards

The concept note and provisional programme for the workshop on safety standards relevant to the safe use of low-global-warming-potential (GWP) alternatives to hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), scheduled to take place in Bangkok, Thailand, 10 July 2017, is posted on the conference portal at this [link](#).

This concept note and provisional agenda contains all the information on the objectives, focus, format and a detailed programme of all the sessions of the workshop, including speakers and panelists for the various sessions

As envisaged by decision XXVIII/4 taken by the parties to the Montreal Protocol at their 28th Meeting held in

Kigali last year, the workshop will provide an opportunity for informed discussions on technical and policy aspects related to the safe use of flammable refrigerants as alternatives in the refrigeration, air conditioning and heat pump sectors. The workshop will focus only on one aspect of safety standards: flammability. It will involve wide stakeholder participation, including representatives of standards organizations, industries, institutions, associations and technical experts.

The workshop will be structured as follows:

- Session I: Overview of the international safety standards of greatest importance to the Montreal Protocol and its Kigali Amendment and the process for developing and revising the standards.
- Session II: Identifying limitations to the uptake of lower-GWP alternatives that could be addressed with changes to existing international safety standards.
- Session III: Relationship between international and national safety standards.
- Session IV: How stakeholders can work together to maximise the opportunities for the safe use of lower-GWP alternatives.
- Session V: Concluding remarks

At the workshop, overview speakers and panelists will provide technical and policy clarifications on the process of setting and revising standards. The conclusions of the workshop will be presented for further consideration and discussion by the parties. We are grateful to all the people who have agreed to participate in various roles and share their expertise at the workshop.

Parties are encouraged to invite national representatives of relevant industries, enterprises and their associations, as well as technical experts involved in safety standards in their countries to participate in the workshop and contribute actively to the discussion.

▶ UN Environment, [Ozone Secretariat](#), May 2017



3. Post Meeting Summary of the 78th Meeting of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol

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		Post meeting summary of the 78th meeting of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol	78915 View
	UMEP/OzL.Pro/ExCom/78/11	Report of the Seventy-eighth meeting of the Executive Committee	7811 View
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Introduction

The 78th meeting of the Executive Committee, which took place in Montreal, Canada from 4 to 7 April 2017, was a special meeting held in accordance with decision 77/59(a) to address matters related to the Kigali Amendment to the Montreal Protocol arising from decision XXVIII/2 of the Meeting of the Parties, and potential additional contributions to the Multilateral Fund.

The 78th meeting was attended by the representatives of the 14 Executive Committee member Parties and by participants co-opted from 20 other countries (see attached list). Mr. Paul Krajnik of Austria presided over the meeting as Chair of the Executive Committee in 2017. Representatives of the Ozone Secretariat, implementing agencies, UN Environment as the Treasurer, and members of the Replenishment Task Force of the Technology and Economic Assessment Panel (TEAP) were also present. A total of nine governmental and non-governmental organizations also attended as observers.

The agenda of the special meeting included only the consideration of policy matters and the related documents prepared by the Secretariat or the Treasurer: the report from the Treasurer on the status of additional contributions to the Multilateral Fund; the report on HFC consumption and production in Article 5 countries; information relevant to development of the cost guidelines for the phase-down of HFCs; key issues identified during the phase-out of HCFCs, in particular, those related to the introduction of low-global warming potential technologies; the current status of HFC-23 emissions and potential means to reduce such emissions; and, the procedures for Article 5 countries to access additional contributions for enabling activities for fast-start actions to implement the Kigali Amendment. In line of decision 77/59(b), the documents¹ prepared by the Secretariat for each agenda/sub-agenda item contained preliminary information only.

The 78th meeting was the first meeting where the Executive Committee had an opportunity for substantial discussions on matters relating to HFC phase-down policy issue. This document outlines discussion on the various matters that were considered and summarizes the six decisions taken at the meeting. The account of the extensive discussions and exchange of views at the meeting is contained in the Report of the 78th meeting². [...]

- ▶ Read/Download the [Full Report](#)
- ▶ [Multilateral Fund for the Implementation of the Montreal Protocol](#)



4. The Road to Low-global Warming Potential Alternatives: If you want to walk fast, walk alone; but if you want to walk far, walk together

It was over 30 years ago when the Vienna Convention for the Protection of the Ozone Layer obligated Parties to protect human health and the environment against the adverse effects of human activities that modify or are likely to modify the ozone layer. The Vienna Convention, which was negotiated at a time of scientific uncertainty and doubts surrounding the ozone depletion process and our capacity to address it, defines “adverse effects” as changes in the physical environment or biota, including changes in climate, so it could be said that we have been walking together on the road to climate benefits since 1988.

As a result of the work done so far under the Montreal Protocol’s Multilateral Fund, the ozone-depleting substances (ODS) phase-out has resulted in substantial ozone and climate benefits without disrupting the industrial and agricultural sectors within Article 5 countries that had been dependent on ODS. The next step for Article 5 countries to reduce hydrochlorofluorocarbon (HCFC) consumption and production by 35 per cent by 1 January 2020 is already under implementation to the extent that there are already approved national plans in place that will address 30 per cent of the aggregate HCFC consumption and 89 per cent of the aggregate HCFC production baselines in Article 5 countries. In approving those plans, the Executive Committee of the Multilateral Fund paid careful attention to alternatives to HCFCs that minimize environmental impacts and provided additional funding for the introduction of low-global warming potential (GWP) technologies.

Article 5 countries face challenges as some energy-efficient and climate-friendly alternative technologies they may wish to adopt are still being developed, tested and adapted to local markets. In this respect, the Multilateral Fund has funded demonstration projects to independently assess alternatives to HCFC technologies in different industrial sectors and to overcome inherent challenges such as flammability, toxicity, or corrosiveness. A number of countries have already made choices to adopt low-GWP alternatives as a result of such projects and, based on this success, the Executive Committee approved further demonstration projects, giving priority to those in the refrigeration and air-conditioning sector, and to address the needs of countries with high-ambient temperatures.

To enable the uptake of these low-GWP alternatives, it is essential that Article 5 countries develop regulations and standards on good practices for safe use of alternatives and arrange sustainable and comprehensive training in the refrigeration servicing sector to ensure an adequate number of technicians trained in the safe handling of alternative flammable and toxic refrigerants. Otherwise, there is a risk that the lack of appropriate standards and training could become a significant barrier to the safe adoption of low-GWP alternatives.

Over the past 25 years, a key feature of the Multilateral Fund has been its immediate adaptability to the changing needs and challenges presented by the London, Copenhagen, Montreal and Beijing Amendments, and the adjustment to accelerate the phase-out of HCFC consumption and production. As we journey forward on the path to low-GWP alternatives following the Kigali Amendment, it is certain that the Multilateral Fund will adapt to the new challenge placed before it and continue providing technical assistance to Article 5 Parties to continuously be in compliance with their obligations under the Montreal Protocol and fulfil the principles of the Vienna Convention.

- ▶ Author: Eduardo Ganem, Multilateral Fund Secretariat, [OzonAction Special Issue 2017](#), Pg.4



5. Kigali Amendment: We did it!

We did it! Together we accomplished a major milestone of international cooperation and global environmental protection in 2016 – the Kigali Amendment to the Montreal Protocol.

The Amendment will phase down hydrofluorocarbons (HFCs) under the Montreal Protocol, helping to avoid up to 0.5 degree Celsius of global warming by 2100, while continuing to protect the ozone layer.

To all the parties to the Montreal Protocol who pulled together in Kigali and made their contributions to make the Amendment a reality, we say thank you.

In beautiful Kigali, during the early hours of 15 October 2016, you chose the path of compromise and consensus and wrote a new script for a greener and healthier future.

Thank you for your commitment to act for the common good and for making your individual voices part of a collective message to protect our planet from climate change.

In Kigali, you ensured that the solutions you found to your national challenges of phasing down HFCs were accurately reflected in the final agreement without leaving any country behind.

Thank you for adopting an Amendment that ensures that:

- HFCs with high global warming potential (GWP) will be phased down;
- developed countries will assist developing nations in their transition out of powerful global-warming HFCs;
- developing nations commit to HFC reduction schedules by putting their growth on a greener path;
- the industry will choose the most efficient technologies and innovative approaches will be in place.

The Amendment was made possible by the political will of 197 countries and passionate and committed individuals who believe in this cause.

To all these individuals, delegates and country representatives, who stayed the course during lengthy and extensive negotiations for the sake of our planet and its people, we say thank you.

Thank you for working tirelessly and enduring long negotiation sessions to bring about the Amendment.

You answered the call of history with courage and vision and we are all grateful to you for getting it done.

As we look to mark the 30th anniversary of the Montreal Protocol in 2017, the once endangered ozone layer is recovering. Ours is an extraordinary success story of governments, experts and ordinary people coming together, responding to scientific findings, and acting together to protect life on the planet from the sun's harmful ultraviolet rays.

In the next 30 years, our defining mandate under the Montreal Protocol will be to phase down HFCs so that the planet and its people may be better protected against climate change. We will all contribute through the Montreal Protocol to combating climate change and achieving the Sustainable Development Goals.

As we begin the task of implementing the Amendment, you can always count on the Ozone Secretariat. We will continue supporting all countries and ozone officers with energy and resolve to implement what they agreed on.

We look forward to working with all of you – governments, industry and NGOs – to ensure the vision of the Amendment becomes a reality, to make our work relevant to the lives of the people of our nations, and to deliver more and better for the global climate under the Montreal Protocol.

▶ Author: Tina Birmpili, Ozone Secretariat, [OzonAction Special Issue 2017](#), Pg.5

6. WMO: Increased research, observation crucial to efforts to continue to protect the ozone layer and climate



Top ozone experts from around the world highlighted the need for increased research and observations to inform policy on ozone and climate at a meeting sponsored by UN Environment and the World Meteorological Organization in Geneva, 28 – 30 March.

The 10th Ozone Research Managers (ORM) meeting concluded that integrated earth science observation systems are essential to ensure that action to protect the ozone layer also benefits the climate, given the complex and evolving interaction between the ozone layer and the climate system.

This key ozone/climate coupling has been captured in the overarching finding of the Ozone Research Managers that states: Understanding the complex coupling of ozone, atmospheric chemistry, transport and climate changes remains a high priority and the need for further research and systematic monitoring in this area has been heightened since the past ORM recommendations.

“Observing and monitoring ozone is critical as it provides a basis for the nations of the world to take informed decisions and implement policies to protect all life on earth,” said Tina Birmpili, Executive Secretary of the Ozone Secretariat. “We need to convince our policy makers that the stratosphere is a critical part of the earth and that observing and monitoring ozone will reveal critical data and interlinkages with other areas of earth science like climate change”, she added.

“International action on ozone is a shining example of the collaboration needed to address many of the environmental challenges faced by humanity,” said Deon Terblanche, Co-Director of WMO’s Research Department. “The long-term investment in observations and research and capacity development has reaped dividends in terms of the value to society, and it is vital that this should continue,” he said.

Scientists and government managers of research related to ozone attended the meeting. Its recommendations will be submitted to the Meeting of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer, which will be held in November this year in Montreal, Canada.

The key recommendations/findings included:

- It is incumbent on the scientific community to monitor the continued effects of the Montreal Protocol. There is a research need for detailed analyses of the wide range of data on ozone, ODS, their replacements and related gases so that we can assess the impact of the Protocol.
- As most Ozone Depleting Substances are declining, other source gases, especially N₂O, CH₄, and water vapour, are increasing in importance for understanding Ozone change. Hence increased efforts to monitor vertical profiles of these gases up to the stratosphere will be required.
- A working group between scientists among organizations with significant scientific capacity along with those from organizations with a need for significant increase in scientific capacity should be established to allow continued and enhanced scientific capacity among all parties of the Montreal Protocol.

Greenhouse Gases

The ozone layer, the shield that protects life on Earth from harmful levels of ultraviolet rays, is on track to recovery to 1980 benchmark levels by the middle of this century in mid-latitudes and the Arctic, and slightly later in the Antarctic. This is thanks to the near 99 per cent phase-out of ozone destroying substances like chlorofluorocabons (CFCs) and hydrochlorofluorocarbons (HCFCs) and some of their replacements addressed under the Montreal Protocol on Substances that Deplete the Ozone Layer.

Ozone-depleting substances are also powerful greenhouse gases and so their elimination has also been beneficial to the climate and has averted more than 135 billion tonnes of carbon dioxide equivalent emissions.

However, the phase-out of CFCs led to a shift towards the use (in air conditioning and refrigeration) of chemicals known as hydrofluorocarbons, or HFCs. They do not harm the ozone layer but are extremely potent greenhouse gases. It was feared that rapid growth in production and use of HFCs would cancel out the climate gains achieved by the regulation of other ozone-depleting substances.

In October 2016, parties to the Montreal Protocol adopted the Kigali Amendment, which will phase down the production and consumption of global-warming HFCs. Countries who ratify the Kigali Amendment commit to cut the production and consumption of HFCs by more than 80 percent over the next 30 years. Most developed countries will start reducing HFCs as early as 2019.

It is expected that this will avoid up to 0.5° Celsius warming by the end of the century—while continuing to protect the ozone layer.

“While the agreements and implementation of the Montreal Protocol have been crucial in ensuring the protection of the global population from significant loss of stratospheric ozone, the Montreal Protocol has also been an effective climate protection treaty in that it has been instrumental in the overall decrease in abundances of very effective Greenhouse gases, that otherwise would have amplified the effects of increased CO₂ and CH₄ on global temperatures.” said Kenneth Jucks, a co-chair of the 10th Ozone Research Managers meeting and NASA Program Scientist for NASA’s stratospheric observations and research activities.

Ozone hole and climate interactions

The Ozone Research Managers meeting discussed wider interactions between stratospheric ozone, weather and climate.

The stratosphere and troposphere are connected. Ozone, as the main heat source in the stratosphere, thus has an

effect on the weather below. There is a correlation between ozone amounts in the Arctic stratosphere in March and tropospheric weather in March and April, such as surface temperature. Adding data on the distribution of ozone in the stratosphere can therefore help to improve medium and long range weather forecasts.

A UNEP-WMO Scientific Assessment report in 2014 found that the annual Antarctic ozone hole has caused significant changes in Southern Hemisphere surface climate in the summer.

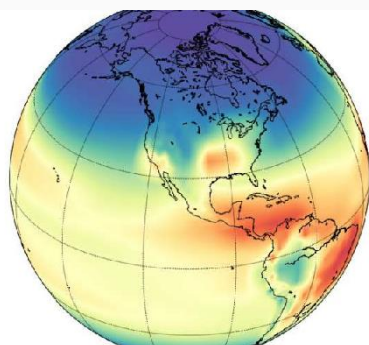
Ozone depletion has contributed to cooling of the lower stratosphere and this is very likely the dominant cause of observed changes in Southern Hemisphere summertime circulation over recent decades, with associated impacts on surface temperature, precipitation, and the oceans.

What happens to the ozone layer in the second half of the 21st century will largely depend on concentrations of CO₂, methane and nitrous oxide – the three main long-lived greenhouse gases in the atmosphere. Overall, CO₂ and methane tend to increase global ozone levels. By contrast, nitrous oxide, a by-product of food production, is both a powerful greenhouse gas and an ozone depleting gas, and is likely to become more important in future ozone depletion.

“We cannot look at the ozone layer and the climate system as two separate systems. They are interconnected,” said John Pyle, co-chair of a panel which will produce the next major scientific assessment on ozone in 2018. “The pace of ozone layer recovery will be strongly influenced by the future trajectory of greenhouse gases,” he said.

Ozone Research Managers meet every three years to review ongoing national and international research and monitoring programmes to ensure proper co-ordination of these programmes and identify gaps that need to be addressed. The Ozone Research Managers meetings take place prior to the Meeting of the Conference of the Parties to the Vienna Convention, which also convenes every three years.

► [World Meteorological Organization](#), 3 April 2017



7. Banned Industrial Solvent Sheds New Light on Methane Mystery

Model simulation of the hydroxyl radical concentration in the atmosphere. Credit: Angharad Stell, University of Bristol.

Recent studies have explored a range of possible causes. Suggestions have included a rise in oil and natural gas extraction, increased emissions from tropical wetlands or increases in emissions from growing East Asian economies.

However, a new paper by an international team of scientists in the *Proceedings of the National Academy of Sciences (PNAS)* investigates an alternative possibility: a rise and fall in the concentration of the substance that destroys methane in the atmosphere, the hydroxyl radical.

Lead author, Dr Matt Rigby from the University of Bristol's School of Chemistry and Cabot Institute, said: "A change in the hydroxyl radical concentration would be a neat explanation for the changes in methane that we've seen.

"It would mean that emissions may not have increased suddenly in 2007, but rather, risen more gradually over the last couple of decades."

Since the global concentration of the hydroxyl radical cannot be measured directly, the team's findings were made by studying the rate at which the solvent methyl chloroform, which is also destroyed by hydroxyl, was removed from the atmosphere.

Professor Ron Prinn from the Massachusetts Institute of Technology, who co-authored the paper and leads the Advanced Global Atmospheric Gases Experiment (AGAGE), an international project that measures greenhouse gas concentrations, said: "We have been monitoring trends in the methyl chloroform for nearly 40 years because of its role in depleting stratospheric ozone.

"Because methyl chloroform is now banned under the Montreal Protocol for the Protection of the Stratospheric Ozone Layer, we've see its concentration drop very rapidly.

"We can examine how this rate of decline changes from one year to the next to infer the hydroxyl radical concentration."

Dr Steve Montzka from the National Oceanic and Atmospheric Administration (NOAA), who also co-authored the paper, and operates an independent measurement network for methylchloroform, added: "This paper re-examines some of the assumptions that had previously been made in studies of hydroxyl radical and methyl chloroform and shows how they influence our understanding of methane's atmospheric sink.

"To me, one of the main findings is that our objective analyses of two sets of observations tells essentially the same story, even as it becomes more and more difficult to measure methyl chloroform given that its concentration is approaching zero."

Dr Rigby added that there was still uncertainty remaining. He explained: "Whilst there are strong hints in our study that hydroxyl radical changes could be playing a significant role in the fluctuations in methane growth, our uncertainties are very large.

"In future, we need to think about new ways to reduce this uncertainty, if we are to truly understand changes in atmospheric methane."

The study also led to a more certain, but unexpected finding: that emissions of methyl chloroform had not dropped to zero.

Dr Rigby said: "Because its production is now banned globally, we were expecting to see no emissions of this substance at all. However, we have very strong evidence that emissions are continuing."

The team are preparing a follow-up study that would determine where these emissions are originating. Meanwhile, they are continuing to monitor methane in the atmosphere, and are waiting to see whether its current rate of increase will continue.

Explore further: [Researchers measure atmosphere's self-cleaning capacity](#)

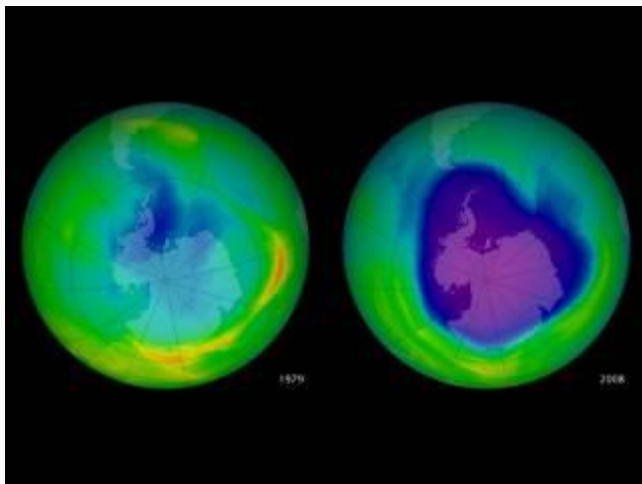
More information: Matthew Rigby et al., "[Role of atmospheric oxidation in recent methane growth](#),"

PNAS (2017). **Journal reference:** [Proceedings of the National Academy of Sciences](#)

► [Phys.org](#), 17 April 2017

8. Could Stratospheric Ozone Depletion Make Hadley Cells Expand?

Convection-driven Hadley cells are expanding poleward. Scientists now may have uncovered part of the reason why.



NASA images of the stratospheric ozone layer over Antarctica in (left) 1979 and (right) 2008. Credit: [NASA](#)

In 1735, meteorologist George Hadley shook up his field by proposing a novel model of global atmospheric circulation, since named the Hadley cell, in which warm air rises at the equator and heads toward the poles before cooling and sinking back toward Earth's surface at midlatitudes. Over time, especially within the past few decades, these large-scale circulation patterns have been visibly widening for reasons unknown to scientists.

The southernmost edges of the Hadley cell in the Southern Hemisphere are defined by the set of points where sea level pressure is highest. Using a technique called optimal fingerprinting analysis, *Kim et al.*

compared a series of model simulations to examine long-term observed changes in these edges during the austral summers (December through February) of 1979–2009. They found that the southernmost edges of the Hadley cell over the Atlantic and Indian oceans expanded farther poleward during this period.

While examining causes of these trends, the researchers detected within the models strong signals of anthropogenic forcing, or human activities such as industry and agriculture, which has ultimately led to increases in greenhouse gases. Specifically, the models showed a link between the expansion of Hadley cells and the depletion of stratospheric ozone. Ozone depletion can lead to "holes" in the ozone, like the one detected over Antarctica in 1985. This would induce cooler conditions over Antarctica, shifting the lower-latitude circulation system poleward, including Hadley cells.

This newfound knowledge provides an important link in the chain for scientists seeking to understand Earth's evolving climate. The authors note that the correlation they uncovered needs to be fleshed out with causes that pinpoint exactly how ozone depletion leads to Hadley cell expansion and what the future holds for Hadley cells if ozone does or does not recover.

(*Geophysical Research Letters*, <https://doi.org/10.1002/2016GL072353>, 2017)

▶ [Geophysical Research Letters](#), 21 April 2017, By Sarah Witman

9. TIME Magazine Names Montreal Protocol Atmospheric Scientist Dr. Guus Velders among Most Influential People of 2017

Played key role in phasing out one of the six main greenhouse gasses

Washington DC— *TIME Magazine* has named Dutch scientist Dr. Guus Velders one of the 100 most influential people for 2017 for research that helped smooth the way to amend the 1987 Montreal Protocol to strengthen its role fighting global warming by eliminating warming from hydrofluorocarbons (HFCs), one of the most potent of the six main greenhouse gases, over the next several decades. (Leonardo DiCaprio wrote *TIME's* entry on Velders.)

Prof. dr. Guus Velders, Photograph by Tjitske Sluis



Working with a small, international group of scientists, Velders calculated that up to 0.5° Celsius of warming could be avoided by reducing HFCs, powerful short-lived climate pollutants (SLCPs) used primarily as refrigerants for air conditioners and other cooling equipment. This and similar analysis provided the scientific foundation for the Kigali Amendment to the Montreal Protocol agreed on 15 October 2016 in Rwanda to phase out HFCs with high global warming potential.

“The Kigali Amendment is the single largest contribution to date to keep warming below the 2° Celsius guardrail”, said Durwood Zaelke, President of the Institute for Governance & Sustainable Development (IGSD), a policy group in Washington DC. “It’s safe to say that the world wouldn’t have achieved this without Velders and his team.”

The 2° Celsius target is the outer limit set by the Paris climate agreement, which aims to limit warming to no more than 1.5° Celsius. Without the HFC amendment, the carbon budget—the amount of carbon dioxide we can still emit before hitting the 2° Celsius guardrail—would have been reduced by 30 to 60 percent.

The Montreal Protocol will celebrate its 30th anniversary in November in Montreal, when the Kigali Amendment is expected to enter into force. Prior to the Kigali Amendment, the treaty has phased out nearly 100 chemicals that both destroy the stratospheric ozone layer and warm the climate. As a result, the protective ozone layer is on the way to recovery by 2065, and climate warming that otherwise would have equaled the contribution of carbon dioxide has been prevented.

“Dr. Guus Velders earned this *TIME Magazine* honor with his extraordinary scientific proof that phasing down HFCs will avoid up to 0.5° Celsius of warming,” said Dr. Stephen O. Andersen, IGSD’s Director of Research. “By my count, Dr. Velders was lead author or co-author of half of the scientific studies that persuaded Parties to amend the Montreal Protocol.”

In December 2016 Velders was recognized by *Nature* as [one of the ten people who mattered this year](#). He works at National Institute for Public Health and the Environment ([RIVM](#)).

▶ [IGSD Press release](#), 20 April 2017

▶ See also: [TIME.com](#), The 100 Most Influential People-2017



ASIA PACIFIC



10. Ammonia video coverage from China Refrigeration 2017

[Natural refrigerant ammonia was discussed extensively at China Refrigeration 2017. Watch coverage here!](#)

▶ [Ammonia21](#), 25 April 2017, By Devin Yoshimoto

11. Daikin Organizes the First KONWAKAI for Latin America

A roundtable for the promotion of Energy Efficiency and Environmental Friendly Technologies for a sustainable society.

With the aim to exchange ideas and discuss technological innovations and energy efficiency regulations for the air conditioning industry, Daikin welcomed industry experts, academics and government members from Latin America, United States, France and India to the first KONWAKAI for Latin America.

The meeting took place in Mexico City on April 19. It was organized by Daikin, [...]. Other countries such as Japan, China, U.S.A. and Europe have also hosted the event.

The meeting was attended by the Japanese Ambassador in Mexico, Mr. Akira Yamada and representatives of large organizations such as UNEP, EPRI, TERI, JICA, the Secretariat of Energy (SENER) and the Secretariat of Environment and Natural Resources (SEMARNAT) of the Mexican Government, among other professionals.

The opening of the roundtable was initiated by Daikin's Latin America Chairman, Junichi Sato, who affirmed his intention to contribute to the sustainable development of Latin America through the use of energy saving and environmental technologies to solve the problems of climate change in countries of this region.

The Japanese Ambassador in Mexico, Mr. Akira Yamada recognized Daikin as the representing brand of Japan in the world. And shared his high expectations for energy-saving and environmentally friendly technology that promotes energy savings in Latin America, who is playing an important role in combating climate change.

In addition, Mr. Santiago Creuheras, General Director of Energy Efficiency and Sustainability of the Mexican Government, mentioned that are currently implementing the Mexican Energy Reform to promote the installation of energy saving equipments in commercial buildings. Also they have participated on international energy saving agreements with G20 countries where Mexico is involved in global discussion topics.

The first speaker was Satoru Fujimoto, General Manager of the CSR and Global Environment Center of Daikin who presented the corporate policies towards the environment, the measures against global warming, and the promotion of eco-friendly technologies and energy saving activities in the world.

During the first half of the meeting, speakers and participants emphasized on the actions they took to promote energy efficiency policies in Mexico and Brazil and the improvements on environmental regulations such as energy efficiency standards and energy demand. Also shared their vision on new efficiency product trends, the development of energy efficiency evaluation standards for commercial buildings in the Latin America region and the incentive strategy for construction companies to promote energy savings.

The Climate Change Office of the United Nations Environment Programme (UN Environment) explained the problem of the increasing energy demand in emerging economies and regions, as well as the effectiveness of energy efficiency as a countermeasure and their actions to create performance standards for energy efficiency in Latin America by introducing the MEPS (Minimum Energy Efficiency Standard).



Odón de Buen, General Director of the National Commission for the Efficient Use of Energy of the Mexican Government explained the energy supply and demand problems in Mexico, the solution to the increasing demand of air conditioners in high temperature regions and the policy of energy saving initiatives. In addition, Professor Roberto Lamberts of the Federal University of Santa Catarina in Brazil explained the air conditioning market situation in Brazil and the obstacles they face to promote energy saving products.

On the second part of the event, Agustín Sánchez from the Secretariat of Environment and Natural Resources of the Mexican Government and Mirian Vega from the Montreal Protocol Compliance Assistance Programme for Latin America commented the progress of the Latin America HCFC Phase-out Plan (in accordance to the Montreal Protocol), the vision to reduce HCFCs/HFCs use according to post Kigali Amendment and the industry-government collaboration efforts to promote low GWP refrigerants. Towards the end of the event, Mr. Karan Mangotra of TERI, Dr. Suely Carvalho, expert consultant and Dr. Stephen Andersen, The Institute for Governance and Sustainable Development (IGSD) presented the joint work carried out by Government Institutions in India, where they achieved the dissemination of energy saving equipment with affordable prices to the end user.

Tooru Inazuka, Senior Associate Officer of Daikin confirmed the company's commitment and efforts to achieve zero energy building (ZEB) through advanced innovation, applied research and in collaboration with the Industry, Government and Educational Institutions.

To conclude the event, Daikin's Senior Executive Officer and Advisor, Yasushi Yamada, commented - "This century is the century of the environment. Extreme weather and climate-related events are occurring more frequently, there is an urgent need to take immediate action. Latin America differ from country to country and cannot respond uniformly, therefore interregional communication is important. Air conditioning equipment consumes much energy as they provide comfort so Daikin's role in environmental problems is relevant. To think about what should be the future of air conditioning, we need the collaboration of university professors and government officials. I have always thought that constant efforts on giving continuity to things, becomes a great strength".



Author: Daikin Latin America Operations, 28 April 2017

- ▶ Contact: [Mirian Vega](#), Regional Coordinator/ROLAC, UN Environment, OzonAction, Compliance Assistance Programme



NORTH AMERICA



12. US Closer to Adopting Hydrocarbon Fridges

USA: The use of hydrocarbon refrigerants in domestic refrigerators in the USA has moved a step closer after the approval of a new safety standard by the US Underwriters Laboratories (UL).

UL has adopted a new safety standard, UL 60335-2-24 Edition 2, that will allow domestic fridges and freezers to use up to 150g of hydrocarbon refrigerants like propane and isobutane. This brings the US

into line with requirements elsewhere in the world. Under the current UL 250 standard, which will be replaced next year with the new standard, only 57g of hydrocarbons are allowed.

While other countries have been using hydrocarbon fridges for over a decade, US consumers have continued to purchase around 12 million new fridges a year using R134a. It is estimated that there are more than two billion hydrocarbon fridges in use elsewhere around the world, but the current 57g charge limit in the USA is deemed too small to allow cost effective and energy efficient manufacturing.

Despite this barrier, R134a is scheduled for phase out in domestic fridges under EPA regulations in 2021. It will now require the US EPA to update the Significant New Alternatives Policy (SNAP) regulations to include the new safety standard to allow hydrocarbon fridges to be sold in the United States as well.

Propane (R290) was approved for use in 2011 but it was not until last year that a number of others were approved for use under the SNAP programme. A 150g charge limit on hydrocarbons already applies for certain uses in commercial refrigeration. [...]

► [CoolingPost](#), 1 May 2017



13. Strategies for Reducing Refrigeration System Charge Size, US EPA-GreenChill Webinar

Date: Tuesday, May 9, 2017 | Time: 2:00 pm to 3:00pm (Eastern time)

Description: Representatives from Meijer, a food retailer with stores in six states, will describe how the company has reduced the amount of refrigerant used in their commercial refrigeration systems, and the benefits of these reductions.

To join the webinar: 1. Go to <http://epawebconferencing.acms.com/reducing-charge-size/> 2. Select "Enter as a Guest". It is important that you select the option to enter as a guest. 3. Enter your name. 4. Click "Enter Room".5. Click "OK".

For audio: 1. Call the toll free call-in number: 1-866-299-3188 (706-758-1822 from outside the U.S.)
2. Use Conference Code: 202 343 9185#



EUROPE & CENTRAL ASIA

14. European Industry and UN Environment Join Forces to Model Phase-out of Ozone-depleting Substances

According to recent findings, a significant increase in global hydrofluorocarbon (HFC) emissions was expected over the next decades if no action had been taken. The main growth will occur in developing countries due to the phase-out of ozone-depleting substances (ODS) and the anticipated strong market growth. The October 2016 Kigali Amendment to the Montreal Protocol is a crucial step to counter this trend.

The European Partnership for Energy and the Environment (EPEE), representing the refrigeration, air-conditioning and heat pump industry in Europe, has always supported global action to reduce HFC emissions. Based on experiences in the European Union (EU) and Japan, for example, we believe that such action should incorporate three main pillars, namely containment (tightness of installations), competence (skills) of the workforce and a move towards lower global warming potential (GWP) refrigerants with attention to safety concerns.

To achieve emission reductions, it is of key importance to understand and take into account, local specificities in terms of particular needs, climate and market dynamics. This requires detailed knowledge and data to design appropriate equipment and avoid hasty decisions that foreclose future options. A thorough segmentation of the market is part of this data gathering process and required to evaluate available technologies per application and to anticipate market dynamics.

This approach has proved to be effective for EPEE. Over the past years, and in particular in the run-up to the new fluorinated greenhouse gases (F-Gas) rules in Europe, EPEE has developed extensive experience in modelling future refrigerant consumption scenarios which are based on such careful segmentation of the market. Our model, developed together with SKM Enviro allows us to better understand how the market may develop in Europe over

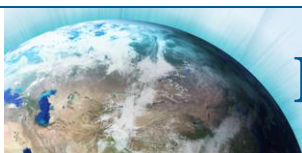
the next decades. It assesses more than 40 product segments and takes into account a number of key parameters including, but not limited to, refrigerant types, charge sizes, leakage rates and equipment lifetime. The model has now been taken a step further to help us recognise key priorities for the European HFC phase-down such as, for example, the rapid transition from R-404A to lower GWP alternatives, both in existing and new equipment (EPEE Roadmap)¹

Based on this experience, EPEE is proud to partner UN Environment in a new project to model future consumption scenarios for ODS alternatives in developing countries, taking into account economic growth and other relevant parameters. The project will be limited to Bahrain and Kuwait, but will create a platform which could be a basis for modelling for other countries or larger geographic regions after populating it with country-specific data.

We look forward to our cooperation with UN Environment and hope that it will provide industry, users and governments with valuable insights on how to make the best of the HCFC phaseout without repeating the mistakes of the developed countries and taking into account all relevant parameters such as energy efficiency, safety and affordability of new solutions and technologies.

¹ <http://www.epeeglobal.org/news/videos/the-gapometer-roadmap/>

- ▶ Author: Andrea Voigt, European Partnership for Energy and the Environment (EPEE), [OzonAction Special Issue 2017](#), Pg.21



FEATURED

OZONE SECRETARIAT

- ▶ - [Twenty-Eighth Meeting of the Parties.](#)
- ▶ - [Resumed 38th meeting of the Open-ended Working Group.](#)
- ▶ - [57th meeting of the Implementation Committee.](#)
- ▶ 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 will be preceded by the 58th meeting of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol, to be held on 9 July and a workshop on safety standards relevant to the use of low-GWP alternatives to HFCs, to be held on 10 July.

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



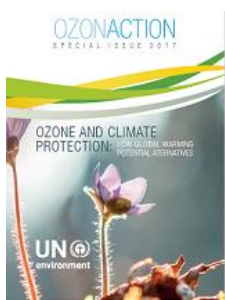
[Report of the 78th meeting of the Executive Committee](#)

See also: [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



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

OzonAction Factsheets:



[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](#)

Get the new RAC Technician Video App

Watch our short instructional videos on refrigeration & air-conditioning techniques, safety and best practices on your mobile device
Available in English, French, Spanish, and German



Download for free from Google Play Store & Apple Store/iTunes or scan this QR code



New! 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 11, 200 installations to date!**

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



(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.



(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

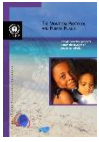
OzonAction Recent Publications:



[Lower-GWP Alternatives in Commercial and Transport Refrigeration: An expanded compilation of propane, CO₂, 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, CO₂ 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. [Read/Download](#)



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. [Read/Download](#)



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. Read/Download in [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. [Read/Download](#)



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. [Read/Download](#)



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. Read/Download in [English](#) | [French](#) | [Spanish](#)



[Guide on Good Practices: Phasing out HCFCs in the Refrigeration and Air-conditioning Servicing Sector](#)



[Phasing out HCFCs in Small and Medium-sized Foam Enterprises](#)



[Demonstrating the feasibility of R-290 based AC manufacturing: China's](#)



[Low-GWP Alternative for Small Rigid PU Foam Enterprises](#)

► [Learn more](#) about OzonAction publications



EVENTS

2017



[7th Conference on Ammonia and CO₂ Refrigeration Technologies](#), 11-13 May 2017, Ohrid, Macedonia



[12th Heat Pump Conference](#), 15-18 May 2017, Rotterdam, the Netherlands



[ATMOsphere America 2017](#), 5-7 June 2017, San Diego, USA. Interactive workshops bringing together decision makers from industry and government to change the future of natural refrigerants.



[ATMOsphere Asia 2017](#) taking place a day before the [Bangkok RHVAC trade show](#), 7-9 September, which ranks among the world's best HVAC&R exhibitions and is the second largest in the Asia Pacific region.



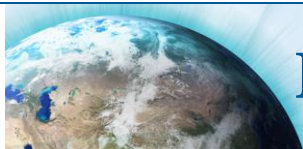
[9th International Conference on Compressors and Coolants](#), 6-8 September 2017, Bratislava, Slovakia



[Future of HVAC 2017](#) – 13–14 September 2017, Sydney, NSW, Australia



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



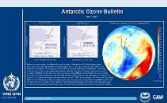
READING



[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 CO₂-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 Grabel. Contributing authors: Stephen O. Andersen, Xiaopu Sun, Dennis Clare, Yuzhe Peng Ling, and Alex Milgroom.

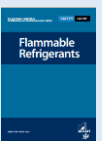
[Flammable Refrigerants Safety Guide](#), AIRAH - Many of the refrigerants traditionally used in refrigeration and air conditioning systems in Australia have been non-flammable, non-toxic, synthetic greenhouse gases (SGGs) that have a high global warming potential (GWP). These were typically synthetic 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, Colorado 80309, United States

[Geothermal Heating and Cooling: Design of Ground-Source Heat Pump Systems-ASHRAE](#)

A first edition, the IIR guide "[CO₂ 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...



Organic bromine compounds—another threat to the ozone layer

Industrial Refrigeration Equipment Market (Refrigeration systems, Coil and Condensers, Thermal panels and Parts) - Latin America Industry Analysis, Size, Share, Growth, Trends and Forecast 2013 - 2019



[Organic Bromine Compounds—another threat to the ozone layer](#)

[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 [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.

Implementing Regulation on Ozone Layer Depleting Substance (Turkey) - Ozon Tabakasını İncelten Maddelere İlişkin Yönetmelik, [Haber Turk](#), 07 Nisan 2017

[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.



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 Defender(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



[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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- 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 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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Since its inception in January 2000, the goal of OzoNews is to provide current news relating to ozone depletion and the implementation of the Montreal Protocol, to stimulate discussion and promote cooperation in support of compliance with the Montreal Protocol. With the exception of items written by UNEP and occasional contributions solicited from other organizations, the news is sourced from on-line newspapers, journals and websites.

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.



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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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