

# OZONENEWS

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**Multilateral Fund**  
for the Implementation of the Montreal Protocol

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



# GLOBAL

## 1. “Caring for All Life under the Sun” Theme and Logo for 30<sup>th</sup> Anniversary of the Montreal Protocol and International Ozone Day 2017

The 30<sup>th</sup> 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 30<sup>th</sup> 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](mailto:dan.tengo@unep.org) and [ozone.info@unep.org](mailto:ozone.info@unep.org)

## 2. The 78<sup>th</sup> Meeting of the Multilateral Fund for the Implementation of the Montreal Protocol

The 78<sup>th</sup> 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 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 by 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, namely draft criteria, enabling activities, and institutional strengthening; 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 HFC23 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 documents prepared by the Secretariat for each agenda/sub-agenda item contained preliminary information only and no analysis.

The 78<sup>th</sup> meeting was the first meeting where the Executive Committee had an opportunity for substantial discussions on matters relating to HFC phase-down policy issue and the account of the extensive discussions and exchange of views at the meeting will be available in the Report of the 78<sup>th</sup> meeting.

- ▶ [The Multilateral Fund for the Implementation of the Montreal Protocol](#), April 2017

### 3. UN Environment Convenes the First International Conference on Sustainable Marine and Fisheries Refrigeration Technologies for Ozone and Climate Protection

Bangkok, 6-8 April 2017 - The Ministry of Industry, Thailand and the UN Environment, OzonAction, hosted the International Conference on Sustainable Management of Refrigeration Technologies in Marine and Off-Shore Fisheries Sector from 6 to 8 April 2017 in Bangkok, Thailand. This first International Conference of its kind was co-organised by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), the International Institute of Refrigeration (IIR), United Nations Industrial Development Organization (UNIDO), and supported by the United Nations Development Programme (UNDP).



Dr. Somchai Harnhirun, Permanent Secretary, Ministry of Industry, Thailand officially opened the three-day international conference in which governments, international organisations, and industry experts came together to discuss for the first time in an international forum, the great importance of moving towards non-ozone depleting, low global warming energy efficient and refrigeration technologies in the mobile marine and fisheries sector.

The official opening was followed by addresses from Ms. Dechen Tsering, Regional Director (UN Environment); Ms. Sheila Hayter, Treasurer (ASHRAE); Mr. Didier Coulomb, Director General (IIR); Mr. Yury Sorokin, Industrial Development Officer (UNIDO) and Ms. Christine Wellington-Morre (UNDP).

Dr. Somchai Harnhirun, in his address highlighted that refrigerant technologies are essential and considered as “blood” required for the operation of refrigeration and air-conditioning equipment, which have been used not only for comfort purposes, but also in food cold chains for reasons of food security. He informed the conference that there is still work to be done in the Marine and Off-Shore fisheries sector for enabling countries to meet their commitments under the Montreal Protocol on Substances that Deplete the Ozone Layer, and thereby contributing to global ozone and climate protection.

Ms. Dechen Tsering in her address, thanked the Small Island Developing States (SIDS) and in particular, the Pacific Island Countries (PICs), for bringing this urgent and important subject of marine refrigeration management into the international focus. She mentioned that recent reports of the Montreal Protocol Technical and Economic Assessment Panel indicate that over 70% of global fleets are still reliant on HCFCs (Hydrochlorofluorocarbons) – a major ozone depleting substance. Furthermore, in light of the recent amendment of the Montreal Protocol in Kigali, Rwanda, which calls for global action to phase down the high global warming chemicals, HFCs (hydrofluorocarbons), she added that the conference discussions would be pertinent to developing countries in preparing their dossier for ratification of the amendment.

180 participants, including 47 government representatives, attended this international conference. The deliberations during the conference ranged from maritime Montreal Protocol implementation and compliance; adoption of energy efficient, ozone and climate friendly refrigeration technologies in marine vessels; data gaps; off-shore vessels servicing sector challenges; standards and strategic action plans.

- ▶ Contact: [Artie Durbie](#), Trans-Regional Capacity Building/ Pacific Islands Network Coordinator, UN Environment, Asia and the Pacific

- ▶ All presentations to this event are available on the [conference website](#)
- ▶ UN Environment, [OzonAction](#), April 2017

#### 4. Air-conditioning Industry from High Ambient Temperature Countries Oriented with the Production and Installation of Hydrocarbon Refrigerants in Air-conditioners

An International Workshop & Field Trip (10-14 April 2017, Ningbo and Shanghai- China)

UN Environment, in cooperation with UNIDO, Foreign Economic Cooperation Office / Ministry of Environmental Protection of China (MEP/FECO) and China Household Electrical Appliances Association (CHEAA) organized special program for senior air-conditioning industry experts from high ambient temperature countries, mainly in the



middle east region, to orient them with the development related to the use of Hydrocarbon (HC) refrigerants in refrigeration and air-conditioning applications with emphasis on HC-290 uses in air-condoning industry and experience of China in converting its industry under the Multilateral Fund of the Montreal Protocol.

In China, HC-290 was recommended as the major alternative to HCFC-22 in room air-conditioner taken into consideration on the Ozone and Climate benefit together. Through a lot of work within all aspects in recent years, China has achieved fruitful results from theory, practice, research and development, and application of technology to products. China experience provides valuable experience to phase out HCFCs by low GWP refrigerant to other developing countries.

The program, which is part of UNEP/UNIDO implementation of the global project for promoting low-GWP alternatives in A/C industry in high ambient temperature countries, includes a dedicated international workshop on designing, producing and installing air-conditioners with HC-290 as well field trips to air-conditioning manufacturer and large installation site. As the event is organized in conjunction with the China Refrigeration Expo which will took place in Shanghai during 12-14 April, participants also joined UN Environment Annual Industry Ozone-To-Climate (O2C) Roundtable Meeting on 13<sup>th</sup> April in margins of the Expo.

This International workshop attracted the presence of many key partners that supported the program i.e. MLF Secretariat, UNDP, GIZ and CRAA and members form Montreal Protocol Refrigeration and Air-Conditioning Technical Options Committee (RTOC). It also witnessed presence of large audience from Chinese industry and institutions.

- ▶ **Contact:** [Ayman Eltalouny](#), Partnerships Coordinator, UN Environment

#### 5. Increased Research and Observation Crucial to Efforts to Continue to Protect the Ozone Layer and Climate

Research managers meeting puts spotlight on ozone/climate coupling



*The Co-Chairs of the 10th ORM: Kenneth Jucks, NASA and Gerrie Coetzee, SAWS.*

3 April 2017 – 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 10<sup>th</sup> 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 N<sub>2</sub>O, CH<sub>4</sub>, 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 CO<sub>2</sub> and CH<sub>4</sub> on global temperatures.” said Kenneth Jucks, a co-chair of the 10<sup>th</sup> 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 CO<sub>2</sub>, methane and nitrous oxide – the three main long-lived greenhouse gases in the atmosphere. Overall, CO<sub>2</sub> 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.

▶ [UN Environment News Centre](#), 3 April 2017

## 6. Mali Ratifies Amendment to Montreal Protocol, First Country Vowing to Slash HFCs

Mali has become the first country to ratify the Kigali Amendment, a ground-breaking amendment to the Montreal Protocol to phase out hydrofluorocarbons, a major source of greenhouse gas emissions, the United Nations environment agency today announced.

“We urge more countries to follow suit in order to protect our climate,” said Erik Solheim, Head of UN Environment, in his congratulatory statement.



Countries that ratify the Kigali Amendment commit to cut the production and consumption of greenhouse gases hydrofluorocarbons (HFCs), which are frequently used as substitutes for ozone-depleting substances (ODSs).

The goal is to cut HFCs by more than 80 percent over the next 30 years. According to preliminary studies, this could lead to a cut in 0.5 degrees Celsius if fully implemented.

The Kigali Amendment will enter into force on 1 January 2019, provided that it is ratified by at least 20 parties to the Montreal Protocol.

“Through the Kigali Amendment, the Montreal Protocol takes responsibility for HFCs and plays a leading role in working towards an environmentally sustainable world where no one is left behind, consistent with the 2030 Agenda for Sustainable Development,” UN Environment said in a press release.

The 2030 Agenda includes 17 goals that the world governments universally agreed to try to attain, including one standalone goal on combatting climate change and its impacts.

▶ [UN News Center](#), 4 April 2017

▶ See also: [Status of Ratification of Kigali Amendment](#) (United Nations Depository)

## 7. Montreal Protocol Marks a Milestone with First Ratification of Kigali Amendment

- Countries that ratify the Kigali Amendment commit to cut the production and consumption of powerful greenhouse gases hydrofluorocarbons by more than 80 percent over the next 30 years

- Reducing hydrofluorocarbons under the Kigali Amendment is expected to avoid up to 0.5° Celsius warming by the end of the century, while continuing to protect the ozone layer
- All prior amendments and adjustments of the Montreal Protocol, which marks its 30th anniversary this year, have universal support



Delegates applaud the adoption of the Kigali Amendment to the Montreal Protocol

3 April 2017 – Global efforts to protect the climate and the ozone layer have received a boost with the first ratification of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer. The ratification by Mali was received on 31 March. More countries are expected to ratify this Amendment in the coming months.

The Amendment was adopted in October 2016 to phase down powerful greenhouse gases hydrofluorocarbons (HFCs), which are frequently used as substitutes for ozone-depleting substances (ODSs). HFCs are climate-warming gases that have significant global warming potentials.

“We congratulate Mali for officially becoming the first party to ratify the Kigali Amendment. We urge more countries to follow suit in order to protect our climate,” said Erik Solheim, Head of UN Environment.”

The Kigali Amendment will enter into force on 1 January 2019, provided that it is ratified by at least 20 parties to the Montreal Protocol.

### **Reducing HFCs by more than 80 percent**

Countries that 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.

The Kigali Amendment is the fifth in a series of amendments to the Montreal Protocol. All prior amendments and adjustments of the Montreal Protocol, which marks its 30<sup>th</sup> anniversary this year, have universal support.

“We warmly congratulate Mali for ratifying the Kigali Amendment. This is a significant milestone in the protection of the climate and the ozone layer. We stand ready to support all parties to the Montreal Protocol as they undertake the important step of ratification and to work with them in the eventual implementation of the Amendment for the protection of our environment,” said Tina Birmpili, Executive Secretary of the Ozone Secretariat.

Through the Kigali Amendment, the Montreal Protocol takes responsibility for HFCs and plays a leading role in working towards an environmentally sustainable world where no one is left behind, consistent with the 2030 Agenda for Sustainable Development. [...]

▶ UN Environment, [Ozone Secretariat](#), 3 April 2017

## **8. Kigali Amendment Delivers a Win for the Climate**

In October, nearly 200 countries struck a landmark deal to reduce the emissions of powerful greenhouse gases, hydrofluorocarbons (HFCs), in a move that could prevent up to 0.5°C of global warming by the end of this century. The amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, which is hosted by UN Environment, is the single biggest step the world has taken to limit global warming. [...]

[...] **VIENNA CONVENTION FOR THE PROTECTION OF THE OZONE LAYER AND THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER**

The **Kigali Amendment** was adopted by the 28<sup>th</sup> Meeting of Parties to the Montreal Protocol. The Amendment adds hydrofluorocarbons (HFCs), powerful greenhouse gases, to the list of substances controlled under the Protocol to be phased down. HFC phasedown is expected to avoid up to 0.5°C of global temperature rise by 2100, while continuing to protect the ozone layer.

▶ Excerpts from the UN Environment [Annual Report 2016](#)

## 9. Remarkable Role of the National Ozone Officers - Sentinels of Ozone Layer Protection

Like nature's hard-working ecological guardians, the bees, members of the unique regional networks of National Ozone Officers (NOOs) set up by the UN Environment OzonAction Compliance Assistance Programme (CAP), play a key role as sentinels of ozone layer protection under the Montreal Protocol, helping make it one of the most successful multilateral environmental agreements.

A vibrant community supporting the phase-out of ozone depleting substances (ODS) in Article 5 (developing) countries in compliance with Protocol obligations, the National Ozone Units, are now promoting the synergy between ozone protection, climate change mitigation and energy efficiency.

As climate change impacts communities, ecosystems and economies, the NOOs, already advising their governments on the technology trajectory towards low-global warming potential (GWP), non-ODS refrigerant alternatives, are well positioned to support implementation of the next phase of the Montreal Protocol after its landmark at the Kigali meeting of the Parties in October 2016. National climate focal points have already been involved in some discussions in these networks and this cooperation will be extended and reinforced at national and regional levels.

Refrigeration and air-conditioning (RAC) technologies are the cornerstone of modern life, ensuring comfort, food safety and security, and access to safe medicines. Good practices in the RAC servicing sector will make a difference in not only minimizing emissions, hence limiting new production of refrigerants, but also maintaining appliance energy efficiency, thereby saving energy and money.

It is important for NOOs to understand the interactions between ozone, climate change and energy efficiency, and envisage the consequences of technology choices for their countries and the climate system. This requires them to have access to reliable national data, knowledge of international processes and be aware of the latest scientific technological data on 'future refrigerants'. A variety of climate-friendly and energy-efficient, non-ODS refrigerant alternatives are available. These include carbon dioxide, ammonia, hydrocarbons, low-GWP hydrofluorocarbons (HFCs) and some 'not-in-kind' technologies such as solar technologies and District Cooling. There is no "one-size-fits-all" approach and a country's choice of ODS alternatives will depend upon the national situation which includes legislation, standards, market availability, suitably trained technicians and the economy. OzonAction assesses the impact of interventions and activities while providing the flexibility for re-orientation based on country needs.

The regional networks of NOOs are an OzonAction flagship activity along with its clearinghouse mandate under the Montreal Protocol and provide a unique forum for sharing of experiences and knowledge transfer between countries and South-South cooperation.

Working with NOOs, OzonAction is promoting responsible use of refrigerants and good practices in training and certification systems for technicians and this will be a priority in the coming years. Without skilled and trained technicians, higher energy efficiency products will not function at the designed capacity. OzonAction is cooperating with international / national organizations and associations working in the field of technician training, safety issues and standards to better assist developing countries to reach the common goals of climate and ozone protection. Moreover, OzonAction has been invited to make a key presentation on challenges faced by developing countries in the context of the recent industry move towards unified refrigerant management, particularly through the Global Refrigerant Management Plan initiative.

An historic decision was taken by the Parties in October 2016 in Kigali, Rwanda. They agreed to phase-down the production and consumption of hydrofluorocarbons (HFCs). This will require all countries, both developed and developing to phase down the production and consumption of HFCs following various specific schedules. These chemicals are commonly used alternatives to ODS and while not ozone depleting substances themselves, they are greenhouse gases which can have high or very high GWPs, ranging from about 121 to 14,800 times more powerful than carbon dioxide at causing climate change. It has been estimated that this agreement will help nations

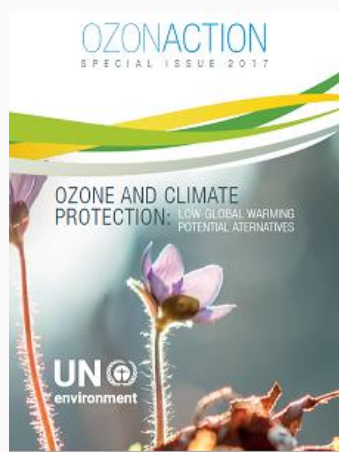




avoid up to 0.5°C of global warming by 2100, which very much continues the historic legacy of the Montreal Protocol.

The Montreal Protocol has far exceeded its original aims. It has protected the ozone layer, contributed to climate mitigation, social development, food security, public health and the creation of 'green jobs'. In the next phase of the Protocol, the National Ozone Units will be strategically placed to support the climate, energy-efficiency and ozone nexus

- ▶ Author: Shamila Nair-Bedouelle, UN Environment, Economy Division, OzonAction, Article in [OzonAction Special Issue](#), pg.3



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

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- ▶ UN Environment, [OzonAction](#)

## 11. The Kigali Cooling Efficiency Program (K-CEP): An Exciting New Philanthropic Initiative Makes its Debut



The Kigali Cooling Efficiency Program (K-CEP) is a collaboration among 18 foundations that came together in September 2016 to announce a joint commitment of \$52 million to help developing countries transition to energy efficient, climate-friendly, affordable cooling solutions. This is the largest single philanthropic commitment that has ever been made to advance energy efficiency in the developing world.

K-CEP was catalyzed by the Montreal Protocol, the famously successful 1987 international treaty that saved the ozone layer by phasing out global emissions of ozone-depleting substances, primarily chlorofluorocarbons (CFCs). Because CFCs and other ozone-depleting substances are also greenhouse gases, the Montreal Protocol resulted in massive additional benefits for the climate. By some estimates the Montreal Protocol has prevented the equivalent of 135 billion tonnes of carbon dioxide (CO<sub>2</sub>) emissions from entering the atmosphere, making it the most significant greenhouse gas reduction program in history.

But in the years after the Montreal Protocol went into effect, a harmful side-effect became evident: manufacturers were replacing CFCs with hydrofluorocarbons (HFCs), compounds that don't damage the ozone layer but are, instead, greenhouse gases hundreds to thousands of times more potent than CO<sub>2</sub>. Over the last few decades, HFCs became very widely used in products like refrigerators, air conditioners, and insulation, and researchers began to predict that HFC emissions under a business-as-usual scenario could grow to the equivalent of one-fifth of global CO<sub>2</sub> emissions by 2050. Recognizing this new challenge, climate advocates, governments, companies, and other stakeholders have been working for years to amend the Montreal Protocol to replace HFCs with alternative coolants that are kinder to the climate.

In October 2016, this sustained effort culminated in a landmark agreement at the 28<sup>th</sup> Meeting of the Parties to the Montreal Protocol in Kigali, Rwanda to amend the Protocol to phase down HFCs. The Kigali amendment prompted headlines around the world and inspired hope that the world is capable of controlling climate change.

In advance of the negotiations, the announcement of \$52 million from philanthropic donors—plus a complementary \$27 million from donor countries—to help developing nations transition to better cooling solutions, set a positive tone of ambition. Now that the agreement is in place, K-CEP will help the Kigali amendment succeed by making cooling more energy efficient. The Program's goal is to “significantly increase and accelerate the climate and development benefits of the Montreal Protocol refrigerant transition by maximizing a simultaneous improvement in the energy efficiency of cooling.” Pursuing “simultaneous improvement” is smart. The Kigali amendment will necessarily drive changes in product designs, manufacturing, and markets as the sector transitions to low-global warming potential refrigerants. It makes good business sense to transition to more energy efficient equipment at the same time. Moreover, K-CEP will look beyond more efficient equipment to deliver low-cost cooling through building design, shade, fans, and other solutions.

The timing of this effort is crucial. Air conditioning is still relatively rare in many countries, but researchers at the Lawrence Berkeley National Laboratory project that the number of room air conditioners globally will nearly double from about 900 million in 2015 to 1.6 billion by 2030. We've seen fast market growth before: In urban China, use of air conditioners went from nearly zero in 1992 to about 100 percent in just 15 years. In the coming years, hundreds of millions of people in emerging markets will benefit when they purchase air conditioning for the first time. If the market moves to energy efficient cooling technologies that use climate-friendly refrigerants and other sustainable cooling solutions, the impact of this beneficial growth on global climate change will be greatly reduced.

The ClimateWorks Foundation is one of the 18 foundations that contributed to the \$52 million commitment. We are also privileged to be the home of the K-CEP Efficiency Cooling Office. The Efficiency Cooling Office will essentially serve as the K-CEP program office, providing grant-making, reporting, program management, and other services to help K-CEP funders maximize the climate and development benefits of their commitments.

► [K-CEP](#), 27 March 2017, By: Charlotte Pera, President & CEO of ClimateWorks Foundation



## ASIA PACIFIC

### 12. High Ambient Project Moves to China

Two United Nations agencies have held a series of meetings in China this week to promote low global warming potential refrigerants for air conditioning.

The United Nations Industrial Development Organisation (UNIDO) and the United Nations Environment Programme (UN Environment) brought together representatives from the Gulf countries, Chinese manufacturers, and companies from Japan and the United States who will jointly implement climate-friendly technologies in the air conditioning sector.

The meetings were based around the PRAHA (Promoting Low-GWP Alternative Refrigerants in the Air Conditioning Industry for High-Ambient Conditions) project, which was developed in 2013 by the United Nations Environmental Programme (UNEP) and the United Nations Industrial Development Organisation (UNIDO) in association with several high ambient nations. The project aims to practically assess next-generation low-GWP refrigerants taking into account energy efficiency, environmental impact, performance, safety and cost.



[Watch the video](#)

Commenting on the initiative, Ole Nielsen, chief of UNIDO's Montreal Protocol Division, said that PRAHA was helping to drastically change the mentality of manufacturers, by encouraging cooperation, rather than competition. "As a result of our efforts, we now see countries working together towards a common goal: avoiding greenhouse gases and achieving improved energy efficiency," he added.

"By building prototypes and testing various alternatives, it became clear that a full product redesign would be necessary, and the appropriate components would need to be developed and made commercially available. International conferences and study tours in China and Japan educated participants about alternative technologies," said Nielsen.

Now in its second phase, the PRAHA project will be extended to include more countries, including Egypt, Pakistan, Tunisia, and Vietnam.

▶ [CoolingPost](#), 12 April 2017

### 13. Significance of the Decision at Kigali: Implications for India

On October 15, 2016 nearly 197 countries got together to mark incremental progress in overcoming differences, drawing upon creativity, compromises, and trust towards finally reaching an agreement which is ambitious, balanced, and unique. Countries came together to adopt a deal to phase-down global climate warming hydrofluorocarbon (HFC) emissions under the Montreal Protocol, drawing a set of differentiated baselines and freeze years within both Article 5 and non-Article 5 countries. India took responsible steps to escalate its ambition to mitigate its HFCs as well as it has put forth an innovative proposal to embed and enhance energy efficiency in the process. This policy brief discusses what lies ahead for India in terms of the long-term implication of the Kigali amendment and the innovative approaches to meet these goals.



▶ [TERI \(The Energy and Resources Institute\)](#), March 2017, By: Swati Agarwal, Associate Fellow, Earth Science and Climate Change Division

## 14. Pakistan Customs Seize 7 tonnes of R22

Customs officers in Peshawar are reported to have seized nearly 7 tonnes of smuggled R22 refrigerant.

According to the independent newspaper [Customs Today](#), 490 13.6kg cylinders of R22 was found amongst other contraband goods in three suspicious trucks stopped in Peshawar.

As well as snuff, cigarettes and mobile phones, the contraband goods are also said to have included 88 air conditioners. [...]

▶ [CoolingPost](#), 11 April 2017



## NORTH AMERICA

### 15. California Backs Stricter HFC Phase down

California has moved ahead of the Kigali amendment to phase-down HFCs by approving plans to implement its own phase-down of HFCs.

California's Air Resources Board (ARB) has approved strategy on short-lived climate pollutants outlines essential measures to reduce HFCs by 40% below 2013 levels as part of new regulations to meet the state's 2030 emission targets.

"Finalizing this strategy is an important step forward at a time when California's leadership is needed more than ever," commented Environmental Investigation Agency climate policy analyst Christina Starr. "We hope ARB will expedite the new rulemaking process, and urge the agency to remain steadfast in setting global warming potential thresholds low enough for proposed equipment bans to be most effective, which will encourage uptake of the most climate friendly refrigerants."

▶ [JARN](#), 26 March 2017



## EUROPE & CENTRAL ASIA

### 16. Honeywell to Stop Sales of R404A

EUROPE: Honeywell says it intends to stop selling the high GWP refrigerants R404A and R507 in Europe from next year.

In a statement today [10 April 2017] Honeywell says it plans to exit the sale of Genetron 404A (R404A) and Genetron AZ-50 (R507) refrigerants in the European Union in 2018 as contracts permit.

One of the world's main refrigerant producers, Honeywell explained that it was taking this action "in anticipation of the expected scarcity of high GWP products due to the F-gas regulation phase-down schedule".

Prices of R404A and R507 from all manufacturers and suppliers have risen dramatically this year in anticipation of the 37% cut in CO<sub>2</sub>e required next year under the European F-gas regulations. Chemours recently announced consecutive monthly price rises of 25% and 30% on these high GWP gases, and warned of shortages next year, but Honeywell is the first manufacturer to announce it is to cease to supply.

This latest announcement is certain to add further inflationary pressures to R404A refrigerant prices and may prompt the other manufacturers to take similar action.

Europe is now just months away from the F-gas phase-down "cliff" in 2018 which will see a 37% cut of the baseline. In practical terms this means the European industry will have to make do on a maximum of 115Mt



CO<sub>2</sub>eq – a little over two-thirds of the 168Mt CO<sub>2</sub>eq consumed in 2015.

“Due to the large, mandated reduction in quota to be implemented on January 1, 2018, it is expected that an accelerated phase-out of high-GWP products will be required in order to cope with the phase-down timing,” Honeywell says. “This means that customers need to convert now to more environmentally preferable solutions in order to prepare for the scarcity of high-GWP products anticipated in 2018 and to fully meet the F-gas requirements by the end of 2019.”

Julien Soulet, managing director for Honeywell Fluorine Products in Europe, Middle East, Africa and India, warned: “Given the upcoming targets set by the F-gas regulation, customers will soon encounter reduced availability of high GWP products. We encourage refrigeration customers to work closely with Honeywell’s authorised distributors to accelerate the transition to near drop-in replacement products that are available now and fully comply with F-gas regulations.”

With quotas based on CO<sub>2</sub> equivalents, no manufacturer wants to continue selling high GWP gases like R404A. They have spent millions developing retrofit gases which, due to their lower GWPs, they would be able to sell 3x as much of compared to R404A.

Honeywell points to its own lower GWP alternatives such as R407F and R407A, along with newer alternatives such as R448A and R449A. Others like Chemours and, more recently, Daikin, also have lower GWP alternatives. Although currently more expensive than R404A and R507, the price differential of the replacements is rapidly reducing and all of the alternatives are said to offer improved energy performance.

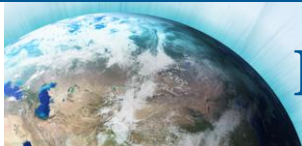
Honeywell says it will work with its network of authorised distributors to help customers and partners to adopt the next generation refrigerants that best meet their needs but warns that significantly reduced amounts of R404A and R507 will be made available to bridge shortfalls in the transitional period.

The phase out of the use of high GWP refrigerants is seen as essential if refrigerant shortages are to be avoided next year. Groups such as EPEE have previously warned that this would require the retrofitting of at least 50% of current R404A systems. Reports suggest that Europe is currently far short of that target and, worse, new equipment using R404A is still being manufactured, imported and installed in large numbers.

R404A, with its GWP of 3922, is the most widely used gas in Europe in stationary refrigeration systems, commonly used in low temperature commercial systems such as those used in supermarkets. R507 has a GWP of 3985 and, although less common, is also used in low and medium temperature refrigeration.

Both R404A and R507 were introduced in the 1990s to replace ozone-depleting CFCs R502 and R12 and, later, the HCFC R22. At that time, global warming and the effect of high GWP refrigerants were not considered.

▶ [CoolingPost](#), 10 April 2017



## FEATURED

### OZONE SECRETARIAT

- ▶ - [Twenty-Eighth Meeting of the Parties.](#)
- ▶ - [Resumed 38<sup>th</sup> meeting of the Open-ended Working Group.](#)
- ▶ - [57<sup>th</sup> 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](#))

Click [here](#) to access MOP 28 documents, General information ...etc.

- 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



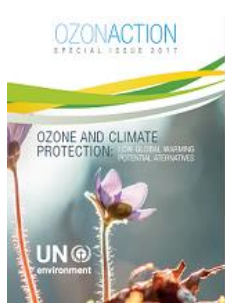
[Learn more](#)

[Agenda of the 78<sup>th</sup> Meeting of the Executive Committee \(April 2017\) and information note for participants](#)

See also: [Adjusted business plan of the Multilateral Fund for 2017-2019 after the 77<sup>th</sup> meeting of the Executive Committee](#)

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

**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...

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

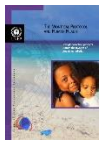
## OzonAction Recent Publications:



**[Lower-GWP Alternatives in Commercial and Transport Refrigeration: An expanded compilation of propane, CO<sub>2</sub>, ammonia and HFO case studies](#)** - This booklet presents an expanded compilation of case studies on lower-GWP alternatives in commercial and transport refrigeration and provides an update to the first set of case studies which was published in 2014 by UNEP DTIE OzonAction/CCAC (Low GWP Alternatives in Commercial Refrigeration: Propane, CO<sub>2</sub> 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





[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 Midea and Meizhi case](#)



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

▶ [Learn more](#) about OzonAction publications

## EVENTS

2017



[5<sup>th</sup> IIR International Conference on Thermophysical Properties and Transfer Processes of Refrigerant](#), 23-26 April 2017, Seoul, South Korea



[7<sup>th</sup> Conference on Ammonia and CO<sub>2</sub> Refrigeration Technologies](#), 11-13 May 2017, Ohrid, Macedonia



[12<sup>th</sup> 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.



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



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

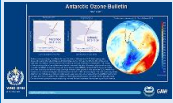
## READING



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



[UNEP and USEPA: Promoting ozone and climate-friendly technologies in public procurement - a scoping study of Asia Pacific](#)



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



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



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



[AREA Guidance on minimum requirements for contractors' training & certification on low GWP Refrigerants](#) - AREA has updated its Guidance on minimum requirements for contractors' training & certification on low GWP Refrigerants.



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



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



[Primer on Hydrofluorocarbons](#), Fast action under the Montreal Protocol can limit growth of HFCs, prevent up to 100 billion tonnes of CO<sub>2</sub>-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 Grabiell. 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 "[CO<sub>2</sub> 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](#)

[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](#)

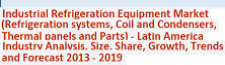
[Update on the Illegal Trade in Ozone-Depleting Substances](#) – The Environmental Investigation Agency (EIA) briefing to the 38<sup>th</sup> meeting of the Open-Ended Working Group of Parties to the Montreal Protocol, in Vienna, Austria, from July 18-21, 2016.

[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.





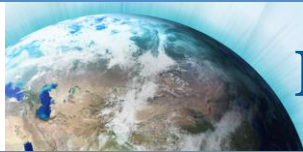
The second issue of [The Natural Voice magazine](#), entitled ‘Mainstreaming Natural Refrigerants’ showcases examples of installations using natural refrigerants around the world, including in the Gambia, Jordan, South Africa, China, Thailand, Tanzania and Saudi Arabia.



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 30<sup>th</sup> 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 Protection Champion. 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.
- Keep up-to-date with subscriptions to customized e-alerts on New Volumes, Topics and saved Searches.

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- Consult the research highlights overview of articles in volumes from 2012 onwards.

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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)



**TRAINING AVAILABILITY - The UEE32211 Certificate III in Air-conditioning and Refrigeration is conducted at the APTC Suva Campus in Fiji.**

**COURSE DURATION** - Course duration is 22 weeks full time including a 1 week mid semester break. Students will attend classes for a minimum of 5 days per week. Training will be delivered face to face. Training will be delivered in

English incorporating language, literacy and numeracy (LLN) support and a work skills facilitation program. Additional out-of-hours study time will be required.

**ENTRY REQUIREMENTS** - Applicants must be a citizen of a Pacific Island Forum country. Individuals are required to have a minimum equivalent of one year full time recent industry experience and hold a relevant local qualification. Applicants will be asked to complete the Literacy and Numeracy Assessment and Vocational Knowledge Assessment. Applicants may apply for recognition of prior learning. For further information visit: <http://www.aptc.edu.au/index.php/recognition> of-prior-learning.

**COURSE FEE** - The course fee is FJD 3,500. The fee includes personal protective equipment, stationery and uniform. The Australian Government subsidizes the cost of the course including materials and consumables. Course fees are subject to change without prior notification.

For current fees visit: <http://www.aptc.edu.au/index.php/course-fees>

*\*Courses offered, course dates and fees may vary depending upon student and industry demand.*



**International Institute of Ammonia Refrigeration's Resources for Using NH<sub>3</sub> and CO<sub>2</sub>**

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

**Description:** Eric Smith and Dave Sainato from the International Institute of Ammonia Refrigeration (IIAR) will discuss the IIAR's scope and mission. This will include the development of guidelines and standards, research projects, and other efforts that should benefit the application of small charge ammonia systems and CO<sub>2</sub> systems. They will discuss the perceived benefits and detractions of using ammonia as a primary refrigerant as well as IIAR's efforts in code development, education and international outreach.

**To join the webinar:** 1. Go to <http://epawebconferencing.acms.com/nh3co2refrigerants/> 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#



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**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:

Mrs. Samira Korban-de Gobert,

Tel. (+33) 1 44.37.14.52, [samira.degobert@unep.org](mailto:samira.degobert@unep.org)

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