

# OZONENEWS

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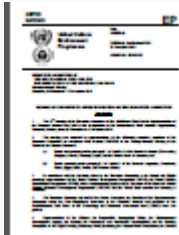


A fortnightly electronic news update on ozone and climate protection and the implementation of the Montreal Protocol



# GLOBAL

## 1. Report of the 77<sup>th</sup> Meeting of the Executive Committee of the Multilateral Fund



### Introduction

1. The 77<sup>th</sup> meeting of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol was held at the headquarters of the International Civil Aviation Organization, Montreal, Canada, from 28 November to 2 December 2016.

2. The meeting was attended by representatives of the following countries, members of the Executive Committee in accordance with decision XXVII/13 of the Twenty-Seventh Meeting of the Parties to the Montreal Protocol:

(a) Parties not operating under paragraph 1 of Article 5 of the Protocol: Austria (Vice-chair), Belgium, Canada, Germany, Japan, and the United States of America; and

(b) Parties operating under paragraph 1 of Article 5 of the Protocol: Argentina, Cameroon, China, Egypt, India, Jordan, and Mexico (Chair).

3. In accordance with the decisions taken by the Executive Committee at its Second and Eighth meetings, representatives of the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), both as implementing agency and as Treasurer of the Fund, the United Nations Industrial Development Organization (UNIDO) and the World Bank attended the meeting as observers.

4. The Executive Secretary and staff of the Ozone Secretariat, the President of the Implementation Committee under the Non-Compliance Procedure of the Montreal Protocol and members of the Replenishment Task Force of the Technology and Economic Assessment Panel (TEAP) were also present.

5. Representatives of the Alliance for Responsible Atmospheric Policy, the Environmental Investigation Agency, the Institute for Governance and Sustainable Development, and the Steering Committee of the Kigali Cooling Efficiency Fund (including, the ClimateWorks Foundation, the Hewlett Foundation and the MacArthur Foundation) attended as observers. The Executive Committee agreed, at the start of the meeting, also to allow a representative of the Natural Resource Defence Council to attend as an observer.

- ▶ Read Download the [Full Report](#)
- ▶ See also: [Adjusted business plan of the Multilateral Fund for 2017-2019 after the 77<sup>th</sup> meeting of the Executive Committee](#)
- ▶ [The Multilateral Fund for the Implementation of the Montreal Protocol](#), December 2016



OZONE SECRETARIAT

SCIENTIFIC ASSESSMENT PANEL

## 2. Ozone Secretariat Launch of the 2018 Quadrennial Report of the Scientific Assessment Panel

Decision XXVII/6 on potential areas of focus for the 2018 quadrennial reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel, adopted at the Twenty-Seventh Meeting of the Parties in November 2015, requests the three assessment panels to prepare quadrennial assessment reports in 2018, to submit them to the Secretariat by 31 December 2018 for consideration by the Open-ended Working Group and by the Thirty-First Meeting of the Parties to the Montreal Protocol in 2019. A synthesis report of the three Assessment Panels will be made available by **30 April 2019**.

The Ozone Secretariat is pleased to announce that the co-chairs of the Scientific Assessment Panel have just launched the scientific assessment process by communicating to the scientists around the world their proposal for developing the 2018 UNEP/WMO Scientific Assessment of Ozone Depletion [...] and inviting them to:

- comment upon and suggest related science matters to aspects of the proposed assessment or assessment process,
- provide suggestions for chapter authors, reviewers, and review editors, including self-nominations,
- provide suggestions for updates to the Twenty Questions and Answers about the Ozone Layer booklet (<http://www.esrl.noaa.gov/csd/assessments/ozone/2014/twentyquestions/intro.html>).

Should your Government wish to nominate national scientists to participate in the assessment process, kindly make sure that you submit their nominations to Ms. Sophia Mylona ([sophia.mylona@unep.org](mailto:sophia.mylona@unep.org)) at the Secretariat by **6 January 2017** along with the curriculum vitae of the nominees. The Secretariat will forward those nominations to the SAP co-chairs for their consideration.

▶ UN Environment, [Ozone Secretariat](#) | [Scientific Assessment Panel](#)



## ASIA PACIFIC

### 3. Customs Seizes Cylinders Containing Poisonous Gas (Solomon Islands)



The Customs and Excise division of the Ministry of Finance and Treasury, alongside the National Ozone Unit- Energy Division within the Ministry of Mines, Energy and Rural Electrification has seized imports of five cylinders of R12 gas.

The 5 cylinder of gases contains R12 refrigerant gas, which has been banned in the country since 2007.

“As a regulation to this illegal import, the Importer is responsible to send the item under their own expenses,” a statement from the National Ozone Unit-Energy Division said.

“Hence these imported items had been sent out of the country through the importers’ arrangement on 30th November, 2016,” the statement added.

“This has been the second incidence that happened this year according to records.

“The first illegal import was done early in the year with Cylinders Labelled as R134A, which is allowed to be imported into the country.

“However when tested with the Gas Identifier, it contained the banned ODS gas which is R12.

“Twenty four of this has been confiscated and are to be sent back to the country of Export.

“In terms of wrongful labelling the importer is liable to pay a fine for False Declaration according to the Customs Act,” the statement said.

It said gases such as Chlorofluorocarbons (CFC) mainly R12 imported to be used as refrigerants are banned and are not allowed to enter into the Country.

“Gases such as HCFC mainly R22 are treated as restricted imports.

“HFCs and Hydrocarbon gases are allowed to enter.

“All gas importers are to contact the National Ozone Unit, Energy Division at the Ministry of Mines, Energy and Rural Electrification before importing gas containing Ozone Depleting Substances.

The National Ozone Unit under the Energy and Rural Electrification Division of the Ministry of Mines, Energy and Rural Electrification is the office that looks after the implementation of the Montreal Protocol in the Solomon Islands.

The National Ozone Unit reports to the Ozone Secretariat and the Multilateral Fund of the United Nations Environmental Program. It also reports to the National Government on issues relating to Ozone Depleting Substances (ODS).

▶ [SolomonStarNews](#), 2 December 2016



## LATIN AMERICA AND CARIBBEAN



### 4. The United Nations Environment to Support Caribbean Region

Barbados, 6 December 2016 - During the official opening ceremony of the Caribbean Ozone Officers' Network Meeting, held at the Radisson Aquatica Hotel, Bridgetown, Barbados, Marco Pinzon, the Regional Network Coordinator, OzonAction, United Nations Environment, Regional Office for Latin America (UNEP-ROLAC) reminded persons present that it has been over 30 years since Governments agreed to protect the ozone layer and to phase out the ozone depleting substances, noting that it will be a challenge to do so, because the potent and harmful chemicals are used in a variety of applications, but are mainly seen in the refrigeration and air conditioning sectors.

He revealed that in October, parties have agreed to control HFCs under the Montreal Protocol Mechanism which meant that all subsidiary bodies, including the UN Environment, need to adjust to the new challenges that were presented as a result of the Kigali Amendment.

Pinzon revealed that the meeting held earlier this week could not have come at a better time, as he believed it was time to start addressing the problems that the Kigali Amendment brought to the table. He said that countries have begun to start collecting relevant information through surveys in order to start to develop sound strategies, stating that for the past three years this has been a good demonstration of the commitment that the Caribbean region has to the Montreal Protocol.

- ▶ Contact: [Marco Pinzon](#), Regional Network Coordinator, OzonAction, United Nations Environment, Regional Office for Latin America
- ▶ [The Barbados Advocate](#), 7 December 2016



## NORTH AMERICA

Environment and Climate Change  
Canada



### 5. Environmental Violations Results in \$225,000 Fine for CRC Canada Co.

On December 5, 2016, CRC Canada Co., located in Mississauga, Ontario, was sentenced in the Ontario Court of Justice and was ordered to pay \$225,000 after pleading guilty to two counts of contravening the Ozone-Depleting Substances Regulations, 1998 under the Canadian Environmental Protection Act, 1999 (CEPA). The fine will be directed to the Environmental Damages Fund (EDF).

Information uncovered by the Intelligence Division within Environment and Climate Change Canada's (ECCC's) Enforcement Branch led enforcement officers to conduct an investigation into the import and sale by CRC Canada Co. of aerosol products containing a prohibited ozone-depleting substance, specifically HCFC-225. Charges were laid under CEPA, in February 2016.

In addition to the fine, CRC Canada Co. agreed to pay all costs associated with the removal and destruction of the products seized by ECCC officers during the investigation.

This conviction will result in the company's name being added to the Environmental Offenders Registry.

#### Quick facts

- Hydrochlorofluorocarbons (HCFCs) are mainly used for foam blowing; refrigeration and air conditioning; solvent cleaning; and, to a lesser extent, aerosols and fire protection.

- Ozone depletion is the term commonly used to describe the thinning of the ozone layer, which acts as a natural filter, absorbing most of the sun's ultraviolet (UV) rays.
- Exposure to UV radiation has been linked to many human health problems, including skin cancer.
- In 1987, Canada signed the Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol) committing to control ozone-depleting substances including chlorofluorocarbons (CFCs), HCFCs, halons, and methyl bromide.
- The Ozone-Depleting Substances Regulations, 1998 were established to ensure Canada's international obligations under the Montreal Protocol are met.
- The EDF is administered by ECCC. Created in 1995, it provides a way to direct funds received as a result of fines, court orders, and voluntary payments to projects that will benefit our natural environment.

► [Environment and Climate Change](#), 6 December 2016

## 6. US Confirms R134a Chiller Ban in 2024

A number of common refrigerants, including R134a, R410A and R407C, will be banned from use in new chillers in the USA from January 1, 2024.

The bans are one of a number of changes to the US Environmental Protection Agency's Significant New Alternatives Policy programme (SNAP) regulations, published today in the Federal Register. The gases affected are the higher GWP HFCs and the higher GWP blends, originally designed as interim retrofit gases.

The wide ranging changes also place future restrictions on the use of the higher GWP HFC gases in new domestic and commercial refrigeration equipment and ban the use of class 3 flammable refrigerants as retrofits.

The higher GWP refrigerants R134a, R410A and R407C are amongst a list of over 25 refrigerants deemed unacceptable for use in positive displacement and centrifugal chillers from January 1, 2024. but exemptions are made for R134a and R404A in certain military applications.

Carrier, Johnson Controls and the Air Conditioning, Heating, and Refrigeration Institute (AHRI) had all argued for a date no earlier than 2025.

The commonly-used high GWP refrigerants R404A and R507A are also included in a list of 24 refrigerants which will be deemed unacceptable for use in new retail food refrigeration (refrigerated food processing and dispensing equipment) from January 1, 2021. The same two refrigerants and 19 others are being listed as unacceptable in new cold storage warehouses from January 1, 2023.

The banning of R134a, along with 27 other refrigerants, in new domestic refrigerators and freezers from January 1, 2021, is expected to open the way for the use of hydrocarbon refrigerants. The flammable class 3 hydrocarbon refrigerant propane, was previously SNAP-listed for use in domestic refrigerators and freezers and, under the new rules, is also being listed as acceptable in new commercial ice machines, new water coolers, and new very low temperature refrigeration equipment.

The HFO refrigerant R1234yf, designed as a replacement for R134a in car air conditioning systems, is extended for use in newly manufactured medium-duty passenger vehicles, heavy-duty pickup trucks, and complete HD vans.

Further restrictions on class 3 flammable refrigerants include confirmation of a ban on their use as a retrofit refrigerants in residential and light commercial AC and heat pumps—unitary split.

AC systems and heat pumps. These include all the flammable hydrocarbons and hydrocarbon blends sold in the US as replacements for R22.

In addition, flammable propylene and the hydrocarbon blend R443A are listed as unacceptable for use in new residential and light commercial AC and heat pumps, cold storage warehouses, centrifugal chillers, and positive displacement chillers.

The full Federal Register announcement is [here](#)

► [ECAcool](#), 2 December 2016



## 7. Overview of New Classes of Refrigerants Offered at ASHRAE 2017 Winter Conference

A review of the new classes of lower global-warming potential (GWP) refrigerants within the context of legacy refrigerants and the forces that drive the development of new refrigerants is the focus of a new educational course from ASHRAE Learning Institute (ALI).

The course is being introduced at the ASHRAE 2017 Winter Conference, Jan. 28-Feb. 1, at Caesars Palace, Las Vegas, with ASHRAE co-sponsored AHR Expo being held Jan. 30-Feb. 1 at the Las Vegas Convention Center.

“ASHRAE-Classified Refrigerants to Meet Society’s Changing Needs” takes place Jan. 29. It is offered by ALI as one of 20 courses at the Conference. For more information or to register, visit [www.ashrae.org/lasvegascourses](http://www.ashrae.org/lasvegascourses)

ANSI/ASHRAE Standard 34, *Designation and Safety Classification of Refrigerants*, maintains a list of refrigerants with a standardized system of assigned refrigerant numbers and well-defined safety classifications, including toxicity and flammability ratings. This ever growing list of refrigerants currently includes 161 chemicals and chemical blends that have been proposed for use as refrigerants.

“There has long been use of flammable and toxic materials as refrigerants, such as propane and ammonia, but their use has been restricted to appropriately designed industrial systems, as prescribed in ANSI/ASHRAE Standard 15, *Safety Standard for Refrigeration Systems*, and other safe use guidelines,” Thomas Leck, Ph.D., course instructor, said. “Currently, concern about global climate change is driving the cooling industry to consider new classes of chemicals to be used as refrigerants. With the new chemicals are new safety classifications for flammability, including ‘Class 2L.’”

Leck is a chemist who spent the majority of his working career with the DuPont and Chemours companies.

The course explains how the changing needs of society are creating requirements for new refrigerants to be developed and used. The course also explains the new safety classifications that are being proposed and some of the ramifications of these new classifications.

“The refrigerant industry, more than any other industries, has been driven by changing needs and understanding of environmental and product safety issues,” Leck said. “Parties who are passionate about issues such as stratospheric ozone protection and global climate change have influenced manufacturers and regulators to create new products and new regulations around properties of refrigerants and how those refrigerants can be used. Sometimes there are consequences and compromises that must be considered. This short course attempts to explain some of these issues and how the resulting changes impact the cooling industry and people who work in this industry.”

▶ [ASHRAE](#), 5 December 2016, Contact: [Jodi Scott](#)



## EUROPE & CENTRAL ASIA

### 8. EU Phasedown on Track as Fluorinated Greenhouse Gas Use Falls



The production, import and export of fluorinated gases (F-gases) fell in the European Union last year, according to a new report published by the European Environment Agency (EEA) today. F-gases are mainly used in cooling and heating equipment. Since they have a high global warming potential, phasing down HFCs is critical to global efforts to fight climate change.

Large reductions in F-gas use and emissions are expected from a new phase-down measure put in place by the 2014 F-gas Regulation, which will progressively cap the supply of hydrofluorocarbons (HFCs) to the EU market. Reducing the use of these gases in products and equipment in addition to preventing losses from equipment will ensure emissions decline. In 2015, companies stayed well within the prescribed limits of the phase-down [quota system](#).

HFCs are the most commonly used F-gases. They were introduced in the past mainly to replace chemicals that were found to be harming the ozone layer. The Montreal Protocol on ozone depleting substances was amended

this year to also regulate HFCs. Both developed and developing countries have agreed on mandatory commitments to reduce production and consumption of HFCs over the next three decades. The ambitious measures put in place through the F-gas Regulation will ensure the EU meets its global commitments.

Key findings based on reporting by companies in the EU in 2015:

- Production of F-gases in the EU declined by 5 % (as CO<sub>2</sub>-eq) in 2015.
- F-gas imports to the EU decreased by about 40 %, compared with the exceptionally high amounts reported in 2014 (both by weight and as CO<sub>2</sub>-eq).
- EU exports of F-gases decreased by 2 % (by weight) or 1 % (CO<sub>2</sub>-eq) compared with 2014. However, compared with 2013, exports in 2015 increased by 18 % (by weight) and 23 % (CO<sub>2</sub>-eq).
- Supply of F-gases in the EU decreased by about 24 % (by weight and as CO<sub>2</sub>-eq) since 2014.

▶ [European Commission](#), Climate Action, 13 December 2016



## 9. The European Commission Calls for Flammability Standards Review

EUROPE: The European Commission sees current flammable refrigerant standards as a barrier to low GWP alternatives and recommends that these should be urgently addressed. The new Commission report is based on responses from 24 member states and is due to be published on January 1. It concludes that flammable refrigerant standards at international, European and national level appear to be a major barrier to the uptake of these

climate friendly alternatives to HFCs.

In particular, the European Commission report sees a need to maximise charge sizes without compromising safety as well as allowing a more general use of risk management approaches for all refrigerants.



“To facilitate the achievement of the EU HFC phase-down and emission reductions in the EU and third countries as required by the Paris Agreement in the most cost-efficient way, these barriers should be addressed with urgency,” the report says.

The most relevant standards for refrigeration, air conditioning and heat pumps are EN 378, as well as the product standards IEC EN 60335-2-40 (for air-conditioning systems) and IEC EN 60335-2-89 (for integral and remote commercial refrigeration appliances). These take precedence over EN 378 but EN 378 has just recently been revised. Its parallel standard at the international level is ISO 5149. At international level, amendments to standards IEC 60335-2-40 and IEC 60335-2-89 are currently being discussed in the relevant IEC committees.

### Restrictions

No member states reported any significant national restrictions on CO<sub>2</sub> or ammonia in air conditioning and refrigeration that went beyond European requirements – although some stakeholders identified some restrictive rules on ammonia use in France. However, the same could not be said for flammables, whether highly flammable A3 hydrocarbons or the “mildly flammable” A2L HFOs.

A number of national decrees were identified in Italy, France and Spain that severely restrict the use of flammable refrigerants in air conditioning equipment in certain types of public access buildings. These requirements are said to go well beyond European and international standards.

In Sweden, additional risk assessments are required for the use of flammable refrigerants, which respondents claim can lead to additional time and cost constraints.

Local building codes and fire regulations, as well as transport and storage-related codes, exist in a number of member states. These, again, can severely restrict the use of flammables.

The report claims that restrictions are inconsistently applied across national territories. In federal states barriers may exist at lower levels of government that are difficult to identify and address.

Some codes at a regional or local level can be unnecessarily strict, and rules applied locally by safety authorities often leave room for interpretation, which can hinder the widespread use of flammable refrigerants.

Germany reported that national rules for hydrocarbons are actually less restrictive than the standards at European

or international level. However many end-users prefer following the more restrictive European standards.

The report calls for European standards organisations to facilitate the update of relevant standards and encourages all stakeholders to contribute. It also asks all member states that have restrictive national codes, standards or legislation to consider a review in the light of technical developments that would allow the safe use of alternative refrigerants.

### EN378 update

Limiting the equipment charge size is currently the main way of minimising risks of flammable refrigerants. EN378 limits charge sizes to 150g but the recent revision to the standard introduces a new flammability category for HFCs and HFOs. This is expected to extend the use of these A2L refrigerants by allowing larger refrigerant charges if certain risk management measures are put in place or considered in the design of the equipment.

While these revisions go some way towards easing the use of HFOs, significant barriers are said to remain for the use of hydrocarbons.

The European Commission report sees EN378 as being unnecessarily restrictive in setting charge sizes for hydrocarbons that go beyond what is needed to guarantee safe use of the equipment. It maintains that risk minimisation in system design and use are not sufficiently considered for all flammable refrigerants to determine safe charge size.

► [CoolingPost](#), 11 December 2016

## 10. Russia's First Transcritical CO<sub>2</sub> Supermarket Launched with UNIDO Support



Russian retailer Magnit opened a new supermarket featuring a CO<sub>2</sub> transcritical refrigeration system manufactured and installed by NORD-SM with UNIDO technical support. Magnit, contracted NORD-SM to develop, install, and put into service a transcritical CO<sub>2</sub> refrigeration system at a supermarket in Voskresensk, Moscow region. UNIDO and Danfoss maintained the project, and on October 16, 2016, Russia's first transcritical CO<sub>2</sub> supermarket was opened.

### Refrigeration system and supermarket:

- Retail area — 900 m<sup>2</sup>
- Transcritical CO<sub>2</sub> booster central by NORD-SM
- Low temperature refrigeration units — 12
- Medium temperature refrigeration units — 22
- Low temperature refrigerating chambers — 3
- Medium temperature refrigerating chambers — 2
- Refrigerated zones — 2
- Low temperature refrigerating capacity — 20 kW at -30 °C
- Medium temperature refrigerating capacity — 95 kW at -10 °C
- Refrigeration units use direct expansion
- Refrigerated zones use secondary refrigeration

### Background

To implement this project, NORD-SM made great efforts together with UNIDO and Danfoss. They built a [working model of a CO<sub>2</sub> store at NORD-SM's training center and constructed a mobile training CO<sub>2</sub> unit](#). With UNIDO's technical assistance and co-financing, NORD-SM could convert its production facilities to launch production of CO<sub>2</sub> refrigeration equipment. As a result, the producer could improve its production capabilities and master production and assembly of CO<sub>2</sub> units.



## CO<sub>2</sub> as refrigerant

CO<sub>2</sub> is an eco-friendly natural refrigerant. It is widespread, not expensive and nonflammable. Under condensation temperatures below critical ones, CO<sub>2</sub> refrigeration systems feature higher COP than traditional systems with synthetic refrigerants. High volumetric refrigerating effect allows to reduce work volume of compressors and pipe sizes. CO<sub>2</sub> systems operate under high working pressures, so they are produced of durable materials and installation should be of best performance.

Due to these properties, CO<sub>2</sub> refrigeration units are compact, energy-efficient and require less materials. The energy consumption in the moderate climate is expected to be 20-25% less compared to similar systems based on traditional refrigerants.

- ▶ Translation from [Russian](#) version by ECACool
- ▶ [ECACool](#), 23 November 2016



## WEST ASIA

### 11. UN Environment and partners train and certify Saudi Arabian technicians in Good Practices in Refrigeration and Air- Conditioning



Dammam, 26 October 2016 – As part of its support to countries in West Asia in meeting their commitments under the Montreal Protocol on Substances that Deplete the Ozone Layer, the UN Environment OzonAction Compliance Assistance Programme (CAP), in partnership with the United Nations Industrial Development Organization (UNIDO), the Saudi National Ozone Unit and Damman College of Technology, conducted two technician training and certification workshops on Good Practices in Refrigeration and Air-Conditioning (RAC) Servicing from 16 - 26 October 2016 in the Kingdom of Saudi Arabia.

The 16-19 and 23-26 October workshops were organized at the Damman College of Technology with a total of 49 participants, including technicians from a leading air-conditioning company in the region as well as other personnel involved in air-conditioning services. Experts from the Italian training centre, Centro Galileo, and Damman College provided theoretical and valuable hands-on training to the technicians who were also briefed by representatives of UN Environment, UNIDO and the Saudi National Ozone Unit.

Ending with the distribution of UN Environment certificates of training to the participants, the workshops were the latest of several RAC training events organized by OzonAction in the Kingdom of Saudi Arabia since 2012 to support the phase out of ozone-depleting hydrochlorofluorocarbons (HCFCs) under the Montreal Protocol.

Most West Asian countries are implementing their HCFC Phase out Management Plans (HPMPs) approved by the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol, aiming to achieve at least the 2013 and 2015 control measures under the universally ratified treaty. The RAC servicing sector accounts for a significant share of HCFC-22 consumption in the region and the quality of servicing is crucial in reducing HCFC consumption.

To strengthen awareness and skills of the technicians in order to prevent refrigerant emissions during servicing, the UN Environment training workshops have also included RAC trainers from all over Saudi Arabia who have, in addition, been trained in the assessment of technician performance.

Besides technical knowledge, participants in the October 2016 workshops were tested on their awareness of the Montreal Protocol, different types of ozone depleting substances (ODS) and ODS alternatives. They were briefed on the environmental and human health impact of ozone-depleting refrigerants as well as on the advantages and disadvantages of HCFC alternatives such as hydrofluorocarbons (HFCs) and HFC blends, and natural refrigerants

like hydrocarbons, ammonia and carbon dioxide.

A presentation on the 'Do's' and 'Don't's' in refrigeration service, focused on how technicians can avoid wrong practices, for example during the recovery of refrigerants by using proper tools and equipment among others.

A post-test evaluated the participants' knowledge of good practices gained from the training and their feedback on the training was also obtained.

A significant development of the UN Environment certification scheme for RAC technicians required in big consuming countries like Saudi Arabia, has led to the introduction of the certification system for F-Gas regulation (EU reg. 303/2008/CE) in order to demonstrate that certification of RAC technicians is doable. The introduction of the F-gas regulation system will also facilitate future work on phasing down the global warming HFCs that have been replacing ozone-depleting HCFCs in the RAC sector, as required under the October 2016 Kigali Amendment to the Montreal Protocol. Several technicians have been certified in 2014 and 2015 under the pilot phase with the support of AREA/Centro Studi Galileo Training Center in Italy. However, the Kingdom of Saudi Arabia is preparing its own certification scheme tailored to local conditions.

▶ Contact: [Khaled Klaly](#), UN Environment, OzonAction



## 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 is now available in all the six official UN languages ([A](#) [C](#) [E](#) [F](#) [R](#) [S](#))

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



The theme for the 2016 International Day for the Preservation of the Ozone Layer to be marked on 16 September is: ***Ozone and climate: Restored by a world united.*** The theme is complemented by the tagline: ***Working towards reducing global-warming HFCs under the Montreal Protocol.*** [Download the theme and tagline in the six official UN languages](#)

The theme for this year's International Ozone Day recognizes the collective efforts of the parties to the Vienna Convention and the Montreal Protocol towards the restoration of the ozone layer over the past three decades and the global commitment to combat climate change. As a result of concerted international efforts, the ozone layer is healing itself and is expected to recover by the middle of this century. In addition, the Montreal Protocol has significantly contributed to the mitigation of climate change by averting the emission of more than 135 billion tonnes of carbon dioxide equivalent into the atmosphere by simply phasing out ozone-depleting substances... [More](#)

- Browse through the Ozone Secretariat "[In Focus](#)" to learn about latest updates.
- Click [here](#) for Montreal Protocol Meetings Dates and Venues
- [Methyl Bromide Technical Options Committee 2014 Assessment Report](#)
- [Medical Technical Options Committee 2014 Assessment Report](#)

Progress & Quadrennial Assessment Reports:

- Environmental Effect Assessment Panel ([EEAP](#))
- Scientific Assessment Panel ([SAP](#))
- Technology and Economic Assessment Panel ([TEAP](#))

## Halon Technical Options Committee Reports:

- [Halons Technical Options Committee 2014 Assessment Report \(Volume 1\)](#)
- [Halons Technical Options Committee 2014 Supplementary Report #1 - Civil Aviation \(Volume 2\)](#)
- [Halons Technical Options Committee 2014 Supplementary Report #2 - Global Halon 1211, 1301, and 2402 Banking \(Volume 3\)](#)
- [Technical Note #1- Revision 4 - Fire Protection Alternatives to Halon - 2014](#)
- [Technical Note #2 - Revision 2 - Halon Emission Reduction Strategies - 2014](#)
- [Technical Note #3 - Revision 2 - Explosion Protection - Halon Use and Alternatives - 2014](#)
- [Technical Note #4 - Recommend Practices for Recycling Halon and Halocarbon Alternatives - 2014](#)
- [Technical Note #5 - Halon Destruction - 2014](#)

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



[Report of the 77<sup>th</sup> Meeting of the Executive Committee](#), 28 November - 2 December 2016, Montreal, Canada

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

[▶ Learn more](#)

## OZONACTION

UN Environment, [OzonAction](#) highlights

### **NEW!** 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 **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 “UNEP OzonAction” and install the application, or scan the 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

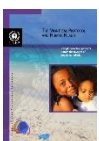
### OzonAction Recent Publications:



**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 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 Midea and Meizhi case](#)



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

► [Learn more](#) about OzonAction publications

## EVENTS

2017



**[Refrigeration Standards Update, Safety and Environmental Requirements](#)**, AIRAH and Standards Australia are pleased to present a seminar series on the recently adopted and published refrigeration safety and environmental standards; AS/NZS/ISO 817:2016 Refrigerants – Designation and safety classification which replaces AS/NZS 1677.1:1998 and AS/NZS 5149 Refrigerating systems and heat pumps – Safety and environmental requirements: Parts 1 to 4, which replaces AS/NZS 1677.2:1998. Each of these new adoptions have had major modifications and revisions over the previous AS/NZS1677 series and are critical as we move to low global warming potential refrigerants. AIRAH will be holding the update seminars throughout Australia in [February and March 2017](#) to provide an introduction and overview to the main changes that will affect the HVAC&R industry.



**[International Ground Source Heat Pump Association \(IGSHPA\) Technical Conference and Expo](#)**, 14-16 March 2017, Denver, USA



**[AIRAH's Refrigeration 2017 Conference calls for abstracts](#)**, 27–28 March 2017, Melbourne, Australia. **The conference committee is now calling for abstracts.**



**Sustainable Management of Refrigeration Technologies in Mobile Marine and Fisheries Sectors**, co-organized by UNEP, ASHRAE, IIR and UNIDO with the kind support of the Government of the Kingdom of Thailand and the Department of Industrial Works, 6-8 April 2017, Bangkok, Thailand



**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



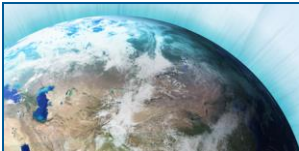
**12<sup>th</sup> Heat Pump Conference**, 15-18 May 2017, Rotterdam, the Netherlands



**ATMOsphere 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



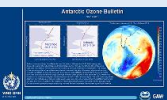
## READING



**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.



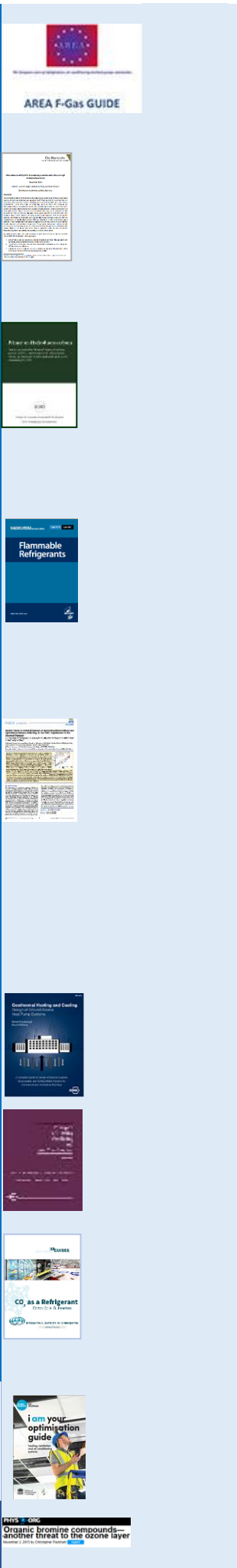
The **EU F-Gas Regulation Handbook**, Keeping Ahead of the Curve as Europe Phases Down HFCs - a free online resource for climate media and other concerned parties, published by the London-based Environmental Investigation Agency (EIA).



**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](#)

[Principles of Heating, Ventilating and Air-Conditioning, 7th Ed. 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 \(2014-2022\)](#)

[R444B tops high ambient R22 drop-in test](#)



[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



[Refrigeration on Fishing Vessels](#)



[Global Market for Natural Refrigerants to Reach 1,408.20 Million by 2020, Growing at CAGR of 11.0% by 2020](#)



ASHRAE [2016 Handbook](#) Focuses on HVAC Systems and Equipment...



MOPIA New [2016 Regulatory Compliance Guide](#) summarizes regulatory controls (*Manitoba and Canada*) and provides some other useful links and references...



[The Importance of Ambition in the 2016 HFC Phase-Down Agreement](#) - Following the adoption of the Dubai Pathway on HFCs, Parties to the Montreal Protocol are set to negotiate and adopt an HFC amendment in 2016, the first major test of the Paris Climate Agreement and global commitment to "pursue efforts to limit the [average global] temperature increase to 1.5 degrees Celsius." The level of climate ambition in the agreed HFC phase-down will be crucial in determining whether or not Montreal Protocol passes the test. In preparation for the next instalment of Montreal Protocol meetings, known as the Open Ended Working Group, set for July 2016 in Vienna, the Environmental Investigation Agency (EIA) has produced a briefing, [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.



Environmental Investigation Agency (EIA) briefing, [The Importance of Ambition in the 2016 HFC Phase-Down Agreement](#), outlining key aspects of the proposals and calling on Parties to seek an agreement securing the highest climate ambition.



[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.



November-December Edition of [Accelerate America!](#) By shecco





"[The Road to Competence in Future Green Technologies](#)", the International Special Issue 2016-2017 of Centro Studi Galileo.

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## MISCELLANEOUS

**[Paris Agreement Enters into Force – Celebration and Reality Check](#)**, 4 November 2016, By Patricia Espinosa, UNFCCC Executive Secretary & Salaheddine Mezouar, President of COP22 and Minister of Foreign Affairs and Cooperation of the Kingdom of Morocco.

Humanity will look back on November 4, 2016, as the day that countries of the world shut the door on inevitable climate disaster and set off with determination towards a sustainable future. The Paris Climate Change Agreement – the result of the most complex, comprehensive and critical international climate negotiation ever attempted – came into force today. The Agreement is undoubtedly a turning point in the history of common human endeavor, capturing the combined political, economic and social will of governments, cities, regions, citizens, business and investors to overcome the existential threat of unchecked climate change. Its early entry into force is a clear political signal that all the nations of the world are devoted to decisive global action on climate change. [...]



The International Institute of Refrigeration (IIR) is delighted to announce **[IIR new Working Group on Careers in Refrigeration “CaRe”](#)**, chaired by Dr Catarina Marques. [Learn more](#)



**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 ... [Learn more](#)  
Contact: [info@area-eur.be](mailto:info@area-eur.be)



MONTREAL PROTOCOL  
WHO'S WHO

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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.

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