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OzoNews

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

Volume XIX

| 15 February 2019

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Global

1. Scientific Assessment of Ozone Depletion 2018: Full Report Now Available

The Scientific Assessment Panel (SAP) of the Montreal Protocol has released the full report of its 2018 Quadrennial Assessment of Ozone Depletion.

The report features a modern page layout with the use of coordinated colours in text, shading and tabs; photographic images on the title page of the document and each chapter; and Appendix A, which is a compilation of physical metrics for over 500 synthetic compounds of interest to the Montreal Protocol and the Intergovernmental Panel on Climate Change. This appendix harmonizes and aggregates a disparate collection of data sources for the first time.

Introduction

The 1985 Vienna Convention for the Protection of the Ozone Layer is an international agreement in which United Nations States recognized the fundamental importance of preventing damage to the stratospheric ozone layer. The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer and its succeeding amendments, adjustments, and decisions were subsequently negotiated to control the consumption and production of anthropogenic ozone-depleting substances (ODSs) and some hydrofluorocarbons (HFCs). The Montreal Protocol Parties base their decisions on scientific, environmental, technical, and economic information that is provided by their technical panels.

The Protocol requests quadrennial reports from its Scientific Assessment Panel that update the science of the ozone layer. This Executive Summary (ES) highlights the key findings of the Scientific Assessment of Ozone Depletion: 2018, as put together by an international team of scientists. The key findings of each of the six chapters of the Scientific Assessment have been condensed and formulated to make the ES suitable for a broad audience.

Ozone depletion is caused by human-related emissions of ODSs and the subsequent release of reactive halogen gases, especially chlorine and bromine, in the stratosphere. ODSs include chlorofluorocarbons (CFCs), bromine-containing halons and methyl bromide, hydrochlorofluorocarbons (HCFCs), carbon tetrachloride (CCl₄), and methyl chloroform. The substances controlled under the Montreal Protocol are listed in the various annexes to the agreement (CFCs and halons under Annex A and B, HCFCs under Annex C, and methyl bromide under Annex E).

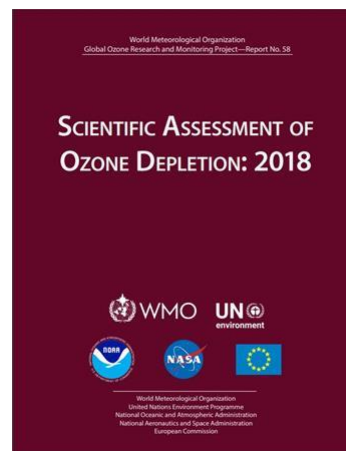
These ODSs are long-lived (e.g., CFC-12 has a lifetime greater than 100 years) and are also powerful greenhouse gases (GHGs). As a consequence of Montreal Protocol controls, the stratospheric concentrations of anthropogenic chlorine and bromine are declining.

In addition to the longer-lived ODSs, there is a broad class of chlorine- and bromine-containing substances known as very short-lived substances (VSLs) that are not controlled under the Montreal Protocol and have lifetimes shorter than about 6 months. For example, bromoform (CHBr₃) has a lifetime of 24 days, while chloroform (CHCl₃) has a lifetime of 149 days. These substances are generally destroyed in the lower atmosphere in chemical reactions. In general, only small fractions of VSL emissions reach the stratosphere where they contribute to chlorine and bromine levels and lead to increased ozone depletion.

The Montreal Protocol's control of ODSs stimulated the development of replacement substances, firstly HCFCs and then HFCs, in a number of industrial sectors. While HFCs have only a minor effect on stratospheric ozone, some HFCs are powerful GHGs. Previous Assessments have shown that HFCs have been increasing rapidly in the atmosphere over the last decade and were projected to increase further as global development continued in the coming decades. The adoption of the 2016 Kigali Amendment to the Montreal Protocol (see Annex F) will phase down the production and consumption of some HFCs and avoid much of the projected global increase and associated climate change.

Observations of atmospheric ozone are made by instruments on the ground and on board balloons, aircraft, and satellites. This network of observations documented the decline of ozone around the globe, with extreme depletions occurring over Antarctica in each spring and occasional large depletions in the Arctic, and they allowed us to report some indications of recovery in stratospheric ozone in the 2014 Assessment. The chemical and dynamical processes controlling stratospheric ozone are well understood, with ozone depletion being fundamentally driven by the atmospheric abundances of chlorine and bromine.

Previous Assessments have shown projections of decreasing ODSs, and models show that global ozone should increase as a result. Models have also demonstrated that increasing concentrations of the GHGs carbon dioxide



(CO₂) and methane (CH₄) during this century will cause global ozone levels to increase beyond the natural level of ozone observed in the 1960s, primarily because of the cooling of the upper stratosphere and a change of the stratospheric circulation. On the other hand, the chemical effect of increasing concentrations of nitrous oxide (N₂O), another GHG, will be to deplete stratospheric ozone.

This 2018 Assessment is the ninth in a series that is provided to the Montreal Protocol by its Scientific Assessment Panel. In this Assessment, many of our previous Assessment findings are strengthened and new results are presented. A clear message of the 2018 Assessment is that the Montreal Protocol continues to be effective at reducing the atmospheric abundance of ODSs. [...]

The full report is available at the following links:

- Ozone Secretariat's [website](#)
- NOAA website at the following [link](#) as a pdf file comprised of the Executive Summary, chapters, and appendices, as well as separate pdf files for each component, and as a [full document](#)
- Scientific Assessment of Ozone Depletion: 2018 - [Executive Summary](#)

UN Environment, Ozone Secretariat, Scientific Assessment Panel, February 2019

2. Study provides more evidence of the recovering Antarctic ozone hole



Without the quintessential ozone layer, which protects the Earth by absorbing the harmful ultraviolet radiations from the Sun, life may not have evolved the way it did. However, in recent decades, there was alarming news of the ozone layer thinning due to the use of ozone-depleting substances like chlorofluorocarbons (CFCs) used in refrigerators and air conditioners. This news prompted the signing of the Montreal Protocol in 1989 to regulate the use of ozone-depleting substances. Thanks to the stepped up efforts of many countries; the Antarctic ozone hole is on its way to recovery.

Scientists recognised the loss of ozone by studying the ozone layer above Antarctica and identified a giant 'hole' in the 1980s. In reality, there is no 'hole' that is entirely devoid of ozone; it is the decreasing volume of ozone in a column of air that is referred to as a 'hole'. When this volume, measured from ground to the top of the atmosphere has a value below 220 Dobson Units (DU), it becomes a cause for concern. The Dobson Unit is a measure of the ozone concentration. A column of air with one DU ozone concentration would contain about 2.69×10^{16} ozone molecules for every square centimetre of area at the base of the column. The average thickness of the ozone layer is about 300 DU.

In a recent study, researchers from the Indian Institute of Technology Kharagpur have provided more evidence to support that the ozone hole is recovering by analysing data from ozonesondes and satellites over Antarctica. An ozonesonde is a balloon-borne instrument for measuring atmospheric ozone. The device has significant design contributions from renowned Indian scientist Anna Mani. The current study, published in the journal *npj Climate and Atmospheric Science*, examined data from ten different stations in Antarctica, including India's research station Maitri, for the period between 1979 and 2017.

The researchers observed significant changes in the ozone loss saturation layer—a stretch in lower stratosphere between 13–21 km, where there is a near-zero concentration of ozone. The data showed that loss of ozone started in the early 1980s, and worsened to a negligible amount of ozone for the first time in 1985. Subsequently, an almost complete ozone loss occurred in 1987 and continued during the following winters, except for the winters of 1988 and 2002, which were warmer than the rest. However, during 2001-2017, although there was continued ozone loss, it was less frequent than earlier and the ozone concentration gradually increased.

Interestingly, the researchers also observed that the loss of ozone was not uniform at all altitudes. A complete loss of ozone began at the height of about 12 km and continued until 22 km into the atmosphere from the surface of the Earth. The whole stretch of 13-16 km encountered a recurring loss of ozone. The satellite measurements corroborated with the data from ozonesonde and showed a similar pattern.

The researchers attribute the change in the ozone layer to the three-decades-old Montreal Protocol. Their analysis shows an evident decline in the frequency of complete loss of ozone layer after the implementation of this protocol. The findings also support the recent report by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) that the ozone hole will completely heal by 2060.

Although it is hard to stay optimistic in a world dogged by several environmental problems, the healing of ozone hole is a reason to cheer.

3. ASHRAE/UNEP Lower-GWP Refrigeration and Air Conditioning Innovation Award

What Is Lower-GWP Refrigeration and Air-Conditioning Innovation Award?

The award promotes innovative design, research and practice by recognizing people who have developed or implemented innovative technological concepts applied in developing countries to minimize global warming potential (GWP) through refrigeration and air-conditioning management.

Who Are the Awarding Organizations?

Award recipients will be recognized by ASHRAE and UN Environment.

How Often Is the Award Issued/Awarded? Annually

What Are the Award Categories?

First Place and Honorable Citation awards are made in two categories:

- Residential Applications
- Commercial/Industrial Facilities

What Are the Entry Criteria?

The award promotes innovative design, research and practice by recognizing people who have developed or implemented innovative technological concepts applied in developing countries to minimize global warming potential (GWP) Refrigerants.

How Do I Enter for the Award **ENTER FOR THE AWARD**

The submission form requires descriptive responses to each of the following:

- Description of innovation in field of lower-GWP refrigerants
- Project/Applicant details (description must include confirmation project has been implemented and date of implementation)
- Extent of need.
- Description and goal of the research, design, practice or project
- Naming of low GWP refrigerants used and description of associated refrigerant management practices associated with the lower GWP refrigerants
- Environmental impact achieved including specific reference to the GWP chemicals' contribution
- Further application of project
- Financial feasibility in developing countries and economic impact of the research, design or practice
- Photographs illustrating the project and tables, figures or charts that present statistical data demonstrating the project's successful performance or experimental findings are encouraged to be provided with the application.

When Does the Entry Period Begin and End?

Submission of entries for 2019 awards will be accepted between January 2019 and May 15, 2019.

How are the Winners Selected?

The winners in each category will be selected based on innovative solutions for designs, practice or research using lower-GWP technologies. The selection will take into account the following criteria:

- Extent of need (25%);
- Innovative aspects in transforming conventional practices (25%);
- Technical replicability to developing countries (25%); and
- Economy feasibility to developing countries (25%).

What Happens to the Winning Projects

Winning projects will be publicized by both organizations, and the First Place recipients will receive a stipend to receive their award at a UN Environment event. UN Environment, represented by the Law Division (OzonAction), and ASHRAE have a Memorandum of Understanding to establish technical cooperation and mutual coordination toward providing professional technical services to the refrigeration and air-conditioning stakeholders (governmental, private, and public). The organizations work to ensure that up-to-date related technical



information and standards are properly introduced and promoted. ASHRAE is a worldwide technical society of more than 57,000 individual members.

[Lower-GWP Refrigeration and Air-Conditioning Innovation Award flyer](#)

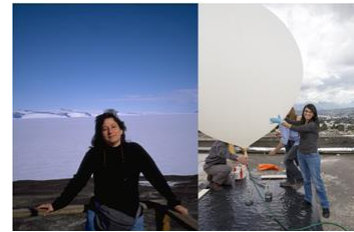
Contact:

[Ayman Eltalouny](#), International Partnerships Coordinator OzonAction-UNEP

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

4. Women in science for ozone protection

International Day of Women and Girls in Science is marked globally on 11 February. This year's theme is "Investment in Women and Girls in Science for Inclusive Green Growth". To commemorate the day, two women in science who have made significant contributions to the cause of ozone layer protection share their stories.



'A career in science is just about the greatest career that you can have' Interview with Susan Solomon, professor of environmental studies at the Massachusetts Institute of Technology and winner of the 2018 Crafoord Prize, on the occasion of the 2019 International Day of Women and Girls in Science. [Read more](#)

'We need more women supporting women' Interview with María del Carmen Cazorla, director of the Institute for Atmospheric Research at Universidad San Francisco de Quito, on the occasion of the 2019 International Day of Women and Girls in Science. [Read more](#)

UN Environment, Ozone Secretariat, 4 February 2019

Africa

5. Rwanda's ambitious plan for clean and efficient cooling



The Government of Rwanda has released a landmark plan for sustainably cooling foods and life-saving medicines, and keeping homes and other indoor spaces comfortable in hot weather.

Such moves are essential to provide equitable access to cooling while ensuring that huge expected growth in the sector does not exacerbate climate change or waste electricity. When it comes to cooling, most people think of refrigerators and air conditioners. While addressing these products is key, the Government of Rwanda is planning holistically when it comes to meeting their cooling needs, noting that continuing on a business as usual path will lead to a huge rise in electricity use and a sharp rise in greenhouse gas emissions and pollution that its people and the planet cannot afford.

Rwanda's National Cooling Strategy outlines the findings of a recent assessment of the current and future market for cooling products. It includes recommended actions that would expand access to cooling while conserving precious resources. This East African Country, which has some of Africa's fastest growth in expanding electricity grid connections to reach its 12 million people, is no stranger to demonstrating bold leadership when it comes to sustainable development.

Rwanda was one of the first countries in the world to ban plastic bags. Just 10 year later, its capital city hosted the meeting that agreed the namesake of the Kigali Amendment to the Montreal Protocol. This global treaty, which went into effect on 1 January 2019, phases-down the use of a potent greenhouse gas that is common in

refrigerators and air conditioners. By doing so, it can avoid a 0.4°C rise in global temperatures this century. Rwanda not only hosted the negotiations, but was an early champion for its successful adoption.

"The Kigali Amendment was the result of hard work and a dedication to building a future that our children and grandchildren can be proud of, and one that is worthy of their aspirations. Rwanda is proud to be working with the Kigali Cooling Efficiency Program and UN Environment's United for Efficiency to move quickly to meet our obligations under the amendment," said Dr Vincent Biruta, Minister of Environment, Republic of Rwanda.

"Through the Rwanda Cooling Initiative, we have conducted a cooling market assessment, developed a national cooling strategy and minimum energy efficiency standards, and created financial tools to support businesses investing in clean cooling," he added.

"The Kigali Amendment presents one solution to climate change that is here now. Nations that ratify the amendment are committing to cutting the production and consumption of climate-warming gases, known as hydrofluorocarbons (HFCs), by more than 80 per cent over the next 30 years. By reducing the use of hydrofluorocarbons, we can avoid up to 0.4°C of global warming by the end of the century. So far, 68 parties to the Montreal Protocol have ratified the amendment and we look forward to many more becoming parties and continuing the fantastic work done under the Montreal Protocol," said Tina Birmpili, the Executive Secretary of the Ozone Secretariat.

Addressing the impacts of such gasses is only part of the challenge. The other is improving the energy efficiency of cooling products, while reducing demand for cooling in the first place. Therefore, the National Cooling Strategy includes regulations with an upper limit on how much electricity can be used by typical refrigerators and air conditioners, and it promotes alternative cooling solutions such as shading and natural ventilation.

If such action to redesign cooling equipment for energy efficiency is taken globally as part of action under the Kigali Amendment, a far larger slice of greenhouse gas emissions could be mitigated.

Altogether, these approaches enable the country to free up electricity for better uses, like electrifying more homes and businesses without having to build more power plants. Residents save money on their utility bills, businesses become more competitive, students can better focus in the classroom, high-tech industries that require precise indoor conditions can take root, farmers can better preserve their crops rather than losing nearly half of their harvest to spoilage, and electricity companies can better cope with growing demand and peak use on the hottest days of the year.

The National Cooling Strategy is the first phase of the Rwanda Cooling Initiative, a joint effort between the Government and UN Environment's United for Efficiency (U4E) team.

"Rwanda is showcasing what we aim to replicate throughout Africa, and beyond," said Brian Holuj, United for Efficiency's lead for cooling initiatives. "United for Efficiency is working with dozens of countries on sustainable cooling, and there is no better case study than a peer who is taking bold action and showcasing the many benefits."

UN Environment, 11 February 2019

6. Effects of climate change felt in Zimbabwe - MPs urged to take lead in finding solutions



Members of Parliament (MPs) should take a lead in raising awareness on climate change as well as in finding solutions to the problem which is affecting millions of people in the country, it has been said.

Participants who attended a workshop on the state of the ozone layer and the unfolding climate change phenomena pointed the greater role that parliamentarians could play in efforts to mitigate the effects of climate change.

They said MPs had legislative authority to ratify such important agreements as the Kigali Agreement and the Montreal Protocol on Substances that Deplete the Ozone Layer.

The workshop was organised by the United Nations Development Programme (UNDP) and the Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement.

Deputy minister Douglas Karoro spoke at the event, saying Zimbabwe was a victim of climate change as characterised by extreme weather patterns such as high temperatures, droughts, late rains, prolonged intra-seasonal dry spells, intense and destructive storms.

“Zimbabwe, like the rest of the signatories to the 2015 Paris Agreement on Climate Change, has submitted a set of actions that it would take to address the climate change problem. The country has indicated that it will reduce emissions from the energy sector by 33 percent per person by the year 2030 if international climate financial support was available to fund key energy projects,” Karoro said.

Karoro said Zimbabwe was also proud to be a member of the United Nations Framework Convention on Climate Change. “Zimbabwe has completely phased out chlorofluorocarbons (CFCs) in 2010 and has reduced the use of hydrochlorofluorocarbons (HCFCs) by 35 percent,” he said. [...]

VOP, 11 February 2019, By: Shingirai Vambe

Latin America and Caribbean

7. Protecting the ozone: Jamaica’s refrigeration industry

Jamaica committed to the use of ozone-friendly technologies and to phase out ozone-depleting substances (ODS) when it became a party to the Montreal Protocol in 1993.

The National Ozone Unit (NOU) at the National Environment and Planning Agency (NEPA) manages all activities related to the phase out of ODS in Jamaica.

ODS such as hydrochlorofluorocarbons (HCFCs) – a family of chemicals containing hydrogen, chlorine, fluorine, and carbon – and chlorofluorocarbons (CFCs) – a family of chemicals containing chlorine, fluorine, and carbon – have found application in the foam-manufacturing sector, the aerosol-manufacturing sector, and more significantly, in the refrigeration and air conditioning industry. They are, therefore, generally regarded as refrigerants.

However, since the phase out of CFCs on January 1, 2006, support has been provided to the aerosol and foam manufacturers to retrofit their process to use ODS alternatives as raw materials.

Jamaica developed a HCFC phase-out management plan (HPMP) which started in 2013 with the main objective of phasing out the importation of HCFC on or before January 1, 2040.

The HPMP utilises a schedule of gradual reduction in HCFC imports until 2040, starting with the average importation for years 2009 and 2010 as the base and reduction targets of 10 per cent, 35 per cent, 67.5 per cent, 97.5 per cent, and 100 per cent by years 2015, 2020, 2025, 2030 and 2040, respectively.

Under the HPMP, only a select group of importers, who were actively involved in the trade of HCFC refrigerants at the time, were given quotas to import HCFC refrigerants. At present, Jamaica is doing extremely well, having greatly reduced HCFC imports ahead of schedule.

Successful alternatives

One group of alternatives which has been successfully introduced to the market is hydrofluorocarbons (HFCs) – is a family of chemicals containing hydrogen, fluorine, and carbon – which do not contribute to the depletion of the ozone layer.

Currently, HFCs such as HFC134a (R-134a) are the most commonly used ODS alternatives in Jamaica.

However, these saturated HFCs, while they meet the requirement as ODS alternatives, have adverse effects on the environment because of their high global warming potential (GWP), contributing to climate change.

As a result, the Kigali Protocol, an amendment to the Montreal Protocol, mandates countries to phase down the usage of HCFs, which is slated to commence in 2024 in Jamaica.

As time progresses, it is expected that newer refrigerants including unsaturated HFCs, the hydrofluoroolefins (HFOs) – a family of chemicals containing hydrogen, fluorine, and carbon – with lower GWP – will see greater use.

Protecting the ozone: Jamaica’s refrigeration industry

Jamaica Observer 10 Nov. 2019 Kirkland Rowe Contributor



An air-conditioning system outside a house.

JAMAICA COMMITTED to the use of ozone-friendly technologies and to phase out ozone-depleting substances (ODS) when it became a party to the Montreal Protocol in 1993.

fluorine, and carbon – and chlorofluorocarbons (CFCs) – a family of chemicals containing chlorine, fluorine, and carbon – have found application in the foam-manufacturing sector, the aerosol-manufacturing sector, and more significantly, in the refrigeration and air conditioning industry. They are, therefore, generally regarded as refrigerants.

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The use of natural refrigerants and other ODS alternatives which address both the ozone and climate policies must be considered. The use of natural refrigerants such as hydrocarbons, ammonia, and carbon dioxide are central to the approach to meeting phase-out targets, while other options become market ready.

However, there are still concerns with the use of these natural refrigerants because of the safety and health risks if leaks occur. These concerns must be addressed through training and educational programmes.

Locally, there is an increasing interest and use of these natural refrigerants. The refrigeration and air conditioning sector is the largest consumer of the ODS alternatives in Jamaica.

However, adoption of ODS alternatives is limited by the available equipment, especially since there is a fear that any retrofitting of current HCFC equipment to use alternatives could void warranty.

Given this challenge, the Government has provided capacity building and technology support for the various sectors. But more technical support to the service industry is needed to provide specific training and capacity building on the ODS alternatives to encourage and promote their use and to guide the industries on the best international practices on servicing and safe handling.

The ability of the sectors to adapt to the increasing need for the ODS alternatives is central to enable a smooth transition from ODS substances.

Furthermore, the acceptance of ODS alternatives, globally, has also seen the introduction of more energy-efficient technology. While this is likely to reduce the energy cost of operating the equipment, the use of more energy-efficient technology will also see reductions in energy use and consequently lead to a reduction in carbon dioxide emissions from electricity production.

Environmentally, there must be consideration for the types of ODS alternatives used and the risk to human, flora, and fauna.

[PressReader, quoting the Jamaica Gleaner, 10 February 2019](#)

North America

8. Cutting HFCs and other SLCPs is a top sustainable business trend for 2019 - Report



U.S. online publication GreenBiz and the U.S. financial firm S&P Global on February 5 published the 12th annual “[State of Green Business](#)” report, which cited cutting super pollutants such as HFCs as one of the top sustainable business trends for 2019.

“Various actors are prioritizing accelerated replacement of HFCs, a refrigerant commonly used in air conditioners and commercial building chillers,” the report states in a chapter called “Super Pollutants Become Super Important.” In addition to HFCs, super pollutants – also called short-lived climate pollutants (SLCPs) – include methane and black carbon.

A big reason for the action on HFCs, the report notes, is the global phase down of the high-GWP gases under the Kigali Amendment to the Montreal Protocol, which took effect this year on 1 January. The amendment calls for a 10% reduction in 2019 from the baseline level (the consumption of HFCs and HCFCs from 2011 to 2013) for developed countries like Australia, Canada and European Union countries.

The U.S. has not ratified the Kigali Amendment. But at the state level, “Maryland, Connecticut and New York vowed last fall to phase out HFCs, and California previously declared its intention to do so — its rule took effect in January,” the reports says.

The report also notes that the U.S. Climate Alliance (a coalition of 20 governors) aims to reduce emissions from super pollutants like HFCs by up to 50% by 2030.

The Alliance in 2018 said strategies to reduce HFC emissions “promote more energy efficient systems that lower costs for businesses and households, support the leadership of U.S. businesses developing alternatives to HFCs, and increase the need for skilled technicians and system designers.”

[Ammonia21, 7 February 2019, By: Charlotte McLaughlin](#)

9. Permit to pollute withdrawn after North Carolina community pushes back



Company drops chemicals after Delco residents weighs in to protect air quality

After months of intense legal and public pressure, Malec Brothers, a methyl bromide log fumigation company, formally withdrew its air permit application for a proposed operation in Delco, North Carolina.

Despite the fact that methyl bromide is known to pose many hazards to people's health and the environment, the North Carolina Department of Environmental Quality issued a draft permit to Malec Brothers to construct what would have been the largest methyl bromide log fumigation operation in North Carolina and one of the largest sites in the United States.

Methyl bromide is a highly toxic chemical regulated as a hazardous air pollutant under the Clean Air Act. It is also a stratospheric ozone-depleting substance that is banned under the Montreal Protocol except in limited circumstances, such as fumigation of logs for pest control. This past summer, SELC submitted comments on Malec Brothers' draft air permit highlighting its deficiencies under the Clean Air Act and the harm Malec Brothers' operation would pose to nearby communities from methyl bromide exposure.

With the assistance of several partner organizations and advocates in the community, SELC helped inform the community about what was being proposed and the health risks from exposure to this toxic chemical. As a result, the state officials received more than 1,000 public comments and more than 600 people total attended two public hearings on the draft permit.

Shortly after the close of the comment period, the North Carolina Department of Environmental Quality reversed course and announced that it would move forward with designating methyl bromide as a state toxic air pollutant and would develop safeguards for the use of methyl bromide in log fumigation. Additionally, DEQ placed all pending methyl bromide permit applications in the state on hold, including Malec Brothers, pending the adoption of regulations.

Then, last week, state officials announced that Malec Brothers had withdrawn its application for the permit. Instead of using any chemical or fumigant, the company is now going to control pests by removing the bark from logs before shipment.

This is a big win for North Carolina's air quality. Not only are the people of Delco and surrounding communities protected from the toxic emissions from this particular facility, but North Carolina's continuing commitment to regulating methyl bromide and the industry is a huge step forward in protecting people across the state from future operations.

Southern Environmental Law Center, 11 February 2019

Asia Pacific

10. UK to support nitrogen research in India



South Asian Nitrogen Hub to be led by UK's Centre for Ecology and Hydrology.

Nitrogen pollution is an emerging environmental problem linked with air pollution, biodiversity loss, pollution of rivers and seas and ozone depletion. The British government has announced a research project to study nitrogen pollution in India and South Asia.

Nitrogen pollution is caused, among other things, by emissions from chemical fertilisers, livestock manure, and burning of fossil fuels. Gases such as ammonia and nitrogen dioxide contribute to poor air quality and can aggravate respiratory and heart conditions, while nitrous oxide is a greenhouse gas that depletes the ozone layer. Nitrate from chemical fertilisers, manure and industry pollutes rivers and seas, posing a health risk for humans, fish, coral and plant life.

The new partnership programme, South Asian Nitrogen Hub, will be led by the UK's Centre for Ecology and Hydrology and will include 50 organisations from UK and South Asia. [...]

DownToEarth, 24 January 2019, By Sunderarajan Padmanabhan

West Asia

11. Oman ratified international conventions on the mitigation of the effects of manufactured chemicals

سلطنة عمان صادقت على مختلف الاتفاقيات الدولية المعنية بالتخفيف من آثار المواد الكيميائية المصنعة

بعد الحقائق العلمية التي أثبتت علاقة بعض المواد الكيميائية المصنعة باستنفاد طبقة الأوزون، تزايدت الجهود الداعية إلى ضرورة إيجاد حل مناسب لهذه المشكلة التي عهد أشكال الحياة على كوكب الأرض، ونتج عن تلك الجهود إبرام اتفاقية فيينا لحماية طبقة الأوزون في عام 1985م، والتي انفتحت من خلالها الدول الأطراف على ضرورة التعاون من أجل حماية طبقة الأوزون ووقف استنزافها، وكذلك التأكيد على ضرورة إيجاد بروتوكول يحدد التزامات الدول بشأن إنتاج واستخدام المواد المستنفدة لطبقة الأوزون، وقد توجت الجهود العالمية في هذا الشأن بإقرار بروتوكول مونتريال بشأن المواد المستنفدة لطبقة الأوزون في عام 1987م، والذي دخل حيز التنفيذ في يناير من عام 1989م.



تحدثنا إلى إبراهيم بن يعقوب الحارثي رئيس قسم تقنيات ومشاريع خفض الكربون بدائرة التخفيف من التغيرات المناخية التابعة للمديرية العامة للشؤون المناخية بوزارة البيئة والشؤون المناخية، حيث أكد أن السلطة انضمت إلى كل من اتفاقية فيينا وبروتوكول مونتريال في عام 1998م بموجب المرسوم السلطاني رقم (1998/73)، كما صادقت على تعديلي مونتريال وكين في عام 2004م بموجب المرسوم السلطاني رقم (2004/106م)، كما تم إنشاء قاعدة بيانات حماية طبقة الأوزون منذ عام 2000م، والتي يتم استخدامها من قبل الوزارة في تسجيل الشركات المستوردة للمواد المستنفدة لطبقة الأوزون، وإدخال بيانات تراخيص حماية طبقة الأوزون للشركات، وفي إدخال عناوين الشركات ونقاط الاتصال مع الشركات المستوردة للمواد المستنفدة لطبقة الأوزون ومعرفة حصص الاستيراد للشركات، وإصدار التقارير الوطنية الدورية بكميات المواد المستنفدة وغير المستنفدة لطبقة الأوزون المستوردة للسلطة وإرسالها للمنظمات الدولية المختلفة، ومن أهم الإنجازات التي حققتها السلطة في مجال حماية طبقة الأوزون هو إعداد وتنفيذ اللوائح والتشريعات اللازمة لتحقيق متطلبات الامتثال بالاتفاقيات والبروتوكولات، وتنفيذ العديد من المشاريع بالتعاون مع الهيئات والمنظمات الدولية حيث بلغ إجمالي المشاريع المنفذة أكثر من خمسة عشر مشروعاً في مختلف القطاعات المتعلقة بالتدريب والتحول إلى استخدام بدائل المواد المستنفدة لطبقة الأوزون، المشاركة في تنفيذ الدراسات والمسوحات وإعداد الاستراتيجيات الخاصة بالسلطة فيما يتعلق بالاتفاقيات والبروتوكولات الدولية ذات العلاقة مثل استراتيجية التخلص من مواد الكلوروفلوروكربونات (TPMP) التي ساهمت في التخلص من استخدام المواد المذكورة إبداء من عام 2010م وفقاً لمخطبات بروتوكول مونتريال، وكذلك استراتيجية التخلص التدريجي من مواد الهيدروكلوروفلوروكربونات (HPMP) التي ستساهم في التخلص من مواد (HCFCs) وفقاً لجدول التخلص التدريجي لبروتوكول مونتريال، كما قامت الوزارة بتنفيذ مجموعة من حملات التوعية الشاملة التي تستهدف معظم شرائح المجتمع لتعريف المواطنين بمشكلة استنزاف طبقة الأوزون وتشجيعهم على أهمية الحفاظ على طبقة الأوزون، وقد كان من بين ما نفذته من برامج التوعية المحاضرات واللقاءات الإذاعية والتلفزيونية، طباعة الكتيبات وطباعة ملصقات توعوية تهدف إلى تعريف المواطنين على البدائل المستخدمة للمواد المستنفدة لطبقة الأوزون، إعلانات توعوية في الجرائد اليومية للمواطنين عن أهمية وقف استخدام وشراء الأجهزة المحتوية على المواد المستنفدة لطبقة الأوزون واستخدام الأجهزة والتقنيات المستخدمة للمواد غير الضارة بطبقة الأوزون وتنفيذ بعض المسامح الإذاعية ولوحات الجرافيك.

بروتوكول مونتريال

وأضاف رئيس قسم تقنيات ومشاريع خفض الكربون أن بروتوكول مونتريال بشأن المواد المستنفدة لطبقة الأوزون يعتبر أهم أداة قانونية في مجال حماية طبقة الأوزون، حيث يحدد التزامات الدول الأطراف في اتفاقية فيينا لحماية طبقة الأوزون وبروتوكول مونتريال بشأن التخليص والتخفيض ثم التخلص النهائي من المواد المستنفدة لطبقة الأوزون وفقاً لجدول زمني محدد، كما يحدد آليات التعامل والتبادل التجاري بشأن تلك المواد مع الدول غير الأعضاء، ويتكون بروتوكول مونتريال بشأن المواد المستنفدة لطبقة الأوزون من عشرين مادة، من أهمها المادة الثانية التي تختص بإجراءات التخفيض التدريجي للمواد المستنفدة لطبقة الأوزون في الدول المتقدمة، بينما تختص المادة الخامسة منه بإجراءات التخفيض التدريجي لتلك المواد في الدول النامية التي يطلق عليها دول المادة الخامسة، وتختص المادة الرابعة بمراقبة المبادلات التجارية بشأن تلك المواد مع الدول غير الأطراف وإنشاء نظام تراخيص استيراد وتصدير تلك المواد الخاضعة للرقابة، بينما تختص المادة السابعة بضرورة قيام جميع الدول الأطراف بتزويد أمانة بروتوكول مونتريال سنوياً بالبيانات الإحصائية عن إنتاج واستهلاك تلك المواد الخاضعة للرقابة، أما بقية المواد الأخرى فتتناول الأمور الإجرائية والإدارية المتعلقة بالبروتوكول المذكور.

ويشمل بروتوكول مونتريال في هياكله على مرفقات تحتوي على تصنيفات لمجموعات المواد المستنفدة لطبقة الأوزون من حيث الاسم والنوع والمقدرة على استنفاد طبقة الأوزون، وتعتبر المواد التالية من أهم المواد التي وردت في البروتوكول المذكور، حيث حدد لها برنامج زمني من أجل التخلص منها مركبات الكلوروفلوروكربونات وهي عبارة عن مواد تستخدم بشكل رئيسي في أجهزة التبريد المختلفة مثل التلاجات والمكيفات وفي بعض عمليات تصنيع الإسفنج والمواد البلاستيكية في عبوات المبيدات ومطقات الجو، أما الهالونات فهي مواد تستخدم في أنظمة إطفاء الحرائق، ورايع كلوريد الكربون وميثيل الكلوروفورم وهي عبارة عن مواد تستخدم في إنتاج المذيبات والطلاء وتصنيع مواد الكلوروفلوروكربونات، بالإضافة إلى مركبات الهيدروكلوروفلوروكربونات، والتي تعتبر بدائل مؤقتة للكلوروفلوروكربونات سيتم التخلص منها بعد مرحلة طويلة نسبياً، وذلك لثقل تأثيرها على طبقة الأوزون، أما بروميد الميثيل وهو عبارة عن مادة سامة وتستخدم بشكل رئيسي في قطاع الزراعة والحجر الصحي في عمليات التعميم ومكافحة الحشرات [...].

Europe & Central Asia

12. UN, Turkmenistan implementing joint project to reduce ozone-depleting substances



The United Nations Industrial Development Organization (UNIDO) is implementing a joint project in Turkmenistan on a phased reduction of hydrochlorofluorocarbons (HCFCs) in the country, [...] As part of this project, the specialists of the National Ozone Center under the Ministry of Agriculture and Environmental Protection of Turkmenistan organized a seminar for employees of the State Customs Service. The audience was presented with an overview of international agreements and national legislation on the protection of the ozone layer.

In this regard, the role of customs officers in controlling the import and export of substances and mixtures containing prohibited or regulated ozone-depleting substances (ODS) was emphasized.

The overview also reflected import quotas, the licensing scheme, aspects of accounting for imported equipment containing refrigerants, as well as the code system for clean and ODS-containing mixtures, the report said.

The National Ozone Center actively interacts with the Turkmenstandartlary State Service, Turkmenhimiya State Concern, the commodity exchange of the country, international organizations in controlling the use of freons, which are subject to regulation in accordance with the Montreal Protocol.

In September 2018 it was reported that 99.95 percent of the main ODS were excluded from use in Turkmenistan since 1995. The R-22 refrigerant remaining in controlled use is planned to be withdrawn from circulation by 2040. Thus, it is planned to gradually phase out HCFCs in subsequent years.

The country has introduced a licensing system. In 2009, the law "On protection of the ozone layer" was adopted. The legislative documents have been developed for comprehensive control of import-export and consumption of ODS. [...]

Trend News Agency, 12 February 2019, By: Huseyn Hasanov

13. 'Europe's first' professional school for HVAC&R technicians has opened in greater Milan, Italy



'Europe's first' professional school for HVAC&R technicians opens today in Magenta, a suburb of Milan, Italy. The school is the fruit of a partnership between Italian heating and cooling trade associations Assocold, Assofrigoristi and ASLAM, a professional institute.

The school, which according to Italian OEM Epta is the first of its kind in Europe, will offer training sessions on a continuous basis to teenagers and adults.

Students will learn how to work with CO₂ and propane-based systems. The facility boasts a reproduction of an entire CO₂ transcritical supermarket.

Marco Masini, COO of Assofrigoristi, said the school has two objectives: "On the one hand, we aim to create a new generation of young technicians and installers, receiving a professional diploma after three years of core courses and one for advanced classes. We expect around 25 new students (between 14 and 18 years old) every year."

"On the other hand, we will train those technicians who are not familiar with natural refrigerants-based technologies yet," Masini said.

“It is the first centre that offers continuous training activities, and not only at the moments of sale and installation” as is usually the case in existing training centres operated by HVAC&R companies, said Masini.

“Thanks to the contribution of Epta, we first installed the CO₂ transcritical system,” Masini explained. “In the short term, we also plan to install a propane-based chiller, provided by another Italian company in the HVAC&R sector.”

“One of the main problems we face today is to train the trainers,” said Masini, arguing that most trainers now work at private companies and that instead it is necessary to “train technicians to develop the market”.

Carlo Montanari, EptaService manager at Epta, commented: “We are happy to offer to young people the possibility of developing their individual and professional paths, taking advantage of a laboratory containing a complete refrigeration system with cutting-edge technologies and natural refrigerants in the circuits.”

The school was built according to UNI EN 13313, the European standard for assessing the competence of persons who carry out activities with refrigeration systems.

R744, 8 February 2019, By: Dario Belluomini

14. Alternative refrigerants e-learning platform is now live in 15 languages

The REAL Alternatives 4 LIFE project is delighted to announce that the [alternative refrigerants e-learning platform](#) is now live in 15 languages. The e-learning platform is a free tool which focuses on safety, efficiency, reliability and containment of low GWP alternative refrigerants – carbon dioxide, ammonia, hydrocarbon and low flammables (HFOs and R32).

The e-learning platform gives access to 9 learning modules covering:

- Introduction to Alternative Refrigerants - safety, efficiency, reliability and good practice demonstrations
- Safety and risk assessment
- System design using alternative refrigerants
- Containment and leak detection of alternative refrigerants
- Maintenance and repair of alternative refrigerant systems
- Retrofitting existing systems
- Checklist of legal obligations when working with alternative refrigerants
- Measuring the financial and environmental impact of leakage
- Tools and guidance for conducting site survey

The new e-learning platform has been updated to include demonstration videos covering both flammables and carbon dioxide principles.

To support this e-learning programme, the REAL Alternatives 4 LIFE team is organising train the trainer events from March to June 2019 across Europe.

With a focus on flammables and carbon dioxide, these events will provide trainers with a practical introduction to the REAL Alternatives 4 LIFE programme which includes assessments and certification, as well as information about how to set up and market REAL Alternatives training events.

This will lead to a network of over 100 licenced training providers in alternative refrigerants throughout Europe.

REAL Alternatives Europe, February 2019

Safety Classification						
The safety classifications below are defined in ISO817:2014 ¹ and are also used in EN378-1:2016 classification has two parts: A or B followed by 1, 2L, 2 or 3.						
<ul style="list-style-type: none"> • A or B represents the degree of toxicity <ul style="list-style-type: none"> ◦ A is lower toxicity (most refrigerants are class A) ◦ B is higher toxicity (R717 is class B) • 1, 2L, 2 or 3 represents the degree of flammability <ul style="list-style-type: none"> ◦ 1, non flammable ◦ 2L, lower flammability ◦ 2, flammable ◦ 3, higher flammability 						
The table below lists the safety classification of the common alternative refrigerants.						
Refrigerant	Safety classification ²	LFL, kg/m ³	Auto ignition temp, °C	FL, kg/m ³	ATEL / OEL ³ , kg/m ³	
CO ₂ R744	A1	Not applicable	Not applicable	0.1	0.072	
RH ₂ R717	B2L	0.116	630	0.00035	0.00023	
HFC R32	A2L	0.307	648	0.061	0.30	
HFO R1234ze	A2L	0.303	318	0.061	0.28	
HFO R1234yf	A3	0.399	405	0.058	0.47	

15. Swedish treatment operators for cooling and freezing appliances are required to comply with the CENELEC EN50625-series

In November 2018 a press release regarding treatment of cooling and freezing appliances in Europe was distributed by European environmental organizations. The press release contained incorrect information regarding the situation in Sweden. Representatives from Swedish authorities, local government, the collection scheme, treatment operators and the auditor, provides below the correct information regarding the situation in Sweden.

- 1) Treatment operators of cooling and freezing appliances in Sweden comply with Swedish law,
- 2) There are no requirements by law to comply with the CENELEC standards in the EN50625-series,
- 3) Sweden has been represented in the development of the CENELEC standards for treatment of cooling and freezing appliances,
- 4) All treatment operators for cooling and freezing appliances in Sweden have contracts that require compliance with the CENELEC standards in the EN50625-series,
- 5) Compliance will be verified during 2019,
- 6) Ei-Kretsen AB, the collection scheme that collect WEEE from 630 municipal collection facilities in the whole of Sweden – was certified for TS 50625-4 in November 2018, regarding collection of all categories of WEEE, including cooling and freezing appliances.

CENELEC: European Committee for Electrotechnical Standardization

Contact:

Lennart Ask, Swedish representative in CENELEC TC111X/WG6,
Independent WEEE auditor

2019-02-08 – **WEEE AUDITS** Pressrelease:

Swedish treatment operators for cooling and freezing appliances are required to comply with the CENELEC EN50625-series.

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Ytterby, Sweden 8th of February 2019

WEEE AUDITS

Lennart Ask
Swedish representative in CENELEC TC111X/WG6,
Independent WEEE auditor,

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Featured



OZONE SECRETARIAT

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

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

- [40th Meeting of the Open-ended Working Group of the Parties to the Montreal Protocol](#), 11-14 July 2018, Vienna, Austria

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

Read/download OEWG40 [Summary](#)

[OEWG-40 Daily coverage by IISD](#)

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

[The UN Environment Assessment Panels](#)

The Assessment Panels have been vital components of ozone protection since the Montreal Protocol was first established. They support parties with scientific, technological and financial information in order to reach decisions about ozone layer protection and they play a critical role in ensuring the Protocol achieves its mandate.

The Assessment Panels were first agreed in 1988 to assess various direct and indirect impacts on the ozone layer. The original three panels are:

[The Technology and Economic Assessment Panel](#)

[The Scientific Assessment Panel](#)

[The Environmental Effects Assessment Panel](#)

In the past there were 4 main panels. The Panels for Technology and Economic Assessments were merged in 1990 into one Panel, now called the Technology and Economic Assessment Panel.

Why are the three current panels important to ozone layer protection? Each carries out assessment in its respective field. Every four years, the key findings of all panels are consolidated in a synthesis report.



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

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

[Learn more](#)



OZONACTION



NEW OzonAction smartphone application: **Good Servicing: Flammable Refrigerants Quick Guide**

An interactive Quick Guide on Good Practices for Flammable Refrigerants.

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

It offers easy reference to the key safety classification and technical properties of flammable refrigerants that are available in the market. It also provides important safety guidance for the installation and servicing of room air-conditioners designed to use flammable refrigerants.

This interactive guide allows you to scroll and browse the text, jump to specific chapters or use the comprehensive dynamic index to locate specific keywords, figures and tables. The application also includes a refrigerant charge size

calculator and a room size calculator for flammable refrigerants.

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



NEW OzonAction smartphone application: Refrigerant Identifier Video Series

Guidance on how to identify refrigerants using a refrigerant identifier.

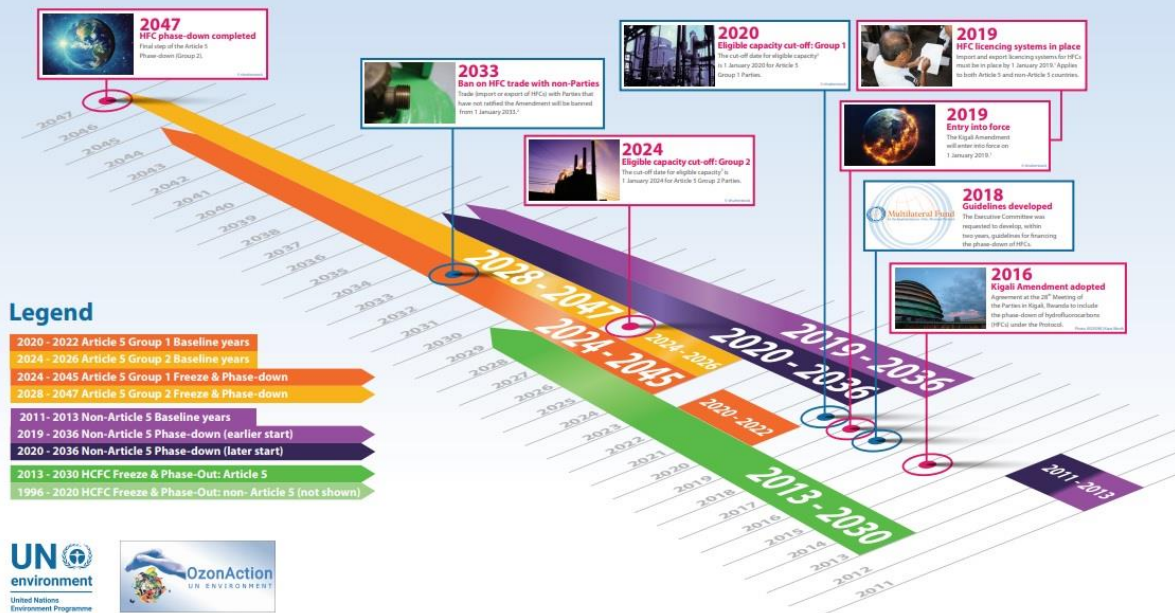
This new OzonAction video series consists of short instructional videos showing how to use and maintain a refrigerant identifier.

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

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

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

The Path from Kigali: HFC Phase-Down Timeline



UN environment
United Nations
Environment Programme

OzonAction
UN ENVIRONMENT

...an Implementing Agency of the Montreal Protocol Multilateral Fund. OzonAction is working with 141 developing countries providing interconnected and mutually-supporting Compliance Assistance Services and project support to assist them meeting their current commitments under the Protocol. OzonAction is now working with these countries to jointly attain the ambitious achievements in climate protection promised by the Kigali Amendment. To find out more about OzonAction and to access our materials, tools and publications, including those on the Kigali Amendment and related issues, please visit our website: www.unep.org/ozonaction or contact us at: ozonaction@unep.org

Kigali Amendment

The Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer reached agreement at their 28th Meeting of the Parties in October 2016 in Kigali, Rwanda to include the phase-down of hydrofluorocarbons under the Protocol.

Hydrofluorocarbons (HFCs)

are commonly-used alternatives to ozone-depleting substances (ODS). While not ozone-depleting, HFCs are greenhouse gases which can have high or very high global warming potentials.

Country Groups

The Montreal Protocol Parties are split into four Kigali Amendment groups:

Article 5, Group 1:
Belarus, India, Iraq, Kuwait, Oman, Pakistan, Qatar, Saudi Arabia, United Arab Emirates

Article 5, Group 2:
Most non-Article 5 countries

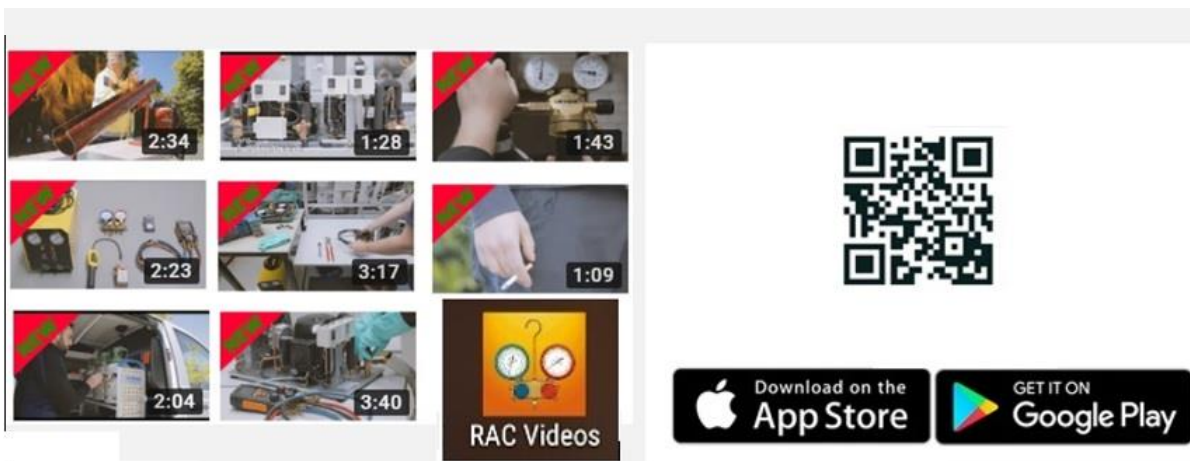
Non-Article 5, earlier start:
Belarus, the Russian Federation, Kazakhstan, Tajikistan, and Uzbekistan

Non-Article 5, later start:

The Kigali Amendment entered into force on 1 January 2019. The maximum number of HFCs permitted to be produced and consumed in 2019 is 100,000 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2020 is 75,000 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2021 is 50,000 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2022 is 25,000 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2023 is 12,500 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2024 is 6,250 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2025 is 3,125 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2026 is 1,562 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2027 is 781 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2028 is 390 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2029 is 195 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2030 is 97.5 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2031 is 48.75 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2032 is 24.375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2033 is 12.1875 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2034 is 6.09375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2035 is 3.046875 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2036 is 1.5234375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2037 is 0.76171875 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2038 is 0.380859375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2039 is 0.1904296875 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2040 is 0.09521484375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2041 is 0.047607421875 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2042 is 0.0238037109375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2043 is 0.01190185546875 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2044 is 0.005950927734375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2045 is 0.0029754638671875 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2046 is 0.00148773193359375 tonnes. The maximum number of HFCs permitted to be produced and consumed in 2047 is 0.000743865966796875 tonnes.

The Path from Kigali: HFC Phase-Down Timeline

This timeline, produced by OzonAction, highlights key hydrofluorocarbons (HFCs) phase-down dates. Click [here](#) to download the timeline



New videos available on the OzonAction RAC video application

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

50,000 downloads and counting!

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



GWP-ODP Calculator Smartphone Application

The application allow you to easily convert ODP, CO₂-eq and metric quantities of refrigerants and other chemicals.

- Helps in understanding and reporting under the Montreal Protocol (and future commitments under the Kigali Amendment)
- The calculator will automatically perform the conversion between metric tonnes, ODP tonnes and/or CO₂-equivalent tonnes (or kg) and display the corresponding converted values
- The app includes both single component substances and refrigerant blends
- The components of a mixture and their relative proportions (metric, ODP, CO₂-eq) are also displayed.

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

Download it Now!



OzonAction Smartphone Application WhatGas? Quickly search for the information you need

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

OzonAction Smartphone Application WhatGas?

Available for **free** in the Google Play and Apple IOS Store

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



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

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

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

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

OzonAction Factsheets



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

OzonAction Series of 19 Fact Sheets related to the Kigali Amendment.

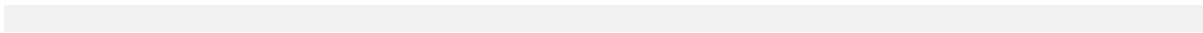
HS codes for HCFCs and certain other Ozone Depleting Substances ODS (post Kigali update).

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

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

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

Tools Commonly used by Refrigeration and Air-Conditioning Technicians.





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

OzonAction has launched an exciting new application which hosts series of short instructional videos on techniques, safety and best practice for refrigeration and air-conditioning technicians.

This application, consisting of short instructional videos on techniques, safety and best practice, serves as a complementary training tool for refrigeration and air-conditioning (RAC) sector servicing technicians to help them revise and retain the skills they have acquired during hands-on training.

New videos on flammable refrigerants just added!

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

OzonAction Multimedia Video Application: Refrigeration and Air-conditioning Technician Video Series

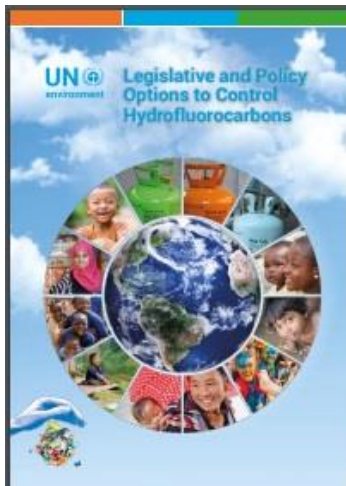
Available in the [Android Play Store](#) and [Apple Store/iTunes](#).

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

Publications



Latest issue of the Centro Studi Galileo - [Industria & Formazione](#). La rivista per il tecnico della refrigerazione e della climatizzazione, N. 424, 2019



Legislative and Policy Options to Control Hydrofluorocarbons

In order to follow and facilitate the HFC phase-down schedules contained in the Kigali Amendment, the Parties, including both developed and developing countries, will have to implement certain measures.

This booklet contains a recommended set of legislative and policy options which the developing (Article 5) countries may wish to consider for implementation. It is intended to be a guide/tool for countries.

Events

2019

- [2019 IIR Natural Refrigeration Conference and Expo](#), 3-6 March 2019, Phoenix, AZ, USA
- [15th Cryogenics 2019 Conference](#), 7-11 April 2019, Prague, Czech Republic
- [China Refrigeration 2019](#), 9-11 April 2019, Shanghai New International Expo Center, China
- [8th Conference on Ammonia and CO₂ Refrigeration Technologies](#), 11-13 April 2019, Ohrid, Macedonia (FYROM)
- [25th IIR International Congress of Refrigeration](#) - 24-30 August 2019, Montreal, Canada

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

Reading



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

Lead Author:
 Michaela I. Hegglin
 Coauthors:
 David W. Fahey, Mack McFarland, Stephen A. Montzka, Eric R. Nash



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

Summary:
 Fast action under the Montreal Protocol can limit growth of hydrofluorocarbons (HFCs), prevent 100 to 200 billion tonnes of CO₂-eq by 2050, and avoid up to 0.5°C of warming by 2100.

Lead authors:
 Durwood Zaelke, Nathan Borgford-Parnell, and Stephen O. Andersen.
 Contributing authors:
 Kristin Campbell, Xiaopu Sun, Dennis Clare, Claire Phillips, Stela Herschmann, Yuzhe Peng Ling, Alex Milgroom, and Nancy J. Sherman.



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

refrigeration technologies in multiple languages.

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

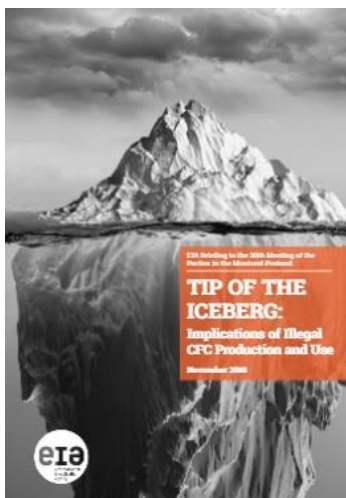
The dictionary provides term searches in Arabic, Chinese, Dutch, English, French, German, Italian, Japanese, Norwegian, Russian and Spanish.

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



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

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



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



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

hydrofluorocarbons (HFCs) which are being phased down from January 2018.

Miscellaneous



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

The United Nations Environment, OzonAction, in collaboration with Marco Gonzalez and Stephen O. Andersen are updating and expanding the "Montreal Protocol Who's Who".

We are pleased to invite you to submit your nomination*, and/or nominate

Ozone Layer Champion(s). **The short profile should reflect the nominee's valuable work related to the Montreal Protocol and ozone layer protection.**

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

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

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

- View the «Montreal Protocol Who's Who» **introductory video**
- Contact : [Samira Korban-de Gobert](#), UN Environment, OzonAction

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



New International Journal of Refrigeration service for IIR members -

Access the complete archives of the International Journal of Refrigeration (IJR) online. Designed with IIR members in mind, this new and practical electronic subscription gives members substantial advantages:

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

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



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



The International Institute of Refrigeration supports World Refrigeration Day - As the only independent intergovernmental organisation in the field of refrigeration, the International Institute of Refrigeration (IIR) joins associations and companies worldwide to support the initiative of an official World

Refrigeration Day on 26 June every year. The annual World Refrigeration Day, to be launched on 26 June 2019, aims to raise awareness among the wider public about the importance of refrigeration technologies in everyday life.

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

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

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



Global Cooling Prize - Cooling for all, without warming the planet.

An innovation competition to develop a climate-friendly residential cooling solution that can provide access to cooling to people around the world without warming the planet



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