

# OzoNews

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

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**GLOBAL**



## 1. Kigali Amendment latest ratifications

Congratulations to the latest countries which have ratified the Kigali Amendment:

**Turkey, 10 November 2021**  
**St. Lucia, 2 November 2021**

At the Twenty-Eighth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, held in Kigali from 10 to 15 October 2016, the Parties adopted, in accordance with the procedure laid down in paragraph 4 of article 9 of the 1985 Vienna Convention for the Protection of the Ozone Layer, a further amendment to the

Montreal Protocol as set out in Annex I to the report of the Twenty-Eighth Meeting of the Parties (Decision XXVIII/1).

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

**United Nations Treaty Collection**

*Image: UN Treaty Collection website*

## 2. Cooling Matters: World Refrigeration Day Announces 2022 Theme

**LAS VEGAS, 14 February 2022** – Food available when and where we choose. Apps that make our cell phones personal assistants and inanimate products SMART. Vaccines to protect us from disease, and medicines to cure disease. Cities thriving in places once inhabitable. They all require cooling.

“Cooling is at the very heart of modern life. It enables people to live and work comfortably, it saves lives, it enables people to achieve. The need for cooling is everywhere, it touches lives in fantastic, though often unnoticed ways. However, we look at it, cooling matters to us.” said Steve Gill, founder of World Refrigeration Day.



At a side session held during the 2022 AHR Expo in Las Vegas, Gill announced that Cooling Matters would be the day's 2022 theme. "Our objective is to make the public aware of cooling's essential benefits, how cooling impacts daily life, and how technology choices foster environmental well-being of future generations." World Refrigeration Day is celebrated on and around June 26.

According to the secretariat, despite policies, standards and codes related to the refrigeration and air-conditioning industry, there is still significant lack of public understanding of cooling's importance even though issues like refrigerant transition, emissions reduction, and maximizing energy efficiency have been addressed for decades by governments due to global policies and binding international frameworks.

At AHR, partnering groups for previous World Refrigeration Day campaigns described how the day serves as a platform to educate the public about cooling's benefits. Past campaigns targeted refrigerant choices that protect the ozone layer, using the cold chain to distribute food, medicines and vaccines, and promoting "cool" careers. Together, those partnering groups represent a half million engineers and technicians, more than a thousand suppliers of equipment services, and near 200 governmental bodies and agencies: United Nations Environment Program OzonAction, ASHRAE, European Partnership for Energy and the Environment, Federation of Ibero-American Air Conditioning and Refrigeration Associations, Global Food Cold Chain Council, International Institute of Refrigeration, Indian Society of Heating, Refrigerating and Air-Conditioning Engineers, and Union of Associations of African Actors in Refrigeration and Air Conditioning. They are among some hundred national and international associations that are World Refrigeration Day allies.

"The public can make choices that minimize environmental impacts when they select, operate and maintain cooling equipment," Gill explained. According to the International Energy Agency, the average efficiency of air conditioners sold today is less than half of what is typically available on the shelves – and one third of best available technology.

Buildings generate nearly 40% of annual global CO<sub>2</sub> emissions. Of those total emissions, building operations are responsible for 28% annually, while building materials and construction are responsible for an additional 11% annually. "How RAC systems are maintained and operated is one of the most important actions the world can take to address climate change," said Rajan Rajendran representing ASHRAE's Refrigeration Committee and the Global Food Cold Chain Council.

The challenge will only become greater. "Half of the buildings standing in 2060 have not yet been built," said Ayman Eltalouny, representing UNEP OzonAction. There are 3.6 billion cooling units in use today. By 2050, that number is expected to be 9.5 billion. "If left unchecked, emissions from cooling appliances are expected to double by 2030. They will triple by 2100 driven by heat waves, population growth, urbanization and a growing middle class. Moving to best available cooling technologies would reduce cumulative emissions by 38 gigatons of CO<sub>2</sub> emissions by 2030. This would avoid future greenhouse gas emissions equivalent to 2018 levels."

And there is the increasing need for food. "Due to population growth, the world will need 60% more food by 2050. The unfortunate reality is much of the world's food supply is lost

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due to waste,” said Rajendran. “Increasing refrigeration in emerging economies is required to meet this growing demand. Some 475 million tons of food currently lost could be saved by wider application of refrigeration.”

“We must communicate to the public that there is value to cooling if we hope to have policies in place which encourage use of low carbon emitting refrigeration and air conditioning,” said Rajendran.

Said Gill, “Cooling Matters will tell the story of how our wellbeing depends upon cooling and how cooling technology choices can safeguard the well-being of future generations. We encourage the whole the refrigeration and air-conditioning industry to join us in celebrating World Refrigeration Day 2022. Join the global community conversation using the hashtags #coolingmatters and WREFD22.”

Learn more about World Refrigeration Day “Cooling Matters,” visit [www.worldrefrigerationday.org](http://www.worldrefrigerationday.org) or contact [info@worldrefrigerationday.org](mailto:info@worldrefrigerationday.org)

### 3. The influence of iodine on the Antarctic stratospheric ozone hole Significance

The role of chlorine and bromine in Antarctic stratospheric ozone depletion is well known. However, the contribution of iodine to the ozone hole chemistry has not been assessed, mainly due to the negligible amounts of iodine previously reported to enter the stratosphere. New measurements demonstrate that the injection of iodine to the lower stratosphere is higher than previously assumed. Based on these observations, our modeling work shows that iodine chemistry can enhance spring ozone loss at the lower part of the Antarctic ozone hole, and even dominate the halogen-mediated ozone loss during summer. Iodine can also alter, by several days, the timing of the seasonal formation and closure of the ozone hole.

#### Abstract

The catalytic depletion of Antarctic stratospheric ozone is linked to anthropogenic emissions of chlorine and bromine. Despite its larger ozone-depleting efficiency, the contribution of ocean-emitted iodine to ozone hole chemistry has not been evaluated, due to the negligible iodine levels previously reported to reach the stratosphere. Based on the recently observed range ( $0.77 \pm 0.1$  parts per trillion by volume [pptv]) of stratospheric iodine injection, we use the Whole Atmosphere Community Climate Model to assess the role of iodine in the formation and recent past evolution of the Antarctic ozone hole. Our 1980–2015 simulations indicate that iodine can significantly impact the lower part of the Antarctic ozone hole, contributing, on average, 10% of the lower stratospheric ozone loss

**The influence of iodine on the Antarctic stratospheric ozone hole**

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**Significance**

The role of iodine and bromine in Antarctic stratospheric ozone depletion is well known. However, the contribution of iodine to the ozone hole chemistry has not been evaluated, due to the negligible amounts of iodine previously reported to reach the stratosphere. Based on the recently observed range ( $0.77 \pm 0.1$  pptv) of stratospheric iodine injection, we use the Whole Atmosphere Community Climate Model to assess the role of iodine in the formation and recent past evolution of the Antarctic ozone hole. Our 1980–2015 simulations indicate that iodine can significantly impact the lower part of the Antarctic ozone hole, contributing, on average, 10% of the lower stratospheric ozone loss during summer and early fall, when the homogeneous reaction of mesopgeic chlorine and bromine reverts to iodine. The stratospheric ozone destruction caused by 0.77 pptv of iodine can be equivalent to that of 3.1 pptv of chlorine and bromine reverts to iodine. The stratospheric ozone hole is likely to remain as anthropogenic chlorine and bromine emissions decline following the Montreal Protocol.

during spring (up to 4.2% of the total stratospheric column). We find that the inclusion of iodine advances the beginning and delays the closure stages of the ozone hole by 3 d to 5 d, increasing its area and mass deficit by 11% and 20%, respectively. Despite being present in much smaller amounts, and due to faster gas-phase photochemical reactivation, iodine can dominate (~73%) the halogen-mediated lower stratospheric ozone loss during summer and early fall, when the heterogeneous reactivation of inorganic chlorine and bromine reservoirs is reduced. The stratospheric ozone destruction caused by 0.77 pptv of iodine over Antarctica is equivalent to that of 3.1 (4.6) pptv of biogenic very short-lived bromocarbons during spring (rest of sunlit period). The relative contribution of iodine to future stratospheric ozone loss is likely to increase as anthropogenic chlorine and bromine emissions decline following the Montreal Protocol. [...]

*Authors: Carlos A. Cuevas, Rafael P. Fernandez, Douglas E. Kinnison, View ORCID ProfileQinyi Li, Jean-François Lamarque, Tarek Trabelsi, Joseph S. Francisco, Susan Solomon, and Alfonso Saiz-Lopez*

Read/download full [text](#)

[Proceedings of the National Academy of Sciences \(PNAS\), 15 February 2022](#)

Image: PNAS website

#### 4. Call for nominations now open for Scientific Prizes at IIR Congress 2023

Don't miss out on your chance to apply for the prestigious academic and scientific awards to be presented at the upcoming 26<sup>th</sup> IIR International Congress of Refrigeration.



In anticipation of the 26<sup>th</sup> IIR International Congress of Refrigeration (ICR) to take place in Paris (France) in August 2023, the IIR is launching a call for nominations for several scientific prizes.

The series of prestigious academic and scientific awards **recognise those who have made outstanding contributions to the field of refrigeration or have completed noteworthy research.**

The prizes presented will be the:

- IIR Gustav Lorentzen Medal
- IIR Science And Technology Medal
- IIR Young Researchers' Awards

**Application deadline: April 30, 2022**

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Find out how to apply

[International Institute of Refrigeration \(IIR\), 11 February 2022](#)

Image: IIR website

## 5. Women working for the Montreal Protocol and environmental protection



To mark International Day of Women and Girls in Science, celebrated each year on 11 February, the Ozone Secretariat is delighted to showcase the tremendous work and dedication of 2 scientists working passionately for the Montreal Protocol to save the ozone layer and help safeguard the environment.

During her extensive career in the field of applied physics and environment spanning more than 35 years, **Dr. Suely Machado Carvalho**, has been a member of the Brazilian delegation at some of the earliest meetings of the Montreal Protocol and served as Co-chair of the Technology and Economic Assessment Panel from 1993 – 2000. She joined the United Nations Development Programme in 1997 as Deputy Chief and later in 2001 as Director of the Montreal Protocol and Chemicals Unit. Since 2014, she has been an independent consultant to several organizations and currently serves as one of the Senior Experts of the Technology and Economic Assessment Panel, advising the parties to the Montreal Protocol. Embarking on a career in physics in the 1970s, she **“realized early that I needed to be among the best students to have a chance to succeed, and so I was.”** [Read more](#)

Our second distinguished scientist, **Dr. Helen Tope**, is an independent principal consultant with Planet Futures based in Australia, has more than 30 years’ experience in environmental policy development and scientific, technical and analytical studies. Since 1995, she has been a member of the Montreal Protocol’s Technology and Economic Assessment Panel, co-chair of the Aerosols, Sterilants, Miscellaneous Uses and Carbon Tetrachloride Options Committee, the Medical Technical Options Committee, and more recently, the Medical and Chemicals Technical Options Committee providing technical advice to the parties to the Montreal Protocol. According to Dr. Tope **“A career in science, a life in science, is very**

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rewarding. There are so many meaningful ways for women to contribute to the sciences, now more than ever.” [Read more](#)

[United Nations Environment Programme \(UNEP\), Ozone Secretariat, 10 February 2022](#)

*Image: UNEP, Ozone Secretariat website*

## 6. Marine Environment-What are Ozone Depleting Substances on Ships?

The ozone layer is the most important protection zone in the atmosphere of the earth. Having a molecular formula  $O_3$ , the element in the ozone layer is well-known for absorbing the ultra-violet rays emitted by the sun and thus protecting the earth from harmful radiation effects.



In the past three decades, owing to the superfluous usage of substances that contain chlorofluorocarbons (CFCs), it has become a widespread knowledge that the layer is depleting, which could cause severe problems not just for humans but also for plants and animals as well.

Considering the precariousness of the oceanic environment, a MARPOL regulation referred to as the Prevention of Air Pollution from Ships has been put into active force from the 19<sup>th</sup> May 2005. Under this regulation, all ships that have a gross tonnage of over 400 tons and have been constructed prior to this date have to have an International Air Pollution Prevention (IAPP) certificate. This certification will be issued by the officials in the administration department of the country to which the ship belongs.

A survey is carried out to determine the maintaining of stipulations prescribed by the MARPOL regulation pertaining to hazardous components like ozone depleting substances along with other pollutants. Based on this primary survey, the certification is awarded to a ship. Detailed below is a list of ozone depleting substances that are categorically stated in the MARPOL extension.

- Ozone Depletion Substances (Stipulation 12)
    - CFCs: These include Trichlorofluoromethane (CFC11), Dichlorodifluoromethane (CFC12) and Chloropentafluoroethane (CFC15)
    - Halon (Organic Compound): These include two sub-categories where the first category compounds have been banned from being used in ships with a construction date of 19<sup>th</sup> May 1995 and the second category compounds have been banned from being used in ships with a construction date of 1<sup>st</sup> January 2020
    - The first type compounds are R11 to R13, R111 to R115 and R211 to R217 while some of the second type compounds include R21, R22, R31 and R271.
    - Methyl Chloroform
    - Methyl Bromide
-

- Bromochlorodifluoromethane
- Bromotrifluoromethane

If the ozone depleting substances from ships are found to emitting the toxic fumes into the waters either during repair or maintenance work, they shall be brought under the purview of the Parties to the Protocol (1997) governance. Also these kinds of discharges of the ozone depleting substances from ships are regarded to be as being deliberate and therefore merit stringent disciplinary action.

Also, in accordance with this protocol, all the governments whose countries are a part of this protocol need to have a proper facility (stipulation 17) to ensure that the gadgets and devices containing ozone depleting substances are repaired or removed entirely without causing any unwanted detaining to the operation of the vessels.

As Per MARPOL Annex VI, an ozone depleting substance record book to be kept and maintained onboard.

Apart from the ozone depletion substances, the other pollutants listed in the MARPOL regulations' extension are:

- Oxides of Nitrogen (Stipulation 13)
- Oxides of Sulphur (Stipulation 14)
- Organic Compounds volatile in nature (Stipulation 15)

Due to the availability of the list of ozone depleting substances and the proper maintenance facilities, a substantial contribution to save the fast-depleting ozone layer has been undertaken. It is only by these proactive measures that we can help to ensure a better and safer planet for the generations of civilisations to come.

[Marine Insight, 8 February 2022, By KaranC](#)

*Image: Marine Insight website*



**AFRICA**

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## 7. Liberia: Refrigeration, Air-conditioning Technicians Trained

Liberia Environmental Protection Agency (EPA) through its National Ozone Unit (NOU) over the weekend concluded a three-day refresher training for technicians and trainers of refrigeration and air-conditioning practitioners from Bong, Cape Mount and Grand Bassa counties.



The training, which took place at the Monrovia Vocational Training Center (MVTC) on the Japanese Freeway, Paynesville, outside Monrovia is a second of a series of training for refrigeration and air-conditioning technicians organized by the EPA in conjunction with the German Agency for International Cooperation.

Recently, the EPA and the German Agency for International Cooperation concluded refresher training for refrigeration and air-conditioning technicians.

Students of the Refrigeration and Air-conditioning Department at MVTC were also attracted to the training, which was the first of a series of training planned to take place across the country.

The trainings were held under the theme: "Refrigeration and Air-conditioning Techniques, Safety and Best Practices.

The training for technicians from Bong, Cape Mount and Grand Bassa counties considered several topics including 'Emphasis on the Safe Handling of Hydrocarbon Refrigerants', 'Focus on Practical Learning and Hands on Training', 'Proper Brazing Techniques and System Leak Prevention'.

Speaking at the start of the training, Seta Marshall, National Focus Point on Montreal Protocol and Head of the National Ozone Unit said as Liberia prepare to enforce obligations under the Kigali Amendment it was crucial to train refrigeration and air-conditioning technicians.

Mr. Marshall disclosed the training fostered the use of new technologies, which are in line with the Kigali Amendment and strengthen capacities in their safe use.

Liberia is a Party to the Vienna Convention, which gave birth to the "Montreal Protocol on Substances that Deplete the Ozone Layer".

Liberia has ratified the Montreal Protocol and all of its amendments, including the Kigali Amendment which was ratified on July 12, 2020.

The Montreal Protocol, according to Mr. Marshall is a landmark agreement that identified the major ozone depleting chemicals and established a timetable for their eventual phase out.

“Under this protocol, the production and consumption of ozone depleting substances (ODS) is to be reduced and eventually eliminated through the development of chemical substitutes and alternative manufacturing processes,” Mr. Marshall said.

On 15<sup>th</sup> October 2016, following seven years of intensive negotiations, the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer finally reached an historic agreement at their 28<sup>th</sup> Meeting of the Parties (MOP) held in Kigali, Rwanda, to phase down production and consumption of a list 18 Hydrofluorocarbons (HFCs).

Mr. Marshall disclosed that HFCs are commonly used alternatives to ozone depleting substances in the refrigeration and air-conditioning industry.

“HFCs do not deplete the ozone layer, but they are portent “Green House Gases” (GHGs) with high Global Warming Potentials (GWPs) ranging from 12 to 14,800,” Mr. Marshall explained.

Prior to him, Charles Dennis, Assistant Head of the National Ozone Unit disclosed that the workshop was in continuations of a workshop that supposed to be held last year but didn’t happened due to COVID 19 outbreak.

Mr. Dennis told participants that the training wasn’t intended to make technicians, but rather to refresh them on new development in the sector so that they make adjustment.

For his part, the Dean of Students at MVTC, Samuel J. Moribah lauded the EPA and its National Ozone Unit for the opportunity provided the students and lecturers and other technicians of refrigeration and air-conditioning industry.

[Global News Network \(GNN\), 13 February 2022, By Cholo Brooks](#)

*Image: GNN website*

## **8. West Africa marks journey to household energy efficiency under ECOWA**

The ECOWAS or the Economic Community of West African States is a regional grouping of 15 West-African states that have come together to create a Trade Union and promote self-sufficiency. Economic integration in Western Africa and further with the rest of African continent is the stated aim of this grouping.

Western Africa is one of the poorest regions of the world overlooking the Sahara region marked by high levels of impoverishment. But it has continued to



advance significantly in comparison to the past decades. The rising wages have driven an increase in energy demands, particularly, in the domestic consumption needs. Refrigerators dominate the household consumption of power, and the use of air conditioners is also on the rise. By 2030, it is predicted that Senegal will have 9 out of 10 families using Refrigerators.

To curb this rise in demand for power, ECOWAS has embarked on a programme to increase the efficiency of the refrigerators and Air Conditioners to conserve power and also help in the fight against global warming. The old generation refrigerators use chlorine-based coolants that are devastatingly harmful to the Ozone layer. Also, older cooling devices consume much more power than modern energy-efficient products.

With the coordination of the Kigali Cooling Efficiency Program that is the successor of the Montreal Protocol which envisaged the phasing out of the Hydrofluorocarbons (HFCs); ECOWAS has introduced the ECOFRIDGES, a novel initiative to replace the older generation cooling devices with efficient and climate- friendly products.

With an aim of 25 million dollars of financial support, ECOWAS Centre for Renewable Energy and Energy Efficiency hopes to add over 50 thousand new cooling devices in Ghana and Senegal. ECOFRIDGES also includes programmes to spread awareness among the public and scientific approaches to enhance the efficiency of the products.

The range of benefits that are expected to be derived from the ECOFRIDGES programme include 4288 GWh of power savings that translates into 0.5 billion dollars saved in bills, in addition to the reduction of 1933 kilotons of carbon dioxide emissions.

To implement the programme, the governments are set to offer the replacement of the existing cooling devices that are over a decade old at subsidized rates. The finance mechanisms will be explored based on local needs and facilitated for quick adoption by the families. The products catalogued under the scheme will be tested for energy performance and approved by a body.

This energy efficiency programme can become a trendsetter, if successful, in the fight against global warming and rising power demands in developing countries. The toolkit that will be developed by multiple partners with ECOWAS in this campaign will be based on the practical results from ECOFRIDGES implementation in Ghana.

This will be instrumental in further implementation around the world in developing countries through the U4E or United for Efficiency programme of the United Nations Efficiency Program that supports the developing economies to move towards energy efficiency.

The demand for power is rapidly growing and the developing countries are under pressure to enhance electricity generation. But cleaner sources of power are dearer and hydrocarbon-based sources are dirty.

Even with the use of coal and gas, the power demands by 2030 will be sharply challenging to meet for many developing countries. ECOFRIDGES can meet the difference between demand and capacity through optimization of efficiency. This will also contribute to the global aim of cutting carbon emissions.

The challenge of ecology sensible cheaper alternatives to development can be met by mass implementation of the energy efficiency programmes across the developing countries.

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African continent, many Latin American countries and other developing nations are set to implement the Kigali mandates which have set guidelines to timely phase out the harmful HFCs entirely. Learning curves derived from the poorer regions will be crucial to extension of the efficiency programme to other regions.

[International Institute for Non-Aligned Studies \(IINS\), February 2022](#)

Image: ECOWAS website

## ASIA AND THE PACIFIC

### 9. Thailand: Go hand in hand with 3 agencies to reduce and stop ozone layer depleting substances

The Director-General of the Department of Industrial Works (SEC), Mr. Wanchai Phanomchai, Revealed that the Department of Industrial Works, as the main unit in driving the Action Plan to reduce and eliminate the use of hydrochlorofluorocarbons (HCFCs), Phase 2, cooperates with the Customs Department. To prevent smuggling of substances that destroy the ozone layer By procuring and delivering 8 refrigerant analysis tools to the Customs Department and cooperating with the Department of Skill Development (KorPor.) and the Office of Vocational Education Commission (VEC) in enhancing the potential of installers. and maintenance of air conditioners by procuring and delivering equipment to 72 sets of training centers, including training for technicians to install and maintain air conditioners.



Activities under the Hydrochlorofluorocarbon Reduction and Elimination Project, Phase 2 in 2022 consist of:

- 1) delivery of refrigerant analysis equipment to the Customs Department. By purchasing 8 refrigerant analysis tools worth 1.5 million baht to promote the potential of customs officers at various checkpoints which is responsible for controlling the import and export of ozone depleting substances with modern tools It can check and analyze the refrigerant type manually effectively in the beginning.
- 2) Grant financial assistance to change the production process to substitutes that do not destroy the ozone layer and has a low global warming potential in the spray foam manufacturing industry, amounting to more than 57 million baht in order to change the production process to use a new substitute that does not destroy the ozone layer and has low global warming potential, such as hydrofluoroolefins (HFOs).
- 3) Procurement of tools/equipment to training centers under the NEDA and VEC, totaling 72 sets to be used in training for technicians installing and maintaining air conditioners,

worth more than 8 million baht. 4) Training for technicians installing and maintaining air conditioners The goal is to train 5,500 technicians to install and maintain air conditioners with a total amount of more than 17 million baht.

DIW received funding from a multilateral fund under the Montreal Protocol. through the world bank To implement the Hydrochlorofluorocarbon Reduction and Elimination Project, Phase 2 (2020-2023), with the following goals:

- 1) Limit the amount of HCFCs to no more than 354 ODP tons (ODP. Tonnes) by 2023 and can reduce greenhouse gas emissions by at least 847,673 tons of carbon dioxide equivalent (Tonnes CO<sub>2</sub> eq).
- 2) Eliminate all remaining HCFC-141b in the production of spray foam 31.53 ODP tons and reduce greenhouse gas emissions by at least 207,811 tons CO<sub>2</sub> equivalent (Tonnes CO<sub>2</sub> eq).
- 3) Reduce the use of HCFC-22 in the air conditioning maintenance sector by at least 20 ODP tons and reduce greenhouse gas emissions by at least 658,181 tons CO<sub>2</sub> equivalent (Tonnes CO<sub>2</sub> eq).

As for the past implementation of the project in Phase 1 (2014 to 2018), the goal has been achieved in accordance with the commitments under the Montreal Protocol.

[Archyde, 7 February 2022](#)

Image: wikipedia



[Asia Pacific Ozone2Climate Art Contest](#) organized by the Asia-Pacific Regional Network of Ozone Officers, as part of UNEP's workplan under the Montreal Protocol's Multilateral Fund. **The Art Contest will run its course and close on 31 March 2022**, followed by the regional contest of nominated winners. The final winners in the three categories of artworks - photography, drawing, and graphic design, will be evaluated and announced on World Ozone Day in 2022.

For more information about the contest, please visit: [www.ozone2climate.org](http://www.ozone2climate.org)  
**Contact:** [Shaofeng Hu](#), Senior Montreal Protocol Regional Coordinator, UNEP, [OzonAction](#) Compliance Assistance Programme (CAP) Asia-Pacific.

Image: OzonAction

WEST ASIA

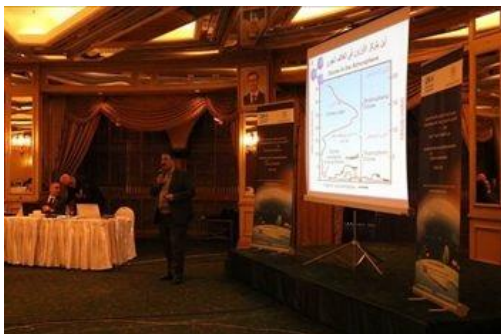
## 10. Syria Keeps Pace with Montreal Protocol Implementation

**Damascus, Syria, 31 January 2022** – The UNEP OzonAction Compliance Assistance Programme (CAP) in West Asia, in cooperation with the Ministry of Local Administration and Environment of the Syrian Arab Republic, organized a physical



workshop in Damascus on 18 January to present the outcomes of the Kigali Enabling Activities project that was completed in 2021, to initiate the preparation of the national Kigali Implementation Plan (KIP) to phase down Hydrofluorocarbons (HFCs) and to launch the implementation of the Hydrochlorofluorocarbons (HCFC) Phase-out Management Plan (HPMP) for Syria. These projects, which are financed by the Multilateral Fund for the Implementation of the Montreal Protocol, are designed to assist the country to meet its compliance obligations under this multilateral environmental agreement.

In his opening statement, Mr. Khaled Klaly, UNEP Montreal Protocol Regional Coordinator for West Asia, highlighted the importance of organizing the event despite the difficult times of the pandemic which demonstrated the confirmed will of Syria to keep pace with the Montreal Protocol and implement approved projects efficiently. Subsequently Eng. Rowaida Al-Nahar, Director, Environmental Safety, Ministry of Local Administration and Environment, Syria, thanked UNEP and the Multilateral Fund for the great support to facilitate the full compliance of Syria with the provisions and targets under the Montreal Protocol and the Kigali Amendment.



The event included an active presence of 53 participants (18 female, and 35 male) from the relevant authorities in Syria from the public and private sectors, educational and training institutions, the General Directorate of Syrian Customs, and the Engineers Association. Also present at the workshop were invited representatives from the National Ozone Unit in the Republic of Iraq who joined to exchange experiences and lessons learned throughout the long journey

in implementing the Montreal Protocol.

During the workshop, the national plan for Syria's full compliance with the Montreal Protocol was reviewed, including the country's new obligations for HFCs following its ratifications of the Kigali Amendment in April 2021. Subsequently, the results of the Enabling Activities project and the first tranche of the national HPMP for Syria were presented.

Also presented and explained was the updated ozone depleting substance bylaws regulating the import, export, and handling of controlled substances under the Montreal



Protocol and related equipment, followed by an interactive discussion session between Syria and Iraq on experience and knowledge sharing.

The workshop which was moderated by Eng. Rowaida Al-Nahar and Mr. Khaled Klaly, as part of the regional OzonAction CAP work plan for 2022 to support countries in meeting and sustaining their Montreal Protocol commitments.

**Contact:** [Khaled Klaly](#), Montreal Protocol Regional Coordinator, West Asia, UNEP OzonAction

[UNEP, OzonAction, 31 January 2022](#)

*Image: OzonAction website*

### 11. Oman: Committee formed to tackle Climate Change and Ozone Layer Protection

**Muscat** – In efforts to mitigate the effects of climate change, Civil Aviation Authority (CAA) has formed the National Committee for Climate Change and the Protection of the Ozone Layer.

A statement issued by CAA said that the committee has been formed under the chairmanship of H E Naif Ali Hamad al Abri, chairman of the authority, and membership of thirty-one members.

'The committee aims to manage and follow up on climate change issues, mitigate the negative effects of climate change, and protect the ozone layer. It also aims to raise political and societal awareness on climate change,' CAA stated.

According to a CAA official, the committee will implement policies and national action plans to reduce greenhouse gas emissions, adapt to the negative impacts resulting from climate change and protect the ozone layer in accordance with Oman Vision 2040.

"The committee will contribute to defining the sultanate's position on international issues related to climate change and protection of the ozone layer, and follow-up on and implement the recommendations of international agreements in the field," the CAA official said.

[Muscat Daily, 2 February 2022](#)

*Image: Muscat Daily website*

### MUSCAT DAILY

AN ARAB MEDIA PUBLICATION

Committee formed to tackle climate change

2 FEBRUARY 2022



BY OUR CORRESPONDENT

# LATIN AMERICA AND CARIBBEAN

## 12. Nicaragua Ministerio del Ambiente y Recursos Naturales (Marena) celebra encuentro ambiental con importadores de sustancias refrigerantes

El Ministerio del Ambiente y Recursos Naturales (Marena) sostuvo un encuentro con importadores de refrigerantes a fin de dar a conocer la Encuesta Nacional de Consumo y Distribución de Hidrofluorocarbono (HFC), en Nicaragua y las medidas a implementar en el marco de la Enmienda de Kigali.



“Hoy estamos realizando un encuentro con todos los importadores de todos los gases y refrigerantes que son utilizados en los aires acondicionados, para los sistemas de refrigeración de la cadena alimenticia y venimos en todo un proceso desde que fuimos firmantes del protocolo de Montreal donde venimos utilizando sustancias cada año menos agotadoras para la capa de ozono y por supuesto para nuestra población”, explicó la Ministra del Marena Sumaya Castillo.

El encuentro con los importadores sirvió para brindarles un reconocimiento por cumplir lo establecido por la ley ambiental y para asignarles las cuotas que deben importar en este 2022.

Castillo destacó que, en los últimos años gracias al trabajo conjunto entre autoridades e importadores, al país ingresan cada año sustancias o refrigerantes menos nocivos al ambiente y más amigables a nuestros ecosistemas.

“Venimos de un escenario, de una temporada donde veníamos utilizando sustancias HFC que son más contaminantes y ahora venimos reduciendo poco a poco, llevamos más del 55 por ciento de reducción a utilizar otras sustancias menos agotadoras y ahí venimos (cumpliendo) con otros compromisos internacionales que le llevamos nosotros enmienda de Kigali al protocolo de Montreal, como su palabra lo dice enmendamos y decimos ahora vamos a otra escala donde vamos a utilizar sustancias que sea aún menos agotadoras”, dijo Castillo.

Reconoció la funcionaria que las empresas importadoras cumplen las leyes ambientales, hacen un buen manejo de los productos y con eso contribuyen al proceso de cuidado de nuestros ecosistemas.

“Hacemos el reconocimiento sin olvidar a toda esa gran cantidad de protagonistas que son los técnicos de refrigeración formal y no formal, al Tecnológico Nacional, a la comisión nacional de sustancias tóxicas y a otras instituciones como la DGA, IPSA, DGI. Hemos

venido desarrollando todo un proceso donde podemos decir que ya tenemos importadores de refrigerantes naturales”, añadió Castillo.

La Enmienda de Kigali entró en vigencia el 1 de enero de 2019 y establece medidas para reducir la producción y el consumo de hidrofluorocarbonos (HFC), gases de efecto invernadero que contribuyen fuertemente al calentamiento global.

[El19Digital, 11 de Febrero 2022, Por: Pedro Ortega Ramírez](#)

*Image: El19Digital website*

## NORTH AMERICA

### 13. HFC Policies & Refrigerant Regulations by State

Amidst increasing regulatory pressures at the state and federal levels, it can be difficult to stay on top of new and changing regulations. This [new tool](#) tracks state and federal regulatory activities, and includes:

- Interactive map of regulatory status by state
- Summary of regulatory details by state
- Overview of federal refrigerant regulations

In the U.S., the federal government and several states have enacted legislation to regulate Hydrofluorocarbon refrigerant (HFC) use and production. This interactive map tracks the regulatory status of each state.

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**Alternative Refrigerants for Commercial Refrigeration Applications and Current United States Approval Status**

Category	Current Refrigerants (GWP <sup>1</sup> , Class <sup>2</sup> , Retrofit <sup>3</sup> )	Future Low GWP Alternative (GWP, Class)	US Approval Status <sup>4</sup>
Stationary Refrigeration (>50 lbs.) – Remote systems, Direct Expansion	R-22 (1810, ODS) R-404A (3922, A1) R-507A (3985, A1) R-407A (2107, A1, R) R-448A (1386, A1, R) R-449A (1396, A1, R) R-513A (630, A1, R) R-744 (1, A1)	R-454A (237, A2L) R-515A (287, A1) R-454C (146, A2L) R-455A (146, A2L) R-471A (140, A1) R-1234yf (1, A2L) R-1234ze (1, A2L) R-744/HVAC (1, A1)	<ul style="list-style-type: none"> <li>While R-22 (Ozone Depleting Substance) has been banned by the EPA under the Montreal Protocol, there remains a large number of installed systems that are still in the process of transitioning away from this refrigerant.</li> <li>EPA SNAP Rule 20 and 21 (partially reinstated) banned high GWP refrigerants such as R-404A and R-507A in new and retrofit applications, a number of states have adopted the SNAP rules.</li> <li>California has passed regulations limiting the GWP for existing stores to meet by 2030. The industry sees the potential for a similar restriction for new systems at the federal level starting as early as 2025, and is awaiting additional details from the EPA in the near future.</li> <li>Mid-range GWP alternative refrigerants, such as R-448A and R-449A, are “drop-in” or retrofit compatible options for some refrigerants, however due to GWP considerations, there are concerns about their future compliance and availability due to the phasedown of HFC refrigerants under the AIM Act.</li> <li>Technologies using Zero and Near-Zero GWP refrigerants, such as CO2 (R-744), Propane (R-290), and Ammonia (R-717), are available in the US today, but are not retrofit compatible with synthetic refrigerant Direct Expansion (DX) systems and usually require full replacement of all equipment.</li> <li>CO2 Transcritical (R-744) systems continue to make advancements in energy performance and reduction in cost, including new system architectures that fully integrate with the HVAC system to take advantage of heat reclaim benefits and take advantage of the R-744 system high operating pressure to improve efficiency.</li> <li>Indirect systems (ID), using secondary or cascade architectures with a primary refrigerant acting as a chiller on the high side to cool a secondary system on the low side (R-744, glycol,</li> </ul>
Stationary Refrigeration (>50 lbs.) – Remote systems, Secondary, Cascade, Indirect, Chillers	R-404A (3922, A1) R-507A (3985, A1) R-407A (2107, A1) R-407C (1774, A1) R-448A (1386, A1, R) R-449A (1396, A1, R) R-134a (1430, A1, R) R-513A (630, A1, R) R-290 (3, A3) <sup>5</sup> R-744 (1, A1) R-717 (0, B2L)	R-515B (287, A1) R-454C (146, A2L) R-471A (140, A1) R-290 (3, A3) R-1234yf (1, A2L) R-1234ze (1, A2L)	<ul style="list-style-type: none"> <li>CO2 Transcritical (R-744) systems continue to make advancements in energy performance and reduction in cost, including new system architectures that fully integrate with the HVAC system to take advantage of heat reclaim benefits and take advantage of the R-744 system high operating pressure to improve efficiency.</li> <li>Indirect systems (ID), using secondary or cascade architectures with a primary refrigerant acting as a chiller on the high side to cool a secondary system on the low side (R-744, glycol,</li> </ul>

<sup>1</sup> AR4, 100-year GWP, if not contained in AR4, AR5 100-year GWP used

<sup>2</sup> ASHRAE Standard 34 classifies new refrigerants based on flammability and toxicity. Toxicity Groups: A – Nontoxic, B – Toxic. Flammability Classes: 1 – No flame propagation (i.e., non-flammable), 2L – Lower flammability 2 – Flammable, 3 – Higher flammability

<sup>3</sup> Refrigerants that are retrofit compatible or “drop-in” to an existing system are denoted with an “R”

<sup>4</sup> Summary of current status of US EPA SNAP regulations, UL, ASHRAE, building codes, and applicable state and federal regulations

<sup>5</sup> Test market approval only

			<p>or other), have been popular alternatives to Direct Expansion (DX) systems. While ID systems significantly reduce leak rates, there can also be energy penalties due to the need for additional heat exchangers.</p> <ul style="list-style-type: none"> <li>Food retailers are exploring options to convert existing high GWP DX systems to ID systems using mid-range GWP refrigerants available today (R-448, R-449, R-513A) on the high side, with the intention of replacing with lower GWP solutions as they become available.</li> <li>While some Ammonia (R-717) chillers exist today, they are typically oversized for food retail applications, and are therefore cost prohibitive, as they were primarily designed for larger industrial uses. Use of B2L refrigerants like R-717 in public facing applications, or located in residential settings, can be cost prohibitive due to the toxicity concerns.</li> </ul>
Remote Condensing Units	R-404A (3922, A1) R-507A (3985, A1) R-407A (2107, A1) R-448A (1386, A1) R-449A (1396, A1) R-744 (1, A1) R-290 (3, A3)	R-513A (630, A1) R-450A (601, A1) R-454B (465, A1) R-454A (237, A2L) R-454C (146, A2L) R-455A (146, A2L) R-471A (140, A1) R-290 (3, A3) R-1234yf (1, A2L)	<ul style="list-style-type: none"> <li>Remote condensing units have been typically used to serve new or specialty loads in addition to the refrigeration rack (DX or ID). While they are typically less energy efficient than a remote system, they are a good solution to ensure regulatory compliance by using less than 50 lbs. of refrigerant.</li> <li>There is a growing interest in using remote condensing units to migrate away from an existing HFC remote system over time to comply with federal and state regulations. This modular approach can result in less upfront capital investment and is logistically less disruptive to store operations during remodels than replacing the entire refrigeration system at one time.</li> <li>Increased energy use, future maintenance expense and product integrity concerns exist with remote condensing units due to limited capacity control to meet fluctuating refrigeration load.</li> <li>While Food Retailer demand for Zero or Near-Zero GWP condensing units is high, there remain relatively few products available in the US market.</li> </ul>
Self-contained Refrigerated Cases – Stand-alone or Micro-Distributed Systems	R-448A (1386, A1) R-449A (1396, A1) R-513A (630, A1) R-290 (3, A3)	R-454A (237, A2L) R-454C (146, A2L) R-455A (146, A2L) R-290 (3, A3) R-1234yf (1, A2L) R-744 (1, A1)	<ul style="list-style-type: none"> <li>Micro-Distributed systems (MDS) are gaining traction as an alternative to remote systems and offer potential benefits, such as regulatory compliance, reduced costs of installation, energy, maintenance and service, and increased flexibility in merchandizing.</li> <li>The use of R-290 is promising, especially in the modular conversion of existing stores, but is currently limited by charge restrictions of 150 grams per circuit.</li> <li>UL standard 60335-2-89 approved an increase in the allowable charge limits for A3s (R-290) and A2Ls in October 2021. EPA SNAP applications are under review and ASHRAE 15 is in the process of updating the standard to match UL. State and local building code updates will be necessary for most states.</li> </ul>

Last update Feb 2022, contact [info@nasrc.org](mailto:info@nasrc.org)

## EUROPE & CENTRAL ASIA



It is with great sadness that we learned about the passing away of Prof. Dr Sovetbek Toktomyshev on 1<sup>st</sup> February 2022.

Prof. Dr Toktomyshev, a national of the Kyrgyz Republic, was one of the pioneers who researched the ozone layer in 1970s. He established the scientific station at Issyk-Kul in 1979, which consistently monitored and assessed the state of the ozone layer, its depletion and recovery, over many years.

He worked with other scientists to provide the World Meteorological Organization with critical data and important scientific information on the ozone layer, greenhouse gases, ultraviolet radiation, and various aspects of the atmosphere, in particular for the mountain region of Central Asia. As a result, the Issyk-Kul station was recognized by the United Nations as an important regional station of global service to the atmosphere.

In 2016 Prof. Dr Toktomyshev received an "Appreciation Letter" from the United Nations Environment Programme, Ozone Secretariat for his contribution to the ozone layer protection. May his soul rest in peace.



## 15. EU's ENOUGH Project to Address Cooling and Heating Emissions in Food Industry

A new EU research and innovation project is looking at how the food industry, a major contributor to climate change, can become climate neutral by 2050, including ways to reduce the emissions caused by cooling and heating.



The four-year project, called ENOUGH, was launched in October 2021 to support the EU's Farm to Fork Strategy (F2F) for transitioning to a sustainable food system by providing technical, financial, and political tools and solutions to reduce GHG emissions in the food industry.

ENOUGH is being coordinated by SINTEF\_Ocean, a division of Norwegian research group SINTEF, and includes a consortium of 28 partners with expertise in the food industry, cold-chain management and advanced refrigeration systems and processes. Among the industry partners are CO<sub>2</sub> (R744)-system providers EPTA, ENEX and ENGIE.

Funding for ENOUGH comes from the EU Horizon 2020 Program, which supports research and innovation initiatives advancing the European Green Deal.

"ENOUGH will study almost the entire food value chain, everything from farm gate to consumer, including processing, storage, transport, retail and domestic," wrote Kristina N. Widell, Project Coordinator of ENOUGH and Senior Research Scientist at SINTEF Ocean, in a blog published in December on SINTEF's website. The food categories selected are all perishables – meat, fish, dairy products, fruit and vegetables.

Food systems are responsible for about 21 to 37% of total global greenhouse gas emissions, noted Widell. Across the whole food chain, approximately 60% of food is refrigerated at some point, and it is estimated that 70% of emissions from food are related to perishable food.

The main source of these emissions "is related to heating and cooling demands within the food chain, but leakage of high-GWP refrigerants is another relevant source of emissions," she wrote.

### Leveraging thermal energy

One key to reducing emissions in the food industry is "utilizing surplus cold and heat," said Widell. Another is leveraging thermal energy storage at process facilities to prevent power peaks, which can make "electricity costs especially high," she added.

In a collaboration among partners SINTEF, NTNU and Norwegian dairy producer Rørosmeieriet, the ENOUGH project will study how cold thermal energy storage can enable a dairy to produce and store cold at night when electricity costs are low for use during the

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day when power is expensive, and cooling is essential for processes. "It is like a battery, but you store thermal energy instead of chemical," noted Widell.

The project aims to increase awareness of these solutions and their potential for uptake in the EU, among policymakers, businesses, investors, entrepreneurs, institutions, stakeholders, and citizens.

ENOUGH will also calculate a baseline of emissions by the food sector between 1990 and 2020 to predict emissions in 2030 and 2050. These predictions consider key factors such as world population trends, climate change, the use and integration of renewable energy systems, consumer behavior and technological development.

[r744, 10 February 2022, By Thomas Trevisan](#)

Image: r744 website

## 16. New environmental labelling system unveiled

Belgium academics have unveiled a new environmental labelling system that enables easy recognition of the degree of environmental sustainability of food and beverages at point of sale.

Ozone layer depletion is among the impacts incorporated in the algorithm.

### An algorithm that combines 16 environmental impacts

*"EnviroScore is an algorithm that incorporates in one final score the environmental impacts generated throughout all the production and consumption stages of a kilogram of product," she said. Specifically, it combines 16 environmental impacts, including climate change potential, ozone layer depletion, water pollution, fossil resource exhaustion and toxicity, among others.*

[Food Navigator, 8 February 2022, By Oliver Morrison](#)

Image: Food Navigator website

## 17. Switch to dry powder inhaler more than halves carbon footprint of asthma treatment

*Switch to dry powder inhaler more than halves carbon footprint of asthma treatment It doesn't worsen symptoms and it would be good for most patients and the planet*



Switching from a metered dose inhaler to a dry powder version for maintenance therapy more than halves the carbon footprint of people with asthma, and without any worsening of their condition, finds a pharma industry sponsored study published online in the journal Thorax.

This substitution would be an acceptable and worthwhile 'green' option for most patients who can safely manage their condition at home, and should be widely encouraged, conclude the researchers.

The use of chlorofluorocarbons (CFCs) in aerosol propellants was banned under the 1987 Montreal Protocol agreement because of their impact on global warming. [due to their contribution to ozone layer depletion]

But while the hydrofluorocarbons that replaced CFCs in pressurised metered dose inhalers don't deplete the ozone layer, they are potent greenhouse gases, say the researchers. Emissions from this source account for 3–4% of the total carbon footprint associated with healthcare in the UK.

The researchers wanted to compare the potential impact on carbon footprint and symptom control of switching maintenance therapy to a dry powder inhaler and continuing with a metered dose inhaler containing hydrofluorocarbon propellant.

They carried out a secondary (post hoc) analysis of data from a group of patients who were part of the Salford Lung Study in Asthma. This included a broad range of 4000 patients with asthma who were managing their condition at home and closely reflected routine UK clinical practice.

Adults with asthma on regular maintenance therapy to control their symptoms were randomly assigned to either start using a dry powder inhaler (1081; 'switch group') or to continue using a pressurised metered dose inhaler (1151; 'usual care') for a period of 12 months.

Both groups were matched for average age (49) and symptom severity. Symptom control was assessed at the start of the study, and after 12, 24, 40, and 52 weeks, using a validated test (Asthma Control Test).

Annual CO<sub>2</sub> emissions in kg were calculated for the total number of maintenance (preventer and rescue) inhalers prescribed over the 12-month study period.

Patients were allowed to change inhaler during the study, but most stuck with the type to which they had been assigned: 80% remained on a metered dose inhaler in the usual care group and 85% remained on a dry powder inhaler in the switch group.

Analysis of the data showed that after a year annual CO<sub>2</sub> emissions for each person in the 'switch' group were less than half those of the usual care group: 108 kg vs 240 kg.

Asthma control improved in both treatment arms during the study period. By week 24, the odds of responding well to treatment in the switch group were around double those of the usual care group, and this difference persisted over the entire 12 months.

As a result, the switchers were prescribed around one less rescue salbutamol metered dose inhaler than those who continued on usual care: 7.2 vs 8.

The researchers calculated that the annual carbon footprint saving for each patient in the switch group was 130 kg CO<sub>2</sub> emissions.

Scaling this up "would represent approximately 40% of the total carbon footprint due to [metered dose inhalers] in the UK," they suggest.

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“The potential for carbon saving could be much greater if patients also switched to a rescue medication administered via a [dry powder inhaler],” as most patients in this study used pressurised metered dose rescue inhalers, “typical of usual care in the UK,” they add.

In a linked podcast, lead author Professor Ashley Woodcock suggests that asthma patients are often unaware of the environmental impact their inhalers have.

“Each puff of a [metered dose inhaler] is equivalent to driving 1 mile in a family car, so one inhaler is close to driving 200 miles... but a powdered inhaler is about a twentieth of that,” he points out.

This is an “easy win” for the NHS to cut its carbon footprint, he suggests, especially because the UK is very much an outlier in its use of high carbon inhalers, he adds.

Low carbon inhalers are predominantly used in Europe. The large carbon footprint caused by the use of hydrofluorocarbon propellants in metered dose inhalers in the UK is three times that in Europe.

Where feasible, switching these patients to powder inhalers would “make a big difference to our carbon footprint,” he suggests.

“Essentially this is about evolution, not revolution. In discussion with patients, healthcare professionals should have a conversation about the environmental footprint of their inhalers,” he emphasises.

The researchers conclude: “The results of this analysis support the growing calls from official bodies that, where possible, switches... to low carbon-impact alternatives should be sought.

“Together with the role of pharmaceutical companies in producing accessible alternatives, prescribers, pharmacists, and patients should be made aware of the significant differences in the global warming potential of different inhalers.”

**Authors:** Ashley Woodcock, Christer Janson, Jamie Rees, Lucy Frith, Magnus Löfdahl, Alison Moore, Martin Hedberg, David Leather

[BMJ, February 2022](#)

*Image: BMJ website*

## FEATURED



ozone  
secretariat

[OZONE SECRETARIAT](#)

Overview for the meetings of the ozone treaties in 2022

[68<sup>th</sup> IMPCOM](#), Venue – to be determined, | 09 July 2022  
[44<sup>th</sup> OEWG](#), Venue – to be determined, | 11 - 15 July 2022  
[69<sup>th</sup> IMPCOM](#), Venue – to be determined, | 29 October 2022  
[33<sup>rd</sup> MOP Bureau](#), Venue – to be determined, | 30 October 2022  
[34<sup>th</sup> MOP](#), Venue – to be determined, | 31 October - 04 November 2022

Click [here](#) for past and upcoming Montreal Protocol Meetings Dates and Venue.

Upcoming meetings	
2022	
68th IMPCOM	Venue – to be determined,   09 Jul 2022
44th OEWG	Venue – to be determined,   11 - 15 Jul 2022
69th IMPCOM	Venue – to be determined,   29 Oct 2022
33rd MOP Bureau	Venue – to be determined,   30 Oct 2022
34th MOP	Venue – to be determined,   31 Oct - 04 Nov 2022

Summary of the Combined Twelfth Meeting of the Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer (part II) and the Thirty-Third Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer: 23-29 October 2021.

- > [The Earth Negotiations Bulletin, 1 November 2021, Vol. 19 No. 157](#) /
- > [IISD Daily coverage and photos](#)

### UNEP Ozone Secretariat launches free teaching kits on ozone layer and environmental protection

- New free online teacher toolkits and lesson plans based on the success of UNEP's Ozone Secretariat's [Reset Earth](#) animation and video game
- Targeting Tweens by adopting animation and gamification to create innovative online lessons to raise awareness on ozone layer and environmental protection
- Available online in digital and print format for universal access



Read/download >>> [Ozone Secretariat's education platform](#)

Image: UNEP, Ozone Secretariat website

## 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. [Learn more >>>](#)



## [THE MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL](#)

### [REPORT OF THE INTERSESSIONAL APPROVAL PROCESS AND ONLINE MEETINGS FOR THE 87<sup>TH</sup> MEETING](#)

The present document consists of the following two parts:

I. Process for the 87<sup>th</sup> meeting, describing the agreed process followed by the Executive Committee for conducting the 87<sup>th</sup> meeting, which included consideration of several



items of the agenda through an intersessional approval process (IAP) and several other items through online meetings.

II. Comments, discussions, and decisions by the Executive Committee, containing a compilation of comments and discussions where applicable, and decisions on each of the documents considered during the 87<sup>th</sup> meeting, presented in the order of the agenda of the meeting.

- Click [here](#) for the Executive Committee upcoming and past Meetings and related documents.



## OzonAction

[OzonAction Compliance Assistance Programme](#) produces and outreaches a wide variety of information and capacity building materials and tools that support the implementation of the Montreal Protocol programs and assist Article-5 countries in meeting the compliance targets. These include publications, technology briefs and factsheets, mobile applications, videos, e-Learning, modelling and database programs and special educational or certification programs.

**The section below features several of our most recent products.**

Visit [OzonAction website](#) for more information, discover the entire range of products.

*Images in this section are by OzonAction*

**New OzonAction Knowledge Maps tool** - The UNEP OzonAction Knowledge Maps tool was developed to provide the National Ozone Units (NOUs) and different UNEP partners with a simple tool to help them access data and information about relevant stakeholders, who are mainly involved in the implementation of programmes and projects under the Montreal Protocol (MP) supported by Multilateral Fund (MLF).

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Currently, the first two available knowledge maps are described below:

**Refrigeration, Air-Conditioning, and Heat Pumps (RACHP) Associations & Organizations:** This Knowledge Map provides a global directory of RACHP associations, societies, and organisations around the world. These are key stakeholders for ensuring safe and efficient refrigerant transitions, for the training of technicians and supporting the national policies related to the Montreal Protocol.



**Local Technical & Vocational Education and Training (TVET):** This Knowledge Map provides a global directory of TVET entities and centres around the world. These are the strategic partners for conducting and promoting training and certification programmes related to the refrigeration servicing sector.

To develop this tool, UNEP OzonAction collected and reviewed different datasets from multiple sources, and then presented the collected datasets into a common platform and format (mainly in the form of a global map so that data can be geographically displayed).

Kindly note that the data and information provided will be updated regularly through the feedback that will be received from NOUs and partners to update and/or add new records. Other maps are currently under development which will include access to other key data and information of importance to the implementation of Montreal Protocol programmes.

Click [HERE](#) to access the OzonAction Knowledge Maps tool

Click [HERE](#) to download the OzonAction Knowledge Maps tool flyer

**Gas Card Tool: Web-based Visual Printable Cards of Refrigerant Gases** developed by the UN Environment Programme (UNEP) OzonAction, to provide engineers, workers, and technicians with easily accessible information on substances/ gases that they are working with or handling in the workplace on visual printable cards.



**Content of Gas Cards** - Each Gas Card is printable (in PDF or image format) and includes the following information about each substance/gas: a) General Characteristics (Chemical name, formula and type, ASHRAE designation, Trade names, Harmonized System (HS) codes, Chemical Abstract Service (CAS), United Nations (UN) numbers, Blend/ mixture components, Montreal Protocol Annex and Control measures, main usage, etc.) b) Gas Performance—Radar Chart (in terms of: Ozone depleting potential-ODP, Global warming potential- GWP, Toxicity Class & Flammability Class) c) Environmental and Safety Impact, and Safety Impact (with visualization of Toxicity & Flammability Class, Hazardous Symbols).

**More Information** - The Gas Card web based tool is part of UNEP OzonAction's portfolio of activities and tools to assist various stakeholders in developing countries, including customs officers and technicians, to achieve and maintain compliance with the Montreal Protocol on Substances the Deplete the Ozone Layer. In the left navigation bar of the Gas

Card tool web page, you will find a list of commonly used HFCs and HFC Blends in different sectors. \*

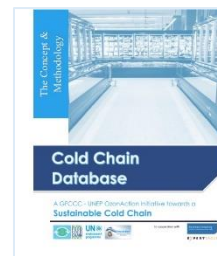
### Using the Gas Gard web-based tool

- The Gas Gard tool is available online on the [OzonAction website](#)
- Read the full [2021 annual iPIC report](#)
- See the [flyer](#) introducing the new iPIC platform

*\* Based on the Overall Analysis of the Results of the Survey of ODS Alternatives Report (conducted in 119 countries from 2012 to 2015)*

### OzonAction and GFCCC launch the methodology questionnaires the Cold Chain Database Initiative

The Global Food Cold Chain Council (GFCCC) and the United Nations Environment Programme (UNEP) OzonAction announced the launch of their Cold Chain Database and Modeling initiative. The initiative marks the first formal step to assist developing countries in identifying their cold chain baseline along with consumption of relevant HCFCs or HFCs or other refrigerants. The initiative was conceived in 2019 and kicked off during the 31<sup>st</sup> Meeting of Parties to the Montreal Protocol (Rome, Italy), which concluded with the Rome Declaration on “The Contribution of the Montreal Protocol to Food Loss Reduction through Sustainable Cold Chain Development”. The launch also comes in advance of the United Nations Food Systems Summit.



With the support provided by the Montreal Protocol’s Multilateral Fund, the Cold Chain Database initiative is currently being piloted in six countries – Bahrain, Bosnia and Herzegovina, Maldives, North Macedonia, Paraguay, and Senegal. From the pilot data gathering initiatives, a model is being developed that will allow the projection of benefits of cold chain expansion.

GFCCC is an independent not-for-profit industry organisation that seeks to simultaneously reduce food waste, and related greenhouse gas emissions in the processing, transportation, storage, and retail display of cold food by expanding and improving access to energy efficient low-global warming potential technology. The Cold Chain Database concept, methodology and data collection questionnaires are offered to interested countries and partners to help in assessing local cold chain capacities and designing respective action plans and policies.

> [GFCCC-UNEP OzonAction Cold Chain Modelling Press Release](#)

> [GFCCC-UNEP Cold Chain Database Methodology Final](#)

> For countries or partners interested to use the model data collection detailed questionnaires, please fill in the [Expression of Interest and NDA of Cold Chain Database](#) form and return to [Ayman Eltalouny](#)

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**Contact:** [Ayman Eltalouny](#), Coordinator International Partnerships, UNEP, OzonAction

**United Nations Environment Programme (UNEP), OzonAction**

Image: OzonAction



Substance ID	Quantity (ODP tonnes)	Quantity (CO <sub>2</sub> -equivalent tonnes)	Country ID	Year ID	Quota ID	License ID
1000	100	100,000	100000	100000	100000	100000
1001	100	100,000	100000	100000	100000	100000
1002	100	100,000	100000	100000	100000	100000
1003	100	100,000	100000	100000	100000	100000

### [HCFC Quota and Licence Tracker](#) - UNEP

**OzonAction launches a new desktop application to assist with HCFC licences and quotas** - National Ozone Officers have the great responsibility of managing the allocation and monitoring of quotas for substances controlled under the Montreal

Protocol. This process can be complex with many importers, especially if the country imports a range of different hydrochlorofluorocarbons (HCFCs) and mixtures containing HCFCs. To address this challenge, OzonAction developed a new desktop application that helps Ozone Officers with the tasks of planning, calculating, monitoring and managing consumption quotas and licences. It can be used on a daily basis to track and manage the current year's quota allocations for different importers, or for future planning by trying different scenarios that adjust the type of substances imported, their quantity, or the number of importers. The HCFC Quota and Licence Tracker allows Ozone Officers to see the effect of such scenarios on the national HCFC consumption and helps ensure that the quotas stay within agreed HCFC Phase-out Management Plan (HPMP) targets. For countries that have ratified the Kigali Amendment, in the future OzonAction will extend the tracker to include hydrofluorocarbons (HFCs) once countries begin designing their quota systems for those controlled substances.

**Access the:**

- [HCFC Quota tracker app](#)
- [Flyer for more information on the tracker](#)
- [Short video tutorial on the OzonAction YouTube Channel](#)

### [GWP-ODP Calculator Application](#) – Updated

**“Quickly, efficiently and accurately convert between values in metric tonnes, ODP tonnes and CO<sub>2</sub>-equivalent tonnes”**

Data are extremely important for the Montreal Protocol community, and the data reporting formats for both A7 and CP have changed recently, to a large degree triggered by the Kigali Amendment. HFCs, blends, CO<sub>2</sub>-equivalent values, etc, now have to be addressed much more frequently by Ozone Officers during their daily work. Sometimes the terminology and values are complex and can be



confusing, and it helps to have it all the official facts and figures in one place. Conversion formulas need to be applied to calculate CO<sub>2</sub>-eq values from both GWP and metric tonne values. This free app from OzonAction is a practical tool for Ozone Officers to help demystify some of this process and put frequently needed information at their fingertips.

#### **What's new in the app:**

- An updated more user-friendly interface
- Multilingual interface: English, French and Spanish
- A new **Kigali Amendment mode** - in this mode the GWP values used to calculate the refrigerant blends/mixtures only include GWP contributions from components that are controlled HFCs
- Latest updated ODP and GWP values from the recent reports from the Montreal Protocol technology and scientific expert panels as well as the Intergovernmental Panel on Climate Change (IPCC) reports
- References added for sources of all values
- New refrigerant mixtures (with ASHRAE -approved refrigerant designations)

The new and updated UNEP OzonAction **GWP-ODP Calculator** application will help you to convert between values in metric tonnes, ozone depleting potential (ODP) tonnes and CO<sub>2</sub>-equivalent tonnes of substances controlled by the Montreal Protocol and their alternatives.

This application, available at no cost, is particularly useful for National Ozone Officers to assist with understanding and calculating quantities of controlled substances, both pure substances and mixtures, for quota assignment, reporting requirements, etc. Other stakeholders interested in ODP and global warming potential (GWP) values of controlled substances and their alternatives will also find this tool useful.

Operation of the application is very simple – just select a substance from the dropdown list and enter the known value in the appropriate field; the calculator will automatically perform the conversion between metric tonnes, ODP tonnes and/or CO<sub>2</sub>-equivalent tonnes and display the corresponding converted values. The ODP, GWP and information about the substance is provided. For mixtures, the components of the mixture and their relative proportions (metric, ODP, CO<sub>2</sub>- equivalent tonnes) are also calculated.

The updated **GWP-ODP Calculator** application now includes a new Kigali Amendment mode. The app can now be used in two different modes: the regular "Actual Values" mode and the "Kigali Amendment" mode. In the Kigali Amendment mode, the GWP values provided are those specified in the Kigali Amendment to the Montreal Protocol, i.e., GWP values are only assigned to controlled HFCs. In this mode the GWP values used to calculate the refrigerant blends/mixtures only include GWP contributions from components that are controlled HFCs. The user can effortlessly switch between modes.

The OzonAction GWP-ODP Calculator uses standard ODP values and GWP values as specified in the text of the Montreal Protocol to make the conversions. Other ODP and GWP values from the recent reports of the Montreal Protocol Technology and Economic Assessment Panel and Scientific Assessment Panel as well as the Intergovernmental Panel on Climate Change (IPCC) are used when appropriate, with references to sources of all

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values used. The app includes new refrigerant mixtures (with ASHRAE- approved refrigerant designations).

This application is designed primarily for use by Montreal Protocol National Ozone Units and other related stakeholders. The application was produced by UN Environment Programme (UNEP) OzonAction as a tool principally for developing countries to assist them in meeting their reporting and other commitments under the Protocol and is part of the OzonAction work programme under the Multilateral Fund for the Implementation of the Montreal Protocol.

If you already have the application installed on your device, be sure to update to benefit from the new features. The app can be viewed in English, French or Spanish.



Smartphone Application: Just search for “GWP-ODP Calculator” or UNEP in the Google Play store or use the QR code – free to download! If you already have the application installed on your device, be sure to update to benefit from the new features.



Desktop Application: GWP-ODP Calculator is also available online on the OzonAction [website](#)



Watch the new short introductory tutorial **video** on the GWP-ODP Calculator - available now on [YouTube](#)

>>> Read/download the [flyer](#) for more information

## OzonAction [WhatGas?](#) Updated

### New features:

- An updated more user-friendly interface
- Multilingual interface: English, French and Spanish
- HFCs and HFC containing mixtures
- Latest updated ozone depleting potential and global warming potential values from the recent reports from the Montreal Protocol technology and scientific expert panels as well as the Intergovernmental Panel on Climate Change; as well as the standard ODP and GWP values as specified in the text of the Montreal Protocol
- References to sources of all values used
- New refrigerant mixtures (with ASHRAE approved refrigerant designations)
- Values for ‘actual GWP’ and ‘Kigali Amendment context’ GWP for pure substances and mixtures (i.e., only including GWP values/components assigned to controlled hydrofluorocarbons - HFCs).

**The WhatGas?** application is an information and identification tool for refrigerant gases: ozone depleting substances (ODS), HFCs and other alternatives. It is intended to provide a





number of stakeholders, including Montreal Protocol National Ozone Officers, customs officers, and refrigeration and air-conditioning technicians with a modern, easy-to-use tool that can be accessed via mobile devices or the OzonAction website to facilitate work in the field, when dealing with or inspecting ODS and alternatives, and as a useful reference tool. If the user requires additional information or assistance in identifying a refrigerant gas they are inspecting or that is described in the relevant paperwork, this can be easily obtained by consulting the application.

### Using the application:

If you already have the application installed on your device, be sure to update to benefit from the new features.

**Smartphone Application:** Just search for “WhatGas?” or UNEP in the Google Play store or use the QR code – free to download!



**Desktop Application:** WhatGas? is also available online on the OzonAction [website](#)

**For more information:** Watch the new short introductory tutorial [video](#) on WhatGas? available on [YouTube](#)

See/download the [WhatGas? flyer](#)

**Over 10,000 installations on Android and iOS devices to date!**

### [RAC Technician Videos](#) - Full length films

Two ‘full length’ videos for refrigeration and air-conditioning (RAC) sector servicing technicians: on 1) Techniques, Safety and Best Practice and 2) Flammable Refrigerant Safety.

The OzonAction Refrigeration and Air-Conditioning Technician Video Series consists of instructional videos on techniques, security and best practice and flammable refrigerant safety. They are intended to serve as a complementary training tool RAC sector servicing technicians to help them revise and retain the skills they have acquired during hands-on training. The videos are not intended to replace structured formal technician training, but to supplement and provide some revision of tips and skills and to build on training already undertaken.




These videos are based on the successful UNEP OzonAction smartphone application, the RAC Technician Video Series app. This application has been downloaded on more than **86,000** devices since its launch.


Following many requests to make the videos more versatile and better suited to classroom and training settings, OzonAction has responded to this demand and produced two ‘full-length’ instructional videos.

You may wish to share this message and the flyer with:

- Your national/regional RAC associations
- Training or vocational institutes
- Master RAC trainers in your country
- Any other interested national stakeholders

 You can watch these videos on the OzonAction YouTube Channel:

- [Techniques, Safety and Best Practice](#)
- [Flammable Refrigerant Safety](#)

 The videos are also available for download by request from UNEP OzonAction: [unep-ozonaction@un.org](mailto:unep-ozonaction@un.org)



If you prefer to access the video clips via the OzonAction smartphone application, just search for “RAC Technician Video Series” or UNEP in the Google Play Store and iTunes/App Store or scan the QR code – **Free to download!** The flyer is available from the [OzonAction website](#).

### [Refrigerant Cylinder Colours: What has Changed](#)

*A new UNEP OzonAction factsheet on the new AHRI revised guideline on a major change to refrigerant cylinder colours*

One of the ways in which refrigeration cylinders are quickly identified is by cylinder colour. Although there was never a truly globally adopted international standard, the guideline from the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) although not required by law was used by the vast majority of industry and chemical producers around the world.

An AHRI revised guideline, first published in 2015, now removes paint colour assignments for refrigerant containers and specifies that all refrigerant containers should have the same paint colour from 2020 onwards.

NOOs and technicians should be aware of this change and inform national stakeholders, as well as familiarising themselves with relevant container labels and markings for refrigerants.

Read/download the [factsheet](#)



### **Update on [new refrigerants designations and safety classifications](#)**

The latest version of the factsheet providing up to date information on refrigerant designations and safety classifications is now available (September 2020 update).

The factsheet, produced by **ASHRAE** in cooperation with **UN Environment Programme OzonAction** is updated every 6 months.

The purpose is to provide an update on ASHRAE standards for refrigerants and to introduce the new refrigerants that have been awarded an “R” number (or ASHRAE designation) over the last few years and which have been introduced into the international market.



Read/download the [factsheet](#)

The factsheet, as well as more information on ASHRAE-UNEP joint activities and tools, is also available on the [ASHRAE UNEP Portal](#).

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

### **[OzonAction's iPIC platform - Updated](#)**

Collaboration between China and Thailand using OzonAction's informal Prior Informed Consent (iPIC) system has resulted in the prevention of a huge consignment of ozone-depleting and climate damaging hydrochlorofluoro-carbons (HCFCs). Those chemicals, which are primarily used as refrigerants for air conditioners and fridges, are controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer and are being phased out by all countries according to a specific timeline.

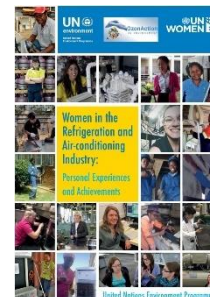


### **[Women in the refrigeration and air-conditioning industry: Personal experiences and achievements](#)**

The United Nations Environment Programme's (UNEP), OzonAction, in cooperation with UN Women, has compiled this booklet to raise awareness of the opportunities available to women and to highlight the particular experiences and examples of women working in the sector and to recognise their successes.

All of the professionals presented in the booklet are pioneers. They are role models whose stories should inspire a new generation of young women to enter the weld and follow in their footsteps.

Read/download the [publication](#)



As part of IIR and UNEP OzonAction's partnership, a set of Cold Chain Technology Briefs was released over the past few years, which includes in-depth summaries about the cold chain in different key sectors. They include descriptions of technology, refrigerant options and trends and conclude with prospects and challenges. They cover the main cold chain sub-sectors, i.e., [Production & Processing](#), [Cold Storage](#), [Transport Refrigeration](#), [Commercial & Domestic](#), and [Fishing Vessels](#).

Download the Cold Chain Technology brief in [English](#) | [French](#) | [Russian](#) | [Spanish](#)

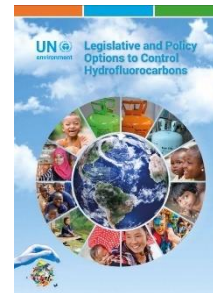


## PUBLICATIONS

### [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.

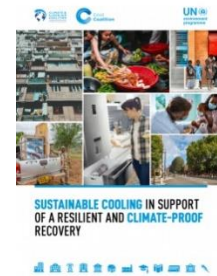
[Read/download](#)



Latest issue of Centro Studi Galileo magazine, **Industria & Formazione**, n. [10-2021](#) (in Italian).



[Sustainable Cooling in support of a Resilient and Climate Proof Recovery](#), Report by the Climate and Clean Air Coalition (CCAC), 2021



[Status of the Global Food Cold-Chain: Summary Briefing-Food Cold Chain Food saved is as important as food produced](#). The UNEP-led Cool Coalition in collaboration with the Climate & Clean Air Coalition (CCAC), United Nations Environment Programme (UNEP), United Nations Food and Agriculture Organization (FAO), OzonAction and the Ozone Secretariat, with the support of the Italian Government, are producing a status report on the global food cold-chain, which will include case studies to show the current state and development across areas such as technologies, design approaches, finance and business models, policy, and planning. This brief is a short summary of the full report that will be published in December 2021. The aim is to help better identify and accelerate solutions to simultaneously feed the world, support smallholder and marginal farmers, and protect our environment.



[Cool Coalition Secretariat, September 2021](#)

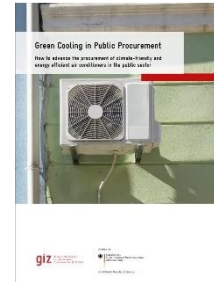
[Leaks, maintenance and emissions: Refrigeration and air conditioning equipment report](#) details common faults identified in both residential and commercial refrigeration and air conditioning equipment. The report also lists the impacts of these faults and how routine maintenance of the equipment has the potential to significantly reduce electricity use, refrigerant leaks and emissions.



*The research was supported by an extensive survey of international and domestic literature included as Appendix B to the report.*

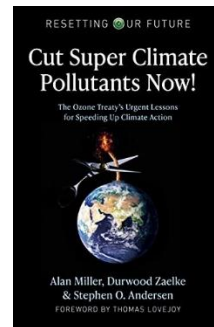
[Australian Government, Department of Agriculture, Water and the Environment, Expert Group, 2021](#)

**Green Cooling in public procurement** How to advance the procurement of climate-friendly and energy-efficient cooling equipment in the public sector? Air conditioning in public buildings is often responsible for around 50% of total electricity consumption. Switching to climate-friendly cooling technologies ("Green Cooling") can reduce costs and energy consumption and improve the carbon footprint of public buildings. This study takes a closer look at the benefits of Green Cooling in the public sector and discusses current barriers and possible solutions. The information presented provides a solid basis to revise current procurement criteria for sustainable cooling systems in public buildings. **Read/Download the [study](#)**



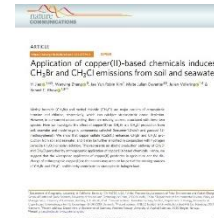
**Cut Super Climate Pollutants Now!**: The Ozone Treaty's Urgent Lessons for Speeding Up Climate Action (Resetting Our Future). We have a decade or less to radically slow global warming before we risk hitting irreversible tipping points that will lock in catastrophic climate change. The good news is that we know how to slow global warming enough to avert disaster. Cut Super Climate Pollutants Now! explains how a 10-year sprint to cut short-lived "super climate pollutants" -- primarily HFC refrigerants, black carbon (soot), and methane -- can cut the rate of global warming in half, so we can stay in the race to net zero climate emissions by 2050.

*Authors: Alan Miller, Durwood Zaelke, Stephen O. Andersen.*



**Application of copper(II)-based chemicals induces CH<sub>3</sub>Br and CH<sub>3</sub>Cl emissions from soil and seawater** - Methyl bromide (CH<sub>3</sub>Br) and methyl chloride (CH<sub>3</sub>Cl) are major carriers of atmospheric bromine and chlorine, respectively, which can catalyze stratospheric ozone depletion. However, in our current understanding, there are missing sources associated with these two species. [...]

*Authors: Yi Jiao, Wanying Zhang, Jae Yun Robin Kim, Malte Julian Deventer, Julien Vollering & Robert C. Rhew. [Nature Communications](#), 13 January 2022*



**What Are the Health Benefits of Protecting the Ozone Layer?** Overexposure to ultraviolet (UV) radiation is considered to be a health risk, causing skin and eye damage, alongside effects on the immune system comment that ultimately compromise health. The primary protection against solar UV radiation is the stratospheric ozone layer...





Article in News-Medical.Net, 22 January 2022, By Hidaya Aliouche, B.Sc., Reviewed by Emily Henderson, B.Sc.

## MISCELLANEOUS



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

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

We 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 Programme, OzonAction

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

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Prepared by: Samira Korban-de Gobert  
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