

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 ratification

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

[Gambia, 5 May 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. Ever-evolving Montreal Protocol a model for environmental treaties



- *Since the Montreal Protocol was signed in 1987, countries have been phasing out most ozone-damaging chemicals, helping protect the Earth's protective shield. In this exclusive Mongabay interview, Megumi Seki, Acting Executive Secretary of the UN Environment Programme's Ozone Secretariat, reviews the history and future of the landmark treaty.*
- *The Montreal Protocol phase-down has also helped prevent further climate warming. But the HFCs – replacement gases employed by industry as refrigerants and for other uses – while not harmful to the ozone layer, have been found to be powerful greenhouse gases that contribute to climate change.*
- *In 2016, national delegates agreed on the Kigali Amendment to the Montreal Protocol, which calls for cutting the production and use of HFCs by 80–85% by the late 2040s. The amendment entered into force at the start of 2019, with the goal of avoiding additional warming by up to 0.4°C (0.72 °F) by the end of the century.*
- *The early steps of the Montreal Protocol, and its ongoing adjustments including the Kigali Amendment, provide vital clues as to how to effectively negotiate, implement, update, and succeed in moving forward with other future environmental treaties.*



In the early 1970s, scientists first discovered that chlorofluorocarbon (CFC), coolants used in refrigeration and foam production, had the potential to destroy ozone in the upper atmosphere, with devastating consequences. The ozone layer acts as a shield to protect life on Earth from the sun's damaging ultraviolet radiation.

Then in 1985, accumulating scientific research and the first evidence of a widening ozone hole over Antarctica, galvanized the world's nations. Their delegates came together in 1987 to create the Montreal Protocol, a binding international environmental treaty regulating the production and use of manufactured chemicals damaging to Earth's

ozone layer. Since then, nearly 200 countries have signed on and some 100 chemicals have been phased out or phased down.

When scientists realized in 2016 that the latest generation of refrigerants, hydrofluorocarbons (HFCs), while safe for the ozone layer, were very powerful greenhouse gases, the UN parties added the Kigali Amendment to the Montreal Protocol. Under this agreement, which came into force in 2019, signatories will phase down the production and consumption of HFCs, creating the potential to avoid up to 0.4 degrees Celsius (0.72 degrees Fahrenheit) of warming by the end of the century.

“If we achieve that, then it will be a great contribution to protecting the climate,” says Megumi Seki, Acting Executive Secretary of the UN Environment Programme’s Ozone Secretariat, based in Nairobi, Kenya.

Seki’s work on ozone layer issues started in 1988, and she was one of the staff members of the Ozone Secretariat when it was formally established in 1989. Consequently, she has facilitated various changes and updates which the parties to the Montreal Protocol have introduced to the treaty in the last three decades.

Mongabay: How has the Montreal Protocol treaty evolved over time?

Megumi Seki: The Montreal Protocol has continued to evolve, and we sometimes refer to this as the “start and strengthen” approach.

When the Montreal Protocol was first adopted, it dealt with only five CFCs and three halons. However, since the Montreal Protocol has a provision for periodic assessments on the science, on the environmental effects, and on the technology and economics of ozone layer depletion and protection, the parties have been strengthening the Montreal Protocol through adjustments and also amendments based on the findings in the assessments. So right now, the Montreal Protocol is controlling about 100 ozone depleting substances, plus 18 climate-warming HFCs.

Mongabay: What factors have made the treaty so successful?

Megumi Seki: There are several elements that have made the Montreal Protocol very successful, such as commitment of the parties and their political will, and the global partnership, including the partnerships between governments, industry, NGOs, and academia.

All these partnerships were of fundamental importance in making sure that everything moved in the right direction through concerted action. The Montreal Protocol and its mechanisms, institutions and provisions including the Multilateral Fund, recognition of special situations of developing countries, the assessment process, science-based policymaking, non-compliance procedure, and so on, are all important elements.

Of course, one key to success was the development and availability of greener and cleaner alternatives to ozone depleting substances [ODS] that were used, for example, as refrigerants, in aerosol sprays and in foams. The Montreal Protocol provided a stable framework that allowed industry to plan their research and innovation and ensured a smooth transition by society. There were benefits for industry in moving away from ODS gases, and the transition to alternatives benefited the environment and industry. If the

alternatives didn't exist, then it wouldn't have worked. And, of course, universal ratification and full compliance by the parties were essential.

Mongabay: What role has the Multilateral Fund played in the Protocol's success?

Megumi Seki: The Multilateral Fund was the first of its kind to be established for global environmental protection. It reflects a recognition of the differentiated responsibilities of the parties to implement a global environmental treaty. The developed countries contribute to the Multilateral Fund so that the Fund covers the incremental costs incurred by the developing countries in phasing-out ozone-depleting substances. The Fund and its implementing agencies support developing countries with their phase-out activities.

This is a global partnership that enabled the developing countries to meet their responsibilities, and they were equal partners in meeting their obligations and taking action towards a global goal. So, the Multilateral Fund is definitely a pillar of success of the Montreal Protocol.

Mongabay: It has been found that HFCs are powerful greenhouse gases. Why did the Montreal Protocol parties not recommend a complete phase out of HFCs in the Kigali Amendment?

Megumi Seki: It is a phase-down rather than a phase-out because there are some uses of HFCs where there are currently no alternatives available. For example, HFC-134a is used in metered dose inhalers, and there's no effective-enough alternative for this use at this time. So, the parties can choose to continue to use HFC-134a because it is not going to be a complete phase-out.

It is a "basket" of HFCs that are being controlled under the Kigali [Agreement], so parties can choose which of the HFCs they want to reduce, so long as they stay within the control limits specified in the control measures. And parties may want to choose to reduce the high-global-warming-potential HFCs because the phase-down amounts and the control limits are calculated on the basis of the global-warming-potential weighted tons.

Mongabay: Why has it been important to implement changes to the Montreal Protocol in stages?

Megumi Seki: It has been a step-by-step, not a cold-turkey approach. The Montreal Protocol has a provision for assessments of the latest information on the science, environmental effects, technology and economics of ozone layer depletion and protection, based on which parties can take informed decisions, including on strengthening of the control measures through adjustments and amendments.

Such assessments are carried out periodically by the three Assessment Panels of the Montreal Protocol in which the world's renowned scientists and experts participate. Major assessments are carried out at least every four years, and progress and emerging issues are reported to the parties annually. Based on the evolving status and knowledge of ozone layer depletion and recovery, effects of the ozone depletion and climate change, and availability of alternatives, parties take decisions to strengthen the control measures and ensured transition to greener, more environmentally friendly – both climate-friendly and ozone-friendly – substitute chemicals and alternative technologies.

Mongabay: What will it take for the Kigali Amendment to be as successful as the original phase out of CFCs?

Megumi Seki: Success can be measured in different ways. For the Kigali Amendment to be successful, as successful as the Montreal Protocol itself – although the Kigali Amendment is, of course, part of the Montreal Protocol – one of the main elements is universal ratification which is a challenge in itself to achieve. If all the countries in the world join the Kigali Amendment, and they are 100% compliant, it will be successful in achieving the objective of an 80 to 85% phase-down of the HFCs by 2047. And if we achieve that, there is going to be significant contribution to mitigation of climate change.

But, before reaching the universal ratification, if the countries that have not ratified the Kigali Amendment take action to reduce HFCs in line with the requirements of the Kigali Amendment, it can still be successful in making the expected contribution to climate change mitigation while continuing to protect the ozone layer. [Editor's note: As of the publication date of this story, the United States., China and India (leading HFC producers), have not ratified the Kigali Amendment, though the U.S. and China appear to be moving toward signing.]

Mongabay: Can increasing energy efficiency boost the possible success of the Kigali Amendment?

Megumi Seki: During the evolution of the Montreal Protocol, every time there is a design change in refrigeration and air-conditioning (RAC) equipment, energy efficiency of the equipment has improved. Phase-out of CFCs, and now the ongoing phase-out of HCFCs used as refrigerants, have resulted in significant energy efficiency improvements in the cooling sector over the years.

HFCs have replaced CFCs and HCFCs as refrigerants. Now that HFCs are to be phased down, there is an opportunity to enhance energy efficiency in refrigeration and air conditioning equipment again and that is going to contribute to climate change mitigation.

The Scientific Assessment Panel estimates that up to 0.4 degrees Celsius [0.72 degrees Fahrenheit] warming can be prevented by the year 2100 with HFC phasedown in accordance with the Kigali Amendment. If at the same time, energy efficiency improvements are made, the climate benefit could potentially double.

[Mongabay, 12 May 2021, by Glenn Scherer](#)

Image: Mongabay website

3. Climate emissions shrinking the stratosphere, scientists reveal

Thinning indicates profound impact of humans and could affect satellites and GPS

Humanity's enormous emissions of greenhouse gases are shrinking the stratosphere, a new study has revealed.



▲ The thickness of the stratosphere has contracted by 400 metres since the 1980s, the researchers found.
Photograph: Alamy

The thickness of the atmospheric layer has contracted by 400 metres since the 1980s, the researchers found, and will thin by about another kilometre by 2080 without major cuts in emissions. The changes have the potential to affect satellite operations, the GPS navigation system and radio communications.

The discovery is the latest to show the profound impact of humans on the planet. In April, scientists showed that the climate crisis had shifted the Earth's axis as the massive melting of glaciers redistributes weight around the globe.

The stratosphere extends from about 20km to 60km above the Earth's surface. Below is the troposphere, in which humans live, and here carbon dioxide heats and expands the air. This pushes up the lower boundary of the stratosphere. But, in addition, when CO₂ enters the stratosphere it actually cools the air, causing it to contract.

The shrinking stratosphere is a stark signal of the climate emergency and the planetary-scale influence that humanity now exerts, according to Juan Añel, at the University of Vigo, Ourense in Spain and part of the research team. "It is shocking," he said. "This proves we are messing with the atmosphere up to 60 kilometres."

Scientists already knew the troposphere was growing in height as carbon emissions rose and had hypothesised that the stratosphere was shrinking. But the new study is the first to demonstrate this and shows it has been contracting around the globe since at least the 1980s, when satellite data was first gathered.

The ozone layer that absorbs UV rays from the sun is in the stratosphere and researchers had thought ozone losses in recent decades could be to blame for the shrinking. Less ozone means less heating in the stratosphere. But the new research shows it is the rise of CO₂ that is behind the steady contraction of the stratosphere, not ozone levels, which started to rebound after the 1989 Montreal treaty banned CFCs.

The study, [published in the journal Environmental Research Letters](#), reached its conclusions using the small set of satellite observations taken since the 1980s in combination with multiple climate models, which included the complex chemical interactions that occur in the atmosphere.

"It may affect satellite trajectories, orbital life-times, and retrievals [...] the propagation of

radio waves, and eventually the overall performance of the Global Positioning System and other space-based navigational systems,” the researchers said.

Prof Paul Williams, at the University of Reading in the UK, who was not involved in the new research, said: “This study finds the first observational evidence of stratosphere contraction and shows that the cause is in fact our greenhouse gas emissions rather than ozone.”

“Some scientists have started calling the upper atmosphere the ‘ignorosphere’ because it is so poorly studied,” he said. “This new paper will strengthen the case for better observations of this distant but critically important part of the atmosphere.”

“It is remarkable that we are still discovering new aspects of climate change after decades of research,” said Williams, whose own research has shown that the climate crisis could triple the amount of severe turbulence experienced by air travellers. “It makes me wonder what other changes our emissions are inflicting on the atmosphere that we haven’t discovered yet.”

The dominance of humanity activities on the planet has led scientists to recommend the declaration of a [new geological epoch: the Anthropocene](#).

Among the suggested markers of the Anthropocene are the radioactive elements scattered by nuclear weapons tests in the 1950s and domestic chicken bones, thanks to the surge in poultry production after the second world war. Other scientists have suggested widespread plastic pollution as a marker of a plastic age, to follow the bronze and iron ages.

[The Guardian, 12 May 2021](#)

Read the publication >>> [Stratospheric contraction caused by increasing greenhouse gases](#) Author(s): Petr Pisoft et al



4. World Refrigeration Day announces theme of 2021 campaign

[“Cooling Champions: Cool Careers for a Better World”](#)

World Refrigeration Day celebrates the people and technologies responsible for creating and maintaining the world we live in, a world dependent upon temperature-controlled

environments. Centered around June 26, the event is supported globally by industry, professional groups, scientific and engineering associations, as well as by governments and individuals.

The WRD 21 campaign will focus on careers in the refrigeration, air-conditioning and heat pumps industry and is titled “[Cooling Champions: Cool Careers for a Better World](#)”. The goal of the campaign is to inspire students and young professionals – for both men and women – in all countries, encouraging them to meet the challenges faced in their communities.

Following successful campaigns in the last two years, the WRD Secretariat will continue partnering with UNEP OzonAction in the WRD 21 campaign to attract a new generation of Cooling Champions. The campaign includes other partners representing the industry and professionals around the world. The full list of partners and the campaign program will be announced in the coming weeks.

Refrigeration is at the very heart of modern life. More than 15 million people are employed worldwide in the refrigeration sector. The total number of refrigeration, air-conditioning and heat-pump systems in operation worldwide is around 5 billion. Those systems provide the conditions we require for health, comfort, worker productivity, manufacturing, and essential environments for food, pharmaceuticals, and digital data. Dedicated professionals design, build, maintain, and regulate them as well as educate a new generation of practitioners.

Opportunities within the industry abound for young people with a wide range of career aspirations. Advanced cooling technologies need to be implemented in order to expand life required environmental conditions while meeting sustainability requirements of international climate and ozone protection accords. A new generation of cooling champions – engineers, technicians, researchers, educators, policy experts and executives – are needed to create controlled environments modern live requires. The benefits of reaching into a wide diversity of communities for promising talent will be a high campaign priority.

To support the Cooling Champions Campaign contact: info@worldrefrigerationday.org

[World Refrigeration Day 26th June around the World](#)

Image: WRD



NORTH AMERICA

5. Phase Down of Hydrofluorocarbons Initiated by EPA

The American Innovation and Manufacturing (AIM) Act of 2020, which was included in the Consolidated Appropriations Act, 2021, provides EPA new authorities to address hydrochlorofluorocarbons (HFCs) in three main areas: phasing down the production and consumption of listed HFCs, maximizing reclamation and minimizing releases of these HFCs and their substitutes in equipment (e.g., refrigerators and air conditioners), and facilitating the transition to next-generation technologies by restricting the use of HFCs in particular sectors or subsectors. Under this third authority, EPA recently received five petitions from industry, states, and environmental organizations to address HFC use in refrigeration, air conditioning, and other applications.



The AIM Act's phasedown is consistent with the global phasedown of HFCs outlined in the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, an international agreement ratified by more than 115 countries.

EPA has proposed its first rule under the AIM Act to phase down the production and consumption of hydrofluorocarbons (HFCs), highly potent greenhouse gases commonly used in refrigerators, air conditioners, and many other applications. The AIM Act directs EPA to sharply reduce production and consumption of these harmful pollutants by using an allowance allocation and trading program. This phasedown will decrease the production and import of HFCs in the United States by 85% over the next 15 years. A global HFC phasedown is expected to avoid up to 0.5 °C of global warming by 2100.

"With this proposal, EPA is taking another significant step under President Biden's ambitious agenda to address the climate crisis," said EPA Administrator Michael S. Regan. "By phasing down HFCs, which can be hundreds to thousands of times more powerful than carbon dioxide at warming the planet, EPA is taking a major action to help keep global temperature rise in check. The phasedown of HFCs is also widely supported by the business community, as it will help promote American leadership in innovation and manufacturing of new climate-safe products. Put simply, this action is good for our planet and our economy."

"By phasing down hydrofluorocarbons (HFCs), which are powerful greenhouse gases, implementation of the AIM Act will create hundreds of thousands of good paying jobs that will combat climate change, said Sen. Thomas Carper (D-DE), Chairman of the Senate Environment and Public Works Committee. "In joining the rest of the world in reducing the use of HFCs, we will help avoid an increase of 0.5°C of global warming by the end of the century. Passing the AIM Act was a momentous climate achievement that will help save our planet, and today we are one step closer to its benefits being a reality."

“The AIM Act is one of the most significant environmental policy laws passed in recent years. This HFC allocation rule is key to achieving an orderly HFC phasedown in the United States, creating a uniform federal approach to this effort, and capturing significant projected environmental and economic benefits,” said Karen Meyers, Vice President of the Rheem Manufacturing Company, and Chairman of the Alliance for Responsible Atmospheric Policy. “Alliance member companies look forward to working with EPA on rapid completion of this first AIM Act rule, as well as moving to next generation compounds and user technologies and improving refrigerant management.”

“The U.S. Climate Alliance welcomes this next step from EPA to phase down highly potent HFCs across the country. National standards will ensure all communities have access to higher quality products, and that we are giving U.S. industry the best opportunity to innovate and lead the global transition to HFC alternatives,” said U.S. Climate Alliance Executive Director Julie Cerqueira. “Alliance states have been leading the charge in reducing HFC emissions in recent years and now have a strong federal partner in this push. It’s a win for jobs, a win for our economy and it will help us achieve our bold state and federal climate goals.”

The AIM Act is among the most significant environmental laws from the U.S. Congress in recent years – co-sponsored and passed with strong, bipartisan support. Backed by a broad coalition of industry and environmental groups, it provides regulatory certainty across the United States for phasing down HFCs and ushers in the use of more climate friendly and efficient alternatives that will save consumers money while improving the environment. American companies are at the forefront of developing HFC alternatives and the technologies that use them, and the AIM Act allows these companies to continue to lead and innovate internationally.

Phasing down HFCs in favor of environmentally safer alternatives and more energy-efficient cooling technologies is expected to save billions of dollars and better protect Americans’ health and the environment.

HFCs are extremely powerful greenhouse gases that accelerate climate change, which threatens society with costly health and environmental impacts such as floods, wildfires, drought, and increasingly severe weather events. EPA estimates that the present value of the cumulative benefits of this action is \$283.9 billion from 2022 through 2050, and that the proposal will yield cumulative compliance savings for industry. In 2036 alone, the year the final reduction step is made, this rule is expected to prevent the equivalent of 187 million metric tons of carbon dioxide (CO₂) emissions – roughly equal to the annual greenhouse gas emissions from one out of every seven vehicles registered in the United States. The total emission reductions of the proposal from 2022 to 2050 are projected to amount to the equivalent of 4.7 billion metric tons of CO₂ – nearly equal to three years of U.S. power sector emissions at 2019 levels.

EPA conducted an environmental justice analysis that determined overall reductions in greenhouse gas emissions from this rule would benefit populations that may be especially vulnerable to damages associated with climate change, such as the very young, elderly, poor, disabled, and indigenous populations. As the proposal moves forward, EPA will further consider the impacts on at-risk communities.

EPA's proposal would set the HFC production and consumption baseline levels from which reductions will be made, establish an initial methodology for allocating HFC allowances for 2022 and 2023, and create a robust, agile, and innovative compliance and enforcement system. EPA intends to use the approach established through this rulemaking to issue allowances for 2022 by October 1, 2021, and plans to revisit the approach for subsequent years in a later rulemaking. In addition to proposing to establish a general HFC allowance pool and a set aside pool (e.g., for new market entrants), the proposal outlines how EPA plans to issue allowances for specific applications listed in the AIM Act that the agency was directed to provide allowances for, such as mission-critical military applications.

This proposal is the first to provide an estimate of the social costs of HFCs, or the monetized benefits from a decrease in emissions of HFCs, corresponding reductions in global warming, and the avoided damages. In April, EPA finalized a rulemaking under the [Significant New Alternatives Policy \(SNAP\) program](#) that listed new refrigerant options for use in retail food refrigeration, residential and light commercial air conditioning, and heat pump equipment. These additional options have lower global warming potentials and provide additional flexibility for industry, supporting the transition to alternatives needed to meet the AIM Act's HFC phasedown reduction steps. [More information](#)

On April 22, as a part of the Paris Agreement, the United States pledged to reduce national greenhouse gas emissions by 50 to 52 percent below 2005 levels by 2030. Due to the significant reduction of highly potent HFCs, this proposed rulemaking is an important step toward meeting that commitment.

EPA will accept comments on this proposal for 45 days after publication in the Federal Register and hold a public hearing. The agency plans to finalize this rule later this year.

For more information on the rule and how to comment, click [here](#).

[Environmental Resource Center, 10 May 2021](#)

Image: US EPA logo

See also >>> Phasedown of HFCs: Establishing the Allowance Allocation and Trading Program under the AIM Act -

On April 30, 2021, EPA Administrator Michael Regan signed a Proposed Rule titled, "Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program under the American Innovation and Manufacturing Act." This proposed rule is the first regulation under the American Innovation and Manufacturing (AIM) Act of 2020 to address the production and consumption of hydrofluorocarbons (HFCs), which are potent greenhouse gases commonly used in refrigerators, air conditioners, and many other applications. This proposed rule would set the HFC production and consumption baseline levels from which reductions will be made, establish an initial methodology for allocating HFC allowances for 2022 and 2023, and create a robust, agile,

and innovative compliance and enforcement system. An advance copy of the proposed rule is available [here](#), which will be updated once the rule is published in the Federal Register.

To view the public docket, after the proposed rule is published in the Federal Register, visit www.regulations.gov and search for docket number EPA-HQ-OAR-2021-0044.

EUROPE & CENTRAL ASIA

6. Stakeholder conference on the review of the rules on fluorinated greenhouse gases

Fluorinated gases (or F-gases) are used in a range of industrial applications, but they have a particularly powerful warming effect when released into the atmosphere. The EU led the way by first legislating on F-gases in 2006. Thanks to strong measures, F-gas emissions in the EU have been falling since 2015.



As part of the European Green Deal, the EU has raised its climate ambition, and committed to net greenhouse gas emission reductions of at least 55% by 2030, and climate neutrality by 2050. To achieve this, the European Commission is in the process of reviewing all climate relevant rules, including those on F-gases.

The first Fit for 55 package is due to be adopted in summer 2021, and a review of the EU F-gas Regulation (EU) No 517/2014 will follow by the end of 2021. The Regulation is the main instrument for reducing emissions from fluorinated greenhouse gases in the EU. Besides its contribution to the EU targets and the goals of the Paris Agreement, the EU F-gas Regulation must also ensure compliance with the EU's obligation to reduce consumption and production of hydrofluorocarbons (HFCs) under the Montreal Protocol on substances that deplete the ozone layer.

Speaking ahead of a conference on the review, Deputy Director General for Climate Action, Clara de la Torre said, “*the question is not **whether** we need to do this, but **how** we can do it best,*” underlining the importance of a more ambitious EU action on F-gases. In addition to raising the level of ambition and ensuring long-term EU compliance with international rules, the review will also help ensure the rules are easier to enforce and coherent with other legislation.

Stakeholders will be informed about the [preliminary findings](#) of a study and the Commission will seek additional technical input to enhance the basis for the F-gas review. See the [agenda](#) for more details.

The Commission commissioned this study to support its work on an evaluation of the current Regulation and an impact assessment of the future rules. Its findings will show how well the Regulation works and how it could be improved, as well as analysing impacts of potential policy options that take into account the most recent technologies.

Indeed, since the current Regulation was written almost a decade ago, industry has made impressive progress on climate-friendly solutions in the areas where F-gases are used, e.g. in refrigeration, heat pumps and air-conditioning equipment.

The conference is fully booked with over 400 participants expected to attend.

[The European Commission, 6 May 2021](#)

Image: The European Commission website

7. One step forward, two steps back

A deep dive into the climate impact of modern fluorinated refrigerants

Executive summary and policy recommendations

Attempts have been made to reduce the negative environmental impacts of refrigerants by replacing old generations of F-gases with new ones. But replacing one synthetic refrigerant with another has not proved to be a sustainable solution. Even if new refrigerants have a low GWP, there exist a number of other climate impacts coming from their production and their degradation in the atmosphere. These impacts, however, are mostly ignored by policymakers. Information about the full impact of refrigerants is scarce, and the way it is presented is sometimes misleading.

In view of the revision of the EU F-Gas Regulation and the Industrial Emissions Directive, we urge the European Commission to take into account the following considerations and recommendations:

Briefing: One step forward, two steps back

A deep dive into the climate impact of modern fluorinated refrigerants

Brussels, May 2021

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- Specific measures and thresholds used in policies need to be adapted as our knowledge of GWP values of these gases develops. We believe that a continuous and dynamic review process is more adequate to consider the improvements in understanding atmospheric processes. In parallel, other time-scale references (a GWP over 20 years, instead of 100) would highlight the drastic global warming impacts of individual substances in a shorter timeframe and provide policymakers and the public with an accurate snapshot of the short-term climate benefit of fast action on HFCs¹.
- GWP values are always substance-specific threshold values. As a result, they do not give any information about the additional global warming impact (that can also be expressed in GWP values) that could result from degradation products. The definition of a lifecycle GWP that considers the manufacturing as well as the degradation impacts of refrigerants would give a better view of their real emissions and should be considered by policy measures or standards.
- The current transition from HFCs to HFOs and other low-GWP refrigerants will not maximise the benefits for the climate. Due to the HFC phase-down, companies are now at their decision-making momentum on whether to develop new cycles for new refrigerants or not. We therefore encourage the shift towards truly future-proof alternatives, such as natural refrigerants and, more particularly, hydrocarbons. They not only have a low-GWP, but also a very low manufacturing carbon footprint as shown in this briefing.
- Technically unavoidable losses [28] due to corrosion, fatigue and production errors, together with a foreseeable increase of HVACR systems will still result in continuous emissions – both directly from their release into the atmosphere and indirectly from their energy-intensive production and degradation products.
- Last but not least, information on lifecycle emissions of all refrigerants should be better tracked in order to overcome the scarcity of data which poses transparency issues and eventually hinders decision-making.

History has taught us that the shift to refrigerants that are better for the climate has never been done the right way. The new generation of fluorinated refrigerants is yet another example of a false solution that has proven unsustainable in the long term. It is now clear that policies and standards supporting low-GWP fluorinated refrigerants should only be transitional tools and contribute to the development of a high-scale usage of natural refrigerants. We must not repeat the mistakes of the past.

¹ Joint environmental NGOs position paper "Strengthening the F-Gas Regulation to Address Hydrofluorocarbons and Sulphur Hexafluoride", September 2020

[Environmental Coalition on Standards \(ECOS\), May 2021, Edited by: Rita Tedesco, and Carolina Koronen](#)

Image: ECOS website

See also >>> [Natural refrigerants needed for cutting emissions from fridges and air conditioners](#) - New briefing: Environmental Coalition on Standards (ECOS) : Fluorinated refrigerants (F-gases) are artificial gases that are mainly used in the refrigeration, heat pump and air conditioning sectors. Most of them have a significant global warming effect once they are emitted into the atmosphere, thousands of times worse and with a longer life than carbon dioxide. Our new briefing shows that there are more climate impacts associated with F-gases than the ones usually considered. [...]

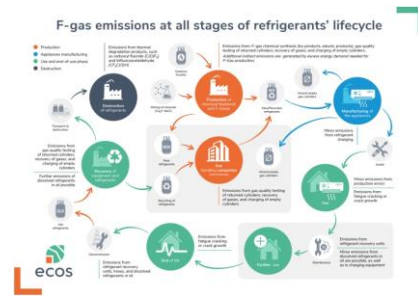


Image: ECOS website

8. Chemists close in on greener method for making fertilizer

Known as laughing gas, nitrous oxide is no laughing matter. The potent greenhouse gas emitted during the production of fertilizer is 300 times more harmful than carbon dioxide, forcing industrial factories all over the world to spend a lot of money and energy to dispose of the waste by-product.



But in a breakthrough that one day might enable farmers to produce their own fertilizer from recycled waste, University of Miami chemists Carl Hoff and Burjor Captain have shown for the first time that it's possible to convert nitrous oxide into potassium nitrate—a key component of the fertilizer needed to feed half the world's population.

"Right now, the process is slow. To get a 50 percent conversion takes 50 hours," said Hoff, a professor in the Department of Chemistry. "So, it is inefficient, and the yield is small. But we've shown that it can be done, and that is a big deal. Before, we had zilch. Now we have a solid that absorbs nitrous oxide and turns it into nitrate. So, we are taking something that you would pay money to get rid of and turning it into something that you would pay money to get."

Their breakthrough, for which they have applied for a patent, flips the century-old method of cleansing nitrous oxide (N₂O)—which is used in medicine for its anesthetic effects but threatens the ozone layer when emitted in industrial plants—on its head. Instead of using the tried-and-true method of removing the oxygen from nitrous oxide to turn it into nitrogen gas, the chemists piled the oxygen on, eventually producing potassium nitrate.

That result, which was surprising and unprecedented, raises the possibility that the chemists are closing in on a viable alternative to the process that German chemist and Nobel laureate Wilhelm Ostwald invented to neutralize ammonia and turn it into nitric acid, which is a nitrate. Patented in 1902, the high-temperature, high-pressure Ostwald process

continues to be used in tandem with the process another German chemist and Nobel laureate, Fritz Haber, developed to convert atmospheric nitrogen and hydrogen gas to ammonia. Their combined discoveries provide the ammonium nitrate fertilizer that has helped feed the world for more than a century.

But as Hoff and Captain noted, the Ostwald process is expensive, wasteful, and dirty. It produces nitric acid by burning half the ammonia produced in the Haber process—usually with coal—and leaves behind nitrous oxide, and two noxious gases, nitric oxide (NO) and nitrogen dioxide (NO₂), that contribute to acid rain. All three gases evolve any time ammonia is burned, but nitrous oxide is the most difficult to remove. [...]

the chemists began using lower temperatures, alkali salts, and a mechanical ball mixer—which beats compounds into more reactive nanoparticles by smashing a one-inch ball against the container 35 times a second.

The combination of those three changes would prove critical. On Jan. 16, Hoff, Captain, and graduate students Jack Davis and Oswaldo Guio confirmed that, after about six hours in the ball mixer, different salt mixtures and reaction conditions were able to trap and bind the nitrous oxide gas. That was a major breakthrough. But there was an even bigger surprise: as the mechanical pounding continued, it produced potassium nitrate—something that no one had reported producing directly from nitrous oxide gas before.

“What we did is to take nitrous oxide, or N₂O, which is a greenhouse gas, and convert it to something useful—which is nitrate,” said Captain, an associate professor in the Department of Chemistry. “And once you have nitrate, particularly potassium nitrate, you are home free because, as many gardeners know, potassium nitrate is a great fertilizer and can be mixed with compost or other materials. That’s why fertilizers are often ranked on their N, P, K—nitrogen, phosphorous, and potassium—values.”

Now that the chemists know it is possible to convert nitrous oxide into a nitrate using low temperatures and low pressure, they are working on developing ways to speed up the process. Figuring out how to increase the yield for industrial use will fall to engineers. But Hoff already can envision the day that farmers across the heartland will use their grain windmills to produce their own fertilizer.

“The method we are working on now to trap gases in a solid matrix uses mechanical energy, so it can be adapted to windmill energy,” Hoff said. “With a modern adaptation, the chemical reactions needed to make the fertilizer could be done right there on the farm, using energy from the windmills that farmers have used for centuries to grind grain. They could, in essence, create their own fertilizer from salt mixtures and waste gas from the combustion of ammonia that powers farm equipment.”

[The University of Miami, 11 May 2021, By: Maya Bell](#)

Image: From left, chemists Jack Davis, Carl Hoff, Oswaldo Guio, and Burjor Captain used a mixer mill to test ways to trap and convert nitrogen oxides into agricultural fertilizer. Photo: Evan Garcia/University of Miami

9. Green Cooling Summit 2021: Germany opts for a rapid HFC phase-down

International online conference on political and technical approaches to manage the HFC phase-down under the Kigali Amendment with natural refrigerants.

The German Environment Agency (UBA), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) will jointly host a fully virtual conference from May 25 – 27. The '**Green Cooling Summit**' addresses how the phase-down of hydrofluorocarbons (HFCs) according to the Kigali Amendment of the Montreal Protocol can best be implemented and accelerated politically and technically through the use of natural refrigerants and improved energy efficiency.

The German Federal Environment Minister Svenja Schulze, the President of the German Environment Agency Dirk Messner and GIZ Chair of the Management Board Tanja Gönner cordially invite you to participate and to jointly advance Green Cooling worldwide!

[Watch the invitation video >>>](#)



Participants shall be encouraged to perceive the requirements of the Kigali Amendment as an opportunity to make an active contribution to climate protection at an early stage. The insights and best practices presented at this conference will provide a solid basis for a critical rethink of current cooling practices.

[The Green Cooling Initiative, 11 May 2021](#)

FEATURED

Overview for the meetings of the ozone treaties in 2021

- **4th ExMOP** - Online meeting | 21 May 2021
- **43rd OEWG** - Online meetings | 22 May - 17 Jul 2021
(Replenishment: 22 & 24 May, CFC-11: 14 & 15 Jul, Energy Efficiency: 16 & 17 Jul)
- **66th IMPCOM** - Online meeting | 12 - 13 Jul 2021
- **11th ORM (part II)** - Online meeting | 19 - 23 Jul 2021
- **67th IMPCOM** - Nairobi, Kenya (tentative) | 23 Oct 2021
- **12th COP (part I) – 32nd MOP Bureau** - Nairobi, Kenya (tentative) | 24 Oct 2021
- **12th COP (part II) – 33rd MOP** - Nairobi, Kenya (tentative) | 25 - 29 Oct 2021

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

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](#)

- Click [here](#) for the Executive Committee upcoming and past Meetings and related documents..
- [Executive Committee Primer – 2020](#) - An introduction to the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol.



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

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.

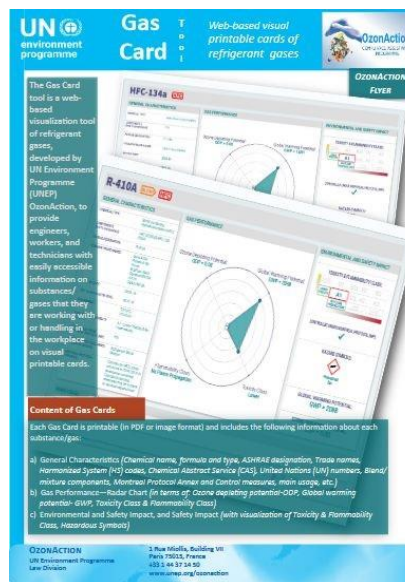
Content of Gas Cards - Each Gas Card is printable (in PDF or image format) and includes the following information about each substance/gas: a) General Characteristics (Chemical name, formula and type, ASHRAE designation, Trade names, Harmonized System (HS) codes, Chemical Abstract Service (CAS), United 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).

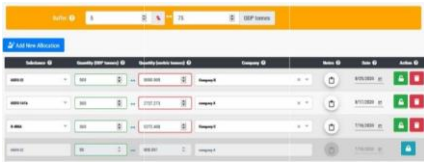
More Information - The Gas Card web based tool is part of UNEP OzonAction's portfolio of activities and tools to assist various stakeholders in developing countries, including customs officers and technicians, to achieve and maintain compliance with the Montreal Protocol on Substances that Deplete the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

- The Gas Card 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)



[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 CO₂-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, CO₂-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 CO₂-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 CO₂-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 CO₂-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, CO₂- 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 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



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](#)

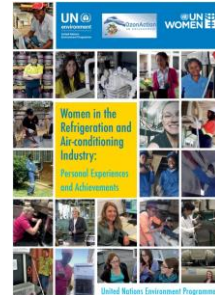
Collaboration between China and Thailand using OzonAction's informal Prior Informed Consent (iPIC) system has resulted in the prevention of a huge consignment of ozone-depleting and climate damaging hydrochlorofluoro-carbons (HCFCs).



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](#)

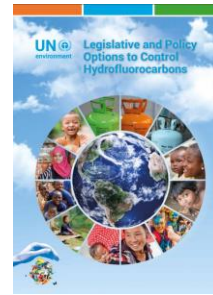
PUBLICATIONS

[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. 448 - 2021](#)
(in Italian).



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



[Solar Cooling \(2020\), 40th Informatory Note on Refrigeration Technologies. Summary](#)

Solar cooling is a promising and environmentally friendly technology that can help meet the growing global demand for space cooling. Solar cooling can be achieved by various technologies. The two main commercial options are photovoltaic (PV)-driven vapour compression chillers and heat-driven cooling machines powered by solar collectors. Thermal cooling equipment can be coupled with various types of solar collectors with different efficiencies and costs. Overall system efficiencies of PV-driven and solar thermal-driven plants may not have such different values. Economic analysis indicates that the investment cost for the PV solution is at least half that of other systems. Solar cooling may have a very positive environmental impact by reducing the use of fossil fuels, and the technology may be considered mature to compete with conventional cooling equipment.



** This Informatory Note is an update of a previous version published in April 2017. It was prepared by Renato Lazzarin (President of IIR Section E).*

A Summary for policy makers - Solar Cooling 2020 is [available](#) in English and French languages.

[International Institute of Refrigeration, March 2021](#)

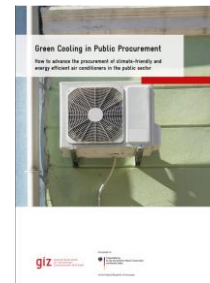
[Leaks, maintenance and emissions: Refrigeration and air conditioning equipment report](#) details common faults identified in both residential and commercial refrigeration and air conditioning equipment. The report also lists the impacts of these faults and how routine maintenance of the equipment has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

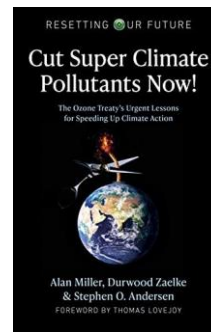


[Australian Government, Department of Agriculture, Water and the Environment, Expert Group, 2021](#)

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.

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 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 Programme, OzonAction

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

R744.
CO₂ COOLING MARKETPLACE

R744.com

Originally established in 2006, the new and improved [R744.com](#) offers a trusted source for the latest CO₂ products, services and news from around the world with a key feature being the new marketplace. In addition to the latest CO₂ news and information about the site's partners, the revamped R744.com includes a store where users can browse all available products, and filter for a wide variety of criteria, including components and services. It is also

possible to narrow your search to include only products available in your home region, making it easier to find the best local options. The site covers all CO₂ applications, from air-conditioning and refrigeration to heat pumps, mobile AC and beyond... "This website will become a key tool for end users to empower and educate themselves around the best available CO₂ products and services on the market,"... In the road map for developing the R744 CO₂ cooling marketplace, shecco has a number of key elements in store for the

coming months. In May, they will launch a revolutionary new feature for the products on R744.com where users will be able to submit comments and reviews, comparing products by ranking and rating them. This proposed user-friendly yet quality-assured ranking, rating, and review system for products is something only an independent marketplace can do. [Watch this space!](#)



Click [here](#) to access recent OzoNews Issues [Request a PDF](#) of the current issue

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The views expressed in articles written by external authors are solely the viewpoints of those authors and do not represent the policy or viewpoint of UNEP. While UNEP strives to avoid inclusion of misleading or inaccurate information, it is ultimately the responsibility of the reader to evaluate the accuracy of any news article in OzoNews. The citing of commercial technologies, products or services does not constitute endorsement of those items by UNEP.

If you have questions or comments regarding any news item, please contact directly the source indicated at the bottom of each article.

Prepared by: Samira Korban-de Gobert
Reviewed by: Ezra Clark

If you wish to submit articles, invite new subscribers, please contact:
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